

Macroeconomics Theory and Analysis II

DEECO530

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Unit 01: The Classical System

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Keywords

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Objectives

- Analyse the features of Classical System
- Identify the various components of Classical System
- Analyse the equilibrium output and employment under the classical model

Introduction

The study of Macroeconomics started in the lead 1930s when the problem of Great Depression became a global issue and all over the world all the economies got affected by it. This is when in Keynesian economics emerged when Keynes laid the foundation of macroeconomics based on the criticism of the classical school of thought. The products of this studies with the theories regarding business cycles and the policy prescriptions for stabilising the economy. Klein's was of the firm view that alleges for economy could not solve all the problems that had emerged in the post First World War era. He brought about a revolution which is popularly known as Canadian revolution which was basically against the tenets of a classical school of thought. as macroeconomics is based on the classical thought and the classical system it is very necessary to have a clear understanding of this school of thought. This chapter looks at the various features of the classical system, identifies the components of the system and also analyse the equilibrium output and employment as given by the classical model.

The epoch of the classical school is the period dominated by the work of Adam Smith, David Ricardo and John Stuart Mill. However, Keynes referred to all the economists before 1936 as classical economics which is not correct as per the traditional classification of economic thought. The period after the work of Mill is known as the neo-classical school of thought which was dominated by Alfred Marshall and AC Pigou.

1.1 Classical Revolution

Before the classical school of thought emerged, there was bullionism and mercantilism. The classical economics emerged as a revolution against the body of mercantilism. Mercantilism was a period when the nation state emerged in Europe and it was during the 16th and the 17th century. The two basic features or tenets on which the mercantilism thought was based were

1. bullionism a believe that the wealth and power of a nation were determined by its stock of precious metals and
2. the belief in the need for state action to direct the development of the capitalist system.

The main objective of the countries under bullionism was to amass gold by increasing exports and creating a surplus the role of the state was necessary to further the cause of the developing capitalist system. Foreign trade was regulated, and the export of bullion was prohibited. protectionism was practiced so as to nurture the domestic trade.

"In opposition to these palpable absurdities it was triumphantly established by political economists that consumption never needs encouragement." J S Mill

The classical economists on the other hand emphasised on the importance of the real factors to determine the wealth of nations. they advocated less fare economy where the intervention of the state was minimal. The other basic premise of classical school of thought was full employment. It was assumed that all the factors of production were fully employed. Money played the role of means of

exchange. It was not a part of the analysis of the real problems of the economy. Money had no intrinsic value and was important only for the goods that it helps to buy. Mercantilists believed that money helped to spur economic activity. Classical economists did not believe this even in the short run. The classical attack on the mercantilist view of the need for state action to regulate the capitalist system also had implications for short-run macroeconomic analysis. One role for state action in the mercantilist view was to ensure that markets

existed for all goods produced. Consumption, both domestic and foreign, must be encouraged to the extent that production advanced.

1.2 Production

A central relationship in the classical model is the aggregate production function. The production function, which is based on the technology of individual firms, is a relationship between the level of output and the level of factor inputs. For each level of inputs, the production function shows the resulting level of output and is written as

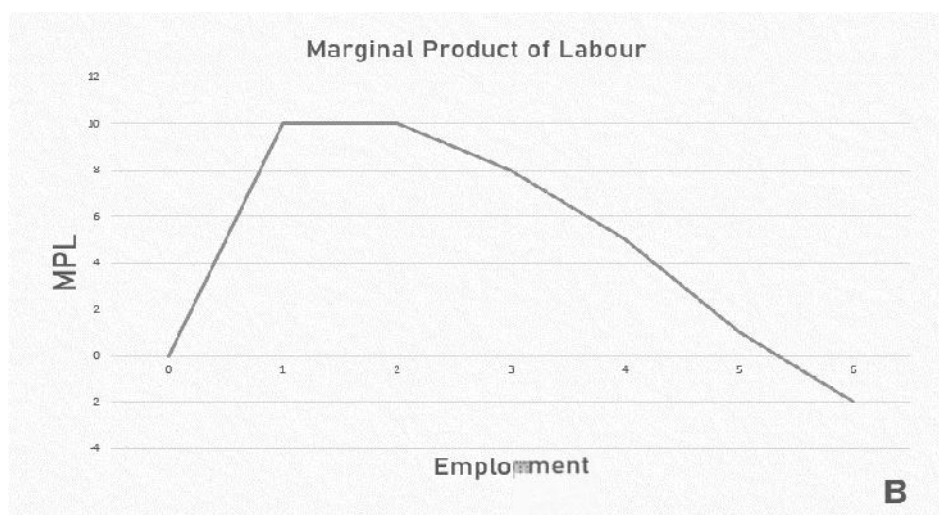
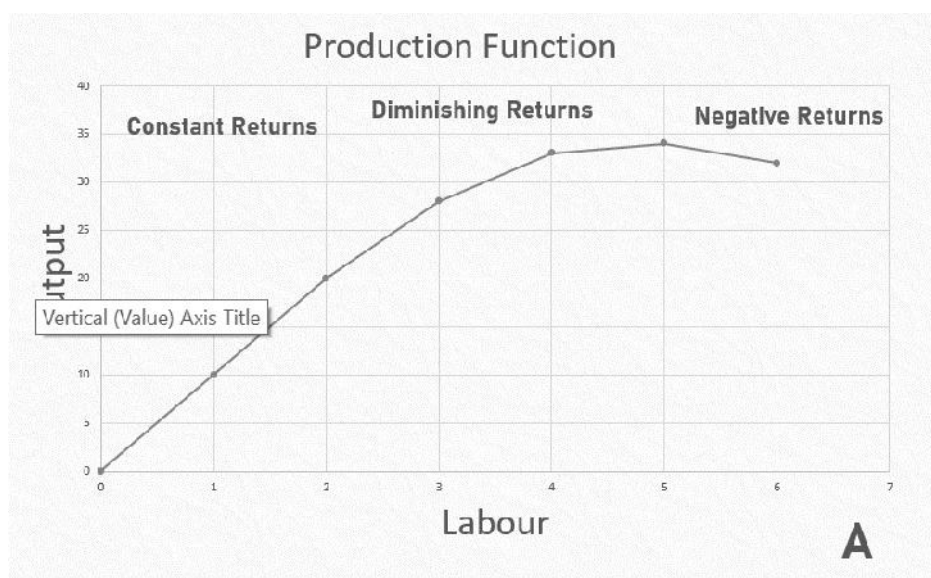
$$Y = f(\bar{K}, N)$$

where Y is output, \bar{K} is the stock of capital (plant and equipment), and N is the quantity of the homogeneous labour input. For the short run, the stock of capital is assumed to be fixed, as indicated by the bar over the symbol for capital. The state of technology and the population are also assumed to be constant over the period considered. For this short-run period, output varies solely with variations in the labour input (N) drawn from the fixed population.

Table 1.1 Relationship between Output and Labour

	N-Labour	Y=Output	$\Delta Y/\Delta N = MPL$	
A	0	0	0	Constant returns
B	1	10	10	
C	2	20	10	Diminishing returns
D	3	28	8	
E	4	33	5	
F	5	34	1	
G	6	32	-2	Negative returns

Fig. 1.1 Production Function and Marginal Product of Labour Curve



In Figure 1.1A, the production function, $Y = F(K, N)$, indicates the output that would be produced by the efficient utilization of each level of labour input. As drawn, the production function has several characteristics. At low levels of labour input, the function is a straight line. The slope of the line gives the increase in output for a given increment in labour input, so this straight-line (constant-slope) portion of the production function exhibits constant returns to scale. For very low levels of labour utilization, it might be presumed that additional workers could be applied to a given amount of plant and equipment without a fall in the productivity of the last worker hired. For the most part, however, we consider situations where adding additional labour will result in increased total output, but where the size of the increases to output declines as more labour is employed. This portion of the production function exhibits diminishing returns to scale. Negative returns to scale occur when additional labour input results in decreased total output. Firms would not operate on this portion of the production function because hiring additional labor results in a decrease in total output.

In Figure 1.1 B, we plot the change in output given a change in labor input. This is the marginal product of labor (MPN). The MPN is the slope of the production function ($\Delta Y / \Delta N$) in Figure 1.1 B. In the range of constant returns to scale, as N increases, the slope of the line is flat. As more workers are hired, however, the slope becomes negative, indicating that although the marginal product of each worker hired is positive, it is less than the marginal product of the previous worker. This area represents diminishing returns to scale. The marginal product of the additional worker is below the horizontal axis in the area of negative returns to scale. The short-run production function plotted in Figure 1.1 A is a technological relationship that determines the level of output given the level of labor input (employment). The capital stock, along with the existing level of technology and skill level of the workforce, is being held constant. Classical economists assumed that the quantity of labor employed would be determined by the forces of demand and supply in the labor market.

1.3 Employment

The assumptions regarding employment are the following:

1. Market works well
2. Firms and individual workers optimize
3. Perfect information about relevant prices
4. No barriers to adjustment of money wages

Labor Demand

The purchasers of labor services are firms. To see how the aggregate demand for labor is determined, we begin by considering the demand for labor on the part of an individual firm, denoted the i th firm. In the classical model, firms are perfect competitors that choose their output to maximize profits. In the short run, output is varied solely by changing the labor input so that choice of the level of output and quantity of the labor input are one decision. The perfectly competitive firm will increase output until the marginal cost of producing a unit of output is equal to the marginal revenue received from its sale. For the perfectly competitive firm, marginal revenue is equal to product price (P). Because labor is the only variable factor of production, the marginal cost of each additional unit of output is the marginal labor cost. Marginal labor cost equals the money wage divided by the number of units of output produced by the additional unit of labor. We defined the units of output produced by the incremental unit of labor employed as the MPN. Thus, marginal cost for the i th firm (MC_i) is equal to the money wage (W) divided by the marginal product of labor for that firm (MPN_i).

$$MC = W / MPL \quad (1)$$

The condition for short-run profit maximization in the perfectly competitive market is

$$P = [MC]_i \quad (2)$$

Substituting the values of MC from the first equation, we get

$$P = W / MPL \quad (3)$$

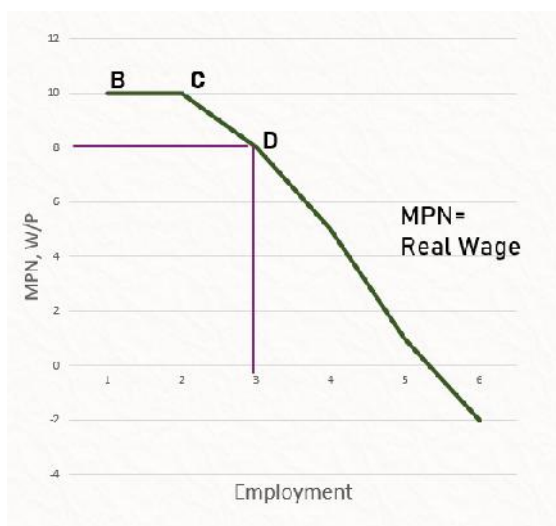
By multiplying both the sides of equation 3 by MPL and dividing both sides by P, we get

$$MPL = W / P \quad (4)$$

The profit maximization condition in equation (4) can be explained as follows: The firm will hire up to the point where the additional output obtained by hiring one more worker (MPN) is just equal to the real wage ($W > P$) paid to hire that worker.

The condition for profit maximization in equation (4) is illustrated in Figure 1.2. The demand for labor schedule for the firm, plotted against the real wage, is the MPN schedule from Figure 1.1. The labor demand curve is downward-sloping due to the law of diminishing returns. At a real wage such as 8.0 (e.g., a money wage of \$8 and a product price of \$1), the firm will hire 3 workers. At a quantity of labor below 3, say 2, the MPN (10) exceeds the real wage (8.0). The payment to the worker in real terms is less than the real product produced. Profits will be increased by hiring additional units of labor. Alternatively, at quantities of labor input above 3, if the real wage is 8, the real wage is above the MPN. The payment to labor exceeds the real product of the marginal worker, and marginal cost exceeds product price. The firm will reduce labor to increase profit. Thus, the profit-maximizing quantity of labor demanded by a firm at each real wage is given by the labor input that equates the real wage and the MPN. The marginal product curve is the firm's demand curve for labor. The labor demand curve is downward sloping due to the law of diminishing returns. The higher the real wage, for example, the lower the level of labor input that will equate the real wage to the MPN. In Figure 1.2, if the wage were 5, instead of 8, labor demand would be 4 instead of 3. The demand curve for labor is an economywide aggregation of the individual firms' demand curves. For each real wage, this curve will give the sum of the quantities of labor input demanded by the firms in the economy.

Fig. 1.2 Labour Demand of a Firm



We write this aggregate labor demand function (N^d) as

$$N^d = g\left(\frac{W}{P}\right) \quad (5)$$

(-)

where in the aggregate, as with individual firms, an increase in the real wage lowers the demand for labor.

Labour Supply

The last relationship necessary for determining employment and output in the classical system is the labor supply curve. Labor services are supplied by individual workers. Classical economists assumed that the individual attempts to maximize utility (or satisfaction). The level of utility depends positively on both real income, which gives the individual command over goods and services, and leisure. There is, however, a trade-off between the two goals because income is increased by work, which reduces available leisure time. Consider, for example, how individual j allocates one 24-hour period between leisure hours and hours worked: (N_j^s) is the individual's supply of labor. Figure 1.3 illustrates the choice facing the individual. On the horizontal axis, we measure hours of leisure per day. The maximum, of course, is 24 hours. The horizontal intercept, where the individual chooses no labor and all leisure, is 24. The number of hours worked are, therefore, 24 minus the number of hours of leisure selected. Real income is measured on the vertical axis and is equal to the real wage, $W > P$, multiplied by the number of hours the individual works. Each vertical intercept is the real wage multiplied by 24 hours in the day, which would occur if the individual chose all labor and zero leisure – i.e., ($W > P \# 24$). The curved lines in the graph (labeled U_1, U_2, U_3) are indifference curves. Points along one of these curves are combinations of income and leisure that give equal satisfaction to the individual; hence, the person is indifferent about which point along a given curve is selected. The slope of the indifference curve gives the rate at which the individual is willing to trade off leisure for income – that is, the increase in income the person would have to receive to be just as well off after giving up a unit of leisure. In fact, the cost of choosing each hour of leisure is the real wage, $W > P$, because the individual is choosing not to work for each hour of leisure. In addition, all points along U_2 , for example, yield greater satisfaction to the individual than any point on U_1 because any point on an indifference curve that sits farther to the right indicates a larger income, given leisure (or the same number of hours worked). Therefore, the individual attempts to achieve the “northernmost” possible indifference curve. The higher the real wage, the higher the satisfaction the individual can select (represented by an indifference curve that sits farther to the right). The straight-line rays originating at the point of 24 hours on the horizontal axis give the budget lines facing the individual. Starting from 24 hours (no work, all leisure), the individual can trade off leisure for income at a rate equal to the hourly real wage, $W > P$. The slope of the budget line is the real wage. The higher the real wage, the steeper the budget line, reflecting the fact that at a higher real wage, an individual who increases hours of work by 1 unit (moves one unit to the left along the horizontal axis) will receive a larger increment of income (move farther up the vertical axis along the budget line) than he or she would have

received at the lower real wage. Three budget lines, corresponding to real wage rates of 2.0, 3.0, and 4.0, are shown in Figure 1.3A . Notice that at a higher real wage, the individual can choose an indifference curve that yields greater satisfaction.

Fig.1.3 A. Income Leisure Trade Off

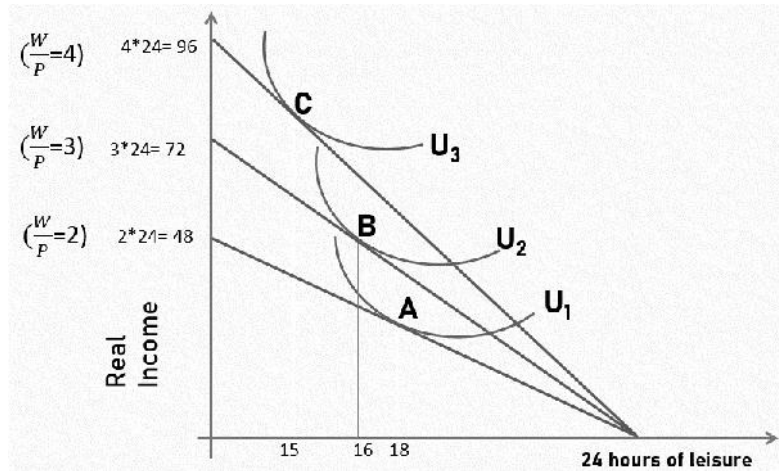
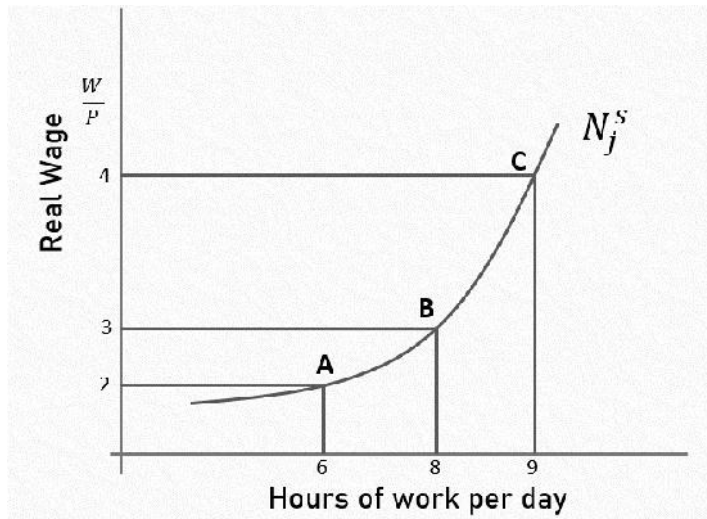


Fig. 1.3 B Labour Supply Curve



In Figure 1.3B, we construct the labor supply curve for the j^{th} individual. This supply curve consists of points such as A, B, and C from Figure 1.3A, giving the amount of labor the individual will supply at each real wage. This aggregate labor supply curve can be written as

$$N^s = g\left(\frac{W}{P}\right) \quad (6)$$

(+)

Two features of the classical labor supply theory require further comment. First, note that the wage variable is the real wage. Labor supply is determined by the real wage, not the money wage. The worker receives utility ultimately from consumption, and in making the labor-leisure decision, the individual is concerned with the command over goods and services received for a unit of labor. For example, starting at point C on the income-leisure trade-off graph, if the money wage is \$4 and the price is 1.0, the real wage is 4.0 (4/1) and the individual will choose 15 hours of leisure and work 9 hours (point C on the labor supply curve). If the money wage is still \$4, but the price is now 2.0, the individual's real wage is 2.0 (4/2). The individual will now select point A on the income-leisure trade-off graph, choosing 18 hours of leisure. Hours of work decrease to 6 (24 - 18), which is point A on the labor supply curve. Clearly, as the real wage increases (decreases), leisure decreases (increases), and hours of work increase (decrease). This is the significance of equation (3.6). Because the real wage ($W > P$) is measured along the vertical axis on the labor supply curve, if either the money wage or price (or both) change, the number of hours worked are determined by moving along the labor supply curve.

Second, by the construction of Figure 1.3, the labor supply curve is positively sloped; more labor is assumed to be supplied at higher real wage rates. This relation reflects the fact that a higher real wage rate means a higher price for leisure in terms of foregone income. At this higher price, we assume that the worker will choose less leisure. This effect is analogous to the substitution effect in the theory of consumer demand. There is another effect: the equivalent of the income effect in consumer demand theory. As the real wage increases, the worker is able to achieve a higher level of real income. At higher levels of real income, leisure may become more desirable relative to further increments in income. With successive increases in the real wage, a point may be reached at which the worker chooses to supply less labor as the real wage increases and consumes more leisure. At this point, the income effect outweighs the substitution effect; the labor supply curve assumes a negative slope and bends back toward the vertical axis. Almost certainly, at extremely high wage rates, we would reach a backward-bending portion of the labor supply curve, and perhaps wage rates need not be so "extremely" high. Although the empirical evidence on this question is inconclusive, we will assume that for wage rates observed in industrialized nations, the aggregate labor supply curve does have a positive slope; the substitution effect outweighs the income effect.

1.4 Equilibrium Output and Employment

In the previous sections the following relationships have been established.

$$Y = F(\bar{K}, N) \quad (1)$$

$$N^d = f\left(\frac{W}{P}\right) \quad (4)$$

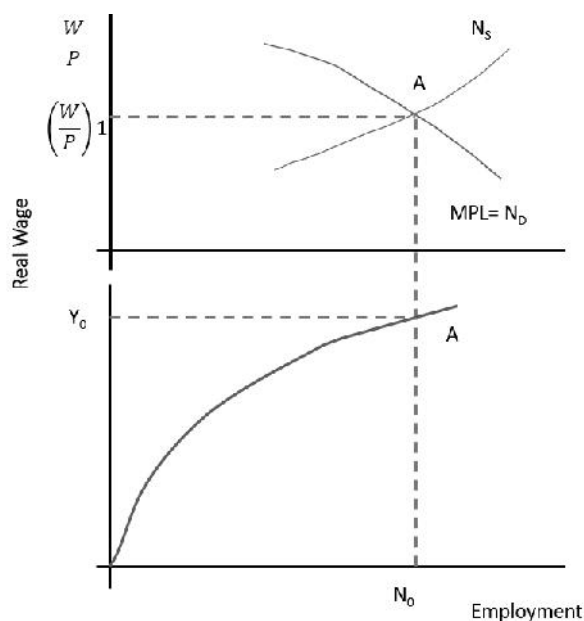
$$N^s = g\left(\frac{W}{P}\right) \quad (5)$$

For equilibrium

$$N^d = N^s \quad (7)$$

These relationships, together with the equilibrium condition for the labor market, determine output, employment, and the real wage. In common terminology, output, employment, and the real wage are designated as the endogenous variables in the model to this point, where an endogenous variable is one that is determined within the model. Equilibrium within the classical model is illustrated in Figure 1.4. Graph A shows the determination of the equilibrium levels of employment (N_0) and the real wage $(\frac{W}{P})_0$ at the point of intersection between the aggregate labor demand and labor supply curves. This equilibrium level of labor input (N_0) results in an equilibrium level of output (Y_0) given by the production function, as shown in Figure 1.4 B.

Fig. 1.4 A and 1.4 B Classical Employment and Output Theory



The Determinants of Output and Employment

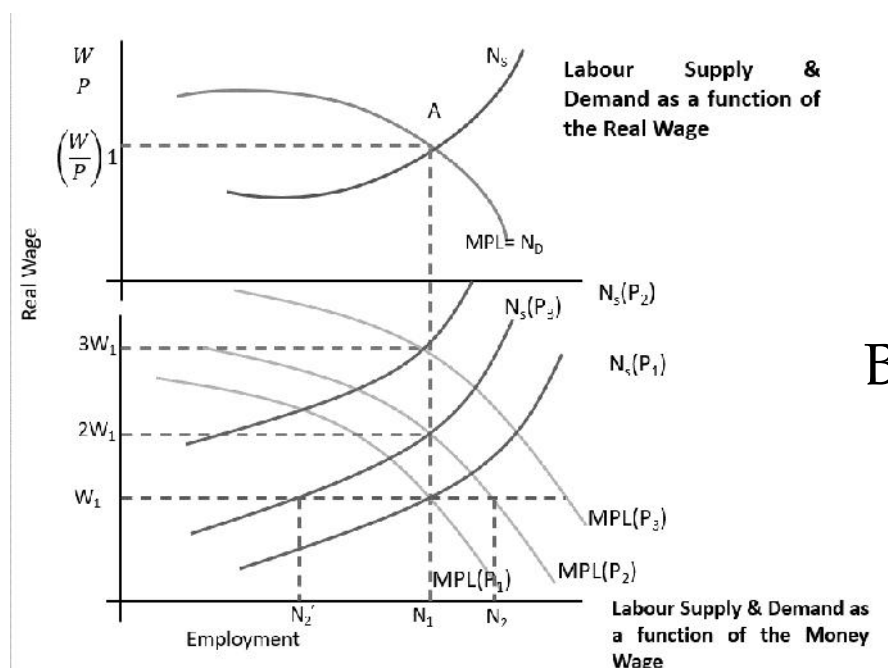
We now consider which factors are the ultimate determinants of output and employment in the classical theory. What are the exogenous variables that, when changed, in turn cause changes in output and employment, where exogenous variables are those determined outside the model? In the classical model, the factors that determine output and employment are those factors that determine the positions of the labor supply and demand curves and the position of the aggregate production function. The production function is shifted by technical change that alters the amount of output forthcoming for given input levels. As graphed in Figure 1.4 B, the production function also shifts as the capital stock changes over time. The labor demand curve is the MPN curve, the slope of the production function. Consequently, the position of the labor demand curve will shift if the productivity of labor changes because of technical change or capital formation. From the derivation of the labor supply curve, one can see that this relationship would change as the size of the labor force changes. Population growth would, for example, shift the labor supply curve out to the right. The labor supply curve would also shift with changes in individuals' preferences regarding labor-leisure trade-offs (i.e., U_1, U_2, U_3 in Figure 1.3 A). A common feature of the factors determining output in the classical model is that all are variables affecting the supply side of the market for output—the amount firms choose to produce. In the classical model, the levels of output and employment are determined solely by supply factors. Because the supply-determined nature of output and employment is a crucial feature of the classical system, it is worthwhile to demonstrate this property more formally. To do so, we further consider the properties of the labor supply and demand functions just discussed. Figure 1.5 A reproduces the aggregate supply and demand curves for labor. Figure 1.5 B plots labor supply and labor demand as functions of the money wage (W). We first consider the form of each of the latter relationships. For labor supply, we can draw a positively sloped curve such as $N^s(P_1)$, which gives the amount of labor supplied for each value of the money wage, given that the price level is P_1 . The curve is upward sloping because at the given price level a higher money wage is a higher real wage. Workers are interested in the real wage, so each price level will have a different curve. For a given money wage each price level will mean a different real wage and, hence, a different amount of labor supplied. At a price level of $2P_1$, or twice that of P_1 , the labor supply curve in Figure 1.5 B shifts to $N^s(2P_1)$; less labor is supplied for any money wage because at the higher price level a given money wage corresponds to a lower real wage. A rise in the price level shifts the labor supply schedule (plotted against the money wage) upward to the left. That the individual worker is interested only in the real wage can be seen from the fact that the same level of labor (N_1) is supplied at a money wage of W_1 and a price level of P_1 (real wage W_1/P_1), as at money wage and price combinations of $2W_1, 2P_1$ or $3W_1, 3P_1$ (real wage = W_1/P_1 at both points). Equi-proportional increases (or decreases) in both money wages and the price level leave the quantity of labor supplied unchanged. Now consider the labor demand curve plotted against the money wage, where in Figure 3-5 we use the fact that the labor demand [$f(W/P)$] and MPN schedules are equivalent. Recall that the condition met at all points along the labor demand curve is

$$\frac{W}{P} = MP$$

Fig. 1.5 Labour Market Equilibrium and Money Wage

(8)

A



If we want to know the quantity of labor that will be demanded at any money wage, as was the case for the quantity supplied, the answer depends on the price level. Given the money wage, the firm will choose the level of employment at which

$$W = MP \cdot P \quad (9)$$

At successively higher price levels ($P_1, 2P_1, 3P_1$) the labor demand curve plotted against the money wage shifts to the right (from MPN # P_1 to MPN # $2P_1$ to MPN # $3P_1$). For a given money wage, more labor is demanded at higher price levels because that money wage corresponds to a lower real wage rate. The demand for labor depends on the real wage. Equi-proportional increases in the money wage and the price level from (W_1, P_1) to $(2W_1, 2P_1)$ and $(3W_1, 3P_1)$ leave labor demand unchanged at level N_1 . They leave the real wage unchanged at W_1/P_1 , which corresponds to the demand N_1 in Figure 1.5 A. The information in Figure 1.5 is useful in constructing the classical aggregate supply function – a relationship that makes clear the supply-determined nature of output in the classical model. The aggregate supply curve is the macroeconomic analog to the microeconomic concept of the firm's supply curve. For the firm, the supply curve gives the output forthcoming at each level of the product price. For the perfectly competitive firm, profits are maximized, as we have seen, where marginal cost ($W > MPN_i$ for the i^{th} firm) equals product price (P), or equivalently, where

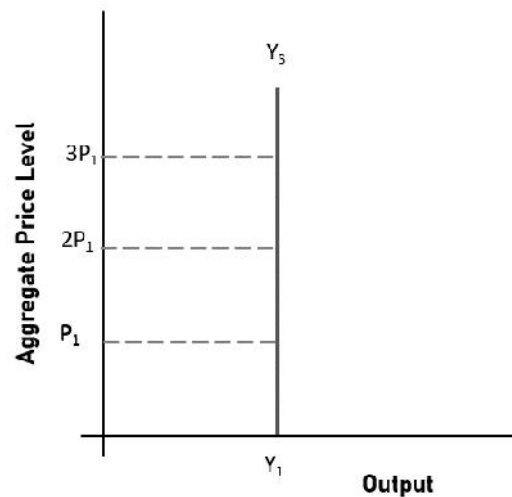
$$MPN_i = \frac{W}{P} \quad (10)$$

the marginal product equals the real wage. The individual firm takes the money wage as given in deciding on the optimal output to supply and therefore the quantity of labor to hire. One firm would not expect its effort to hire more labor to cause the money wage to change because the firm is a small part of the overall market. Because the money wage is assumed to be fixed, the output supply curve for the firm is positively sloped. Higher prices mean lower real wages; consequently, the firm demands more labor and produces more output. In constructing the aggregate supply curve for the economy, we cannot assume that the money wage remains fixed as output and labor input are varied. The money wage must adjust to maintain equilibrium in the labor market. With this important difference, the aggregate supply curve addresses the same question as its microeconomic analog: How will the level of output supplied vary when we change the product price?

In Figure 1.6 we construct the classical aggregate supply function. Consider output supplied at the three successively higher price levels, $P_1, 2P_1$, and $3P_1$, which were plotted in Figure 1.5. At price level P_1 and money wage W_1 , employment was N_1 and we assume that the resulting output is Y_1 , as shown in Figure 1.6. How will output supplied vary as we go to a price level of $2P_1$? At a price level of $2P_1$, if the money wage remained at W_1 , we can see from Figure 3-5 B that labor demand would increase to N_2 . The higher price would mean a lower real wage, and firms would try to

expand both employment and output. The money wage will not, however, remain at W_1 . At a price level of $2P_1$ the labor supply curve in Figure 1.5B will have shifted to $N_s(2P_1)$, and at a money wage of W_1 , labor supply will be only N_2 units. There will be an excess demand for labor equal to $(N_2 - N_1)$ units and the money wage will rise.

Fig. 1.6 Aggregate Supply Curve



The process at work here is one of some firms responding to higher prices by attempting to expand employment and production. To expand employment, they raise money wages in an effort to bid workers away from other firms. Firms that lag in the process of raising money wages suffer higher quit rates and lose workers. This process of rising money wages will stop only when the money wage has increased sufficiently to re-equilibrate supply and demand in the labor market. As can be seen in Figure 1.5B, re-equilibration occurs at a money wage of $2W_1$, where the money wage has increased proportionately with the price level. At this point, the initial real wage is restored, and employment is back at its original level. Consequently, output supplied at price level $2P_1$ is equal to Y_1 , the output level for price level P_1 . At a still higher price level of $3P_1$, the money wage rises to $3W_1$, but again, output is unchanged at Y_1 . The aggregate supply curve is vertical. Higher prices provide a spur to output only if they are not matched by proportionately higher money wages — only if they lower the real wage. Given the assumptions we have made, however, equilibrium in the labor market requires that money wages rise proportionately with prices to maintain the equilibrium real wage in that market. The vertical aggregate supply curve illustrates the supply-determined nature of output in the classical model. For output to be in equilibrium, we must be on the supply curve; output must be at Y_1 .

Summary

The classical model is based on supply side analysis. It considers full employment equilibrium all the time. Real wages are considered and not the money wages. This model was a reaction to monetarism, and it advocated free trade or popularly known as *laissez faire* economy. The market mechanism decides the price of the products. Demand is taken to be given or as Say said that "Supply creates its own Demand". The supply curve is a vertical curve because of the assumptions made about labour by the classical economists. Two assumptions implicit in this classical representation of the labor market are as follows: 1. Perfectly flexible prices and wages 2. Perfect information on the part of all market participants about market prices for whatever time period we assume that the equilibrium model determines employment and output, equilibrium must be achieved. If such a model is to explain employment and output in the short run, prices and wages must be perfectly flexible in that time period

Keywords

Aggregate Demand: Aggregate demand is a measurement of the total amount of demand for all finished goods and services produced in an economy. Aggregate demand is expressed as the total amount of money exchanged for those goods and services at a specific price level and point in time.

Marginal Product of Labour: The marginal product of labour is the change in output that results from employing an added unit of labour.

Aggregate Supply Function: The aggregate supply function (ASF) bridged two branches of economics: (1) money theory and (2) value theory. Keynes defines the notion of aggregate supply price of the output of a given amount of employment as the expectation of proceeds which will make it worth the while of the entrepreneurs to give that employment.

Production Function: Production function, in economics, equation that expresses the relationship between the quantities of productive factors (such as labour and capital) used and the amount of product obtained.

Self Assessment

1. Which of the following economist belonged to Mercantilism?
 - A. Adam Smith
 - B. David Ricardo
 - C. Thomas Mun
 - D. J S Mill
2. Which school of thought propagated protectionism?
 - A. Bullionism
 - B. Mercantilism
 - C. Classical
 - D. Neo-classical
3. What do we mean by the term laissez faire economy?
 - A. No government intervention in the economy
 - B. Full government protection to the economy
 - C. Price stabilisation
 - D. Everything remaining the same.
4. Which school of thought said that money has no intrinsic value?
 - A. Bullionism
 - B. Mercantilism
 - C. Classical
 - D. Neo-classical
5. Which economist quoted that "consumption never needs encouragement"?
 - A. Adam Smith
 - B. Cournot
 - C. J S Mill
 - D. Jevons
6. Labour Supply is determined by?
 - A. Money wages
 - B. Real wages
 - C. Government
 - D. Individuals

7. The labour supply curve is....
- A. Positively sloped.
 - B. Negatively sloped.
 - C. Straight line
 - D. Indeterminate
8. Marginal cost of each additional unit of output is equal to
- A. Marginal cost of capital
 - B. Marginal cost of factors of production
 - C. Marginal labour cost
 - D. None of the above
9. As per the classical school of thought, the production function in the short run has which factor of production as fixed.
- A. Land
 - B. Labour
 - C. Capital
 - D. Enterprise
10. Classical economists believed that the quantity of labour depends on
- A. Demand of labour
 - B. Supply of labour
 - C. Both demand and supply of labour
 - D. None of the above
11. The aggregate supply curve in the classical model is
- A. Horizontal
 - B. Vertical
 - C. Positively sloped
 - D. Negatively sloped
12. The process of rising money wages will continue till
- A. Real wages increase.
 - B. Real wages decrease.
 - C. Equilibrium is restored.
 - D. None of the above.
13. The output and employment will not change when.
- A. Aggregate supply will change.
 - B. Population will change.
 - C. Aggregate demand will change.
 - D. None of the above
14. The demand curve is the MPL which is the slope of the production function.
- A. True
 - B. False

15. The classical model is supply based.

- A. True
- B. False

Answers for Self Assessment

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. C | 2. B | 3. A | 4. C | 5. C |
| 6. B | 7. A | 8. C | 9. C | 10. C |
| 11. B | 12. C | 13. C | 14. A | 15. A |

Review Questions

1. Why is it important to review the classical system while studying the Keynesian revolution?
2. During the pandemic the government of Germany gave subsidies on wages to the companies. How would this impact employment and output in a classical model?
3. Explain the demand for labour in the classical model.
4. Explain the supply of labour in the classical model.
5. What is the impact of an increase in the capital stock on the output and employment in a classical model?



Further Readings

Macroeconomics: Theories And Policies By Richard T. Froyen, Pearson Publications

Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 02: Quantity Theory of Money

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Introduction

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Objectives

- Analyze the Cambridge approach to the Quantity Theory
- Comprehend the classical aggregate demand curve
- Understand the working of the Classical Theory of Interest Rate
- Analyze the effects of fiscal and monetary policy actions within the classical model

Introduction

Nicolaus Copernicus (1473–1543), Jean Bodin (1530–96), Thomas Mun (1571–1641), William Petty (1623–87), and John Locke (1632–1704) are some of the more prominent figures of the sixteenth and seventeenth century who wrote about money and trade. Copernicus and Bodin articulated the quantity theory of money, that growth in the money stock results in a rise in prices, a phenomenon observed in Europe since the influx of gold and silver from overseas. Mun, a leading mercantilist and advocate of net exports as the key to England's prosperity, recognized that market forces transcend legal and institutional arrangements and that genuine wealth comes from the growth of domestic production and the enrichment of the land. Petty was one of the first to devise quantitative measurements of economic phenomena, including per capita output. Locke refined the quantity theory of money, noting the velocity of money, and devised a labour theory of value.

In this chapter, we will analyse the Cambridge equation of quantity theory while referring to the equation of exchange as given by Fisher. We then move to the classical aggregate demand curve model for which the quantity theory of money is the implicit theory. The next organic flow is to the classical theory of interest in which the components of aggregate demand that are consumption, investment and government spending play an explicit role. We end the chapter with a discussion on the policy implications of the classical equilibrium model with a specific effect on the fiscal and monetary policy.

2.1 Cambridge Approach to the Quantity Theory of Money

The discussion on the Cambridge Approach to the Quantity Theory of Money is incomplete without discussing Fisher's equation of the quantity theory of money.

Fisher's Equation

In Fisher's equation, the supply side has the quantity of money times the turnover rate of money which is called the velocity of money and on the demand side, there is price times the volume of transactions.

$$M = P_T T \quad (1)$$

where M is the quantity of money, VT is the transactions velocity of money, PT is the price index for the items traded, and T is the volume of transactions. This relationship is an identity because of the ex-post definition of velocity.

The transaction variable (T) includes not only sales and purchases of newly-produced goods but also exchanges of previously produced goods and financial assets. Another expression of the equation of exchange focuses only on income transactions:

$$MV = PY \quad (2)$$

M is again the quantity of money, and V is now the income velocity of money, the number of times the average dollar is used in a transaction involving current output. The price index for currently produced output is given by P and the level of current output by Y. Again, this relationship would be identity as long as income velocity was defined residually, as the level necessary to make the equality hold:

$$V \equiv \frac{PY}{M} \quad (3)$$

The equation of exchange is a truism and does not explain the variables it contains. Fisher and other quantity theorists, however, postulated that the equilibrium values of the elements in the equation of exchange, except the price level, are determined by other forces. Thus, the equation of exchange determines the price level. As Fisher put it:

We find that, under the conditions assumed, the price level varies (1) directly as the quantity of money in circulation (M), (2) directly as the velocity of its circulation (V), (3) inversely as the volume of trade done by it (T). The first of these three relations is worth emphasis. It constitutes the "quantity theory of money."

The Cambridge Approach

The Cambridge approach, named after Cambridge University, the academic home of its originators, Alfred Marshall and A. C. Pigou, also demonstrated a proportional relationship between the quantity of money and the aggregate price level. The foundation of this relationship was, however, less mechanistic than the transactions, or the Fisherian (after Irving Fisher), version of the quantity theory. Marshall began by focusing on the individual's decision on the optimal amount of money to hold. Some money will be held because of the convenience that money provides in transactions compared with other stores of value. Money also provides security by lessening the possibility of inconvenience or bankruptcy from failing to meet unexpected obligations. But as Pigou noted,

"Currency held in the hand yields no income," so the money will be held only insofar as its yield in terms of convenience and security outweighs the income lost from not investing in productive activity or the satisfaction lost by not simply using the money to purchase goods to consume. On these criteria, how much money will it be optimal to hold?

Marshall and the other Cambridge economists assumed that the demand for money would be a proportion of income. The Cambridge equation is written as

$$M^d = kPY \quad (2.4)$$

Money demand (M^d) is assumed to be a proportion (k) of nominal income, the price level (P) times the level of real income (Y). The desirable property of money is its usefulness for transactions, so it follows that the demand for money depends on the level of transactions, which may be supposed to vary closely with income. The proportion of income that would be optimal to hold in the form of money (k) is assumed to be stable in the short run, depending, as in the Fisherian formulation, on the payment habits of the society. In equilibrium, the exogenous supply of money must equal the quantity of money demanded:

$$M = M^d = kP\bar{Y} \quad (2.5)$$

With k fixed in the short run and real output (Y) determined, as before, by supply conditions, the Cambridge equation also reduces to a proportional relationship between the price level and the money supply. As in the Fisherian approach, the quantity of money determines the price level. The formal equivalence of the Cambridge equation and Fisher's version of the equation of exchange can be seen by rewriting equation 2.5

$$M \frac{1}{k} = P\bar{Y} \quad (2.6)$$

The proportional relationship between the quantity of money and the price level resulted from the fact that the proportion of nominal income people wished to hold in the form of money (k) was constant and the level of real output was fixed by supply conditions. Following up on Pigou's analysis of the alternatives to holding wealth in the form of money, Keynes attacked the quantity theory by providing a new theory of money demand from the fact that the proportion of nominal income people wished to hold in the form of money (k) was constant and the level of real output was fixed by supply conditions. Following up on Pigou's analysis of the alternatives to holding wealth in the form of money, Keynes attacked the quantity theory by providing a new theory of money demand

In addition, the Cambridge focus on money demand leads to an answer to the

question about the way money affects the price level. Let us suppose that we begin at equilibrium and then consider the effects of doubling the quantity of money. Initially, there is an excess of the money supply over the amount demanded. Individuals try to reduce their money holdings to the optimal proportion of their income by putting this excess into alternative uses of consumption and investment. They increase their demand for commodities. This increased demand for commodities puts upward pressure on prices. In the language of classical economists, there is too much money chasing too few goods. If the output is unchanged, as it would be in the classical model, and k is constant, a new equilibrium will be reached only after the price level is doubled. At that point, nominal income, and hence money demand, will have doubled. This was the link in the classical system between money and prices; an excess supply of money led to increased demand for commodities and upward pressure on the price level.

2.2 The Classical Aggregate Demand Curve

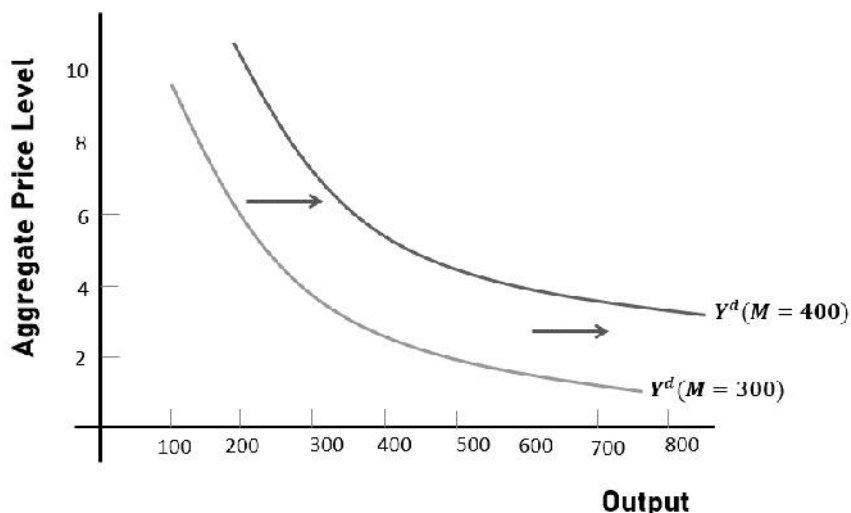
In the classical system, the quantity theory is the implicit theory of the aggregate demand for output theory. The quantity theory is used to construct the classical aggregate demand theory. There are two equations from the classical theory that may be taken to derive the classical aggregate demand curve.

$$M = M^d = kP\bar{Y}$$

$$M\bar{V} = P\bar{Y}$$

The classical aggregate demand curve plots combinations of the price level (P) and output (Y) consistent with the quantity theory equation $Y = M\bar{V}$, for a given money supply (M) and fixed Velocity \bar{V} .

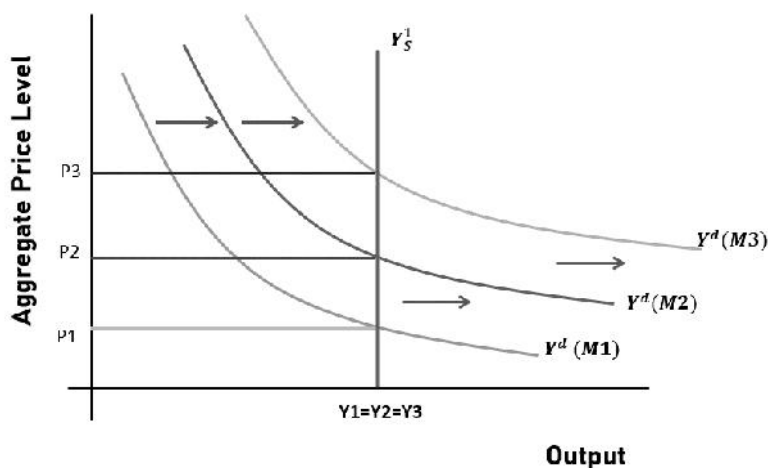
Fig. 2.1 Classical Aggregate Demand Curve



With $M = 300$ and velocity assumed to be 4, points such as $P = 12.0$ and $Y = 100$ or $P = 6.0$ and $Y = 200$ ($PY = 1,200 = MV$ in each case) lie along the aggregate demand curve. An increase in the money supply to $M = 400$ shifts the aggregate demand curve to the right.

For a given supply of money, we trace out a downward-sloping aggregate demand curve that can be put together with the vertical aggregate supply curve to illustrate the determination of price and output in the classical model.

Fig. 2.2 Aggregate Demand and Supply in the Classical Model



As the supply curve is vertical, the change in demand does not impact the output. Only the price level increases. Also note that for a given value of k (or V), a change in the quantity of money is the only factor that shifts the aggregate demand curve. Because the equilibrium value of k (or V) is considered to be stable in the short run, aggregate demand varied only with the supply of money. The classical theory of aggregate demand is implicit as it focuses on the components of AD & explains the factors that explain it. A given value of MV or $M(1/k)$ implies the level of P^*Y that is required for equilibrium. If there is a disequilibrium between AD and AS of money it spills over to the commodity market as individuals try to adjust their expenditure accordingly. Points along the AD curve are points at which firms and households are in equilibrium regarding their money holdings.



Example:

The relationship between money supply and price level is evident during hyperinflation. Hyperinflation is a situation where prices explode, and the value of money is almost nil.

The classical theory of aggregate demand has been termed an implicit theory. The theory is not explicit in the sense that it focuses on the components of aggregate demand and explains the factors that determine their level. Instead, in the classical theory, a given value of MV [or $M(1+k)$] implies the level of $P * Y$ that is required for equilibrium in the money market – for money demand to equal the existing money supply. If money demand exceeds (falls short of) money supply, there will be a spillover to the commodity market as individuals try to reduce (increase) their expenditures on commodities. Points along the Y^d schedule are points at which firms and households are in equilibrium about their money holdings and, therefore, are also at equilibrium rates of expenditures on commodities.

2.3 Classical Theory of Interest

There are three components of aggregate demand, namely, consumption, investment, and government spending. These three factors play a decisive role in the determination of interest rates. It is, in fact, the interest rate that guarantees that exogenous changes in the components of demand do not affect aggregate demand. The rate of interest is determined at the point where the funds desired to lend by individual is equal to funds desired by other to borrow. The basic assumption that is made here to simplify the understanding of the concept is that the investments are done in bonds. Selling of bonds is part of lending and borrowing is the buying of such stocks. These bonds are perpetual bonds which refers to the perpetual earning from the bonds (this is another assumption). **The interest rate depends on the factors that determine the levels of bond supply (borrowing) and bond demand (lending).**

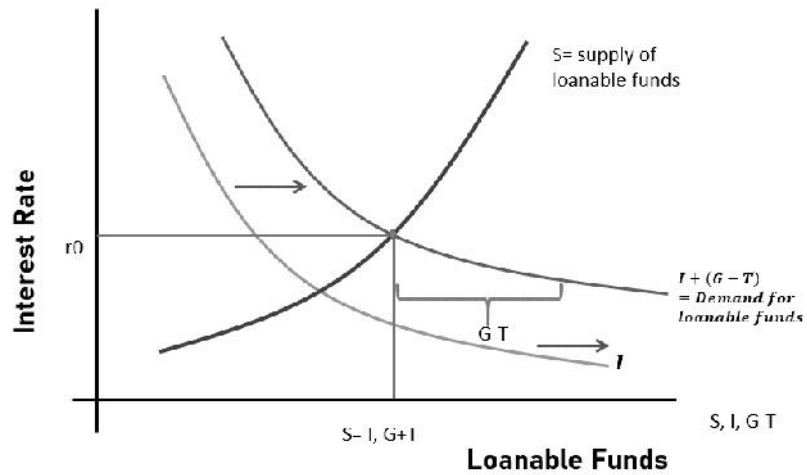
As per the classical theory, the supply of bonds is done by firms and government. In the classical model, the level of business investment was a function of the expected profitability of investment projects and the rate of interest. The government supply of the bonds depends on the amount or proportion of its deficit it wants to finance through the sale of bonds. The decision of the quantity of bonds to be sold by the government is an exogenous decision. In the classical model, the level of business investment was a function of the expected profitability of investment projects and the rate of interest.

The expected profitability of investment projects was assumed to vary with expectations of product demand over the life of these projects, and the state of these expectations was subject to exogenous shifts. For a given expected profitability, investment expenditures varied inversely with the interest rate. A firm has a number of projects for investment which it ranks as per their profitability. Rate of interest is the expenditure of borrowing funds for these investments. There is inverse relationship between interest rate and profitability as is between rate of interest and investment. At a high rate of interest, the number of profitable investments will be less. Contrary to this as the interest rate comes down, more And more investments will take place as they become cheaper. On the borrowing side of the bond market, the government supply is exogenously determined whereas the supply by the firms equals the investment expenditure. Investment varies inversely with the interest rate and is also influenced by exogenous shifts in the expected profitability of investment projects.

The buyers of bond are individuals who pay for them out of their savings. There is positive relationship between savings and rate of interest. Savings is postponing our current consumption and the interest is the payment made to compensate the postponement. As the rate of interest increases the savings also go up as the trade off between current consumption and future consumption becomes more profitable. Classical economists assumed that individuals would take advantage of this more favourable trade-off; they would save more at higher rates of interest.

The entire savings done by individuals do not go into buying bonds, a part of it is saved as cash. As per classical economists, money is only a medium of exchange and not store of value, therefore, savings will not be held as cash. They believed that as there were no returns in cash, people would invest their savings in bonds which gives a good rate of return.

Fig. 2.3 Interest Rate Determination in the Classical System

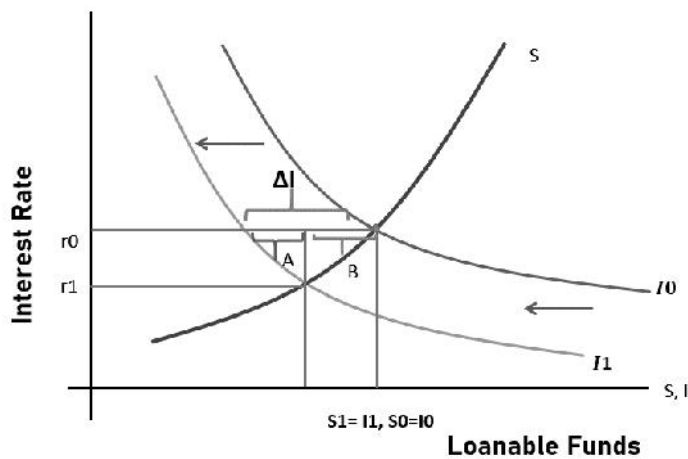


Saving (S) is plotted as an upward-sloping function of the rate of interest. Saving provides the demand for bonds, or as the classical economists called it, the supply of loanable funds. Investment (I) is a negatively sloped schedule plotted against the interest rate. Investment plus the exogenously determined government deficit (G - T), all of which we assume to be financed by selling bonds, equals the bond supply. In classical terminology, this is the demand for loanable funds. In the diagram, r_0 is the equilibrium interest rate, the rate of interest that equates the demand and supply for loanable funds.

Autonomous Decline in Investment Demand

The interest rate plays a stabilizing role in the classical system, as can be seen by examining the effects of a change in the expected profitability of investment. Recall that in the short run, investment depends on the interest rate and the expected future profitability of investment projects. Let us suppose that as a result of an exogenous event (e.g., fear of a future war), business managers in general lower their expectation about future profits from investment. The effect would be reduced investment and, hence, a reduced demand for loanable funds at each interest rate.

Fig. 2.4 Autonomous decline in interest rate



An autonomous decline in investment shifts the investment schedule to the left from I_0 to I_1 – the distance ΔI . The equilibrium interest rate declines from r_0 to r_1 . As the interest rate falls, there is an interest-rate-induced increase in investment – distance B. There is also an interest-rate-induced decline in saving, which is an equal increase in consumption – distance A. The interest rate-induced increases in consumption and investment just balance the autonomous decline in investment.

2.4 The Effects of Fiscal and Monetary Policy Actions within the Classical Model

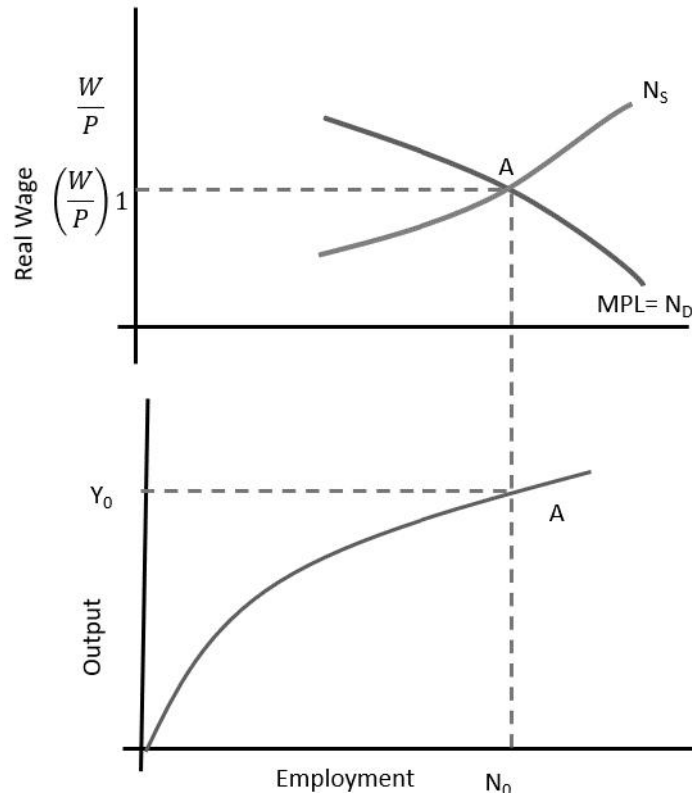
In the short-run model, labour is the only variable factor. The equality between the demand for labour and the supply of labour is necessary for equilibrium in output and employment. The point where the demand and supply of labour equate become the equilibrium level of employment and at that level the output is determined.

Government Spending

Consider the effects of an increase in government spending. The question of how the increased spending is financed arises first. Like a business or household, the government has a budget constraint, the condition that all expenditures must be financed from some source. The government has three sources of funds: taxation, selling bonds to the public (borrowing funds from the public), or creating new money. The creation of new money can take several forms, but in our discussion here, it will do no harm to assume that the government simply prints new currency to finance its spending.

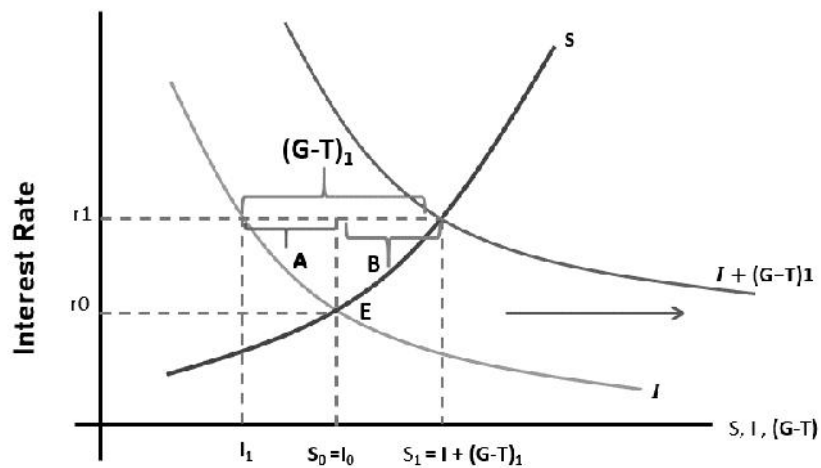
To increase spending, then, the government must increase taxation, sell additional bonds to the public, or increase the money supply. For now, to avoid bringing in a monetary policy change, we assume that the money supply is fixed. We also assume that tax collections are fixed. The increased government expenditures are therefore assumed to be financed by selling bonds to the public. It follows from our analysis to this point that a bond-financed increase in government spending will not affect the equilibrium values of output or the price level. This must be the case because we constructed both the aggregate demand and aggregate supply curves, which together determine output and the price level, without reference to the level of government spending. Output is not affected by changes in government spending, so employment must also be unaffected. To understand these results, we examine how a change in government spending affects the interest rate. Figure 2.6 shows the effect in the loanable funds market of an increase in government spending financed by the sale of bonds to the public. If government spending is greater than tax revenue, then $(G - T)$ is positive, where G is government spending, T is tax revenue, and $(G - T)$ is the government deficit. We assume that before the increase in government spending the government budget was in balance – that is, $(G = T)$. The government deficit is then equal to the increase in government spending, $(G - T)$.

Fig. 2.5 Equilibrium level of employment and output



Initially, with no government deficit, the loanable funds market is in equilibrium at point E. Assuming there is no government borrowing, the equilibrium interest rate, r_0 , equates the supply of loanable funds with the demand for loanable funds. Initially, investment, I , is the only source of demand for loanable funds. If the increase in government spending is financed by selling bonds, then total demand for

Fig. 2.6 Effect of an increase in Government Spending in the Classical Model



loanable funds includes both investments, I , and government borrowing, $(G - T)_1$. The increase in demand for loanable funds is shown as a rightward shift in demand, from I to $I + (G - T)_1$, moving from equilibrium point E to equilibrium point F. Note that the distance of the horizontal shift in the curve measures the amount of the increase in government deficit spending. This amount is measured by the distance $(G - T)_1$ in Figure 2.6. The increase in government spending creates an increased demand for loanable funds as the government sells bonds to the public to finance the new spending. This creates an excess of borrowers over lenders at the initial interest rate r_0 , and the interest rate is pushed up to r_1 . The increase in the interest rate has two effects. Saving increases from S_0 to S_1 ; this is the distance A in Figure 2.6. As was explained in the preceding section, an increase in saving is mirrored by an equal decline in consumption. Second, the quantity of investment declines with the higher interest rate. At r_1 , we can read the new level of investment as

I_1 along the I schedule. The investment decline is the distance B in Figure 2.6. The figure shows that the decline in consumption, which equals the amount of increased saving (distance A) plus the decline in investment (distance B), just equals the amount of the increase in government spending ($G - T$). The increase in government spending financed by selling bonds to the public pushes the interest rate up by enough to “crowd out” an equal amount of private expenditure (consumption plus investment). Private expenditures are discouraged because the higher interest rate causes households to substitute future consumption for current consumption—in other words, to save more. Investment declines because fewer projects appear profitable with higher borrowing costs. It is this crowding out that keeps aggregate demand from increasing when the government component of demand rises. Because aggregate demand is not changed, increases in government expenditures financed by bonds do not affect the price level.

Tax Policy

Demand-Side Effects.

As long as we consider only the effects on demand, analysis of a change in taxes produces results that are analogous to those for government spending. For example, by increasing the disposable income of households, a tax cut would stimulate consumption. If, however, the government sold bonds to the public to replace the revenues lost by the tax cut, the same crowding-out process would follow, as in the case of a bond-financed increase in government spending. The equilibrium interest rate would rise, the investment would fall, and there would also be an interest-rate-induced rise in saving, meaning that consumption would fall back toward the pre-tax-cut level. In the case of a tax cut, as with an increase in spending, aggregate demand would not be affected. If revenues lost because of the tax cut were replaced by printing new money, then, as with an increase in government spending, the money creation would increase aggregate demand, and the tax cut would cause the price level to rise. Again, though, it would simply be the increase in the money supply that affected the price level. The tax cut would have no independent effect on aggregate demand.

Supply-Side Effects.

If the tax cut were a lump-sum cut, meaning, for example, that every household received a tax cut of \$100, then the demand-side effects would be all that we would need to consider. ⁵ But suppose the tax cut was in the form of reduced income tax rates. Suppose the marginal income tax rate was cut from an initial rate of 40 per cent to a new rate of 20 per cent. Instead of 40 cents of every additional dollar being taken as a tax payment, only 20 cents would be taken. In the classical model, such a change would have an incentive effect on the labor supply. The change would affect the supply side of the model and would affect output and employment. A cut in the tax rate would increase the labor supply at any value of the (pretax) real wage and shift the labor supply schedule out to the right. This shift follows because the worker is concerned about the after-tax real wage, which in this case is $(1 - t^y) W/P$, where t^y is the marginal income tax rate.

$$N^S = g \left[(1 - t^y) \frac{W}{P} \right]$$

For a given pretax real wage ($W > P$), a cut in the income tax represents an increase in the after-tax real wage and therefore increases labour supply.

Monetary Policy

In the classical system, the quantity of money determines the price level and the level of nominal income. In this sense, monetary policy was quite important to classical economists. Stable money was a requirement for stable prices. In another sense, money was not important. The quantity of money did not affect the equilibrium values of the real variables in the system: output, employment, and the interest rate. The theory of the equilibrium interest rate we have constructed here is a real theory that did not mention the quantity of money. Factors determining the interest rate were real investment demand, real saving, and the real value of the government deficit—what the classical economists called the forces of “productivity and thrift.”

Summary

Classical economists stressed the self-adjusting tendencies of the economy. Free from destabilizing government actions, the private sector would be stable, and full employment would be achieved. The first of these self-stabilizing mechanisms is the interest rate, which adjusts to keep shocks to sectoral demands from affecting aggregate demand. The second set of stabilizers consists of freely flexible prices and money wages, which keep changes in aggregate demand from affecting output. The flexibility of prices and wages is crucial to the full-employment properties of the classical system. The inherent stability of the private sector-led classical economists to noninterventionist policy conclusions. To be sure, many of the interventionist mercantilist policies that classical economists opposed (tariffs, trading monopolies, etc.) were a far cry from the macroeconomic stabilization policies of today, but the model itself argues for nonintervention in a very general sense.

A second central feature of the classical system is the dichotomy between the factors determining real and nominal variables. In classical theory, real (supply-side) factors determine real variables. Output and employment depend primarily on population, technology, and capital formation. The interest rate depends on productivity and thrift. Money is a veil determining the nominal values by which quantities are measured, but monetary factors do not play a role in determining these real quantities.

Keywords

Quantity Theory of Money: In monetary economics, the quantity theory of money is one of the directions of Western economic thought that emerged in the 16th-17th centuries. The QTM states that the general price level of goods and services is directly proportional to the amount of money in circulation, or money supply.

Velocity of Money: The velocity of money is a measurement of the rate at which money is exchanged in an economy. It is the number of times that money moves from one entity to another. It also refers to how much a unit of currency is used in a given period of time.

Cambridge Approach: The Cambridge approach, named after Cambridge University, the academic home of its originators, Alfred Marshall and A. C. Pigou, also demonstrated a proportional relationship between the quantity of money and the aggregate price level.

SelfAssessment

1. What is k in the Cambridge equation of quantity theory of money?
 - A. Velocity of circulation of money
 - B. Price level
 - C. The proportion of nominal income that people hold as cash.
 - D. Real income

2. In the short run k is
 - A. Constant
 - B. Variable
 - C. Depends on the income size.
 - D. None of the above

3. V is equal to
 - A. Price
 - B. Velocity of circulation
 - C. Reciprocal of k

- D. Real income
4. In the classical theory, the quantity of money determines aggregate demand, which in turn determines the
- A. Aggregate supply
 - B. Price level
 - C. Equilibrium
 - D. None of the above
5. Is the real income constant in the short run in the Cambridge equation?
- A. True
 - B. False
6. An increase in the money supply would shift the Aggregate Demand curve
- A. Inwards
 - B. Outwards
 - C. Movement along the demand curve
 - D. No change
7. As the supply curve is vertical, the change in demand the output.
- A. Impacts
 - B. Does not impact.
 - C. No relationship between supply, demand and output
 - D. Depends on the shape of the supply curve.
8. The relationship between money supply and price level is evident during
- A. Inflation
 - B. Hyperinflation
 - C. Stagflation
 - D. Creeping inflation
9. For a given expected profitability, investment expenditures varied with the interest rate.
- A. Directly
 - B. Inversely
 - C. Depends on the stage of growth of the economy.
 - D. None of the above
10. The relationship between savings and rate of interest is...
- A. Direct
 - B. Inverse
 - C. Depends on the stage of growth of the economy.
 - D. None of the above
11. Which of them is not source of funding for the government?
- A. Taxation
 - B. Printing of currency

- C. Printing of stamp papers
 D. Issuing bonds to the public
12. In the classical theory, monetary policy is assumed to be
- A. Constant
 B. Dynamic
 C. Does not include the monetary policy.
 D. None of the above
13. Increase in government spending haseffect on aggregate demand
- A. Strong
 B. No independent
 C. Independent
 D. None of the above
14. If government spending is greater than tax revenue, then $(G - T)$ is
- A. Positive
 B. Negative
 C. Undecided
 D. None of the above
15. In the short run, which is the variable factor.
- A. Land
 B. Labour
 C. Capital
 D. Organization

Answers for Self Assessment

1. C 2. A 3. C 4. B 5. A
 6. A 7. B 8. B 9. B 10. A
 11. C 12. A 13. B 14. A 15. B

Review Questions

1. What is the difference between the Fisher's equation and the Cambridge Equation of quantity theory of money?
2. Explain the role of money according to the Cambridge approach. Specifically, explain the relationship between the quantity of money, the price level, and the level of output.
3. How is the interest determined in the classical theory?
4. Are there any policy conclusions as per the classical theory? If yes, then what are they?
5. What do you understand by the term Velocity of money? How is it determined?

**Further Readings**

Unit 02: Quantity Theory of Money

Macroeconomics: Theories And Policies By Richard T. Froyen, Pearson Publications

Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 03: The Keynesian System

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3.3 Contractual View of Labour Market

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Objectives

- Construct a Keynesian aggregate demand schedule
- Compare the classical and Keynesian systems
- Analyse the supply side assumptions of Keynes
- Discuss the contractual view of the labour market in Keynes's theory
- Discuss the differences in the Keynesian and classical views of labour supply
- Examine a Keynesian model in which both the price level and the money wage are allowed to vary
- Analyse the changes in the classical model and its impact on the Keynesian model.

Introduction

The Great Depression of the 1930s brought about a huge change in the economic understanding of the people and in the economic literature. The theories, axioms and tenets of economics as established by the classical economists were turned upside down when the crisis happened which was not experienced at the global level before this period. This gave birth to Keynesian Economics when John Maynard Keynes wrote the book, *"The General Theory of Employment, Interest and Money"*. Keynes argued that the rising unemployment in America and other parts of Europe was mainly because of the fall in aggregate demand. He stressed upon the part that state intervention was required to come out of the economic stagnation. The state needed to increase its investment in various sectors of the economy which in turn would flow into the pockets of the general public, providing them with the much-needed purchasing power.

The classical economists considered unemployment as a part and parcel of the economy, focusing on the skill set of the labour force as the main reason for unemployment. *Say's Law* put in that Supply creates Demand which is a fact that shows that unemployment is not a problem of aggregate demand. However, in the later years, it was proven by economists that aggregate demand is one of the chief reasons for the fall in employment and leading to the slowing down of the economy. Alfred Marshall wrote in *Money, Credit and Commerce (1922)* that

"Forced interruption to labour is a grievous evil. Those, whose livelihood is secure, gain physical and mental health from happy and well-spent holidays. But want of work, with long-

continued anxiety, consumes a man's best strength without any return. His wife becomes thin; and his children get, as it were, a nasty notch in their lives, which is perhaps never outgrown."

Marshall was one of the proponents of the thought that the labour force should improve their skills which would make them more employable. In the same book (above mentioned) he further wrote,

Those causes of discontinuity which lie within our scope, and are remediable, are chiefly connected in some way or other with the want of knowledge; but there is one which is willful: it is fashion. Until a little while ago only the rich could change their clothing at the capricious order of their dressmakers: but now all classes do it. The histories of the alpaca trade, the lace trade, the straw hat trade, the ribbon trade, and a multitude of others, tell of bursts of feverish activity alternating with deadening idleness.

This argument put forward by Marshall did not hold ground in explaining the unemployment scenario in the United Kingdom. The policy steps initiated in the United State of America (hereafter USA) were also not less perplexing. Herbert Hoover, the then President of USA took to increasing the tax rate which led to the worsening of the economic situation of the country.

Both the major economies of that time could not find solution to the problem of unemployment without increasing government expenditure. The increase in state spending on welfare activities was advocated by Keynes as he favoured fiscal policy. The overview of situation of Great Depression very clearly showed the inability of classical theory to solve the crisis and the theories given by them failed. The self-adjustment procedure suggested by the classical school of thought did not work out for the economic crisis. It was the Keynesian school of thought which provided solutions to the crisis and emerged as a strong counter to the classical school of thought. In this chapter, we will discuss the Keynesian system which filled the gap of classical thought.

3.1 The Keynesian System

In the simple Keynesian model for output to be at an equilibrium level, aggregate demand must equal output. For an output (Y) and interest-rate (r) combination to be an equilibrium point, the output must equal aggregate demand and money demand must equal money supply. The condition of equilibrium was

$$Y = E \quad (1)$$

where Y is equal to total output (GDP) and E equals aggregate demand or desired expenditures on output. Aggregate demand (E) consists of three components: household consumption (C), desired business investment demand (I), and the government sector's demand for goods and services (G). Thus, in equilibrium we have

$$Y = E = C + I + G \quad (2)$$

The above equation is that of a closed economy where there is no need to distinguish between GDP and NDP as depreciation is also not considered. This means that we do not include items in the model that cause a discrepancy between the two totals (primarily indirect business taxes). A final assumption relates to the units in which each of the variables is measured. We also assume that the aggregate price level is fixed.

$$Y = C + S + T \quad (3)$$

Equation (3) is about the dispensation of income in consumption (C), savings (S) and taxes (T). In addition, from the fact that Y is a national product, we can write

$$Y = C + I_r + G \quad (4)$$

Equation (4) defines national product as consumption plus realized investment (I_r) plus government spending.

We then combine equations (2) and (3) to explain equilibrium. The combination is based on the definitions as given by equations (3) and (4). By equation (2), Y must equal (C + I + G) in equilibrium, and from equation (3), Y is defined as (C + S + T), in equilibrium, therefore,

$$C + S + T = C + I + G$$

Or equivalently

$$S + T = I + G \quad (5)$$

In a similar fashion, from equations (2) and (4) we can see that in equilibrium

$$C + I_r + G \equiv Y = C + I + G$$

or, by cancelling terms,

$$I_r = I \quad (6)$$

There are three equivalent ways

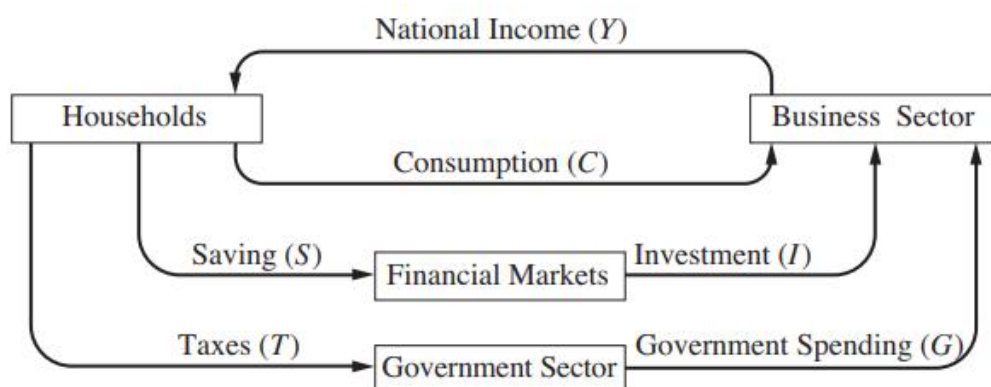
$$Y = E = C + I + G \quad (2)$$

$$S + T = I + G \quad (5)$$

$$I_r = I \quad (6)$$

National income is distributed by households into three flows. One is a flow of consumption expenditures that goes back to the business sector as a demand for the output. Thus the inner loop of our diagram depicts a process whereby firms produce output (Y), which generates an equal amount of income to the household sector, which in turn generates a demand for the output (C).

Fig. 3.1 Circular Flow of Income and Output



Not all national income returns directly to the firms as a demand for output. There are two flows out of the household sector in addition to consumption expenditure – the saving flow and the flow of tax payments. If we regard the inner loop of our diagram, linking the households (as suppliers of factor services and demanders of output) and the business sector (as suppliers of output and demanders of factor services) as the central income- and output-generating mechanism, the saving and tax flows are leakages from this central loop.

The saving leakage flows into financial markets, which means that the part of income that is saved is held in the form of some financial asset (currency, bank deposits, bonds, equities, etc.). The tax flow is paid to the government sector. The tax flow in the diagram is net taxes – that is, gross tax payments minus transfer payments from the government to the household sector (Social Security benefits, welfare payments, unemployment compensation, etc.). Consequently, in later discussions, a tax increase or a tax cut can be interpreted equivalently as a change in the opposite direction in the level of transfer payments.

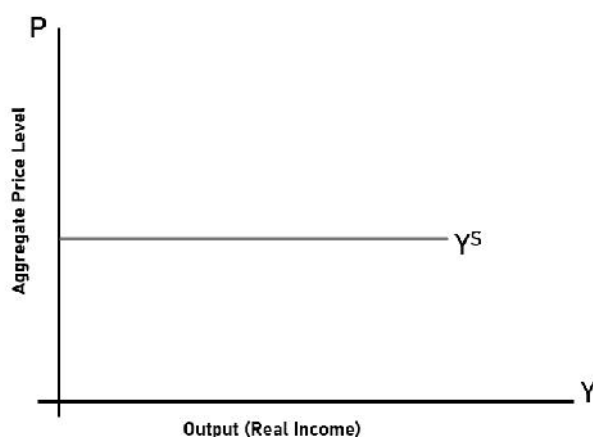
There have to be injections in the circular flow as well because one unit of output (in terms of rupee) does not get directly converted into one unit of household demand. This, however, does not lead to fall in demand. There are additional demands for output on the part of the business sector itself for investment and from the government sector. In terms of the circular flow, these are injections into the central loop of our diagram. The investment injection is shown as a flow from financial markets to the business sector. The purchasers of the investment goods are the firms in the business sector themselves. These purchases must, however, be financed by borrowing. Government spending is a demand for the output of the business sector and is shown as a money flow from the government to the business sector.

3.2 Keynesian Aggregate Demand

We expressed the condition for equilibrium in the simple Keynesian model in terms of the components of aggregate demand. To see the factors that determine the level of income, we consider the factors that affect the components of aggregate demand: consumption, investment, and government spending. Saving and taxes also enter into our discussion.

In the simple Keynesian model for output to be at an equilibrium level, aggregate demand must equal output. For an output (Y) and interest-rate (r) combination to be an equilibrium point, the output must equal aggregate demand and money demand must equal money supply. What guarantees that this level of output will be equal to aggregate supply – equal to the amount the business sector will choose to produce? We assume that any level of output demanded would be forthcoming at the given price level. Such an assumption could be plausible when output is far below the capacity of the economy.

Fig. 3.2 Aggregate Supply Schedule when the Price is fixed and Output determined by Aggregate Demand



3.3 Contractual View of Labour Market

Keynes criticized the classical thought for taking only the money wages. He believed that taking the money wages alone would not adjust to maintain full employment in the economy. As per Classical thought, the demand-supply of labour adjusted as money wages was assumed to be fully flexible. The point where the demand for labour and the supply of labour were equal became the equilibrium real wage and employment level.

Sources of Money Wage Rigidity

The Keynesian theory offers many reasons why the money wage will not quickly adjust, especially in a downward direction, to maintain equilibrium in the labour market. Keynes argued that workers are interested in their relative as well as absolute wage. Wage differentials are present across the industry. Keynes believed that labour would resist money wage cuts even if demand for labour fell. Labour in one industry was not sure that money wage cut would be accepted across the industries. A decline in real wages as a result of an increase in price would not be seen as a decline in relative wages. Keynes believed that declines in real wages caused by price-level increases would meet much less resistance from labour than an equivalent fall in the real wage from a money wage cut. Wage contracts are also responsible for wage rigidity. During the life of the contract, any change in the price level would not change the wages. Indexation of money wages in the contract may have some impact on the wages. Once a fixed-money wage contract is signed, the employer takes a decision regarding the number of people employed. The Labour supply function no longer plays a role in determining employment.

- What is the case with the Indian labour market?
- Is it different in the organized and unorganized labour market of India?

If there are no formal wage contracts, there are implicit contracts between the employer and the employee. In case of a fall in demand, the employer does not reduce wages as employer-employee relations get affected. Keynesians believe that the conventions of labour markets are such that firms find it in their interest to cut the length of the workweek or to have layoffs in response to falls in demand rather than to seek money wage cuts.

A Flexible Price–Fixed Money Wage Model

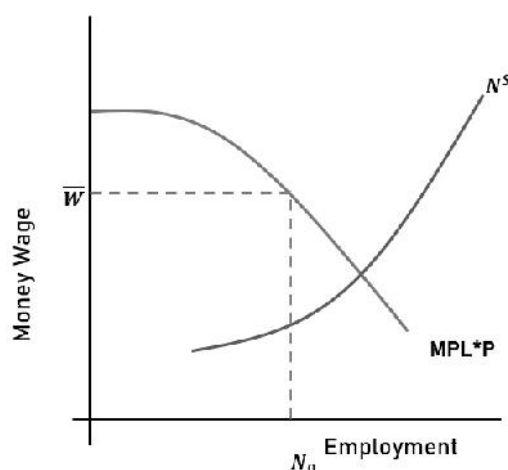
To model this contractual view of the labour market, we assume that, although prices are free to vary, the money wage is fixed. A fixed money wage is an extreme version of a sticky wage, and Keynesian economists do not believe that the money wage is completely rigid. Still, if the response of the money wage to labour market conditions is slow to materialize, as the contractual approach to the labour market suggests, results based on the assumption of a fixed money wage will be approximately correct for the short run. Finally, before we analyze this flexible price fixed money wage model, we should point out that Keynes's concern was with the downward rigidity of the money wage—the failure of the money wage to fall sufficiently to restore full employment. The main situations to which we would want to apply the fixed-wage model are those in which there is an excess supply of labour.

With the money wage fixed and labour supply greater than labour demand, actual employment will be determined by demand. Firms will be able to hire the amount of labour they demand at the going wage. Keynes did not object to the classical theory of labour demand. According to this theory, the profit-maximizing firm demands labour up to the point at which the real wage (W/P) is equal to the MPN or, equivalently, to the point at which

$$W = MP \cdot P$$

The money wage is equal to the money value of the marginal product (the marginal revenue product) of labour. Because, with an excess supply of labour and a fixed money wage, employment depends only on labour demand, the determination of employment is as depicted in Figure 3.3. At a fixed money wage W , labour demand, and therefore employment, will be N_0 . The labour supply schedule is shown in Figure 3.3 as a dashed line. Notice that at the fixed money wage (W), the labour supply schedule is to the right of N_0 , indicating an excess supply of labour. Demand, not supply, is the factor constraining employment. The labour supply schedule plays no role and is not shown in the subsequent figures in this section. The properties of the Keynesian labour supply function are explained in the next section, where we analyze a Keynesian model in which the money wage is allowed to vary.

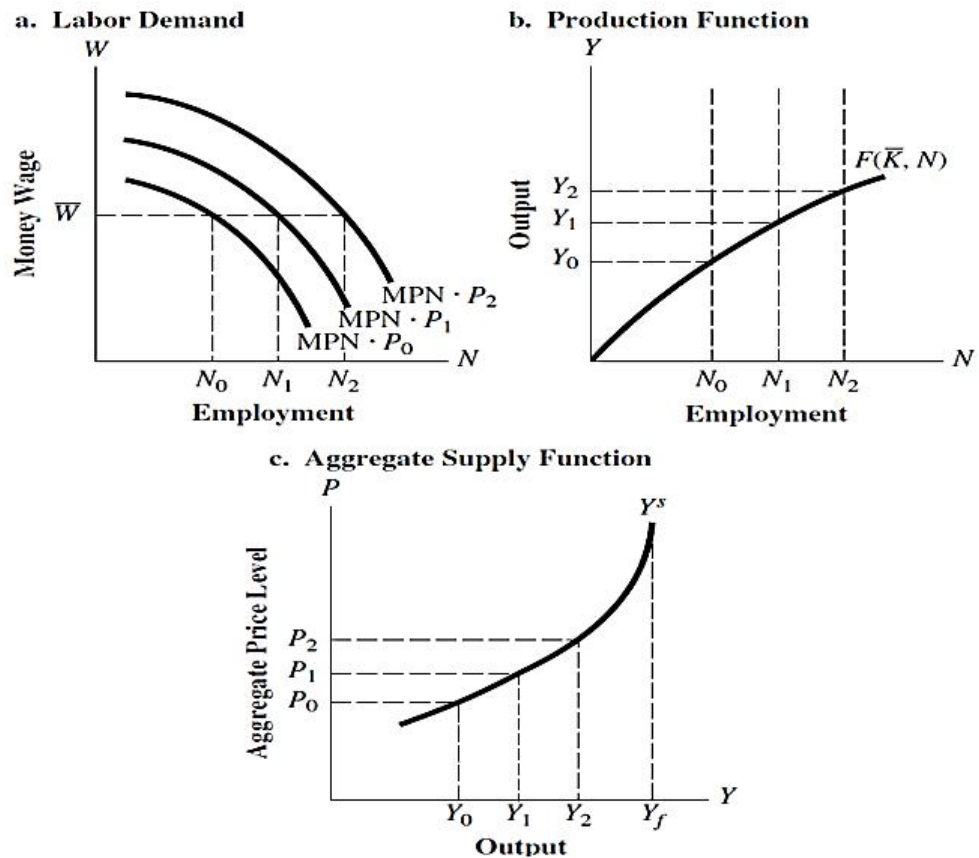
Fig. 3.3 Fixed Money Wage Model



The position of the labour demand schedule, the schedule giving the money value of the MPN corresponding to each level of employment (the $MPN \cdot P_0$ schedule in Figure 3.3), depends on the price level. The number of workers firms will hire, and as a consequence, the amount of output they will supply depends on the price level. This relationship between output supplied and the price level is developed in Figure 3.4. Figure 3.4a shows the level of employment that will result at three successively higher price levels, P_0 , P_1 , and P_2 , with the money wage fixed at W . An increase in the price level (from P_0 to P_1 , then from P_1 to P_2) will increase the monetary value of the MPN

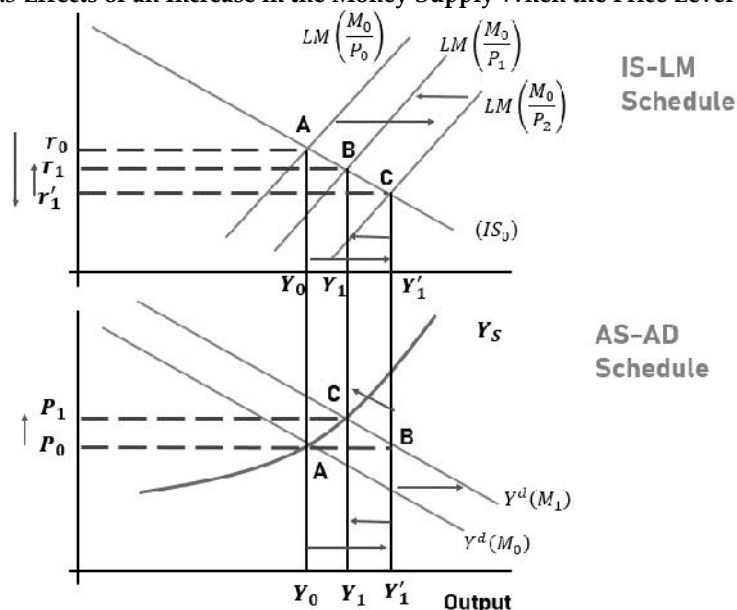
corresponding to any level of employment and therefore will increase labour demand for a given money wage. The labour demand ($MPN \cdot P$) schedule shifts to the right, and employment increases. As employment increases, the output is shown to rise in Figure 3.4b, where we have plotted the aggregate production function giving the level of output for each level of employment. Figure 3.4c combines the information from Figures 3.4a and 3.4b to show output supplied for each price level. Higher prices result in higher supply; the aggregate supply function is upward sloping. At some level of output (Y_f in Figure 3.4c), full employment would be reached, and further increases in price would have no effect on output. The aggregate supply schedule becomes vertical at this level.

Fig. 3.4 Keynesian Aggregate Supply Schedule when the Money Wage is Fixed



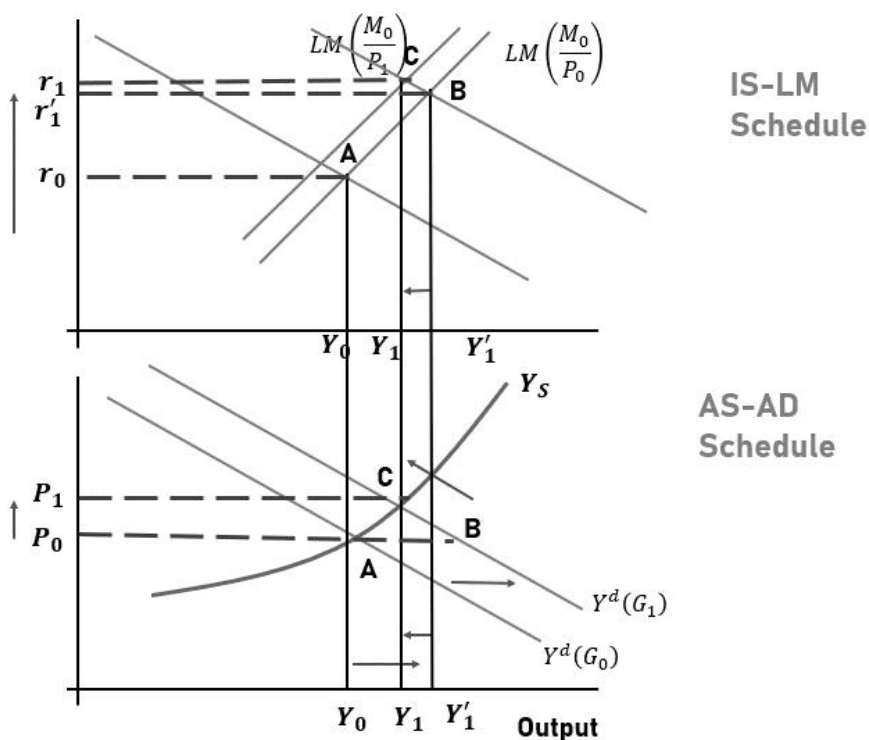
Below full employment, the supply schedule will not be vertical; shifts in the aggregate demand schedule will change the level of output. The effects of an increase in the money supply and the effects of an increase in government spending are illustrated in Figures 3.5 and 3.6, respectively.

Fig. 3.5 Effects of an Increase in the Money Supply When the Price Level Is Flexible



An increase in the money supply shifts the LM schedule from $LM(M_0/P_0)$ to $LM(M_1/P_0)$ (part a) and shifts the aggregate demand schedule from $Y^d(M_0)$ to $Y^d(M_1)$ (part b). The increase in aggregate demand causes output to rise from Y_0 to Y_1 and the price level to rise from P_0 to P_1 . The increase in the price level shifts the LM schedule from $LM(M_1/P_0)$ to $LM(M_1/P_1)$.

Fig. 3.6 Effect of an increase in Spending when the Price Level is flexible



An increase in government spending shifts the IS schedule from $IS(G_0)$ to $IS(G_1)$ (part a) and shifts the aggregate demand schedule from $Y^d(G_0)$ to $Y^d(G_1)$ (part b). The increase in aggregate demand causes output to rise from Y_0 to Y_1 and the price level to rise from P_0 to P_1 . The increase in the price level shifts the LM schedule from $LM(M_0/P_0)$ to $LM(M_0/P_1)$.

3.4 Classical and Keynesian Theories of Labour Supply

Classical economists believed that the supply of labour depended positively on the real wage,

$$N^s = g\left(\frac{W}{P}\right)$$

A rise in the real wage increases the income that can be gained from an hour's labour or, looked at in reverse, increases the opportunity cost of taking 1 hour of leisure. Consequently, an increase in the real wage increases the labour supply. The Keynesian theory of labour supply begins with the observation that the wage bargain is struck in terms of the money wage, not the real wage. The classical theory assumes that suppliers of labour (workers) know the price level (P) and money wage (W) and therefore know the real wage (W/P). Keynesians argue that because the labour bargain is in terms of the money wage, we can assume that workers know the money wage but not the price level. As explained previously, through implicit or explicit contracts, workers agree to provide labour services over some period, let us say for a year. They have no way of knowing the value that the aggregate price level will take on over the coming year. It is this aggregate price level that will determine the purchasing power of any money wage they agree to in a current wage bargain. As a consequence, Keynesians believe that decisions about labour supply depend on the current money wage and the expectation of the aggregate price level. Further, the Keynesian view has been that workers' expectations about the price level depend for the most part on the past behavior of prices.

Keynesian Model Creation with Wages Perfectly Flexible

Features

1. Money wages are perfectly flexible
2. Labour supply is given
3. Output and employment are not solely determined by AS but AD also plays its role.
4. Imperfect information about prices.

Keynesian labour supply function is written as

$$N^s = t(W/P^e)$$

An increase in the money wage (W) for a given value of the expected price level (P^e) would increase labour supply because it would be viewed by workers as an increase in the real wage. An increase in the expected price level would cause the labour supply to decline. Fundamentally, workers are interested in the real wage, not the money wage, and they reduce their supply of labour when they perceive that the real wage has declined. The difference between the Keynesian and classical labour supply functions is that in the Keynesian version workers must form an expectation of the price level. Labour supply, therefore, depends on the expected real wage. In the classical system, workers know the real wage; labour supply depends on the actual real wage. The Keynesian theory of labour supply is incomplete without an assumption about how workers form an expectation of the price level (P^e). The Keynesian assumption is that such price expectations are based primarily on the past behaviour of the price level. Thus

$$P^e = a_1P_{-1} + a_2P_{-2} + \dots + a_nP_{-n}$$

Where P_{-i} ($i=1, 2, 3$) is the price level from the i th past periods and a_1, a_2, a_n are the weights given to past observations on the price level in forming the expectation of the current price level.

Price expectations are essentially backward looking, adjusting to the past behaviour or of the price level. There is considerable inertia in this adjustment process; price expectations adjust only slowly to the past behaviour or of the price level. P^e is assumed to be constant in the short run.

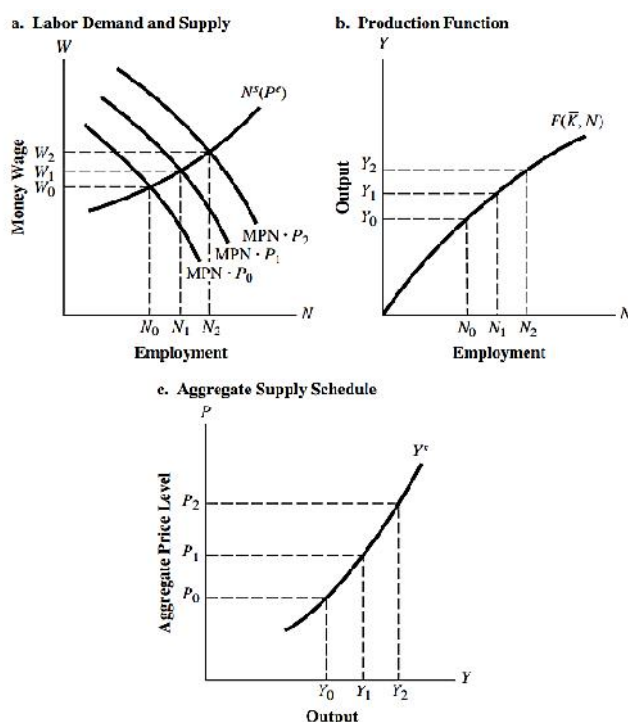
The Keynesian Aggregate Supply Schedule with Variable Money Wage

The construction of the AS schedule of labour is based on $N^s = t(W/P^e)$ and money wages adjust to equate labour supply and demand. Labour supply and demand are plotted as functions of money wages. Though the AD of labour depends on real wages as firms are aware of the price level.

Figure 3.7 illustrates the construction of the aggregate supply schedule, where labour supply is given by equation $N^s = t(W/P^e)$ and the money wage is assumed to adjust to equate labour supply and labour demand. In Figure 3.7a, labour supply (N^s) and labour demand are plotted as functions of the money wage. As in the previous analysis, labour demand depends on the real wage; firms

are assumed to know the price level at which they will be able to sell their products. The labour demand schedule will shift to the right with an increase in the price level. Figure 3.7a shows labour demand schedules for three successively higher price levels: P_0 , P_1 , and P_2 , respectively.

Fig. 3.7 The Keynesian Aggregate Supply Schedule When the Money Wage Is Variable



The labour supply schedule is drawn for a given value of the expected aggregate price level. As just explained, this expected price level is assumed to be fixed in the short run. With the fixed labour supply schedule, increases in the price level shift the labour demand schedule along with the supply schedule, so that for a higher price level the equilibrium levels of employment and the money wage are increased. The process at work here is as follows. The increase in price (from P_0 to P_1 , for example) causes an excess demand for labour at the old money wage (W_0). The money wage is bid up, and for a given value of P^e , an increase in the money wage causes more workers to accept jobs (or to increase the number of hours worked in existing jobs); employment rises.

Factors that Shift the Aggregate Supply Schedule

The question remains of the causes of shifts in the aggregate supply schedule – the nature of supply shocks. Recall that points on the aggregate supply schedule give the desired output of the firms for each aggregate price level. Each firm, and therefore firms in the aggregate, will choose the level of output that maximizes profits.

$$P = MC$$

MC is the addition to total cost as a result of increasing the use of variable factors of production to increase output. In our previous analysis, we assumed that labour was the only variable factor of production. In this case, the MC of producing an additional unit of output was the money wage (W), the amount paid for an additional unit of labour, divided by the MPN. Marginal cost (W/MPN) increased as output increased because as more labour was hired, the MPN declined. In addition, in the variable-wage model of the preceding section, for workers to supply additional labour, the money wage had to be increased, a further factor causing marginal cost to rise as output increased. These two factors, the declining MPN and increasing upward pressure on money wages as output and employment increase, explain why the aggregate supply schedule is upward sloping.

Figure 3.8 shows the effect on labour supply and on the aggregate Figure 8-12 shows the effect on labour supply and on the aggregate.

Suppose that as a result of observed past increases in the aggregate price level, workers' expectations of the current price level rose from P^e_0 to P^e_1 . The labour supply schedule would then

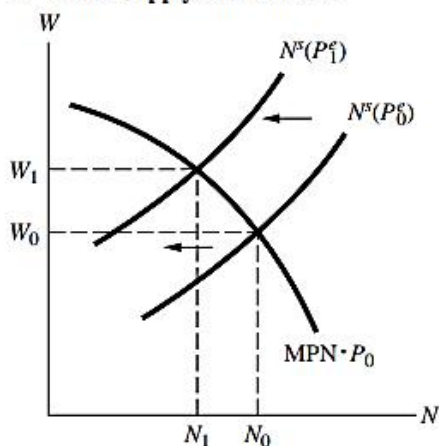
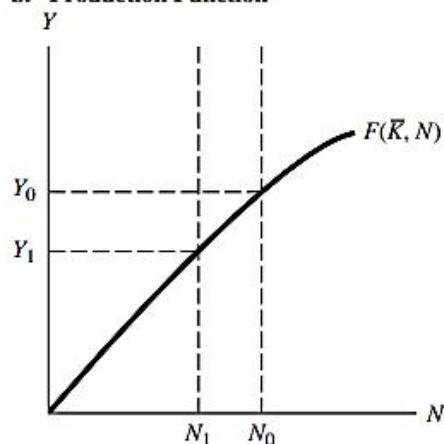
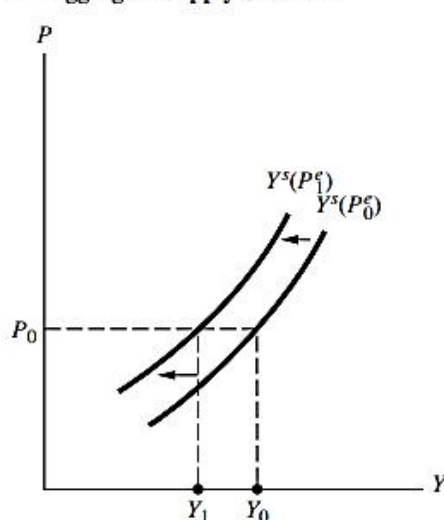
shift to the left in Figure 3.8a, from $N_s(P_{e_0})$ to $N_s(P_{e_1})$. Less labour would be supplied at each money wage because with the higher expectation about the aggregate price level, a given money wage would correspond to a lower real wage. At the initial price level P_0 , the shift in the labour supply schedule would reduce employment (from N_0 to N_1). Consequently, output at price level P_0 would fall (from Y_0 to Y_1), as can be seen in Figure 3.8b. The aggregate supply schedule would shift to the left in Figure 3.8c [from $Y_s(P_{e_0})$ to $Y_s(P_{e_1})$].

Thus, any factor that shifts the labour supply schedule upward to the left, lowering labour supply for a given money wage or, what amounts to the same thing, increasing the money wage at which a given amount of labour will be supplied, shifts the aggregate supply schedule to the left. If we broaden our analysis to allow for variable factors of production other than labour, it follows that an autonomous increase in the price of any variable factor of production will increase MC for a given output level and shift the aggregate supply schedule to the left.

In particular, autonomous increases in the price of raw materials have this cost-push effect. Keynesians believe that increases during the 1970s in the world price of raw materials for production, primarily energy inputs, caused large increases in production cost for a given level of output and resulted in significant shifts to the left in the aggregate supply schedule, increasing the domestic aggregate price level and reducing real output.

In addition to the direct effects that increases in raw material prices have on the aggregate supply schedule, such supply shocks have indirect effects that come through an effect on labor supply. Increases in raw material prices—for example, the price of imported oil and other energy products—push up the domestic price level. As domestic prices rise and enough time passes for these price increases to be perceived by the suppliers of labor, the workers' expectation about the aggregate price level (P_e) will increase. As was just explained, such an increase in the expected price level will cause a shift to the left in the aggregate supply schedule, further increasing the price level and causing an additional decline in real output.

Fig. 3.8 Shift in the Aggregate Supply Schedule with an Increase in the Expected Price Level

a. Labor Supply and Demand**b. Production Function****c. Aggregate Supply Schedule****Summary**

- Aggregate demand schedule is the basis for the macroeconomic theory proposed by Keynes.
- It is a short-run theory.
- Classical economist favoured laissez faire whereas Keynes advocated state intervention especially at the time of crisis.
- It is not only policy effects that remain Keynesian when we allow for a flexible price level; the effects of shocks to the economy also are qualitatively unchanged.
- Changes in autonomous investment and shocks to liquidity preference (money demand) continue to affect output and employment.
- In the Keynesian concept, labour is concerned about money wages.
- The aggregate supply curve is upward sloping.
- It is a short run analysis.

Keywords

Aggregate Demand: Aggregate demand is a measurement of the total amount of demand for all finished goods and services produced in an economy. Aggregate demand is expressed as the total amount of money exchanged for those goods and services at a specific price level and point in time.

Aggregate Supply: Aggregate supply, also known as total output, is the total supply of goods and services produced within an economy at a given overall price in a given period.

Real Wages: The term real wages refers to wages that have been adjusted for inflation, or, equivalently, wages in terms of the amount of goods and services that can be bought. This term is used in contrast to nominal wages or unadjusted wages.

SelfAssessment

1. In the Aggregate Demand schedule in the Keynesian model, the government spending and taxes are taken as constant.
 - A. True
 - B. False
2. Real saving is assumed to depend on
 - A. Real income
 - B. Price level
 - C. Nominal income
 - D. None of the above
3. In the LM schedule, M/P indicates
 - A. Demand for money
 - B. Real wage rate
 - C. Real money supply
 - D. None of the above
4. The aggregate demand schedule is vertical in which of the following model.
 - A. Classical model
 - B. Keynesian model
 - C. Monetarist model
 - D. None of the above
5. As per the Keynesian model, labour would bargain for
 - A. Real wages
 - B. Nominal wages
 - C. Both
 - D. None of the above
6. Which of the following is (are) responsible for money wage rigidity?
 - A. Wage contracts
 - B. No knowledge about prices by the labour
 - C. Implicit contract between employer and employee
 - D. All the above
7. With the money wage fixed and labor supply greater than labor demand, actual employment will be determined by
 - A. Demand
 - B. Price level
 - C. Nominal income
 - D. Real income

8. An increase in the supply of money shifts the LM curve to the
 - A. Left
 - B. Right
 - C. Remains unchanged
 - D. Depends on the time line

9. Classical economists believed that the supply of labor dependedon the real wage.
 - A. Positively
 - B. Negatively
 - C. No relationship
 - D. Perfect relationship

10. As per the Keynesian view the labour is not aware of the real wage rate.
 - A. True
 - B. False

11. Price expectation as discussed by Keynes is influenced by
 - A. Aggregate demand
 - B. Aggregate supply
 - C. Past price level
 - D. Current price level

12. If the supply curve is upward sloping, then there will bein income.
 - A. More increase
 - B. Less increase
 - C. No change
 - D. Proportionate change

13. As per the classical assumptions the supply curve is
 - A. Upward sloping
 - B. Downward sloping
 - C. Horizontal
 - D. Vertical

14. If the government expenditure increases, then the aggregate demand curve
 - A. Shifts outwards
 - B. Shifts inwards
 - C. Does not change
 - D. None of the above

15. As per the classical system, the demand and labour supply are function of
 - A. Nominal wages
 - B. Real wages
 - C. Sticky wages
 - D. None of the above

Answers for Self Assessment

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. A | 2. A | 3. C | 4. A | 5. B |
| 6. D | 7. A | 8. B | 9. A | 10. A |
| 11. C | 12. B | 13. D | 14. A | 15. B |

Review Questions

1. Explain the contractual view of labour market.
2. What are the highlights of the Keynesian system?
3. Compare the Classical and the Keynesian theories of labour supply.
4. What are the factors that shift the aggregate supply schedule?
5. How does change in government expenditure impacts aggregate demand and supply.



Further Readings

Macroeconomics: Theories and Policies By Richard T. Froyen, Pearson Publications

Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 04: Inflation and Unemployment

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4.5 Hyperinflation

4.6 Frictional Unemployment

4.7 Labour Market Experience of the USA and Europe

Summary

Keywords

Self Assessment

Answers for Self Assessment

Review Questions

Further Readings

Objectives

- Comprehend the concept of seigniorage
- Analyze the relation between interest rate and inflation
- Analyze the relationship between nominal interest rate and demand for money.
- Understand Social Costs of Inflation and Hyperinflation
- Understand frictional unemployment and the causes of it.
- Compare unemployment in USA and Europe

Introduction

“Lenin is said to have declared that the best way to destroy the Capitalist System was to debauch the currency. . . . Lenin was certainly right. There is no subtler, no surer means of overturning the existing basis of society than to debauch the currency. The process engages all the hidden forces of economic law on the side of destruction, and does it in a manner which not one man in a million is able to diagnose.” John Maynard Keynes

Keynes was particularly harsh with regards to currency and the economic flow. Inflation is simply an increase in the average level of prices, and a price is the rate at which money is exchanged for a good or service exchanged for a good or service.

4.1 Seigniorage

The revenue raised by the printing of money is called seigniorage. The term comes from the seigneur, the French word for “feudal lord.” In the Middle Ages, the lord had the exclusive right on his manor to coin money. Today this right belongs to the central government, and it is one source of revenue. When the government prints money to finance expenditure, it increases the money supply.

The increase in the money supply, in turn, causes inflation. Printing money to raise revenue is like imposing an inflation tax.

“The total revenues associated with money creation, which is measured as the sum of the revenue from assets purchased due to money creation (after netting out that part of revenue used to keep assets constant) and the revenue from current expansion of money supply in real per capita terms. In other words, seigniorage according to this definition refers to the interest earned on central bank reserves minus losses (gains) due to an increase in the GDP velocity of the monetary base.” Drazen (1985)

Concepts of Seigniorage

- i. The opportunity cost concept (also called fiscal seigniorage), which is measured in terms of the net interest earned on the central bank’s reserves.
- ii. Another concept is that of Monetary seigniorage, which is measured in terms of change in the monetary base over a year after deducting the costs that arise from the creation of the monetary base.
- iii. The inflation tax concept is measured as the product of the inflation rate and the monetary base.

4.2 Inflation and Interest Rate

Interest is the factor payment for capital. It is an important variable to regulate the money supply in the economy. To understand the relationship better, we need to understand the two types of rates of interest. They are

Nominal Interest rate and Real Interest Rate

Nominal Interest Rate

The nominal rate of interest is the rate that is actually agreed and paid. Example: interest received on bank account deposits, interest paid on the loans taken by individuals like education loan, home loan.

Real Interest Rate

It’s not only the nominal payment that is important to both borrowers and savers, but also how many goods, services or other things they could buy with that money. When the rate of inflation is incorporated in the interest rate, it is called the real interest rate. It may be expressed as

$$r = i - \pi$$

Where,

- r= real interest rate
- i= nominal interest rate
- π = inflation

(Mathematically this equation is an approximation. It works so long as all the three are below 20 percent)

The Fisher Effect

Rearranging the terms in our equation for the real interest rate, we can show that the nominal interest rate is the sum of the real interest rate and the inflation rate:

$$i = r + \pi$$

The equation written in this way is called the Fisher equation, after economist Irving Fisher (1867–1947). It shows that the nominal interest rate can change for two reasons: because the real interest rate changes or because the inflation rate changes. Once we separate the nominal interest rate into these two parts, we can use this equation to develop a theory that explains the nominal interest rate. The real interest rate adjusts to equilibrate saving and investment. The quantity theory of money shows that the rate of money growth determines the rate of inflation. The Fisher equation then tells us to add the real interest rate and the inflation rate together to determine the nominal interest rate. The quantity theory and the Fisher equation together tell us how money growth affects the nominal

interest rate. According to the quantity theory, an increase in the rate of money growth of 1 per cent causes a 1-per cent increase in the rate of inflation. According to the Fisher equation, a 1-per cent increase in the rate of inflation, in turn, causes a 1-per cent increase in the nominal interest rate. The one-for-one relation between the inflation rate and the nominal interest rate is called the Fisher effect.

There are two types of Real Interest Rate- Ex-Ante and Ex-Post

When a borrower and lender agree on a nominal interest rate, they do not know what the inflation rate over the term of the loan will be. Therefore, we must distinguish between two concepts of the real interest rate: the real interest rates the borrower and lender expect when the loan is made, called the **ex-ante** real interest rate, and the real interest rate actually realized, called the **ex-post** real interest rate. Although borrowers and lenders cannot predict future inflation with certainty, they do have some expectations of the inflation rate. Let π denote actual future inflation and π^e the expectation of future inflation. The ex-ante real interest rate is $i - \pi^e$, and the ex-post real interest rate is $i - \pi$. The two real interest rates differ when actual inflation π differs from expected inflation π^e .

How does this distinction between actual and expected inflation modify the Fisher effect? Clearly, the nominal interest rate cannot adjust to actual inflation, because actual inflation is not known when the nominal interest rate is set. The nominal interest rate can adjust only to expected inflation. The Fisher effect is more precisely written as

$$i = r + \pi^e$$

The ex-ante real interest rate r is determined by equilibrium in the market for goods and services. The nominal interest rate i moves one-for-one with changes in expected inflation π^e .

4.3 Relationship between Nominal Interest Rate and Demand for Money

The quantity theory is based on a simple money demand function: it assumes that the demand for real money balances is proportional to income. We then add the dimension of nominal interest rate to it to find the demand for money.

The Cost of Holding Money

The money you hold in your wallet does not earn interest. If instead of holding that money, you used it to buy government bonds or deposited it in a savings account, you would earn the nominal interest rate. The nominal interest rate is the opportunity cost of holding money: it is what you give up by holding money rather than bonds. Another way to see that the cost of holding money equals the nominal interest rate is by comparing the real returns on alternative assets. Assets other than money, such as government bonds, earn the real return r . Money earns an expected real return of $-\pi^e$ because its real value declines at the rate of inflation. When you hold money, you give up the difference between these two returns. Thus, the cost of holding money is $r - (-\pi^e)$, which the Fisher equation tells us is the nominal interest rate i . Just as the quantity of bread demanded depends on the price of bread, the quantity of money demanded depends on the price of holding money. Hence, the demand for real money balances depends both on the level of income and on the nominal interest rate. We write the general money demand function as

$$(M/P)^d = L(I, Y)$$

Where M =money supply, P = Price, L : Liquidity preference, i = Rate of interest, Y = income

This equation states that the demand for the liquidity of real money balances is a function of income and the nominal interest rate. The higher the level of income Y , the greater the demand for real money balances. The higher the nominal interest rate i , the lower the demand for real money balances.

Future Money and Cash Balances

Money, prices, and interest rates are now related in several ways. Figure 4.1 illustrates the linkages we have discussed. As the quantity theory of money explains, money supply and money demand together determine the equilibrium price level. Changes in the price level are, by definition, the rate of inflation. Inflation, in turn, affects the nominal interest rate through the Fisher effect. But now, because the nominal interest rate is the cost of holding money, the nominal interest rate feeds back

to affect the demand for money. Consider how the introduction of this last link affects our theory of the price level. First, equate the supply of real money balances M/P to the demand $L(i, Y)$:

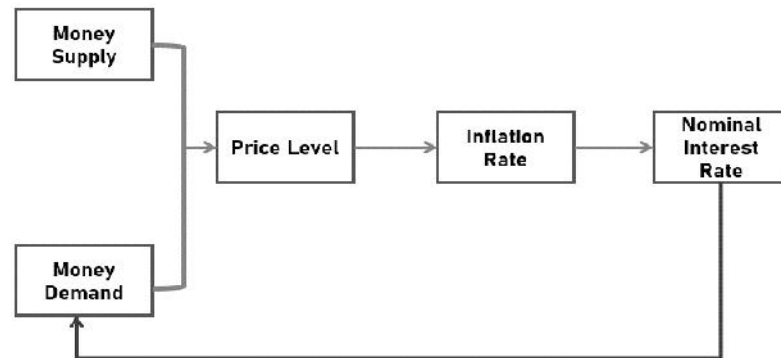
$$\frac{M}{P} = L(i, Y)$$

Next, use the Fisher equation to write the nominal interest rate as the sum of the real interest rate and expected inflation:

$$\frac{M}{P} = L(r + E\pi, Y)$$

This equation states that the level of real money balances depends on the expected rate of inflation.

Fig. 4.1 Linkage among Money, Current Prices and Interest Rate



The last equation tells a more sophisticated story than the quantity theory about the determination of the price level. The quantity theory of money says that today's money supply determines today's price level. This conclusion remains partly true: if the nominal interest rate and the level of output are held constant, the price level moves proportionately with the money supply. Yet the nominal interest rate is not constant; it depends on expected inflation, which in turn depends on growth in the money supply. The presence of the nominal interest rate in the money demand function yields an additional channel through which money supply affects the price level. This general money demand equation implies that the price level depends not only on today's money supply but also on the money supply expected in the future. To see why suppose the Fed announces that it will raise the money supply in the future, but it does not change the money supply today. This announcement causes people to expect higher money growth and higher inflation. Through the Fisher effect, this increase in expected inflation raises the nominal interest rate. The higher nominal interest rate reduces the demand for real money balances. Because the quantity of money has not changed, the reduced demand for real money balances leads to a higher price level. Hence, higher expected money growth in the future leads to a higher price level today. The effect of money on prices is complex. The appendix to this chapter works out the mathematics relating the price level to current and future money. The conclusion of the analysis is that the price level depends on a weighted average of the current money supply and the money supply expected to prevail in the future.

4.4 Social Cost of Inflation and Hyperinflation

The Common Person's View and the Classical Response

The common person sees inflation as a menace that eats away a part of the increased income that she receives every year. She believes that with the increase in income, there is an increase in the price of goods and services that reduces her income. However, this is a common fallacy as the real income of the labour depends on its marginal productivity and not on the fact that the government prints more money or not. The growth rate of the money supply can be increased or decreased through the printing of currency by the government. If the government reduced inflation by slowing the rate of money growth, workers would not see their real wages increasing more rapidly. Instead, when inflation slowed, firms would increase the prices of their products less each year and, as a result, would give their workers smaller raises.

According to the classical theory of money, a change in the overall price level is like a change in the units of measurement. It is as if we switched from measuring distances in feet to measuring them in inches: numbers get larger, but nothing really changes. Imagine that tomorrow morning you wake up and find that, for some reason, all dollar figures in the economy have been multiplied by ten. The price of everything you buy has increased tenfold, but so has your wage and the value of your savings. What difference would this make? All numbers would have an extra zero at the end, but nothing else would change. Your economic well-being depends on relative prices, not the overall price level. Why, then, is a persistent increase in the price level a social problem? It turns out that the costs of inflation are subtle. Indeed, economists disagree about the size of the social costs. To the surprise of many laymen, some economists argue that the costs of inflation are small—at least for the moderate rates of inflation that most countries have experienced in recent years.

The Cost of Expected Inflation

The first scenario that we are looking into is when the rate of inflation is expected. Suppose the rate of inflation is 2 per cent every month, then the yearly inflation is 24 per cent. Now the question is that what would be the social cost of this expected rate of inflation?

Shoe Leather Cost

The inconvenience of reducing money holding is metaphorically called the shoeleather cost of inflation because walking to the bank more often causes one's shoes to wear out more quickly. When the rate of inflation is high, the nominal rate of interest is high, which ultimately leads to less real money balance. If the common person wants to hold a lower cash balance then has to visit the bank frequently.

Menu Costs

The second cost of inflation arises because high inflation induces firms to change their posted prices more often. Changing prices is sometimes costly: for example, it may require printing and distributing a new catalogue. These costs are called menu costs, because the higher the rate of inflation, the more often restaurants have to print new menus.

Relative Price

The third cost of inflation arises because firms facing menu costs change prices infrequently; therefore, the higher the rate of inflation, the greater the variability in relative prices. For example, suppose a firm issues a new catalogue every January. If there is no inflation, then the firm's prices relative to the overall price level are constant over the year. Yet if inflation is 1 per cent per month, then from the beginning to the end of the year the firm's relative prices fall by 12 per cent. Sales from this catalogue will tend to be low early in the year (when its prices are relatively high) and high later in the year (when its prices are relatively low). Hence, when inflation induces variability in relative prices, it leads to microeconomic inefficiencies in the allocation of resources.

Tax Laws

The fourth cost of inflation results from the tax laws. Many provisions of the tax code do not take into account the effects of inflation. Inflation can alter individuals' tax liability, often in ways that lawmakers did not intend. The tax law is not always successful in dealing with inflation. The tax on capital gains is one such example. The government levies the capital gain on the income earned from shares/ bonds. However, any income earned from these sources has to be adjusted with inflation so that the shareholder is not taxed unfairly. However, the tax norms of the government do not take inflation into consideration while forming the tax laws.

Standard of Living

The fifth cost of inflation is the inconvenience of living in a world with a changing price level. Money is the yardstick with which we measure economic transactions. When there is inflation, that yardstick is changing in length. The rupee is a less useful measure when its value is always changing. For example, a changing price level complicates personal financial planning. One important decision that all households face is how much of their income to consume today and how much to save for retirement. A rupee saved today and invested at a fixed nominal interest rate will yield a fixed rupee amount in the future. Yet the real value of that rupee amount—which will determine the retiree's living standard—depends on the future price level. Deciding how much to save would be much simpler if people could count on the price level in 30 years being similar to its level today

The Cost of Unexpected Inflation

Unexpected inflation has an effect that is more pernicious than any of the costs of steady, anticipated inflation: it arbitrarily redistributes wealth among individuals. You can see how this works by examining long-term loans. Most loan agreements specify a nominal interest rate, which is based on the rate of inflation expected at the time of the agreement. If inflation turns out differently from what was expected, the ex-post real return that the debtor pays to the creditor differs from what both parties anticipated. On the one hand, if inflation turns out to be higher than expected, the debtor wins and the creditor loses because the debtor repays the loan with less valuable dollars. On the other hand, if inflation turns out to be lower than expected, the creditor wins and the debtor loses because the repayment is worth more than the two parties anticipated.

Unanticipated inflation also hurts individuals on fixed pensions. Workers and firms often agree on a fixed nominal pension when the worker retires (or even earlier). Because the pension is deferred earnings, the worker is essentially providing the firm with a loan: the worker provides labour services to the firm while young but does not get fully paid until old age. Like any creditor, the worker is hurt when inflation is higher than anticipated. Like any debtor, the firm is hurt when inflation is lower than anticipated. These situations provide a clear argument against variable inflation. **The more variable the rate of inflation, the greater the uncertainty that both debtors and creditors face.** Because most people are risk-averse—they dislike uncertainty—the unpredictability caused by highly variable inflation hurts almost everyone.

Given these effects of uncertain inflation, it is puzzling that nominal contracts are so prevalent. One might expect debtors and creditors to protect themselves from this uncertainty by writing contracts in real terms—that is, by indexing to some measure of the price level. In economies with high and variable inflation, indexation is often widespread; sometimes this indexation takes the form of writing contracts using a more stable foreign currency. In economies with moderate inflation, such as the United States, indexation is less common.

Finally, in thinking about the costs of inflation, it is important to note a widely documented but little understood fact: high inflation is variable inflation. That is, countries with high average inflation also tend to have inflation rates that change greatly from year to year. The implication is that if a country decides to pursue a high-inflation monetary policy, it will likely have to accept highly variable inflation as well. As we have just discussed, highly variable inflation increases uncertainty for both creditors and debtors by subjecting them to arbitrary and potentially large redistributions of wealth.

4.5 Hyperinflation

Hyperinflation is often defined as inflation that exceeds 50 per cent per month, which is just over 1 per cent per day. Compounded over many months, this rate of inflation leads to very large increases in the price level.

Cost of Hyperinflation

Hyperinflation has a high social cost. The shoe-leather costs associated with reduced money holding, are serious under hyperinflation. Business executives devote much time and energy to cash management when cash loses its value quickly. By diverting this time and energy from more socially valuable activities, such as production and investment decisions, hyperinflation makes the economy run less efficiently. Menu costs also become larger under hyperinflation.

Similarly, relative prices do not do a good job of reflecting true scarcity during hyperinflations. When prices change frequently by large amounts, it is hard for customers to shop around for the best price. Highly volatile and rapidly rising prices can alter behaviour in many ways. According to one report, when patrons entered a pub during the German hyperinflation, they would often buy two pitchers of beer. Although the second pitcher would lose value by getting warm over time, it would lose value less rapidly than the money left sitting in the patron's wallet.

Tax systems are also distorted by hyperinflation—but in ways that are quite different than under moderate inflation. In most tax systems there is a delay between the time a tax is levied and the time the tax is paid to the government. In the United States, for example, taxpayers are required to make estimated income tax payments every three months. This short delay does not matter much under low inflation. By contrast, during hyperinflation, even a short delay greatly reduces real tax

revenue. By the time the government gets the money, it is due, the money has fallen in value. As a result, once hyperinflations start, the real tax revenue of the government often falls substantially. Finally, no one should underestimate the sheer inconvenience of living with hyperinflation. When carrying money to the grocery store is as burdensome as carrying the groceries back home, the monetary system is not doing its best to facilitate exchange. The government tries to overcome this problem by adding more and more zeros to the paper currency, but often it cannot keep up with the exploding price level.

Causes of Hyperinflation

The most obvious answer is that hyperinflations are caused by excessive growth in the supply of money. When the central bank prints money, the price level rises. When it prints money rapidly enough, the result is hyperinflation. To stop hyperinflation, the central bank must reduce the rate of money growth. This answer is incomplete, however, for it leaves open the question of why central banks in hyperinflating economies choose to print so much money. To address this deeper question, we must turn our attention from monetary to fiscal policy. Most hyperinflations begin when the government has inadequate tax revenue to pay for its spending. Although the government might prefer to finance this budget deficit by issuing debt, it may find itself unable to borrow, perhaps because lenders view the government as a bad credit risk. To cover the deficit, the government turns to the only mechanism at its disposal—the printing press. The result is rapid money growth and hyperinflation. Once hyperinflation is underway, the fiscal problems become even more severe. Because of the delay in collecting tax payments, real tax revenue falls as inflation rises. Thus, the government's need to rely on seigniorage is self-reinforcing. Rapid money creation leads to hyperinflation, which leads to a larger budget deficit, which leads to even more rapid money creation. The ends of hyperinflations almost always coincide with fiscal reforms. Once the magnitude of the problem becomes apparent, the government musters the political will to reduce government spending and increase taxes. These fiscal reforms reduce the need for seigniorage, which allows a reduction in money growth. Hence, even if inflation is always and everywhere a monetary phenomenon, the end of hyperinflation is often a fiscal phenomenon as well.

4.6 Frictional Unemployment

The problem of frictional unemployment is related to the time taken to search for a job. This is the in-between time when a person is transiting from one job to another. The time is taken because the job market is not in equilibrium. If the job market is in equilibrium, then as soon as a person leaves one job, she will get another job. But this is not the real case.

In fact, workers have different preferences and abilities, and jobs have different attributes. Furthermore, the flow of information about job candidates and job vacancies is imperfect, and the geographic mobility of workers is not instantaneous. One of the primary reasons for the disequilibrium in the job market is the imperfect flow of information. For all these reasons, searching for an appropriate job takes time and effort, and this tends to reduce the rate of job finding. Indeed, because different jobs require different skills and pay different wages, unemployed workers may not accept the first job offer they receive. The unemployment caused by the time it takes workers to search for a job is called frictional unemployment.

Some frictional unemployment is inevitable in a changing economy. For many reasons, the types of goods that firms and households demand vary over time. As the demand for goods shifts, so does the demand for the labour that produces those goods. The invention of mobile phones, for example, reduced the demand for landline phones and, as a result, for labour by landline manufacturers. At the same time, it increased the demand for labour in the electronics industry.

Similarly, because different regions produce different goods, the demand for labour may be rising in one part of the country and falling in another. Economists call a change in the composition of demand among industries or regions a sectoral shift. Because sectoral shifts are always occurring, and because it takes time for workers to change sectors, there is always frictional unemployment.

Sectoral shifts are not the only cause of job separation and frictional unemployment. In addition, workers find themselves unexpectedly out of work when their firms fail, when their job performance is deemed unacceptable, or when their particular skills are no longer needed. Workers also may quit their jobs to change careers or to move to different parts of the country. As long as the supply and demand for labour among firms is changing, frictional unemployment is unavoidable.

Public Policy and Frictional Unemployment

Many public policies seek to decrease the natural rate of unemployment by reducing frictional unemployment. Government employment agencies disseminate information about job vacancies in order to match jobs and workers more efficiently. Publicly funded retraining programs are designed to ease the transition of workers from declining to growing industries. If these programs succeed at increasing the rate of job finding, they decrease the natural rate of unemployment.

Other government programs inadvertently increase the amount of frictional unemployment. One of these is unemployment insurance. Under this program, unemployed workers can collect a fraction of their wages for a certain period after losing their jobs. Although the precise terms of the program differ from year to year and from state to state, a typical worker covered by unemployment insurance in the United States receives 50 per cent of his or her former wages for 26 weeks. In many European countries, unemployment insurance programs are even more generous. By softening the economic hardship of unemployment, unemployment insurance increases the amount of frictional unemployment and raises the natural rate. The unemployed who receive unemployment-insurance benefits are less pressed to search for new employment and are more likely to turn down unattractive job offers. Both of these changes in behaviour reduce the rate of job finding. In addition, because workers know that their incomes are partially protected by unemployment insurance, they are less likely to seek jobs with stable employment prospects and are less likely to bargain for guarantees of job security. These behavioural changes raise the rate of job separation. That unemployment insurance raises the natural rate of unemployment does not necessarily imply that the policy is ill-advised. These programs are implemented by developed countries. In a developing country like India, frictional unemployment is not a major concern for the government. The programs to reduce unemployment focus on generating more employment opportunities for people who are unemployed because of various reasons. During the pandemic, millions of people lost their jobs (as per the CMIE data). However, the budget of 2021 and 2022 did not have anything major to generate direct employment. The government of India publishes a weekly journal called Employment News (in English, Hindi and Urdu) which informs about job vacancies, job oriented training programmes, admission notices, notices related to job oriented exams and results of recruitment exams of Central and State government.

The program has the benefit of reducing workers' uncertainty about their incomes. Moreover, inducing workers to reject unattractive job offers may lead to better matching between workers and jobs. Evaluating the costs and benefits of different systems of unemployment insurance is a difficult task that continues to be a topic of much research. Economists who study unemployment insurance often propose reforms that would reduce the amount of unemployment. One common proposal is to require a firm that lays off a worker to bear the full cost of that worker's unemployment benefits. Such a system is called 100 per cent experience-rated because the rate that each firm pays into the unemployment-insurance system fully reflects the unemployment experience of its own workers. Most current programs are partially experience-rated. Under this system, when a firm lays off a worker, it is charged for only part of the worker's unemployment benefits; the remainder comes from the program's general revenue. Because a firm pays only a fraction of the cost of the unemployment it causes, it has an incentive to lay off workers when its demand for labour is temporarily low. By reducing that incentive, the proposed reform may reduce the prevalence of temporary layoffs.

4.7 Labour Market Experience of the USA and Europe

The US Experience

The duration of unemployment is important. People who are unemployed for a short period of time are due to frictional unemployment which can be avoided. Long term unemployment is structural in nature and requires concrete policies. If the goal is to reduce the natural rate of unemployment, policies must aim at long term unemployed. Long term unemployed account for large scale unemployment. Young people who entered the workforce recently are more likely to get unemployed as they want to explore career options. Unemployment averaged below 5 per cent in the 1950s and 1960s, rose to over 6 per cent in the 1970s and 1980s, and then drifted back to around 5 per cent in the 1990s and the early 2000s. The primary reason for unemployment in the seventies was the population boom after the II World War. The oil price volatility in the seventies also caused unemployment but similar trends were not seen during the 2000s. Productivity of labour was low in

the seventies which caused unemployment. In the nineties, productivity improved, and unemployment decreased.

European Experience

Between 1960 and 2007, France, Italy, UK and Germany had the highest number of people unemployed. One of the prime reasons is the unemployment dole that is given for a long period of time. Demand for unskilled workers in relation to skilled workers has declined. In the USA this has led to wage differentials, however, in Europe, it has resulted in unemployment. Unemployment rates differ between the European countries. The variation is high in the case of long term unemployment (people unemployed for more than a year). In Europe, unemployment doles make people complacent regarding searching for jobs. The unemployment rates differ between the European countries. The variation is high in the case of long term unemployment (people unemployed for more than a year). In Europe, unemployment doles make people complacent regarding searching for jobs. The trade unions are much stronger in Europe giving rise to collective bargaining for wages. Tax rates are high in Europe which makes people work fewer hours. Retirement age is less in Europe. Europeans are using the increase in productivity to have more leisure than income. It is the opposite in the USA.

Summary

- Seigniorage is the revenue that the government raises by printing money.
- The nominal interest rate is the sum of the real interest rate and the inflation rate.
- The Fisher effect says that the nominal interest rate moves one-for-one with expected inflation.
- The price level depends not only on today's money supply but also on the money supply expected in the future.
- On the basis of expected money supply, expected inflation rate is high.
- Through the Fisher effect, this increase in expected inflation leads to an increase in nominal interest rate.
- The higher nominal interest rate increases the cost of holding money and therefore reduces the demand for real money balances.
- Unemployment represents wasted resources.
- Frictional unemployment or structural unemployment can be easily reduced.
- The government cannot make job search instantaneous, and it cannot easily bring wages closer to equilibrium levels.
- Zero unemployment is not a plausible goal for free-market economies.

Keywords

Inflation: Inflation is the rate of increase in prices over a given period of time. Inflation is typically a broad measure, such as the overall increase in prices or the increase in the cost of living in a country.

Hyperinflation: Hyperinflation is a term to describe rapid, excessive, and out-of-control general price increases in an economy.

Seigniorage: profit made by a government by issuing currency, especially the difference between the face value of coins and their production costs.

Menu Costs: Menu costs are the costs incurred by a business when it changes the prices it offers to its customers.

Shoe leather Costs: Shoe leather cost refers to the cost of time and effort that people spend trying to counteract the effects of inflation, such as holding less cash, investing in different currencies with lower levels of inflation, and having to make additional trips to the bank.

SelfAssessment

1. Interest received on bank account deposits is a type of
 - A. Nominal interest rate
 - B. Real interest rate
 - C. Inflation tax
 - D. None of the above

2. The Fisher effect tells how the growth of money impacts
 - A. Nominal interest rate
 - B. Real interest rate
 - C. Inflation tax
 - D. None of the above

3. The real interest rate that the borrower and lender expect when the loan is made, called the interest rate.
 - A. Nominal interest rate
 - B. Real interest rate
 - C. Ex-ante real interest rate
 - D. Ex-post real interest rate

4. The actual inflation rate is known when the nominal interest rate is set.
 - A. True
 - B. False

5. When the rate of inflation is incorporated in the interest rate, it is called the
 - A. Nominal interest rate
 - B. Real interest rate
 - C. Ex-ante real interest rate
 - D. Ex-post real interest rate

6. The quantity theory of money says that today's money supply determines price level.
 - A. Today's
 - B. Future
 - C. No relationship between money supply and price level
 - D. Previous

7. The nominal interest rate is the of holding money
 - A. Trade off
 - B. Opportunity cost
 - C. Price
 - D. None of the above

8. The real wages depend on

- A. Price level
 - B. Marginal productivity of labour
 - C. Nominal wage rate
 - D. Rate of unemployment
9. Shoeleather cost is associated with
- A. Inflation
 - B. Deflation
 - C. Stagflation
 - D. Depression
10. When inflation induces variability in relative prices, it leads to inefficiencies in the allocation of resources.
- A. Macroeconomic
 - B. Uncertainty led
 - C. Microeconomic
 - D. None of the above
11. has a very high social cost.
- A. Inflation
 - B. Deflation
 - C. Hyperinflation
 - D. Stagflation
12. If A leaves the job in the month of April and his joining in the new company is in the month of October, the in between unemployment is called:
- A. Seasonal unemployment
 - B. Frictional unemployment
 - C. Voluntary unemployment
 - D. Cyclical unemployment
13. Long term unemployment isin nature.
- A. Seasonal
 - B. Frictional
 - C. Structural
 - D. All the above
14. The unemployment rise in the seventies in USA was because of
- A. Population boom
 - B. Oil crisis of 1973
 - C. Stagflation
 - D. All the above
15. Is unemployment dole a reason for long term unemployment?
- A. True
 - B. False

Answers for Self Assessment

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. A | 2. A | 3. C | 4. B | 5. B |
| 6. A | 7. B | 8. B | 9. A | 10. C |
| 11. D | 12. B | 13. C | 14. D | 15. A |

Review Questions

1. What do you understand by Seigniorage? What are the costs incurred to the government?
2. Explain nominal and real interest rates. What role do they play in the Fisher Effect?
3. During war time, the prices of goods go up leading to inflation and even hyperinflation. What are the social costs of this inflation during the war time?
4. What are the causes of hyperinflation? In recent times is there any instance of hyperinflation?
5. What are the costs of inflation when it is expected and unexpected? Discuss both the situations.



Further Readings

Macroeconomics: Theories and Policies by Richard T. Froyen, Pearson Publications

Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit05: The Monetarist Counterrevolution

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Objectives

Analyze the monetarist propositions

Evaluate Friedman's view on the classical theory of money.

Analyze the restatement of the quantity theory of money by Friedman

Evaluate the concepts of fiscal policy and monetary policy.

Introduction

The revolution in economics started with Keynesian where he challenged a lot of the assumptions made by the classical theorists. In 1946 after the death of Keynes, many of his followers extended the Keynesian thought in other areas and helped in taking policy decisions. One of the areas where they countered the classical thought was the Quantity Theory of Money. Milton Friedman was the pioneer of the Monetarism revolution and he continued writing on the various facets of monetary policies till the last years of his life. In classical theory, money was not given much importance and the supply of money was taken as constant. As per the monetarist economists, money was a very important component of the economy and so was monetary policy.

In this chapter, we will look at the propositions of monetarists, analyse the restatement of the quantity theory of money by Friedman, evaluate the concept of fiscal policy and monetary policy and end with the comparison of the Keynesian view and the Monetarist view.

5.1 Monetarist Propositions

There are four main propositions as given by the monetarists. They are

1. The supply of money is the dominant influence on nominal income.
2. In the long run, the influence of money is primarily on the price level and other nominal magnitudes. In the long run, real variables, such as output and employment, are determined by real, not monetary, factors.
3. In the short run, the supply of money does influence real variables. Money is the dominant factor causing cyclical movements in output and employment.

4. The private sector is inherently stable. Instability in the economy is primarily the result of government policies.

Milton Friedman would often say that monetary policy is “too important to be left to central bankers.” The monetarists believed that the monetary policy should be implemented by law and not left to the discretion of the policymakers. As per the propositions given by them, they concluded that the money supply provided stability to the economy. The rate of change in the money supply growth rate should be constant in the long run.

The first monetarist proposition is that the level of economic activity in current dollars is determined primarily by the supply of money. An important element in this proposition is that causation is assumed to be primarily from money to income. For the most part, changes in the money supply are assumed to cause changes in nominal income. The level and rate of growth of the money supply are assumed to be determined primarily by the central bank.

The second monetarist proposition asserts that, in the long run, economic activity measured in real dollars does not depend on the quantity of money. In the long run, real output is determined by real factors such as the stock of capital goods, the size and quality of the labour force, and the state of technology. If, in the long run, the level of real economic activity is not affected by the quantity of money, while the level of economic activity in nominal terms is almost completely determined by the supply of money, it follows that the long-run effect of money is on the price level.

The third proposition states that, in the short run, output and employment are strongly influenced by changes in the supply of money. Prices are influenced as well, but in the short run, prices, including wage rates (the price of labour), are not perfectly flexible. Thus, when the quantity of money changes, in the short-run prices, do not make the full adjustment. Output and employment are also affected.

The fourth monetarist proposition asserts that the private sector (businesses and households) is not the source of instability in the economy. As one monetarist, Karl Brunner, put it, the private sector is “essentially a shock-absorbing, stabilizing and self-adjusting process. Instability is produced dominantly by the operation of the government sector.” The government causes instability in the economy primarily by allowing instability in the growth of the money supply, the major determinant of economic activity. In the monetarist view, the government can also destabilize the economy by interfering with the normal adjustment mechanisms in the private economy. Mandatory controls on prices and wages are an obvious example of government interference with such adjustment properties. Other examples are usury ceilings on interest rates, rent controls, and minimum wage laws.

5.2 The Reformulation of the Quantity Theory of Money

The reformulation of the Quantity Theory of Money by the Monetarist has to be studied in two parts. The first part is the evaluation of the classical theory of money in light of the propositions made by Keynes. Friedman then reformulated the quantity theory of money which is the second part of it.

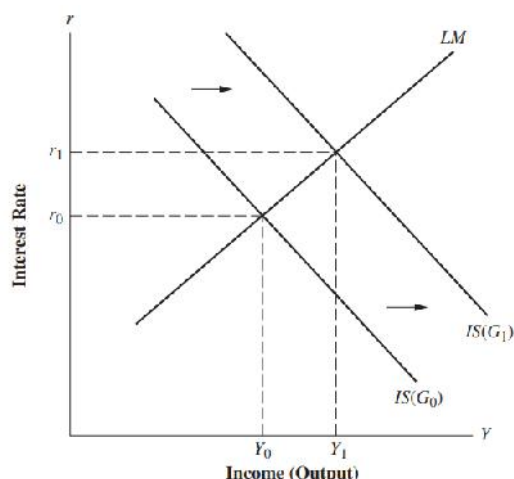
Money and the Early Keynesians

“In monetary theory, that analysis was taken to mean that in the quantity equation $MV = PT$ the term for velocity could be regarded as highly stable, that it could be taken as determined independently of the other terms in the equation, and that as a result change in the quantity of money would be reflected either in prices or in output.” Milton Friedman

The classical quantity theory of money came to a lot of disrepute because of the obvious blanks in the concept. Milton Friedman was of the view that the Keynesian thoughts need to be included in the classical theory so as to give him his due. The early Keynesians considered money to be important but the velocity of money was taken as a variable. Factors other

than money could also affect the level of economic activity.

Fig. 5.1 Effects of Increase in Government Spending



The increase in government spending from G_0 to G_1 shifts the IS schedule from $IS(G_0)$ to $IS(G_1)$. Income rises from Y_0 to Y_1 , and the interest rate increases from r_0 to r_1 . The money supply is held constant here, with the increased government spending assumed to be financed by selling bonds to the public. The higher level of income causes a higher transactions demand for money. Bringing money demand back to equality with the unchanged money supply requires a rise in the interest rate. At the higher interest rate, the speculative demand for money will have declined, and the demand for transactions balances at a given level of income will also have fallen. Thus, the same money supply can support a higher income level. Another way to express this finding is to say that velocity varies positively with the interest rate. Because velocity is variable in the Keynesian system, there is no one income level corresponding to a given money supply. This is not to say that Keynesians believe that money is unimportant; they do not. The quantity of money is one, but not the only, determinant of income in the Keynesian system.

Early Keynesian economists gave limited importance to money. Their view was based on empirical judgments about the slopes of the IS-LM schedules, which, are important in determining the relative effectiveness of the monetary and fiscal policy. Influenced by the Depression, they believed that the LM schedule was quite flat and the IS schedule quite steep – the configuration that would be characteristic of depression conditions such as those of the 1930s. The Depression was characterized by low levels of income and a low-interest rate. Such a situation approaches the liquidity trap; the LM schedule becomes very flat. Further, in depression conditions, the early Keynesian economists believed that investment would be relatively interest inelastic, making the IS schedule steep. The Depression was a period with a very low utilization rate of existing plant and equipment. Early Keynesian economists thought that, with massive excess capacity, the investment would be unlikely to respond much to changes in the interest rate.

Fig. 5.2 View of Early Keynesians on Monetary Policy Effectiveness

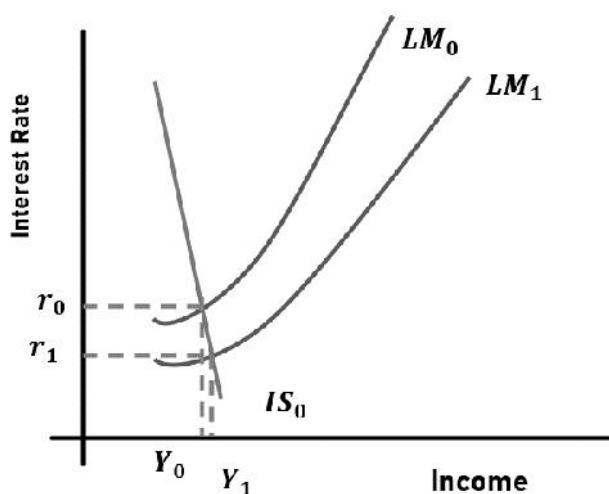


Figure 5.2 shows this configuration of the IS and LM schedules and illustrates the ineffectiveness of an increase in the quantity of money that shifts the LM schedule from LM_0 to LM_1 . With the LM schedule flat around the point of equilibrium, a given change in the money supply does very little

to lower the interest rate, the first link in the chain connecting money and income in the Keynesian model. Further, with a steep IS a schedule, a drop in the interest rate would not increase investment very much. This combination of an assumed high-interest elasticity of money demand and low-interest elasticity of investment-led early Keynesian economists to conclude that money was unimportant.

What role was there for monetary policy? During World War II, much of the war expenditure had been financed by selling bonds to the public at relatively low-interest rates. Keeping the interest rate on bonds low and stable would have the desirable effects of keeping the cost of interest payments on the debt low and protecting the capital value of the bonds for the investors (recall that bond prices and interest rates vary inversely). Low-interest rates also meant that monetary policy would make whatever limited contribution it could to strengthening aggregate demand. Because early Keynesian economists feared a return to the depression conditions of the 1930s, this was another desirable feature of low-interest rates. Thus, low and stable interest rates became the goal of monetary policy. The early Keynesians believed in pegging the interest rate. A further element in the view of the early Keynesians made pegging the interest rate desirable. Following Keynes, they believed that the demand for money (liquidity preference) was highly unstable. The LM schedule shifted around in an unpredictable way. These shifts would lead to instability in financial markets that could be avoided by pegging the interest rate.

Friedman's Restatement of the Quantity Theory of Money

Friedman argued that the demand for money was stable as opposed to the early Keynesians. Contrary to the near-liquidity-trap characterization, Friedman maintained that the interest elasticity of money demand was certainly not infinite and was in fact "rather small." The quantity of money, far from being unimportant, was the dominant influence on the level of economic activity. Friedman's conclusions rest on a restatement of the classical quantity theory of money. The Friedman approach is the closest to the Classical approach of the quantity theory of money. That approach focused on the demand for money. The central relationship was

$$M^d = \bar{k}PY \quad 5.1$$

expressing a proportional relationship between money demand (M^d) and the level of nominal income [price (P) times real income (Y)]. The factor of proportionality (k) was taken as constant in the short run. Friedman emphasizes that the quantity theory was, as can be seen from equation (5.1), a theory of money demand. Because k was treated as a constant by the Cambridge economists and the nominal supply of money (M) was treated as being set exogenously by the monetary authority, the Cambridge equation can be transformed into a theory of nominal income,

$$M = M^d = \bar{k}PY$$

$$M \frac{1}{\bar{k}} = PY \quad 5.2$$

Or alternatively
$$M\bar{V} = PY \quad 5.3$$

The bar over the variables k and V shows that they are constant.

Keynes's theory of money demand stressed the role of money as an asset in addition to its role in transactions. In studying the factors that determined how much money people would hold, Keynes considered factors that determined the desirability of money relative to other assets. He made the simplifying assumption that other assets were a homogeneous enough group to be lumped together under the category "bonds." He then considered how an individual allocated wealth between money and bonds. The key factors that he thought determined the split were the level of income and the level of the interest rate. Put in terms of the Cambridge equation, Keynes focused on the interest rate as the primary determinant of k , the amount of money balances a person would hold for a given level of income. A rise in the interest rate led to a fall in k or, equivalently, a rise in velocity, as we saw in the preceding subsection. Because k was a variable, not a constant, the Cambridge equation could not by itself provide a theory of nominal income. Friedman accepted Keynes's emphasis on the role of money as an asset. With this as a basis, he sets out his own theory of the demand for money. Again income is one determinant of money demand and, as with Keynes's analysis, we can view Friedman's analysis as providing a theory of what determines the Cambridge k , money holdings as a proportion of nominal income. Friedman's money demand function can be written as follows:

$$M^d = L(P, Y, r_B, r_E, r_D) \quad 5.4$$

Where P = price level

Y = real income

r_B = nominal interest rate on bonds

r_E = nominal return on equities

r_D = nominal return on durable bonds

Money demand is assumed to depend on nominal income, the product of the first two arguments in the demand function. An increase in nominal income would increase money demand. For a given level of nominal income, Friedman assumes, as did Keynes, that the amount of money demanded depends on the rate of return offered on alternative assets. These are bonds (the asset Keynes focused on), equities (shares of stock in corporations), and durable goods such as consumer durables, land, and houses. Durable goods do not pay an explicit interest rate. The return on durable goods is the increase in their valuation with the passage of time. Thus, the expected rate of inflation is also a determinant of money demand. The demand of money is inversely proportional to the rate of return on the alternative assets. The higher the rate of return on these assets, the lesser is the demand for money.

Friedman's theory differs from Keynes's in several respects.

1. Friedman views the money demand function as stable. Keynes's view was that the demand-for-money function was unstable, shifting with changes in the public confidence in the economy.
2. Friedman does not segment money demand into components representing transaction balances, speculative demand, and precautionary demand. Money, like other "goods," has attributes that make it useful, but Friedman does not find it helpful to specify separate demands based on each of the uses of money.
3. The third difference between Keynes's and Friedman's money demand theories is that Friedman includes separate yields for bonds, equities, and durable goods. Keynes focused on the choice of money versus bonds.

The restatement given by Friedman is used to explain the Cambridge version as well and to restate it.

$$M^d = k(r_B, r_E, r_D)PY$$

where instead of a constant k we now have k expressed as a function of the rates of return on the assets that are alternatives to holding money. A rise in the rate of return on any one of these alternative assets would cause k to fall, reflecting the increased desirability of the alternative asset. In these terms, we see that Friedman restated the quantity theory, providing a systematic explanation of k that takes into account the Keynesian analysis of money's role as an asset.

In Friedman's version of the Cambridge equation, the equilibrium condition in the money market is

$$M = M^d = k(r_B, r_E, r_D)PY \quad 5.5$$

With a stable money demand function, an exogenous increase in the money supply must either lead to a rise in PY or cause declines in r_B , r_E , and r_D (which will cause k to rise), with indirect effects on PY . A quantity theorist believes that the money demand function is, in fact, stable; that changes in the money supply come mostly from the supply side as a result of central bank policies; and finally, that changes in the quantity of money are important in determining nominal income (that much of the effect of a change in M comes in the form of a change in PY).

5.3 Fiscal and Monetary Policy

Fiscal Policy

The monetarist and Keynesian frameworks produce very different views about the effectiveness of fiscal policy changes. The monetarist view on the effectiveness of fiscal policy has been expressed by Milton Friedman as follows:

"I come to the main point— in my opinion, the state of the budget by itself has no significant effect on the course of nominal income, on deflation, or on cyclical fluctuations." In reference to

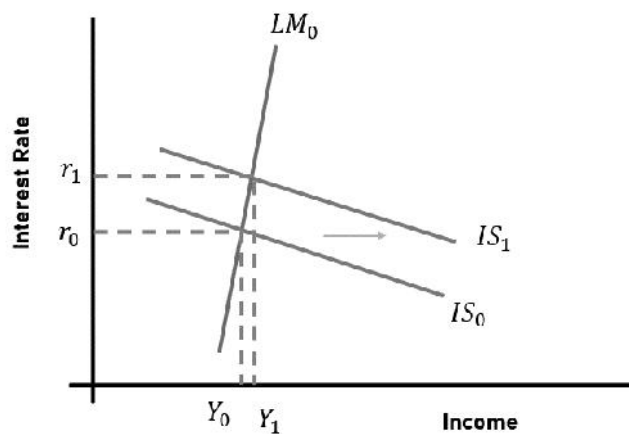
the Keynesian proposition that fiscal policy was effective, **Friedman wrote: "The 'monetarists' rejected this proposition and maintained that fiscal policy by itself is largely ineffective, that what matters is what happens to the quantity of money."**

He takes into consideration the situation of the fiscal policy when the government budget holds the quantity of money as fixed. We discuss situations when there is an increase in government spending.

- If tax rates are not changed, which has been our usual assumption when we consider one policy change at a time, the new spending must be financed by printing money or by selling bonds.
- Similarly for a tax cut, if spending is to be unchanged, lost tax revenues must be replaced by sales of bonds to the public or by printing new money. If a tax cut or spending increase is financed by printing new money, we have both a monetary policy action (M increases) and a fiscal policy action (G increases or T falls).

In terms of the IS-LM framework, both the IS and LM schedules shift. Monetarists do not argue that this type of policy change will be ineffective, however, they argue that it is the change in the quantity of money that will bring about the change. The controversy is over what Friedman refers to as the effect of a change in the federal budget by itself, meaning without an accompanying change in the quantity of money. This means, in the case of a tax cut or spending increase, that the deficit created by these actions would be financed completely by sales of bonds to the public. The monetarist position is that such policy actions will have a little systematic effect on nominal income (prices or real output). The reasons monetarists reach this conclusion can be seen in Figure 5.3. There we consider the effects of an increase in government spending when we accept the monetarist assumptions about the slopes of the IS and LM schedules. An increase in government spending from G_0 to G_1 shifts the IS schedule to the right, from IS_0 to IS_1 . The effect of the increase in government spending in the monetarist case is to cause the interest rate to rise (from r_0 to r_1). Income is changed only slightly (from Y_0 to Y_1). Why?

Fig. 5.3 Effects of Increase in Government Spending as per the Monetarists



The explanation to this given by the monetarists is that the interest elasticity of money demand is very small, and the LM curve is steep. When the government spending increases. It initially increases the aggregate demand. As income begins to rise, the demand for transaction balances increases. With the money supply fixed, this increase puts upward pressure on the interest rate, which rises until money supply and demand are again equal. If money demand is interest inelastic, a large increase in the interest rate is required to re-equilibrate money demand with the fixed money supply. The IS schedule is relatively flat in the monetarist view. Investment demand is highly sensitive to changes in the interest rate. Therefore, the rise in the interest rate required to keep the money market in equilibrium will cause private-sector aggregate demand to decline substantially as government spending begins to stimulate income. This reduction in private-sector aggregate demand is referred as crowding out effect.

Monetary Policy

Monetarists and modern Keynesians- both believe that monetary policy actions have substantial and sustained effects on nominal income. The early Keynesians doubted the effectiveness of the monetary policy. The difference today between Keynesians and monetarists over monetary policy concerns not whether monetary policy can affect income but how monetary policy should be used to stabilize income.

The Monetarist Position

Freidman and the other monetarists trace the instability in income growth to unstable money growth. Monetarists believe that changes in the quantity of money are the dominant influence on changes in nominal income and, in the short run, on changes in real income as well. It follows that stability in the behaviour of the money supply would go a long way toward producing stability in income growth. Freidman's position on monetary policy can be summarized in the following words:

"My own prescription is still that the monetary authority goes all the way in avoiding such swings by adopting publicly the policy of achieving a specified rate of growth in a specified monetary total. The precise rate of growth, like the precise monetary total, is less important than the adoption of some stated and known rate."

Today some monetarists propose alternative rules for monetary policy that are less inflexible than Friedman's constant money growth rate rule. The common element in the monetarist proposals, however, is that monetary policy should be determined by a rule, not left to the discretion of policymakers. If we accept the reasoning that one will do pretty well with a monetary policy rule, the question still remains: Why not the best? Why not use monetary policy to offset even minor shocks that affect income? Friedman's answer is,

"We simply do not know enough to be able to recognize minor disturbances when they occur or to be able to predict either what their effects will be with any precision or what monetary policy is required to offset their effects."

Friedman and other monetarists believe that changes in the money supply will have a strong effect on income, but that there is a lag, with the bulk of the effect occurring only after 6 to 18 months. Thus, to offset a shock, we must be able to predict its size and when it will affect the economy several quarters in advance. Friedman and other monetarists do not think we know enough to do this. To again quote Friedman: **"There is a saying that the best is often the enemy of the good, which seems highly relevant. The goal of an extremely high degree of economic stability is certainly a splendid one; our ability to attain it, however, is limited."**

Contrast With the Keynesians

Keynesians believe that both monetary and fiscal policy should be actively adjusted to offset shocks to the economy. **Franco Modigliani**, a leading Keynesian, expressed this view (which he characterized as non-monetarist) as follows:

Non-monetarists accept what I regard to be the fundamental practical message of The General Theory: that a private enterprise economy using intangible money needs to be stabilized, can be stabilized, and, therefore, should be stabilized by appropriate monetary and fiscal policies.

Keynesians favour discretionary monetary and fiscal policy actions. They oppose money growth rate rules.

The first explanation for these differing views is the disagreement between monetarists and Keynesians concerning the need for active stabilization policies. Whereas monetarists view the private sector as stable and shock-absorbing, Keynesians see the private sector as shock-producing and unstable. This is not to say that Keynesians believe that without government stabilization policies we would constantly experience depressions and hyperinflations, but rather that shocks would result in substantial prolonged deviations from conditions of full employment and price stability.

A second source of the differing views of monetarists and Keynesians is also evident from Modigliani's statement. He believes that we can stabilize the economy. We can predict shocks that will hit the economy and design policies to combat them. To be sure, there will be errors, but overall such policies will result in more stable economic performance than we would have with simple policy rules.

5.4 Unstable Velocity and the Declining Policy Influence of Monetarism

Monetarists ruled the policy area till the end of the 1970s. USA and UK both adopted monetary policies as advocated by the monetarists. At the beginning of the eighties, there was money-income instability. In 1986, *The Economist* asked, "Is this the year when Monetarism vanishes?" The data from the 1980s for the developed countries showed that the monetary policy was not as effective as earlier. There was a need to reconsider and re-evaluate the monetary policy, so that there was more flexibility in the system. There was a thought to directly target inflation in place of targeting money growth rate. In the later years, all over the world, the main objective of monetary policy is inflation targeting and this is no different in case of India as well. Milton Friedman reacted by saying,

"the long and short of it is that I am convinced of a fundamental tenet of monetarism: Money is too important to be left to the central bankers."

Summary

The monetarists have said that money is the basis of all economic activity. The short-run and long-run equilibrium depend directly or indirectly on the supply of money. The money demand function is stable and this stability is because of the monetary policy. This demand function plays an important role in determining the level of economic activity. The quantity of money is strongly affected by money supply factors. There were quite many similarities between the monetarists and modern Keynesians. Monetary policy was more effective as per the monetarists. In spite of volatilities and instability, monetarists believed that money was the most important factor in determining nominal income.

Keywords

Fiscal policy: Fiscal policy refers to the use of government spending and tax policies to influence economic conditions, especially macroeconomic conditions, including aggregate demand for goods and services, employment, inflation, and economic growth.

Monetarists: A monetarist is an economist who holds the strong belief that money supply – including physical currency, deposits, and credit – is the primary factor affecting demand in an economy.

Monetary Policy: Monetary policy is a set of tools that a nation's central bank has available to promote sustainable economic growth by controlling the overall supply of money that is available to the nation's banks, its consumers, and its businesses.

SelfAssessment

1. Who is the pioneer of monetarism?
 - A. J M Keynes
 - B. A C Pigou
 - C. Robert Lucas
 - D. Milton Friedman

2. In the long run, real variables, such as output and employment, are determined by ..., not, factors.
 - A. Monetary, real
 - B. Real, monetary
 - C. Fiscal, monetary
 - D. Monetary, fiscal

Unit 05: The Monetarist Counterrevolution

3. In the long run, money influences
 - A. Price level
 - B. Real factors
 - C. Nominal factors
 - D. None of the above

4. In the short run, money influences
 - A. Price level
 - B. Real factors
 - C. Nominal factors
 - D. None of the above

5. The fourth monetarist proposition asserts that the sector is stable.
 - A. Government
 - B. Public
 - C. Private
 - D. Mixed

6. In which school of thought was velocity of money taken as stable?
 - A. Classical school of thought
 - B. Neo-classical school of thought
 - C. Keynesian school of thought
 - D. Monetarism

7. Which of them is not a sign of depression in the economy?
 - A. Low interest rate
 - B. Low levels of output
 - C. Low level of income
 - D. High rate of employment

8. Why is the LM curve flat?
 - A. High rate of interest
 - B. Low rate of interest
 - C. High supply of currency
 - D. High rate of investment

9. Was pegging the interest rate a part of Keynesian philosophy?
 - A. True
 - B. False

10. Did Milton Freidman argue that the demand for money was unstable?
 - A. True
 - B. False

11. If the interest elasticity of money demand is less than the LM schedule is
 - A. Flat
 - B. Steep

- C. Straight line
D. None of the above
12. If the short run instability in the economy is to be corrected, then,
A. Prediction is to be precise.
B. The time lag is there between monetary policy action and results.
C. Fiscal policy is to be initiated.
D. All the above.
13. As per the Keynesians the main culprit of creating disruptions in the economy is/are.
A. Government
B. Consumers
C. Private enterprises
D. External factors
14. Did Keynes support a laissez faire economy?
A. True
B. False
15. Who has given the concept of Liquidity Trap?
A. David Ricardo
B. Gregory Mankiw
C. J M Keynes
D. Franco Modigliani

Answers for Self Assessment

1. D 2. B 3. A 4. C 5. C
6. A 7. D 8. C 9. A 10. B
11. B 12. A 13. C 14. B 15. C

Review Questions

- How is the Friedman statement a restatement of the Cambridge equation?
- According to you, is monetary policy viable in a developing country like ours? Take the reference of the monetarists view and analyze.
- How according to the monetarists is the monetary policy more important for the stability of the economy? Why according to the monetarists is the fiscal policy not useful?
- Compare the thoughts of the Monetarists and the Keynesians regarding the fiscal policy.
- Discuss the various situations of tax change and how it impacts the fiscal policy. Does this lead to any change in the money growth rate?

**Further Readings**

Macroeconomics: Theories and Policies by Richard T. Froyen, Pearson Publications

Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 06: Output, Inflation and Employment

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Self Assessment

Answers for Self Assessment

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Objectives

- To understand the genesis of the Natural Rate of Unemployment
- Evaluate the different perspectives of Natural Rate of Unemployment
- Understand the relationship between inflation and unemployment using Philips Curve.
- Compare the monetary policy in the short run and long run.
- Understand the Keynesian perspective on output-inflation trade-off
- Compare the monetarist view and Keynesian view for price stabilization.

Introduction

This chapter is about the relationship between output, inflation and employment. In the Keynesian and post-Keynesian period, this analysis has attracted greater attention as the output and employment became important issues to stabilize the economies. The New Zealand economist, A W Philips studied the relationship between unemployment and inflation by taking the data from England which then got to be known as Philips Curve. The natural rate of unemployment was developed during this period by Milton Friedman and Phelps to correct the supply side of economics. Keynes in his theory gave importance to the demand side of the economy with emphasis on short-run analysis. However, the post-Keynesians and monetarists discussed the long term relationship between employment and output.

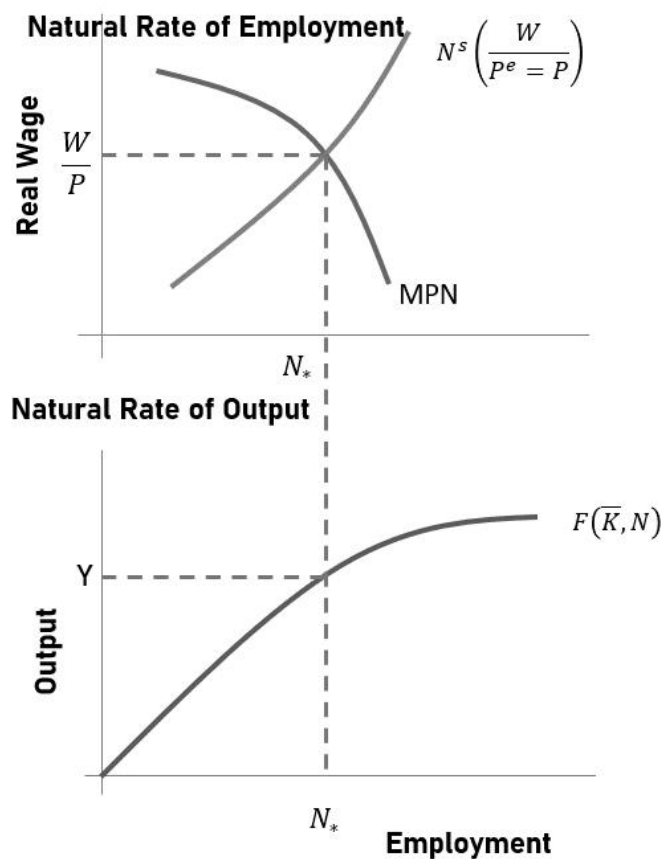
6.1 Natural Rate of Unemployment

The theory of the natural rates of unemployment and output was developed by Milton Friedman as a part of the monetarist system. The theory was developed independently by Edmund Phelps apart from monetarism. Today the natural rate theory is central to the question of the long-run relationships among output, unemployment, and inflation—questions that must be addressed by any macroeconomic system. We begin with Friedman's formulation.

In the long run the influence of money is primarily on the price level and other nominal magnitudes. In the long run, real variables, such as real output and employment, are determined by real, not monetary, factors.

The basis of this proposition is Milton Friedman's theory of the natural rates of unemployment and output. According to the natural rate theory, there exists an equilibrium level of output and an accompanying rate of unemployment determined by the supply of factors of production, technology, and institutions of the economy (i.e., determined by real factors). This is Friedman's natural rate. Changes in aggregate demand cause temporary movements of the economy away from the natural rate. Expansionary monetary policies, for example, move output above the natural rate and move the unemployment rate below the natural rate for a time. The increased demand resulting from such an expansionary policy would also cause prices to rise. In the short run, the price adjustment would not be complete, as in the classical theory, where increases in demand cause prices to rise but do not affect output. Friedman did believe that equilibrating forces cause output and employment to return to their natural rate over a longer period. It is not possible for the government to use monetary policy to maintain the economy permanently at a level of output that holds the unemployment rate below the natural rate. At least it is not possible unless policymakers are willing to accept an ever-accelerating rate of inflation. Friedman defined the natural rate of unemployment as the rate "which has the property that it is consistent with equilibrium in the structure of real wage rates." Thus, the natural rate of unemployment, and the corresponding natural rate of employment, will be such that labour demand equals labour supply at an equilibrium real wage, as depicted in Fig. 6.1a.

Fig. 6.1 Natural Rates of Output and Employment



The labour demand schedule in part a of the figure is the familiar marginal product of labour (MPN) schedule. At N^* , the natural rate of employment, labour demand is equated with labour supply, wherein drawing the labour supply schedule, $N^s[W/(P^e=P)]$, we stipulate that the price level expected by labour suppliers is equal to the actual price level ($P^e=P$). Only at this level of employment is there no tendency for the real wage to change. Labour demand and supply are equated. Moreover, labour suppliers have a correct expectation of the price level. If such were not the case, labour supply would change as workers perceived that their expectations were in error. The natural rate of unemployment can be found simply by subtracting those employed from the total labour force to find the number unemployed and then expressing this number as a percentage of the total labour force. Using the production function in Figure 6.1 b, we can find the level of output that will result from an employment level N^* . This is the natural level of output, Y^* . Figure

Unit 06: Output, Inflation and Employment

6.1 shows that the natural rates of output and employment depend on the supply of factors of production and the technology of the economy – supply-side factors. The natural rates of output and employment do not depend on aggregate demand. All this is much the same as in the classical system. The difference between Friedman and the classical economists is that in Friedman’s theory the economy is not necessarily at these natural levels of employment and output in the short run. As in the Keynesian model, in Friedman’s model labour suppliers do not know the real wage. They must base their labour supply decisions on the expected real wage (W/P^e). Therefore, in the short run, labour supply may not be given by the supply schedule in Figure 6.1a; P^e may not equal P . In this case, employment and hence output will not be at their natural rates.

Hall’s Interpretation of Natural Rate of Unemployment

Robert E. Hall in 1979 gave a different approach for the Natural Rate of Unemployment. In this approach, the number of people who join the job and the ones who move out of the labour force is taken into consideration. Both, together make the labour force.

$$L = E + U \quad 6.1$$

Where L : labour force

E : Number of employed workers

U : Number of unemployed workers

The rate of unemployment is U/L .

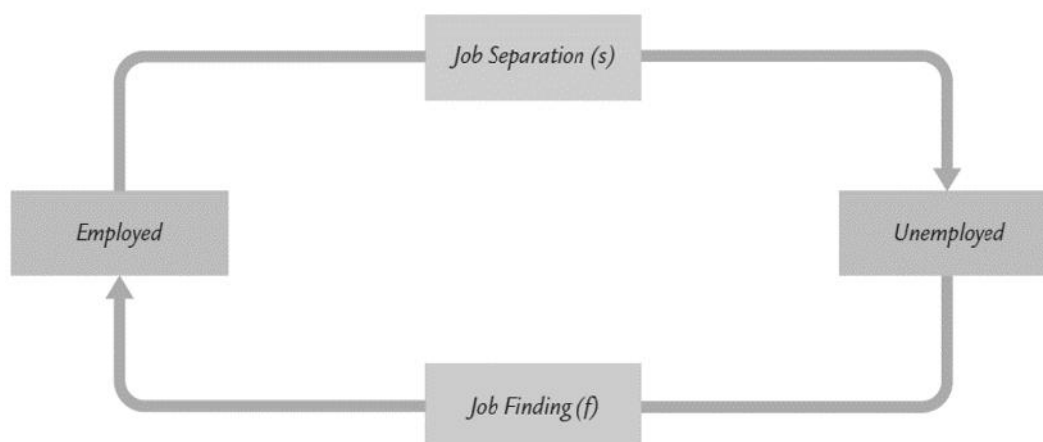
To see what determines the unemployment rate, we assume that the labour force L is fixed and focus on the transition of individuals in the labour force between employment and unemployment. This is illustrated in Figure 6.2. Let s denote the rate of job separation, the fraction of employed individuals who lose their job each month. Let f denote the rate of job finding, the fraction of unemployed individuals who find a job each month. Together, the rate of job separation s and the rate of job finding f determine the rate of unemployment. If the unemployment rate is neither rising nor falling – that is, if the labour market is in a steady state – then the number of people finding jobs must equal the number of people losing jobs. The number of people finding jobs is fU and the number of people losing jobs is sE , so we can write the steady-state condition as

$$fU = sE \quad 6.2$$

We can use this equation to find the steady-state unemployment rate. From an earlier equation, we know that $E = L - U$; that is, the number of employed equals the labour force minus the number of unemployed. If we substitute $(L - U)$ for E in the steady-state condition, we find

$$fU = s(L - U) \quad 6.3$$

Fig.6.2 Transition between employment and unemployment



To get closer to solving for the unemployment rate, divide both sides of this equation by L to obtain

$$f \frac{U}{L} = s \left(1 - \frac{U}{L}\right) \quad 6.4$$

Now we can solve for U/L to find

$$\frac{U}{L} = \frac{s}{s+f} \quad 6.5$$

This equation shows that the steady-state rate of unemployment U/L depends on the rates of job separation s and job finding f . The higher the rate of job separation, the higher the unemployment rate. The higher the rate of job finding, the lower the unemployment rate.

This model of the natural rate of unemployment has an obvious but important implication for public policy. Any policy aimed at lowering the natural rate of unemployment must either reduce the rate of job separation or increase the rate of job finding. Similarly, any policy that affects the rate of job separation or job finding also changes the natural rate of unemployment.

6.2 Monetary Policy, Output and Inflation: A Monetarist's View

Milton Friedman believed that output and employment deviate from their natural rates temporarily. He further points out that both these variables will reach their original rates. In the following section, we evaluate the change in the money supply growth rate- both in the short-run and long run. But before we move to the temporal analysis, let us learn something about monetary policy.

What is Monetary Policy?

Monetary policy refers to the policy of the central bank regarding the use of monetary instruments under its control to achieve the goals as specified by the government. It became important after the Monetarist started the Anti-Keynesian revolution.

Monetary Policy in the Short Run

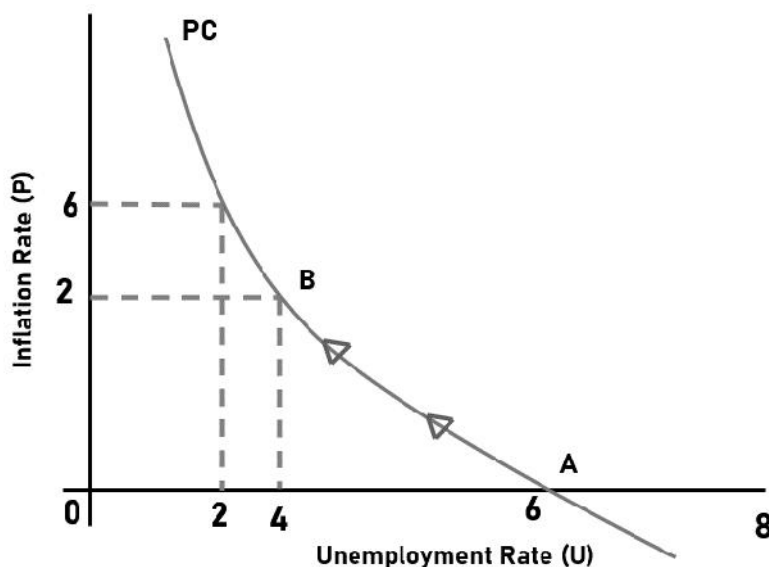
We begin with a situation in which the economy is at the natural rate of unemployment and output. Also, suppose that the money supply (and hence nominal income) has been growing at a rate equal to the rate of growth of real output. Thus, the price level is assumed to have been stable for some time. Suppose now that the rate of growth in the money supply is increased above the rate consistent with price stability. For concreteness, assume that the rate of growth in the money supply rises from 3 per cent to 5 per cent.

The increase in the growth rate of the money supply will stimulate aggregate demand and, as a consequence, nominal income. The short-run consequences of this increase in aggregate demand are described by Friedman as follows:

To begin with, much or most of the rise in income will take the form of an increase in output and employment rather than in prices. People have been expecting prices to be stable, and prices and wages have been set for some time in the future on that basis. It takes time for people to adjust to a new state of demand. Producers will tend to react to the initial expansion in aggregate demand by increasing output, employees by working longer hours, and the unemployed by taking jobs now offered at former nominal wages. This much is pretty standard doctrine.

The standard doctrine to which Friedman refers is the Phillips curve. The Phillips curve is a negative relationship between the unemployment rate (U) and the inflation rate (P), such as that plotted in Figure 6.3. High rates of growth in aggregate demand stimulate output and hence lower the unemployment rate. Such high rates of growth in demand also cause an increase in the rate at which prices rise (i.e., raise the inflation rate). Thus, the Phillips curve postulates a trade-off between inflation and unemployment; lower rates of unemployment can be achieved, but only at the cost of higher inflation rates. Friedman agrees with this notion of a trade-off between inflation and unemployment in the short run.

Fig. 6.3 Philip's Curve



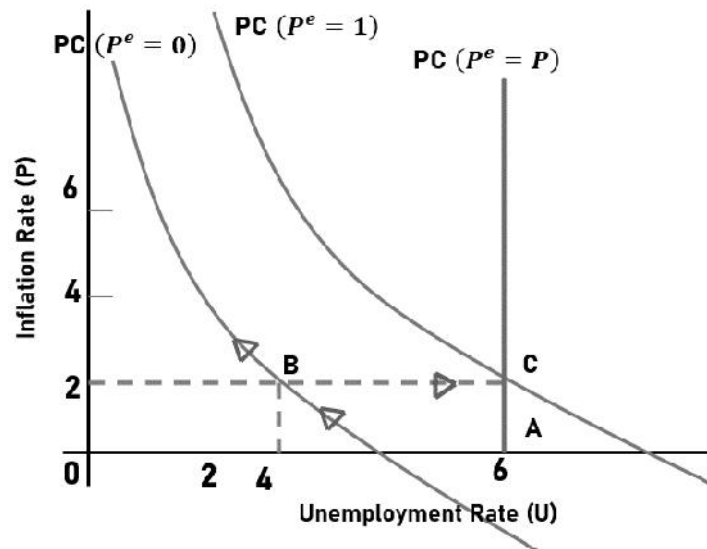
Monetary Policy in the Long Run

The distinctive element in Friedman's analysis is his view of the long-run effects of monetary policy. Here the concept of the natural rate of unemployment comes into play. We have just considered the short-run effects of an increase in the rate of growth of the money supply from 3 per cent to 5 per cent. In terms of Figure 6.3, the original equilibrium was with stable prices ($P \# = 0$) and unemployment equal to the natural rate assumed to be 6 per cent (point A in Figure 6.3). We assume that, as a result of the increase in the rate of growth in the money supply, the economy moves to a new short-run equilibrium, with unemployment reduced to 4 per cent and an inflation rate at 2 per cent (point B in Figure 6.3). The expansionary aggregate demand policy lowers the unemployment rate below the natural rate.

Friedman points out that in the short run, product prices increase faster than factor prices, the crucial factor price being the money wage. Thus, the real wage (W / P) falls. This is necessary for output to increase because firms must be on the labour demand schedule shown in Figure 6.1. Firms expand employment and output only with a decline in the real wage.

Friedman does not argue that workers are always on the labour supply schedule shown in Figure 6.1. That schedule expresses labour supply as a function of the actual real wage, and Friedman does not assume that workers know the real wage. In the short run, after a period of stable prices, workers are assumed to evaluate nominal wage offers "at the earlier price level." Prices have risen, but workers have not yet seen this rise, and they will increase labour supply if offered a higher money wage, even if this increase in the money wage is less than the increase in the price level, even if the real wage is lower. In the short run, labour supply increases because the ex-ante (or expected) real wage is higher as a result of the higher nominal wage and unchanged view about the behaviour of prices. Labour demand increases because of the fall in the ex-post (actual) real wage paid by the employer. Consequently, unemployment can be pushed below the natural rate. This situation is temporary, for workers eventually observe the higher price level and demand higher money wages. In terms of Figure 6.1, the real wage has been pushed below $(W / P)^*$, the wage that clears the labour market once labour suppliers correctly perceive the price level and, hence, the real wage. At a lower real wage, an excess demand for labour pushes the real wage back up to its equilibrium level, and this rise in the real wage causes employment to return to the natural rate shown in Figure 6.1.

Fig. 6.4 Short-run and Long-run Philips Curve

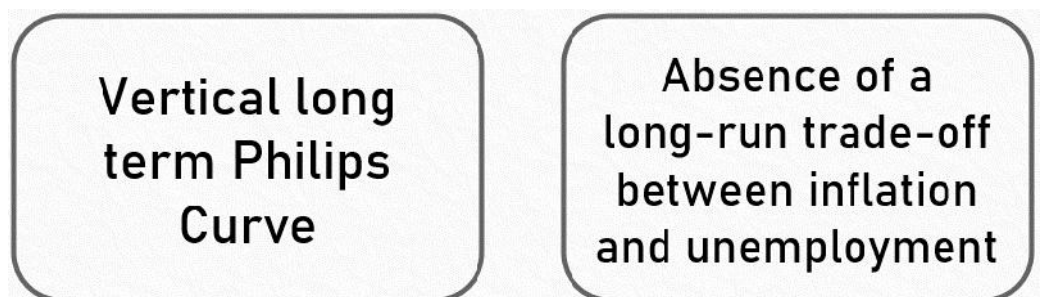


The implications for the Phillips curve of this long-run adjustment back to the natural rate are illustrated in Figure 6.4. The schedule labelled PC ($P^e = 0$) is the short-run Phillips curve from Figure 6.3. Here the schedule is explicitly drawn for a given expected rate of inflation on the part of the suppliers of labour, in this case, stable prices ($P^e = 0$, where P^e is the expected rate of inflation). We have already analyzed the process whereby an increased rate of growth of the money supply from 3 per cent to 5 per cent moves the economy in the short run from point A to point B. As suppliers of labour anticipate that prices are rising, the Phillips curve will shift upward to the right. Suppliers of labour will demand a higher rate of increase in money wages, and as a consequence, a higher rate of inflation will now correspond to any given unemployment rate. If money growth is continued at 5 per cent, the economy will return to the natural 6 per cent rate of unemployment, but now with an inflation rate of 2 per cent instead of the initial stable price level. In terms of Figure 6.4, this long-run adjustment moves the economy from point B to point C. A policymaker who is not content with this return to 6 per cent unemployment (the natural rate) may still pursue a target unemployment rate below the natural rate by again increasing the rate of growth in the money supply.

Friedman believed that an expansionary monetary policy can only temporarily move the unemployment rate below the natural rate. There is a trade-off between unemployment and inflation only in the short run. In terms of Figure 6.4, the downward-sloping short-run Phillips curves that are drawn for given expected inflation rates illustrate the short-run trade-off between unemployment and inflation. The long-run Phillips curve showing the relationship between inflation and unemployment when expected inflation has time to adjust to the actual inflation rate ($P = P^e$) – when inflation is fully anticipated – is vertical, as shown in Figure 6.4.

6.3 A Keynesian View of the Output-Inflation Trade-Off

Friedman's theory of the natural rate of unemployment explains both the short-run and long-run relationship between inflation and unemployment. However, Keynes had a different view regarding the natural rate of unemployment. The Keynesian point of view is understood at two levels-



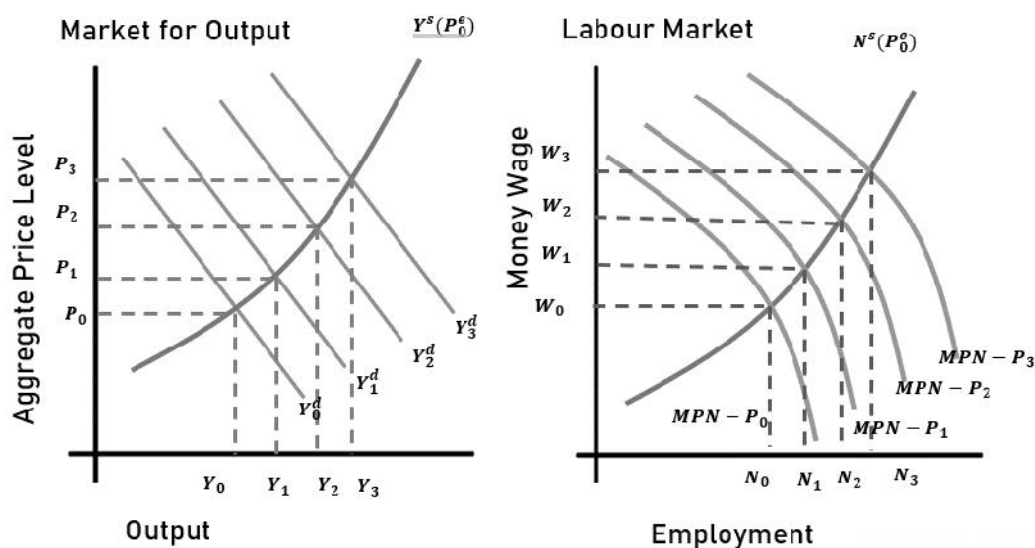
Keynesian Interpretation of Phillips Curve

Keynesians' view of the relationship between the rate of inflation and the levels of employment and output follows directly from their theory of how price and output are determined. Here we relate that theory to the Phillips curve.

Short Run Phillips Curve

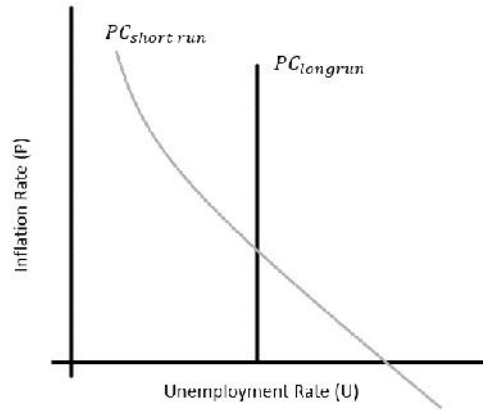
The money wage is flexible, and labor supply is assumed to depend on the expected real wage $\left(\frac{w^e}{p^e}\right)$, the money wage divided by the expected price level. In the Keynesian system, an expansionary aggregate demand policy might be a monetary policy action, such as the increase in the rate of growth in the money supply analyzed in the preceding section, or it might be a fiscal policy action, such as a series of increases in government spending.

Fig.6.5 Short run effects of Increase in Aggregate Demand in the Keynesian model



As can be seen, these increases in aggregate demand will increase output (from Y_0 to Y_1 , to Y_2 , then to Y_3) and employment (from N_0 to N_1 to N_2 , then to N_3), as well as the price level (from P_0 to P_1 , to P_2 , then to P_3). As employment increases, the unemployment rate will decline. The level of the money wage will increase. The more quickly aggregate demand grows, the larger will be the rightward shifts in the aggregate demand schedule, and other things being equal, the faster will be the rate of growth in output and employment. For a given growth in the labour force, this means that the unemployment rate will be lower the faster the rate of growth in aggregate demand. The Keynesian model, then, implies a trade-off between inflation and unemployment. High rates of growth in demand correspond to low levels of unemployment and high rates of inflation. Slower growth in aggregate demand means a lower inflation rate but a higher rate of unemployment. The Phillips curve implied by the Keynesian model is downward sloping.

Fig. 6.6 The Phillips Curve: The Keynesian Perspective



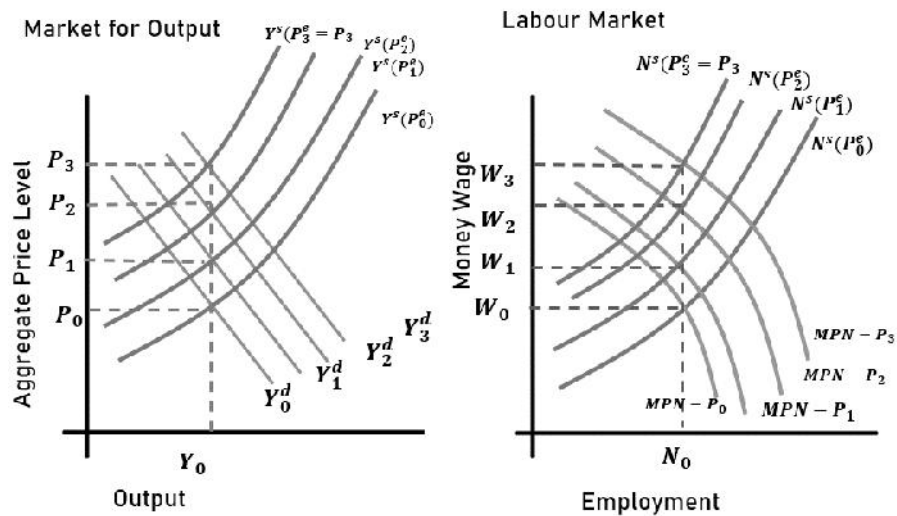
The Long-Run Phillips Curve

In the long run, the expected price adjusts to the actual price. Suppliers of labour perceive the inflation that has resulted from the expansionary aggregate demand policy. In the Keynesian system, labour supply depends on the expected real wage:

$$N^s = t \left(\frac{W}{P^e} \right)$$

As the expected price rises, the labor supply schedule shifts to the left. Less labor will be supplied at any money wage (W) because a given money wage corresponds to a lower expected real wage (W/P^e) after an increase in the expected price level.

Fig. 6.7 Long run effects of Increases in Aggregate Demand in the Keynesian model



The aggregate supply schedule also shifts upward to the left with each increase in expected price, reflecting this decline in output supplied at a given price level. The labour supply and aggregate supply schedules continue to shift to the left until the expected price and actual price are equal. In the diagram the equilibrium is set where aggregate supply schedule $Y^s(P^e_3 = P_3)$ is equal to labour supply schedule $N^s(P^e_3 = P_3)$. The income and employment are back to Y_0 and N_0 . The output and employment can be maintained above Y_0 and N_0 only if labour is not in a position to anticipate inflation correctly. When labour correctly anticipates inflation, then they seek higher wages. An increase in aggregate demand increases output and employment and, therefore, lowers the unemployment rate only in the short run. The long-run Phillips curve is vertical in the Keynesian as well as in Friedman's view.

Stabilization Policies for Output and Employment: The Keynesian View

In the Keynesian view, aggregate demand policies are aimed at stabilizing output and employment in the short run. The goal of such stabilization policies is to keep the economy at its equilibrium level in the face of shocks to aggregate demand or supply. Friedman and other monetarists believed that the private sector could bring stability. It is the government policies that cause instability in the

economy. Small shocks may cause output and employment to deviate somewhat from the natural rate. The policymakers do not have complete knowledge to predict shocks perfectly. Monetarists believed that as per the natural rate of unemployment theory, monetary policy cannot control unemployment and output to remain at desirable levels. Keynesians believed that monetary and fiscal policy can correct the economy and stabilize income.

6.4 Evolution of the Natural Rate Concept

Milton Friedman's purpose in advancing the concept of natural rates of output and unemployment was to illustrate a limitation on monetary policy. Monetary policy could not permanently lower unemployment below the natural rate, not without causing an ever-accelerating inflation rate. Over the four decades since Friedman introduced the concept, however, much attention has also been focused on what determines the natural rate and what that value is for different countries. If, for example, it is important for policymakers to avoid driving the unemployment rate below the natural rate and thereby setting off inflationary pressures, how do they know by how much they can safely reduce the unemployment rate? In the late 1990s, this became a crucial question in the United States as the unemployment rate fell to a 30-year low.

Determinants of the Natural Rate of Unemployment

Friedman did address the question of what determines the natural rate of unemployment. As we have seen, the natural rate is the rate that is consistent with an equilibrium real wage. Within our model of the labour market, this is simply an equilibrium between labour supply and demand subject to the condition that labour suppliers correctly estimate the price level. Friedman argued that, in the real world, the natural rate would be the rate "ground out" by an equilibrating process that would also be affected by "the actual structural characteristics of labour and commodity markets, including market imperfections, stochastic variability in demands and supplies, the cost of gathering information about job vacancies and labour availabilities, the cost of mobility, and so on." These additional characteristics are ones we think of as determining the levels of frictional and structural unemployment. Low labor mobility in a country, for example, might be expected to lead to a higher natural rate of unemployment because, as demand shifted from one region of the country to another, workers would not be quick to follow. Poor information about job vacancies might also lead to a higher natural rate of unemployment, as workers take longer to find initial jobs or to move between jobs. In Friedman's view, then, the natural rate in each country will be determined by the structural characteristics of that country's commodity and labor markets.

Explaining Changing Natural Rates of Unemployment

A large amount of literature has been published on the apparent increase in the natural rate of unemployment in European countries. One possible cause researchers have pointed to is rigidity in European labour markets, especially among nations that are members of the European Union. Labour market regulations in European Union countries include limitations on plant closings and provisions for mandatory severance pay that may discourage firms from expanding employment. European countries also have high degrees of unionization, which may result in wage rigidity. Moreover, Euro-pean countries typically have generous unemployment compensation and other social benefits that make unemployment less painful.

Rising European unemployment may not be the result of increases in rigidities and the generosity of the social safety net, but instead may be the result of growing competition from lower-wage countries, in particular, the rapidly growing Asian economies, given the existing rigidity of labour markets and benefit levels. In other words, growing competition, instead of pulling down European real wages, raises European unemployment.

An alternative explanation for high European unemployment focuses on the idea that the current value of the unemployment rate may be strongly influenced by its past values, a property called hysteresis. From this perspective, high unemployment in the recessions of the 1970s and 1980s, which was cyclical in nature, had long-lasting effects on unemployment in later years.

The divergent behaviour of unemployment in the United States and Europe, especially in the 1990s, has been attributed to different structural characteristics of labour markets in the two regions. According to this view, greater flexibility in the U.S. labour market, due to less regulation and lower unionization, has meant that increased global competition and skill-biased technological change have caused stagnant real wages in the United States (especially for low-skilled workers) instead of slower job growth and higher unemployment. Moreover, in the post-1990 years, any

hysteresis effects have been favourable in the United States, as a low-unemployment environment has been maintained for a long period.

Summary

- Any policy aimed at lowering the natural rate of unemployment must either reduce the rate of job separation or increase the rate of job finding.
- Similarly, any policy that affects the rate of job separation or job finding also changes the natural rate of unemployment.
- Friedman believed that an expansionary monetary policy can only temporarily move the unemployment rate below the natural rate.
- There is a trade-off between unemployment and inflation only in the short run.
- The long-run Phillips curve showing the relationship between inflation and unemployment when expected inflation has time to adjust to the actual inflation rate when inflation is fully anticipated – is vertical.
- Friedman's theory of the natural rates of unemployment and output has been highly influential.
- However, Keynesians did not agree with it, and they felt that both, monetary and fiscal policy may be used to stabilize the economy.

Keywords

Natural rate of unemployment: The natural rate of unemployment represents the lowest unemployment rate whereby inflation is stable or the unemployment rate that exists with non-accelerating inflation.

Phillips curve: The Phillips curve is an economic concept developed by A. W. Phillips stating that inflation and unemployment have a stable and inverse relationship.

Unemployment: Unemployment is a term referring to individuals who are employable and actively seeking a job but are unable to find a job

Self Assessment

1. Rate of unemployment is the ratio between the labour force and
 - A. Number of workers employed
 - B. Number of unemployed workers
 - C. Rate of job separation
 - D. Rate of job finding

2. The fraction of people who lose their job every month is known as
 - A. Rate of job separation
 - B. Rate of job finding
 - C. Frictional unemployment
 - D. Involuntary unemployment

3. The fraction of people who find a job every month is known as
 - A. Rate of job separation
 - B. Rate of job finding
 - C. Frictional unemployment
 - D. Involuntary unemployment

Unit 06: Output, Inflation and Employment

4. Any policy aimed at lowering the natural rate of unemployment must either the rate of job separation or the rate of job finding.
 - A. Increase, reduce
 - B. Reduce, increase
 - C. Remain same
 - D. None of the above

5. The higher the rate of job finding, the the unemployment rate.
 - A. Higher
 - B. Lower
 - C. Not related
 - D. Remains same

6. The curve that shows the relationship between unemployment and inflation is known as
 - A. Laffer curve
 - B. IS curve
 - C. LM curve
 - D. Philips curve

7. What is the current priority of all the central banks across the world?
 - A. Inflation targeting
 - B. Controlling the money supply
 - C. Managing the foreign exchange rate
 - D. Printing money

8. Did Milton Freidman bring about changes in the original Philips curve?
 - A. True
 - B. False

9. In place of inflation,inflation was introduced by Milton Freidman and Edmund Phelps.
 - A. Future
 - B. Expected
 - C. Actual
 - D. Wholesale

10. As per Philips Curve, there is a relationship between the unemployment rate (U) and the inflation rate (P).
 - A. Positive
 - B. Negative
 - C. No
 - D. Some

11. In the Keynesian system, an expansionary aggregate demand policy might be a monetary policy or a fiscal policy.
 - A. True
 - B. False

12. In the Keynesian system, the long term Philips curve is
- Horizontal
 - Vertical
 - Downward sloping
 - Upward sloping
13. As per the monetarists, who caused instability in the economy?
- Government
 - Private sector
 - External forces
 - All the above
14. In the long run, the expected priceto the actual price.
- Adjusts
 - Does not adjust
 - Both are not related
 - None of the above
15. As per the Keynesian system, is there a trade-off between unemployment and inflation in the long run?
- True
 - False

Answers for Self Assessment

1.	B	2.	A	3.	B	4.	B	5.	B
6.	D	7.	A	8.	A	9.	B	10.	B
11.	A	12.	B	13.	B	14.	A	15.	B

Review Questions

- What determines the natural rate of unemployment?
- Explain Hall's interpretation of the natural rate of unemployment.
- What is Friedman's view on the short -run and long-run monetary policy?
- In both Friedman's and the Keynesian models of the Phillips curve the formation of expectations of inflation plays an important role. Explain how expectations are formed in their respective models. Are there any differences in expectation formation between the models?
- Write a note on the evolution of the natural rate concept. What is the current trend in it?

**Further Readings**

- Macroeconomics: Theories and Policies by Richard T. Froyen, Pearson Publications
- Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 07: New Classical Economics

Objective

- comprehend the proposition of New Classical Economics.
- analyze the rational expectations concept and its implications.
- identify a broader look at the new classical economics.
- understand the Keynesian counter critique
- compare the arguments of Keynesian and New Classical Economics

Introduction

The next theoretical system we consider, the new classical economics, developed against the background of the high inflation and unemployment of the 1970s and the accompanying dissatisfaction with the prevailing Keynesian orthodoxy. Both monetarism and the new classical economics have their origins in classical economics, and the two schools of economists reach similar noninterventionist policy conclusions. Robert Lucas, the central figure in the development of the new classical economics, basically agrees with Milton Friedman's proposal for noninterventionist policy rules. Much in the spirit of Friedman, Lucas says, "*As an advice-giving profession we are in way over our heads.*"

New classical economists are even more sceptical than Friedman about the usefulness of activist stabilization policies. The new classical economics, however, is a more fundamental attack on the Keynesian theoretical system than is monetarism. Monetarists and Keynesians reach different policy conclusions and differ on several empirical questions. New classical economists have been motivated by a belief that the Keynesian structure is fundamentally flawed. They have attacked not just the usefulness of Keynesian analysis for understanding economic events and designing useful policies but also its internal consistency.

7.1 New Classical Economics

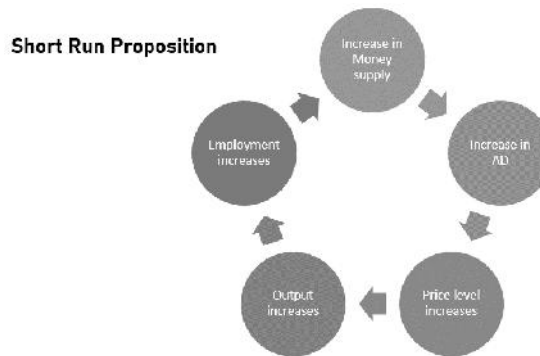
The new classical macroeconomics began with Lucas's and Leonard Rapping's attempt to provide micro-foundations for the Keynesian labour market. Lucas and Rapping applied the rule that equilibrium in a market occurs when quantity supplied equals quantity demanded. The central policy tenet of the new classical economics is that stabilization of real variables, such as output and employment, cannot be achieved by aggregate demand management. The values of such variables in both the short run and the long run are insensitive to systematic aggregate demand management policies. The new classical policy ineffectiveness proposition asserts that systematic monetary and fiscal policy actions that change aggregate demand will not affect output and employment even in the short run.

Review of the Keynesian Position

The review of the Keynesian model is based on the critique of the Keynesian system by the new classical economists. The relationship between output, employment and aggregate demand is reviewed to understand the Keynesian position. **Fig. 3.1** shows the relationship in the short run. Crucial to these results is the fact that the positions of both the aggregate supply schedule and labor supply schedule are fixed in the short run. The position of both of these schedules depends on the value of the expected price level (P_e), which is assumed to depend primarily on past prices and not to change with current policy actions. In the long run, the expected price level converges to the actual price level, and both the aggregate supply schedule and the labor supply schedule shift to the left. The initial levels of employment and output are restored, with only the price level and the money wage left permanently higher as a result of the increase in the money supply. Output and employment remain above their long-run equilibrium levels only as long as it takes labor suppliers to perceive correctly the change in the price level that results from the expansionary policy action.

As long as our attention is confined to monetary policy actions, monetarists would agree with the foregoing analysis.

Fig. 3.1 Short-run Keynesian position



7.2 The Rational Expectations Concept and Its Implications

New classical economists do not agree about the difference between the short-run and long-run results in the Keynesian or monetarist analysis of the effects of aggregate demand on output and employment. Their main contention is regarding the treatment towards price expectations. This formulation assumes that labour suppliers form an expectation of the current aggregate price level (or inflation rate) based on the past behaviour of prices. In practice, Keynesians and monetarists have assumed that such price expectations adjust slowly and can be analysed over short periods. New classical economists denounce such formulations of expectations as naive in the extreme. They opine that only the past expectations should not become the basis for the determination of the present price level. If only the past value of the price is considered then the assumption falls with the shift in aggregate demand. We have been assuming that after changes in aggregate demand – for example, the increase in the money supply considered in the preceding subsection – labour suppliers fail to perceive that the demand shift will affect the price. The new classical adopted John Muth’s “rational-expectations hypothesis”. Muth argued that an economic model in which people’s expectations differ from the outcomes predicted by the model itself is poorly formulated. New classical economists propose that economic agents will form rational expectations. According to the hypothesis of rational expectations, *expectations are formed based on all available relevant information concerning the variable being predicted*. In Keynesian economics expectations are backward-looking. New classical economists believe that labour will use all past data along with the present information to assess the future. Labour supplier is making forward-looking rational forecasts of the price level. Effects of an expansionary policy action previously considered: a one-time increase in the money supply is analyzed.

If labour suppliers make forward-looking rational forecasts of the price level, then modification is required in the prior analysis. The modification made in the analysis is to consider a one-time increase in the money supply. To analyze this change with the assumption that expectations are rational, we must start off to see whether the policy change was anticipated. Anticipated and unanticipated policy changes have very different effects when expectations are assumed to be rational.

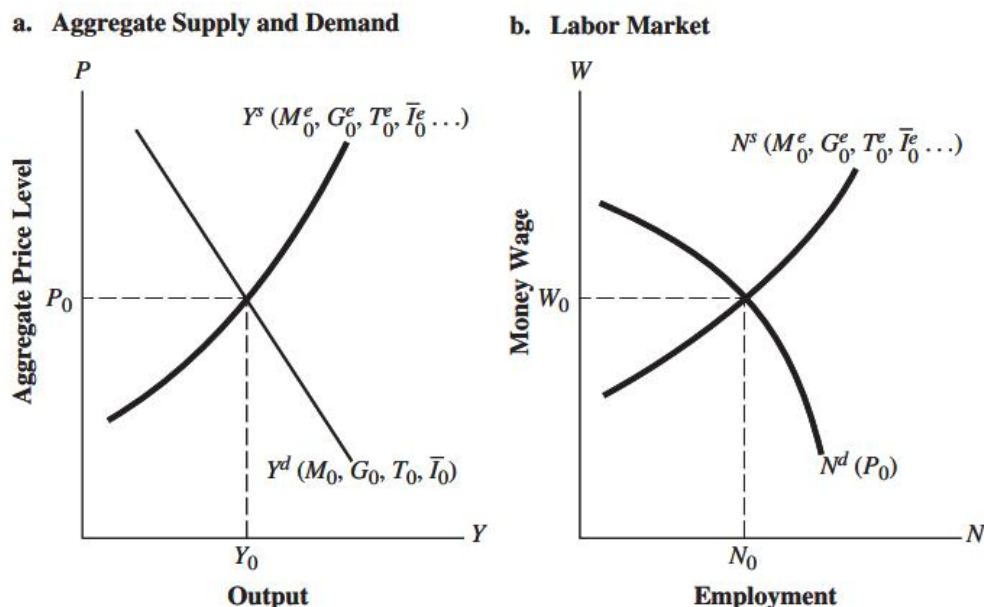
First, we assume that the policy change is predicted, perhaps because the policymaker announced the policy change. Alternatively, the public may anticipate the change because the policymaker is known to act in certain ways. For example, if the policymaker systematically responds to an increase in unemployment in one period by increasing the money supply in the next period (to counteract unemployment), the public will come to anticipate an increase in the money supply for period t when they observe an increase in the unemployment rate of period $t-1$.

To begin, consider the characterization of equilibrium output and employment in the new classical analysis, as illustrated in Figure 7.1. The treatment of the position of labour supply and aggregate supply schedule in the New Classical model is different from the Keynesian model. As in the Keynesian theory, we assume here that labour supply depends on the expected real wage, the known money wage divided by the expected price level:

$$N^s = t \left(\frac{W}{pe} \right) \quad 7.1$$

Consequently, the position of the labour supply schedule, and therefore that of the aggregate supply schedule, depends on the expected price level. Increases in the expected price level will shift both schedules to the left.

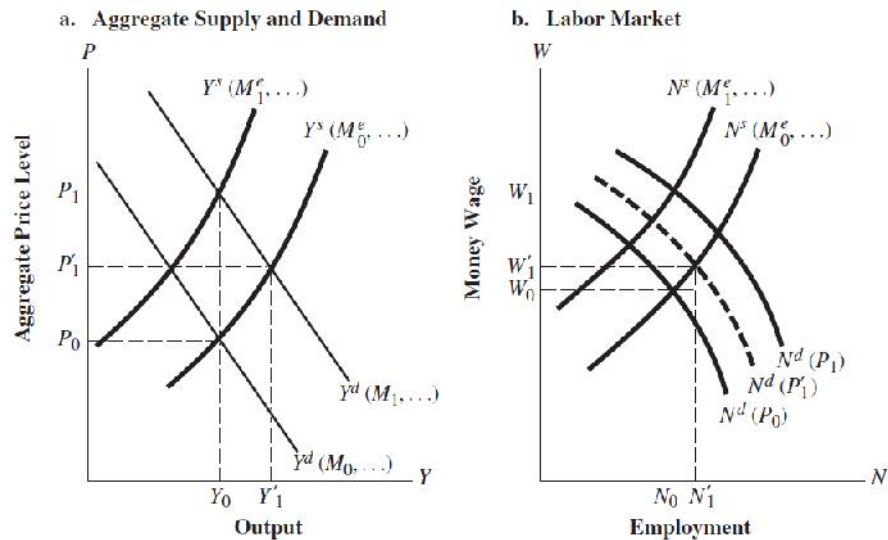
Fig. 7.1 Output and Employment in the New Classical Model



In the new classical model, with the assumption of rational expectations, the expected price level depends on the expected levels of the variables in the model that determine the price level. These include the expected levels of the money supply (M_e), government spending (G_e) and tax collections (T_e), autonomous investment (I_e) and possibly other variables. The dependence of the expected price level, and hence the positions of the labour supply and aggregate supply schedules on these variables, are indicated by the labelling of these curves in Figure 7.1. Especially important is the fact that the positions of the labour supply and aggregate supply schedules depend on the expected levels of the policy variables (M_e, G_e, T_e).

Consider the effect of a fully anticipated increase in the money supply from M_0 to M_1 , as depicted in Figure 7.2. Initially, assume that the aggregate demand, aggregate supply, and labor supply and demand schedules are at the same positions as in Figure 7.1, with actual and expected variables subscripted zero (0). The increase in the money supply will shift the aggregate demand schedule to $Y^d(M_1, \dots)$. If the supply schedule did not shift, the output would rise from Y_0 to Y_1 , and the price level would increase from P_0 to P_1 . With the rise in the price level, the labor demand schedule shifts to the right [to the dashed schedule $N^d(P_1)$] in Figure 7.2 b. If the labor supply schedule did not also shift, employment would rise (from N_0 to N_1). In the Keynesian or monetarist frameworks, with the expected price level unrelated to the current level of policy variables, the positions of the aggregate supply and labour supply schedules would be fixed in the short run, and our analysis would be complete.

Fig. 7.2 Effects of Increase in Money Supply



The new classical economists believed that positions of labour supply and aggregate supply schedules are not fixed in the short run. The expansionary policy action is anticipated. Therefore, the level of the expected money supply also increases. This increase will raise the expected price level because, with rational expectations, labour suppliers will understand the inflationary effect of the increase in the money supply. In the Keynesian or monetarist analysis, the increase in the money supply leads to an increase in employment and output in the short run. On the other hand, the New Classical economists believe that if expectations are formed rationally, anticipated aggregate demand policy actions will not affect real output or employment, even in the short run.

Now we assume that the policy change is unanticipated. The aggregate demand schedule will shift to the right. The price level will go up. The labour demand schedule will also shift to the right. (look at fig. 7.2). When the increase in the money supply is unanticipated, the new classical model indicates that output and employment will be affected. The results are identical to Keynesian and monetarist views.

7.3 A broader view of the New Classical Position

New classical economists are critical of Keynesian economics as a whole. Robert Lucas and Thomas Sargent use terms such as “fundamentally flawed,” “failure on a grand scale,” and “of no value” to describe major aspects of Keynesian theory. Lucas, Sargent, and other new classical economists are critical of the theoretical foundations of the Keynesian system. They argue that Keynes’s rules of thumb, such as the consumption and Keynesian money demand functions, replaced classical functions based on individual optimizing behaviour. The Keynesian model is, in their view, made up of ad hoc elements, which were failed attempts to explain the observed behaviour of the economy in the aggregate. A good example of this failure of the Keynesian system is the handling of expectations. The Keynesian system uses a rule of thumb whereby the expected current price is expressed as a function of the past behaviour of prices. Such an assumption is not based on individuals’ making optimal use of information and implies, in general, that economic agents choose to ignore useful information in making their price forecasts. New classical economists are also critical of Keynes’s assumption that wages are “sticky,” meaning, as they interpret this assumption, that wages “are set at a level or by a process that could be taken as uninfluenced by the macroeconomic forces he proposed to analyze.” We have already considered the arguments that Keynesians advance to support the assumption of wage rigidity. New classical economists do not find these arguments convincing. They favour the classical view that markets, including the labour market, clear; that is, prices, including the money wage rate, move to equate supply and demand. New classical economists argue that fruitful macroeconomic models should rectify the failures of Keynesian economics by consistently adhering to the following assumptions:

1. Agents optimize; they act in their self-interest.
2. Markets clear.

Why, then, did Keynes dispense with those assumptions? Keynesian economics was a response to the failure of classical economics to explain the problem of unemployment and the relationship

between unemployment and aggregate demand. Recall that the classical aggregate supply schedule was vertical. With the supply schedule, aggregate output was dependent on supply factors. The classical model was abandoned by Keynes because it did not explain prolonged deviations of output and employment from full-employment levels. New classical economists argue that a model in the classical tradition can explain the deviations from full employment if the assumption of rational expectations is incorporated into the classical system. Recall that the classical theory of the labour market, which was the basis for the classical vertical aggregate supply function, assumed that labour suppliers knew the real wage, implying that labour suppliers had perfect information about the value that the aggregate price level would take on over the short run. New classical economists substitute the assumption that labour suppliers make a rational forecast of the aggregate price level. In this case, as we have seen, systematic, and hence anticipated, changes in aggregate demand will not affect output and employment, but unanticipated changes in aggregate demand will. Such unanticipated changes in aggregate demand can explain deviations from full employment.

The Keynesian Countercritique

The theme that runs through the Keynesian response to the new classical criticisms is that, although they raise valid points, especially concerning the weakness of the Keynesian treatment of expectations formation, it is still, as the Keynesian Robert Solow puts it, “much too early to tear up the IS-LM chapters in the textbooks of your possibly misspent youth.” Keynesians continue to believe that Keynes provided the basis for a useful framework in which to analyze the determinants of output and employment. They continue to believe in the usefulness of activist policies to stabilize output and employment. The major areas where the Keynesians have raised their doubts regarding the claims made by New Classical Economists are the following.

The Question of Persistence

The new classical economist explained the deviation from potential output. Unanticipated declines in aggregate demand would move output and employment below their potential levels. Keynesians emphasize that the changes can be short-run but are not persistent in the long run. Unanticipated declines in aggregate demand would move output and employment below their potential levels. Keynesians argue that although such an explanation might be plausible for brief departures from potential output and employment, it is not adequate to explain the persistent and substantial deviations that we have experienced. An unanticipated decline in investment, such as we considered previously (Figure 7.3), might well cause output and employment to decline over a short period, say one year. By the next year, however, this decline in aggregate demand would be apparent; it would no longer be unanticipated. Labour suppliers would recognize that the price level had declined. Consequently, the shifts to the right in the labour supply schedule and the aggregate supply schedule discussed previously (see Figure 7.3) would restore employment and output to their initial levels.

Keynesians ask the question that how new classical economists answer the question of depression in Great Britain between 1923-1939, in America during the 1930s, stagflation and recession of the 1970s, 1980s. How can the model explain the movement of the unemployment rate during the deep and prolonged recessions of the mid-1970s, early 1980s and 2007-09? New classical economists respond that although the source of the unemployment, the unanticipated change in aggregate demand, will be of short duration, the effects of the shock will persist. Consider, for example, the response to an unanticipated decline in demand. Assume that after one year or so, everyone recognizes that demand has fallen, so the change is no longer unanticipated. Declines in output and employment will have occurred. New classical economists argue that it will take time before such declines are reversed. Firms that have already cut output will not find it optimal to restore production immediately to pre-shock levels because of the cost of adjusting output. Moreover, firms will have accumulated excess inventory stocks over the period during which output was in decline. It will take time to run off such stocks; in the meantime, production and employment will remain depressed.

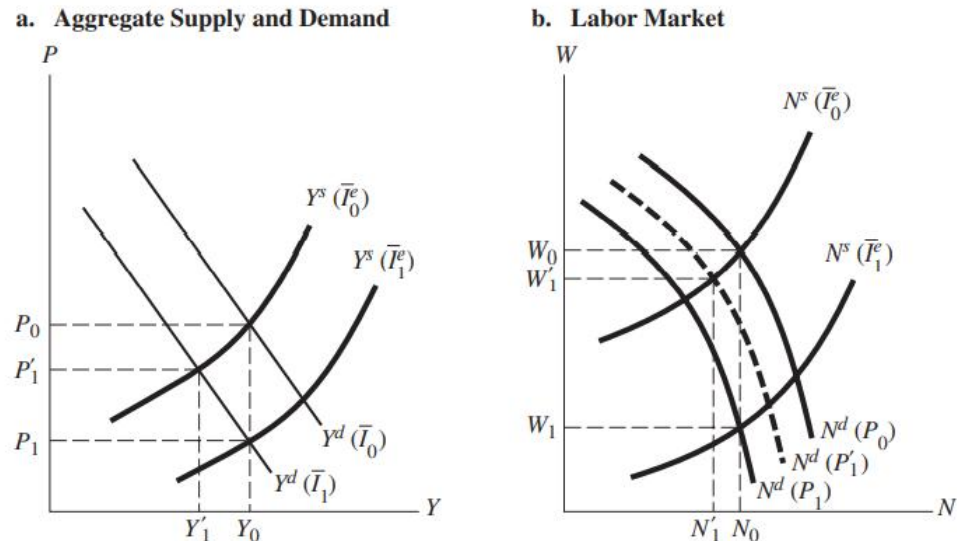
On the labour supply side, workers who have become unemployed will not find it optimal to take the first job offer that comes along but will search for the best opportunity. New classical economists argue that, as a consequence of these adjustment lags, lengthy deviations from full employment, such as the United States experienced during the mid-1970s and early 1980s, can be

explained even though the shocks that cause such deviations are short-lived. What about the depression in Great Britain and the United States in the 1930s? One proponent of the new classical position, Robert Barro, has explained the severity of the U.S. experience by the extent of the largely unanticipated monetary collapse during the early years of the Depression when the money supply fell by one-third. The slow recovery is viewed as a result of the massive government intervention during the New Deal period that subverted the normal adjustment mechanisms of the private sector. 11 Other new classical economists, such as Sargent and Lucas, agree with Keynesians that the Great Depression is not well explained by their theory, but they do not find the Keynesian explanation convincing. On this question of persistence, Keynesians remain unconvinced that adjustment lags sufficiently explain prolonged and severe unemployment. They believe that accepting the classical or new classical framework can explain episodes such as the Great Depression only as a result of factors on the supply side, which in their view are the only factors in these models that could cause prolonged unemployment. If markets clear and there is no involuntary unemployment, then, as Modigliani put it, to the classical or new classical economists “what happened to the United States in the 1930s was a severe attack of contagious laziness.”

Extreme Informational Assumptions of Rational Expectations

Keynesians accept the new classical economists’ criticism of price expectations formulations based only on information about past prices. Such rules are naive because they assume that economic agents neglect available and potentially useful information in making their forecasts. Such naive assumptions about expectations came into use in the 1950s and early 1960s, when the inflation rate was both low and stable. In these circumstances, such rules might have been reasonable approximations of the way people made forecasts because good forecasts could have been based on the past behaviour of prices. With the volatile and, at times, high inflation of the post-1970 period, it is harder to believe that economic agents did not find it worthwhile to make more sophisticated forecasts. Still, many Keynesians argue that the rational expectations assumption errs in assuming that economic agents are unrealistically sophisticated forecasters, especially when

Fig. 7.3 Effects of Autonomous Decline in Investment



rational expectations are assumed for individual suppliers of labour. Keynesians criticize the assumption that individuals use all available relevant information in making their forecasts. Such an assumption ignores the costs of gathering information. The rational expectations theory also presumes that individuals use available information intelligently. They know the relationships that link observed variables with variables they are trying to predict. They are also able to understand the systematic response pattern of policymakers. For example, if the monetary policymaker typically responds to rising unemployment by increasing the money supply, the public will come to anticipate such policy actions. Moreover, they will be able to predict the effects of such anticipated monetary policy actions. If the economy, including the behaviour of policymakers, had been subject to little change for a long period, Keynesians believe, it is perhaps reasonable to believe that

economic agents would come to know the underlying relationships that govern policy variables and economic aggregates. The rational expectations assumption might be realistic in a long-run equilibrium model, but Keynesians argue that it is not realistic in the short run. In the short run, the cost of gathering and processing information may be high enough that labour suppliers making forecasts of the aggregate price level or inflation rate do not find it worthwhile to use much information over and above the past behaviour of prices.

Keynesians conclude

“Macroeconomic models based on the assumptions of the rational expectations hypothesis do not demonstrate the short-run ineffectiveness of policy, therefore, because they are not short-run models. The information availability assumption of the rational expectations hypothesis implicitly places such models in a long-run equilibrium context in which their classical properties . . . are not surprising.”

Summary

In the new classical model, economic agents form rational expectations, but they do not have perfect information; they make mistakes in predicting the price level, and such mistakes cause short-run deviations of output and employment from their long-run equilibrium rates. In the classical model, economic agents were assumed to have perfect information. Labour suppliers knew the real wage; there were no monetary (or other) surprises and no deviations from the supply-determined rates of output and employment.

The new classical economics presents a fundamental challenge to Keynesian orthodoxy. On the theoretical level, new classical economists question the soundness of the Keynesian model, arguing that many of its relationships are not firmly based on individual optimizing behaviour. New classical economists point to the naive treatment of price expectations in the Keynesian model as an example. Further, they criticize what they consider Keynesians' arbitrary assumptions concerning wage stickiness and consequent involuntary unemployment. On policy questions, new classical economists maintain that output and employment are independent of systematic and, therefore, anticipated changes in aggregate demand. This is the new classical policy ineffectiveness postulate. Because meaningful aggregate demand management policies to stabilize output and employment consist of systematic changes in aggregate demand, new classical economists see no role in these policies. They arrive at noninterventionist policy conclusions similar to those of the classical economists.

Keywords

New Classical Economics: The new classical macroeconomics is a school of economic thought that originated in the early 1970s in the work of economists centered at the Universities of Chicago and Minnesota – particularly, Robert Lucas (recipient of the Nobel Prize in 1995), Thomas Sargent, Neil Wallace, and Edward Prescott (co-recipient of the Nobel Prize in 2004).

Rational Expectations Theory: The rational expectations theory posits that individuals base their decisions on human rationality, information available to them, and their past experiences.

SelfAssessment

1. Who of them is not involved with the New Classical Thought?
 - A. Robert Lucas
 - B. Thomas Sargent
 - C. Robert Barro
 - D. Edward Prescott

2. The rational expectation concept was propounded by
 - A. Robert Lucas

- B. Thomas Sargent
 - C. Gregory Mankiw
 - D. John Muth
3. Are the expectations as per the New Classical Thought backward-looking?
- A. True
 - B. False
4. The expected price level depends on
- A. Expected level of money supply
 - B. Expected level of government spending and expenditure
 - C. Expected autonomous investment
 - D. All the above
5. The new classical economists believed that positions of labour supply and aggregate supply schedules is in the short run.
- A. Fixed
 - B. Not fixed
 - C. Cannot be anticipated
 - D. None of the above
6. The concept of sticky wages is associated with which system.
- A. Classical system
 - B. Neo-classical system
 - C. Keynesian system
 - D. New classical system
7. The aggregate supply curve as per the classical system is
- A. Vertical
 - B. Horizontal
 - C. Upward sloping
 - D. Downward sloping
8. The prolonged deviation of output and employment from the full employment level is explained with the help ofby New Classical economists.
- A. Rational expectation theory
 - B. Monetary policy
 - C. Fiscal policy
 - D. Aggregate demand
9. The assumption of market clearing is a part of
- A. Classical system
 - B. Neo-classical system
 - C. Keynesian system
 - D. New classical system
10. As per the classical system, labour has perfect knowledge about the market.

- A. True
B. False
11. declines in aggregate demand would move output and employment below their potential levels.
A. Anticipated
B. Unanticipated
C. Regular
D. Irregular
12. Does with time lag unanticipated decline in aggregate demand become anticipated?
A. True
B. False
13. Who among the following is a pioneer of the new classical thought?
A. Thomas Sargent
B. Milton Friedman
C. J M Keynes
D. Mrs Joan Robinson
14. Did the new classical economist consider the cost of collecting information in their system?
A. True
B. False
15. "In the long run we are all dead" is a quote associated with
A. Thomas Sargent
B. Milton Friedman
C. J M Keynes
D. Robert Lucas

Answers for Self Assessment

1. C 2. D 3. B 4. D 5. B
6. C 7. B 8. A 9. D 10. A
11. B 12. A 13. A 14. B 15. C

Review Questions

1. Why was there a requirement for New Classical thought to emerge? How was it different from Keynesian thought?
2. What are the implications of the Rational Expectations Concept? How are these expectations differing from the expectations of the workers?
3. What are the major criticisms of Keynesian concepts by the New Classical Economists?
4. How do you evaluate the counter-critique by the Keynesians?
5. What is new in the New Classical Economics?



Further Readings

- Macroeconomics: Theories And Policies By Richard T. Froyen, Pearson Publications
- Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 08: Real Business Cycles and New Keynesian Economics**CONTENTS**

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Objectives

- Introduce the concept of Real Business Cycle Theory
- Evaluate the monetary policy in real business cycle model
- Introduce the concept of New Keynesian Economics
- Evaluate the various New Keynesian models

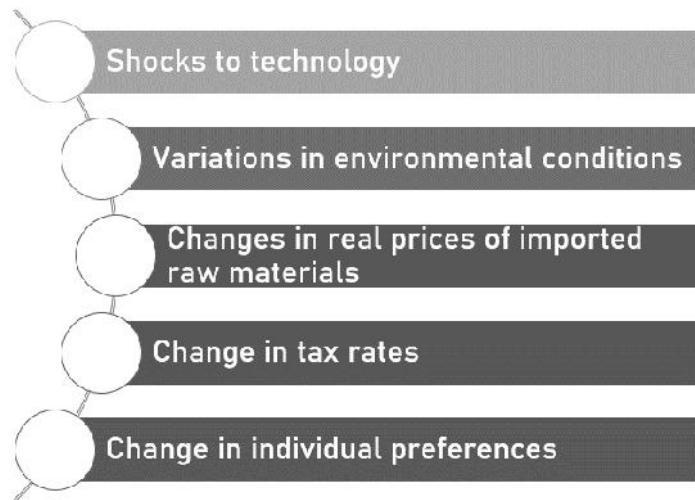
Introduction

Known as Second Generation New Classical Model as it has originated from new classical model. It is basically built on Classical Economics. Real Business Cycle theorists agree with the two assumptions given by New Classical Economists:

1. Agents optimize
2. Markets clear

A hallmark of real business cycle models is their careful attention to microeconomic foundations – the individuals' optimizing decisions. Real business cycle theorists also believe that the business cycle is an equilibrium phenomenon in the sense that all markets clear. This belief contrasts with the Keynesian view that the labor market does not clear. The Keynesian model includes involuntary unemployment. In real business cycle models, as in new classical models, all unemployment is voluntary. Where real business cycle theorists part company with new classical economists is on the causes of fluctuations in output and employment. Real business cycle theorists see these fluctuations as "arising from variations in the real opportunities of the private economy."

Fig. 8.1 Factors that Cause Change in Real Variables



Fluctuations in output also occur with changes in individuals' preferences – for example, a change in the preference for goods relative to leisure. These are the same factors that determined output in the classical model. But classical economists believed that for the most part these factors changed only slowly over time. In the short run, they were taken as given. They were the factors that would determine long-run growth. The real business cycle theorists argue that these supply-side variables are also the source of short-run fluctuations in output and employment.

This view distinguishes the real business cycle theorists from new classical economists, who regarded unanticipated changes in aggregate demand, resulting, for instance, from “monetary surprises,” as the main source of fluctuations in output and employment. Nothing in the new classical framework precludes an important role for supply-side variables, such as the oil price shocks of the 1970s or changes in tax rates, in the short run. Still, unanticipated changes in demand were viewed as the major source of cyclical fluctuations in output. Factors such as technology shocks or changes in individual preferences received less attention.

8.1 Simple Real Business Cycle Model

Real business cycle models, in the words of one of their developers,

view aggregate economic variables as the outcomes of the decisions made by many individual agents acting to maximize their utility subject to production possibilities and resource constraints. As such the models have an explicit and firm foundation in microeconomics (Charles Plosser, 1989)

A usual assumption in real business cycle models is that the economy is populated by a group of identical individuals. The behavior of the group can then be explained in terms of the behavior of one individual, called a representative agent. We may call that agent as Chintu.

Chintu's goal is to maximize his utility in each period of his life. He gets utility from two sources: consumption and leisure. We assume that he has the following utility function (U).

$$U_t = U(C_t, le_t) \quad 8.1$$

where C is consumption and le is leisure. To consume, Chintu must first produce output. In doing so, he forgoes leisure. Thus, as in the earlier models, there is a labor- leisure trade-off. Output in the model is generated by the production function.

$$Y_t = z_t F(K_t, N_t) \quad 8.2$$

The production function specifies the amount of output (Y) that will result from employing given amounts of capital (K) and labor (N) in time period t . The additional term z_t , which represents shocks to the production process. By shocks we mean events that change the level of output forthcoming for given levels of labor and capital. Real business cycle theorists include a number of factors in this category. Among the important ones are shocks to technology, environmental factors, changes in government regulations that affect productivity, and changes in the availability of raw materials.

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In the real business cycle, the capital stock is not taken as given but rather is chosen for each period by the representative agent, in a manner discussed presently. Chintun does not have to consume all the output he produces in each period. The young Chintu might want to save for when he is an old Chintu or for a future generation. What is required is that

$$Y_t = C_t + S_t \quad 8.3$$

Saving (S) plus consumption (C) must equal income, ignoring the existence of taxes. Equation (8.3) indicates that, in addition to a labor-leisure trade-off, the representative agent faces a trade-off between consumption today and saving for future consumption. Saving today will increase consumption in the future because saving is assumed to be invested to increase the capital stock in the next period:

$$K_{t+1} = S_t + (1 - \delta)K_t \quad 8.4$$

The capital stock in period $t + 1$ is equal to saving in period t plus the portion of the capital stock $(1 - \delta)$ leftover from period t , where δ is the depreciation rate for capital (the fraction of the capital stock that wears out in each period). In this representative agent framework, the behaviour of aggregate output, employment, consumption, and saving is described in terms of the choices made by Chintu.

8.2 Macroeconomic Policy in A Real Business Cycle Model

In a real business cycle model, fluctuations arise from individuals' responses to changes in the economic environment. These responses are the result of optimizing behaviour. In these models, it would be suboptimal for policymakers to eliminate the business cycle if they could actually do so. What role is there, then, for macroeconomic policy in a real business cycle model? Let us start with monetary policy and then turn to fiscal policy.

Monetary Policy

The defining feature of real business cycle models is that real, not monetary, factors are responsible for fluctuations in output and employment. In real business cycle models, the role of money is to determine the price level, much the same as in the original classical model. Changes in the quantity of money result in proportionate changes in the price level with no change in output or employment. It follows, then, that monetary policy should focus on controlling the price level. A desirable monetary policy would result in slow, steady growth in the money supply and thus stable prices, or at least a low rate of inflation. When we consider fiscal policy, however, we will see that an alternative view of the optimal conduct of monetary policy emerges from the real business cycle theory. In any case, there is certainly no role for activist monetary stabilization policy of a Keynesian type. Monetary policy cannot affect output and employment, and even if it could, it would be suboptimal to try to eliminate the business cycle.

Fiscal Policy

Many fiscal policy actions will affect output and employment in a real business cycle model. The effect will not be caused by an effect on aggregate demand, as in the Keynesian model, but by supply-side effects. Changes in tax rates on labor income or the return to capital will affect the choices of optimizing agents. Moreover, these effects will be distortionary. A tax on labor income, for example, will cause an individual to choose too much leisure in relation to employment (with resulting lower consumption). Even a lump-sum tax will affect individual behavior by affecting wealth over the planning horizon. The task of fiscal policy in the real business cycle framework is to minimize these tax distortions subject to providing needed government services (e.g., defense). This is where an alternative role for monetary policy emerges (alternative to simply keeping inflation low through slow, steady money growth). Recall from our previous discussion of the government budget constraint that an alternative to financing government spending by taxation is to finance it by printing money. Policymakers can reduce the distortion due to taxation by financing a portion of government spending with newly created money. The term economists use for this practice in which the government gets real resources through money creation is seigniorage. However, seigniorage also has costs because the faster the money supply grows, the higher will be the inflation rate. In the real business cycle model, it follows that the optimal use of monetary and fiscal policies is to combine them so as to minimize the total costs from inflation and tax distortion. This is far different from the Keynesian view of optimal monetary and fiscal stabilization policy.

Concluding Remarks About Real Business Cycle Model

Real business cycle theorists are convinced that the business cycle can be explained as an equilibrium phenomenon. Fluctuations in output come as optimizing economic agents respond to real shocks that affect production possibilities. Policies that try to prevent these fluctuations are unnecessary and misguided. Policies that try to prevent these fluctuations are unnecessary and misguided.

8.3 New Keynesian Economics

Keynes sought to explain involuntary unemployment – at times, mass involuntary unemployment. He set out to show how aggregate demand affected output and employment. The Keynesian models can explain unemployment and a role for aggregate demand in determining output and employment. A key element in these models is money wage rigidity. A fall in aggregate commodity demand, for example, leads to a fall in labor demand. As a result of fixed-wage labor contracts and workers' backward-looking price expectations, the money wage will not fall sufficiently in the short run to maintain the initial employment level. Employment and output will fall. Unemployment will rise. Over the past three decades, economists working within the Keynesian tradition have pursued additional explanations of involuntary unemployment. The models that have resulted from this research effort are called new Keynesian models. In part, this new research is a response to the new classical critique of the older Keynesian models. N. Gregory Mankiw and David Romer, both of whom have made important contributions to the new Keynesian economics, state that “the new classical economists argued persuasively that Keynesian economics was theoretically inadequate, that macroeconomics must be built on a firm microeconomic foundation.”⁹ Not all new Keynesians are this critical of the earlier Keynesian models, but their main task has been to improve the microeconomic foundations of the Keynesian system. Because they see wage and price rigidities as central to Keynes's explanation of involuntary unemployment, much effort has gone to show that these rigidities can arise from the behavior of optimizing agents. New Keynesian economists have not tried to develop one rationale for all price and wage rigidities. Rather, they believe that a number of features of the wage- and price-setting process explain such rigidities. In fact, the new Keynesian literature is characterized by what has been called a “dizzying diversity” of approaches. These approaches have, however, the following common elements:

1. In new Keynesian models, imperfect competition is assumed for the product market. This assumption contrasts with the earlier Keynesian models that assumed perfect competition.
2. Whereas the key nominal rigidity in earlier Keynesian models was the money wage, new Keynesian models also focus on product price rigidity.
3. In addition to factors that cause nominal variables (e.g., the money wage) to be rigid, new Keynesian models introduce real rigidities – factors that make the real wage or firm's relative price rigid in the face of changes in aggregate demand.

Menu cost or Sticky Price Model

Keynesian models viewed the money wage as the variable that failed to adjust to changes in aggregate demand; output and employment had to adjust. The product market in those models was characterized by perfect competition. Keynesian economists did not believe that most real-world product markets were perfectly competitive. The assumption of perfect competition was made for simplicity and reflected the view that money wage rigidity was the real culprit in explaining unemployment.

A crucial element in new Keynesian sticky price models is that the firm must not be a perfect competitor. With perfect competition, prices are set by the forces of supply and demand. Individual firms have no power over their product price; they face horizontal demand schedules. The perfectly competitive firm, a dairy farm, for example, can sell all the milk it wants to at the going market price of, say, 60 rupees per litre. If, owing to a drop in aggregate demand, the market price declines to 55 rupees per litre, the firm can sell all it wants at this new price. If in the face of the fall in demand the perfectly competitive firm maintained its original product price, it would sell no output. There is no room for sticky prices in this market

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In the real world there are monopolistic and oligopoly market where there is stickiness of prices. They have some control over the prices of their products. In case of Oligopoly, if going by the Sweezy model then we see that there is price rigidity or stickiness as any change in price will lead to change in demand. Therefore, in these market forms the firms generally do not lower the price as other firms will not follow. So nobody loses out on their market share.

There are certain costs that are associated with change in the price. They are

Fig. 8.2 Costs of Changing Price



Managerial Costs: These include the costs of gathering the information required to decide on the optimal price change, the cost of communicating to customers the logic for the change, and perhaps negotiating with customers who resist the change. Each of these activities takes management time away from other activities.

Loss of Goodwill: Consumer goodwill would be lost only through price increases, but firms that cut prices in recessions must raise them in recoveries. Firms may instead find it optimal to change prices when their costs change, the necessity of which customers will understand, but not to vary prices with changes in demand. They will thus not be considered “price gougers” in periods of high demand and will not lower prices when demand falls off.

Price War: If possible perceived cost of a price reduction in a recession is that it may set off competitive rounds of price cuts or even lead to a price war as other firms respond. This potential cost is relevant for oligopolistic markets, where firms are cognizant of other firms’ reactions to their pricing decisions.

Sticky price models then suggest a role for monetary and fiscal policies to offset shifts in aggregate demand. Optimal policies in these models may, however, differ from those in traditional Keynesian models. One difference stems from the fact that if there are monopolistic elements in the economy, the equilibrium level of output will be below the optimal level, thus offsetting declines in demand will be more important than offsetting increases. Stabilization will not be symmetric. Moreover, in the presence of menu costs when firms make pricing decisions they will recognize that they may be stuck with the price for some time and therefore be forward looking and try to predict future costs and demand. This opens a role for monetary or fiscal policies to condition expectations in a stabilizing way.

Efficiency Wage Model

Efficiency wage models are models in which labor productivity depends on the real wage that workers are paid. In such models, the real wage is set to maximize the efficiency units of labor per rupees of expenditure, not to clear the labor market.

There are index for measuring the worker efficiency

$$e = e\left(\frac{w}{p}\right) \quad 8.5$$

Worker efficiency is a positive function of the real wage.

Aggregate production function is now written as

$$Y = F[\bar{K}, eN] \quad 8.6$$

Worker efficiency is a positive function of the real wage. Output increases either when more units of labor are hired (N increases) or when the efficiency of the existing labor force improves (e is increased by a rise in W/P).

The goal of the firm is to set the real wage so that the cost of an efficiency unit of labor is minimized. This goal is accomplished by increasing the real wage to the point where the elasticity of the efficiency index $[e(W/P)]$ with respect to the real wage is equal to 1.

Proponents of the efficiency wage theory argue that in many industries real wages are set on efficiency grounds. Real wages do not adjust to clear labor markets. In fact, the rationales that underlie efficiency wage models imply that firms will set the real wage above the market-clearing level. Persistent, involuntary unemployment will result.

Several rationales have been offered for the payment of efficiency wages:

1. **The shirking model:** By setting the real wage above going market levels (i.e., a worker's next best opportunity), a firm gives a worker an incentive not to shirk or loaf on the job. If he does, he may be fired, and he knows it would be hard to get another job at such a high wage. If firms can monitor job performance only imperfectly and with some cost, such a high-wage strategy may be profitable.
2. **Turnover cost models:** By paying an above-market wage, firms can reduce quit rates and, thus, recruiting and training costs. The high wage also allows them to develop a more experienced, and therefore more productive, workforce.
3. **Gift exchange models:** Another explanation of why efficiency depends on the real wage centers on the morale of a firm's workers. According to this argument, if the firm pays a real wage above the market-clearing wage, this higher wage improves morale, and workers put forth more effort. The firm pays the workers a gift of the above-market wage, and the workers reciprocate with higher efficiency.

None of these rationales is intended to apply to all parts of the labor market. If, however, efficiency wage considerations are important and therefore real wage rates are set above market-clearing levels in many sectors, substantial involuntary unemployment may result. Workers will continue to seek jobs in the high-wage sector, working, for example, when demand is high, rather than take low-paying jobs.

Notice that the real wage is fixed on efficiency grounds. Efficiency wage models explain a real rigidity. We have just seen how this real rigidity can explain involuntary unemployment. By itself, however, the rigidity of the real wage due to the payment of efficiency wages does not explain why changes in aggregate demand affect output and employment and therefore the level of involuntary unemployment. If there was a fall in nominal aggregate demand, resulting, for example, from a decline in the money supply, firms could lower their prices sufficiently to keep output (sales) unchanged and lower the money wage by the same amount to keep the real wage at the efficiency wage, $(W/P)^*$. If, however, firms do not lower prices because of menu costs, as explained in the previous section, then to keep the real wage at the efficiency wage requires the money wage also to be fixed. In this case, when aggregate demand declines, output and employment will fall and involuntary unemployment will rise. Thus, a nominal rigidity, the menu cost, and the real wage rigidity due to efficiency wages combine to explain involuntary unemployment.

Insider Outsider Model and Hysteresis

This is the last direction in the New Keynesian research. They try to explain the hysteresis in unemployment with reference to the European countries which had a steady rate of employment from the 1980s onwards through the same countries had a very low level of employment in the 1960s and 1970s. The term hysteresis is used for a variable that is unable to reach to go back to its original position after the initial shock is over. In terms of unemployment, hysteresis models try to explain why high unemployment persists even after its initial cause is long past. There are a number of explanations for hysteresis in the unemployment process. This discussion is limited to one model that has received considerable attention – the insider-outsider model.

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This model works in an imperfect market. We take the example of trade unions and the labour force though in recent times the trade unions have become ineffective in India. The firms employing the labour are considered as outsiders and the labour unions are considered as insiders. The trade union have bargaining power as the firms will face a higher price in employing a non-unionized labour force.

The cost of replacing them is a recruiting and training cost for new workers. Union members may also impose costs on outsiders who attempt to underbid them for jobs – for example, by setting up picket lines. The insiders are assumed to use their bargaining power to push the real wage above the market-clearing level, resulting in an unemployed group of outsiders. Insiders will push the real wage only up to a certain point, however, because the higher the real wage, the fewer insiders will be employed. This relationship follows because employment is equal to the firms' demand for labour, which depends negatively on the real wage. If in our example the insider's number 2000, we will assume that they bargain for a real wage that they believe will result in all (or almost all) of them being employed. They may not, however, end up being employed because if economywide aggregate demand slackens unexpectedly, output and employment will fall. A percentage of the insiders will be laid off. Thus, in the insider-outsider model, unemployment results from a real wage set above the market-clearing level (outsider unemployment) as well as from a cyclical response to changes in aggregate demand. A novel feature of these models is the inter-relationship of these two types of unemployment.

Summary

The two concepts discussed in this chapter, that is real business cycle theory and New Keynesian economics are two very conflicting ideas of macroeconomics. On the one hand, the real business cycle theory is a modern version of classical economics. The business cycle is an equilibrium phenomenon. According to this

Real business cycle theory and the new Keynesian economics are extensions of two conflicting traditions in macroeconomics. The real business cycle theory is a modern version of classical economics. The business cycle is an equilibrium phenomenon. It is the result of the actions of optimizing agents in the face of changes in the economic environment (e.g., productivity shocks) or in preferences. Macroeconomic stabilization policies are counterproductive. The real business cycle theorists, therefore, reach noninterventionist policy conclusions, as did the original classical economists. The new Keynesian economics is set firmly in the tradition of John Maynard Keynes. New Keynesian economists believe that much unemployment is involuntary. They believe that the deviations of output below potential output during recessions are socially costly. There is a potential role for stabilization policy in preventing such output shortfalls and alleviating the personal costs of involuntary unemployment. New Keynesian economics is an attempt to improve the microeconomic foundations of the traditional Keynesian models, not to challenge their major premises.

Keywords

Menu costs are the costs incurred by a business when it changes the prices it offers to its customers.

Insider-Outsider Model: The insider-outsider theory is a theory of labour economics that explains how firm behaviour, national welfare, and wage negotiations are affected by a group in a more privileged position. The theory was developed by Assar Lindbeck and Dennis Snower in a series of publications beginning in 1984.

Sticky Price Model: The sticky-price model of the upward sloping short-run aggregate supply curve is based on the idea that firms do not adjust their price instantly to changes in the economy.

Self Assessment

1. In real business cycle models, the role of money is to determine the
 - A. Price level
 - B. Real variables
 - C. Profit level

- D. Income level
2. Tax on labor income, will cause an individual to choose too muchin relation to employment
- A. Wages
B. Leisure
C. Work
D. None of the above
3. Which of the following is not a factor influencing real variables?
- A. Shocks to technology
B. Changes in tax rates
C. Change in real prices of imported raw materials
D. Change in nominal prices
4. Do the supply side factors cause change in real business cycle in the short run?
- A. Yes
B. No
5. Which factors are responsible for fluctuations in output and employment according to the real business cycle models?
- A. Monetary factors
B. Real factors
C. Both the factors
D. None of the above
6. In real business cycle models the role of money is to determine the
- A. Output
B. Employment
C. Price level
D. All the above
7. Changes in the quantity of money results in changes in the price level withchange in output and employment.
- A. Disproportionate, massive
B. Disproportionate, no
C. Proportionate, massive
D. Proportionate, no
8. Do the real business cycle model support printing new money for the correction of distortions created by the tax system?
- A. Yes
B. No
9. The New Keynesian economists wanted to improve the base of Keynesian economics.
- A. Macroeconomic
B. Microeconomic

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- C. Monetary
D. None of the above
10. Involuntary unemployment is explained with the help of in Keynesian economics.
A. Wage rigidity
B. Price rigidity
C. Both the above
D. None of the above
11. Does New Keynesians assume perfect competition in the product markets?
A. Yes
B. No
12. Is stabilization systematic in the market as per the New Keynesians?
A. Yes
B. No
13. Which was one of the first company in the world to introduce the efficiency wage model?
A. Rockefeller
B. General Motors
C. Chrysler Automobiles
D. Ford motors
14. Worker efficiency is afunction of real wage.
A. Positive
B. Negative
C. Depends on the bargaining power of labour
D. Can be either positive or negative
15. Who are the not the insiders in the Insider-Outsider model?
A. Job seekers
B. Union members
C. Managers
D. Trainees

Answers for Self Assessment

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. A | 2. B | 3. D | 4. A | 5. A |
| 6. C | 7. D | 8. A | 9. B | 10. C |
| 11. B | 12. B | 13. D | 14. A | 15. A |

Review Questions

1. What are the similarities between Real Business Cycle Model and the Classical theory?

2. Explain how the Insider-Outside model works in the developing countries with special context to India.
3. If there is a negative shock of technology, then how would the real business cycle model change.
4. What role does macroeconomic policy play in a real business cycle model?
5. Is there any similarity between the real business cycle and new Keynesian economic concept? Substantiate your answer.
6. Explain the types of menu cost that a firm may have to incur if it changes its product price.
7. Explain the real business cycle theorists' views on the proper conduct of monetary and fiscal policies.



Further Readings

Macroeconomics: Theories And Policies By Richard T. Froyen, Pearson Publications

Macroeconomics By N. Gregory Mankiw, Cengage Publishers

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Objectives

- Understand the formulation of Monetary Policy with special reference to India
- Analyze the targeted monetary aggregate approach and the interest rate approach
- Explain the concept of central bank
- Evaluate the Taylor Rule
- Discuss the goals of macroeconomic policies
- Evaluate the macroeconomic policies

Introduction

The crisis in the banking industry is not new and history has accounts about how banks failed which led to the collapse of the financial system. However, in modern times, the banking industry is just not part of the financial system but is a very important part of the economy. The crisis of 2008 that started in the United States of America spread worldwide having a dominos effect. In 2017 the official non-performing loan ratio in India was 9.6 per cent and the ratio of “stressed assets,” which also includes restructured loans, is 14 per cent. Even at the height of the global financial crisis, non-performing loan ratios in Greece, Portugal, and Italy did not reach this level. The relatively small size of the Indian banking sector may spare the country from the kind of pain experienced in Ireland and Iceland during the global financial crisis. Nevertheless, the Indian banking sector is in urgent need of stabilization and structural changes. The Reserve Bank of India frames the monetary policy for the country and the Finance Ministry frames the fiscal policy.

9.1 Targeting Monetary Aggregates or Interest Rates

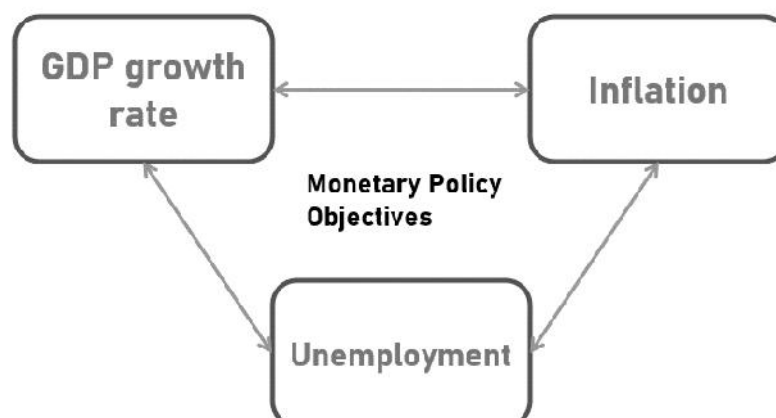
The Monetary policy must be conducted in a way that leads to stable growth in aggregate demand. The Reserve Bank of India should keep demand from growing too rapidly, with resulting inflation, or too slowly, with resulting high unemployment and slow economic growth.

Targeting Monetary Aggregates

The ultimate targets that the monetary authority would like to control are macroeconomic goal variables such as the unemployment rate, the inflation rate, and growth in real GDP (fig. 9.1). Rather than simply adjusting monetary policy instruments, primarily the level of open-market operations, on the basis of past observations on these variables and forecasts of their future behaviour, in the short run the Federal Reserve has at times tried to influence these ultimate targets by influencing intermediate target variables. An intermediate target is a variable that the Federal Reserve controls not because the variable is important in its own right but because, by controlling it, the policymakers believe they are influencing the ultimate policy targets in a predictable way. With a monetary aggregate as an intermediate target, the implicit assumption in the Federal Reserve strategy is that other things being equal, higher rates of growth in the money supply increase inflation while lowering unemployment (raising the level of economic activity) in the short run. Slower monetary growth rates are, again, other things being equal, associated with lower inflation rates and higher short-run rates of unemployment. As implemented by the Federal Reserve, intermediate targeting on monetary aggregate proceeds is as follows.

At the beginning of each calendar quarter, the FOMC chooses the money growth rate target that it views as consistent with its ultimate policy goals for the next year. The committee makes this choice based on past data and staff forecasts of the behaviour of the economy for given money growth rates. After this choice has been made, monetary policy during the quarter proceeds as if the chosen money growth target is the ultimate target of monetary policy. Policy actions within the quarter are aimed at hitting this money growth target.

Fig. 9.1 Targets of Monetary Policy



Targeting Interest Rate

The alternative to targeting monetary aggregates is to target an interest rate. In India, the RBI through the Monetary Policy Committee decides on the policy rate which is then implemented by the RBI so that it alters the expenditure behaviour of the various agents of the economy. The weighted average call rate (WACR) - which represents the unsecured segment of the overnight money market and is best reflective of systemic liquidity mismatches at the margin - was explicitly chosen as the operating target of monetary policy in India. An interest rate corridor - the liquidity adjustment facility (LAF) - has been defined since May 2011 by the interest rate on the marginal standing facility (MSF) as the upper bound (ceiling), the fixed overnight reverse repo rate as the lower bound (floor) and the policy repo rate in between (RBI, 2011). The LAF corridor effectively defines the operating procedure of monetary policy. Once the policy repo rate is announced, liquidity operations are conducted to keep the WACR closely aligned to the repo rate. While the operating target and the LAF corridor framework have remained unchanged during the FIT period, several refinements have been introduced regarding

- (i) the width of the corridor
- (ii) the choice of liquidity management instruments; and

- (iii) finetuning regular/durable market operations, all intended to anchor the term structure of interest rates to the policy repo rate in order to strengthen transmission.

It is useful to mention some additional features of the processes of interest rate and money supply control. Short-term interest rates can be observed contemporaneously and be closely controlled. The Open Market Desk just looks at a computer screen and sees the current funds rate. Therefore, the fund's rate is a short-term operating target. The money supply is only observed with a lag of a week or two and then only with error. If the money supply is a target, some other variable that is more frequently observable, such as the level of the bank reserves, must serve as an operating target. Another point to note is that interest rate targeting focuses on a short-term interest rate such as the central funds rate. Long-term interest rates can also be observed contemporaneously but cannot be closely controlled by central banks.

Money versus Interest Rate Targets in the Presence of Shocks

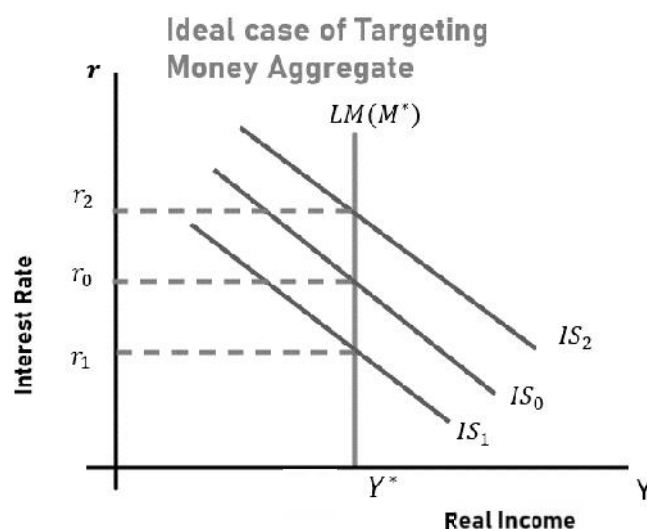
Mervyn King, the Governor of the Bank of England, replied, "The secret to good policy is to think through what are the economics of the shocks hitting the economy at present" when he was asked about the recipe of his monetary policy. In this section, we will look into the merits of each of the strategies discussed above. The IS-LM curve will be used to explain the merits of each of the strategies. The students need to remember that this discussion is under the assumption of shocks in the economy.

Implications Of Targeting a Monetary Aggregate

Situation 1

We first consider an ideal case for targeting a monetary aggregate. This case is depicted within the IS-LM framework as shown in fig. 9.2. LM is vertical because the demand for money is perfectly interest inelastic. Money demand only depends on income. We assume that the demand-for-money function is perfectly stable. There are no shifts in the function – no changes in the amount of money demanded for a given income level.

Fig. 9.2 Ideal Case of Targeting a Monetary Aggregate



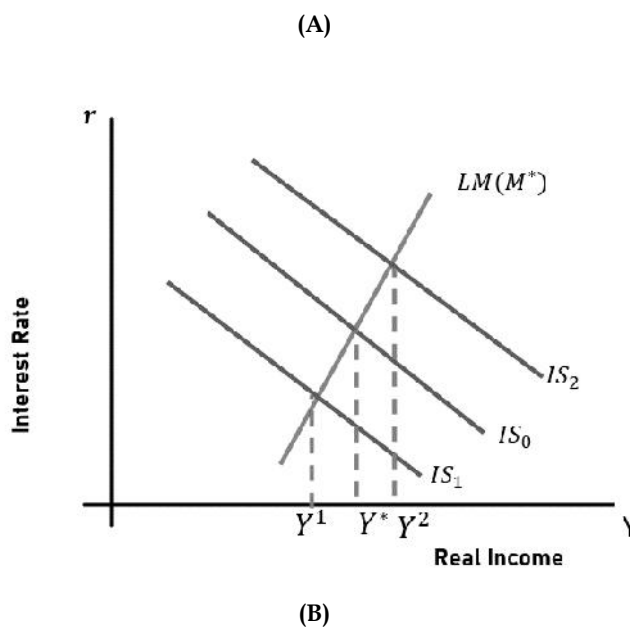
The main aim is to achieve the income level of Y^* . If the central bank achieves its target level of the money supply (M^*), the LM schedule will be perfectly stable at $LM(M^*)$. We assume that the Central Bank cannot predict with certainty the position of the IS schedule. The initial position is IS_0 . Real-sector demand factors such as exports, autonomous investment, and government spending may turn out to be weaker than predicted, causing the IS schedule to be to the left of IS_0 , at IS_1 . Alternatively, such real-sector demand factors may be stronger than predicted, causing the IS schedule to be at IS_2 , to the right of IS_0 . By targeting the money supply, the Central Bank ensures that the vertical LM schedule will be fixed at $LM(M^*)$, and consequently income will be at Y^* , regardless of the position of the IS schedule. Unpredicted shifts in the IS schedule will cause a shift in the rate of interest. If the central bank also has the target of a certain interest rate, then it would be missed.

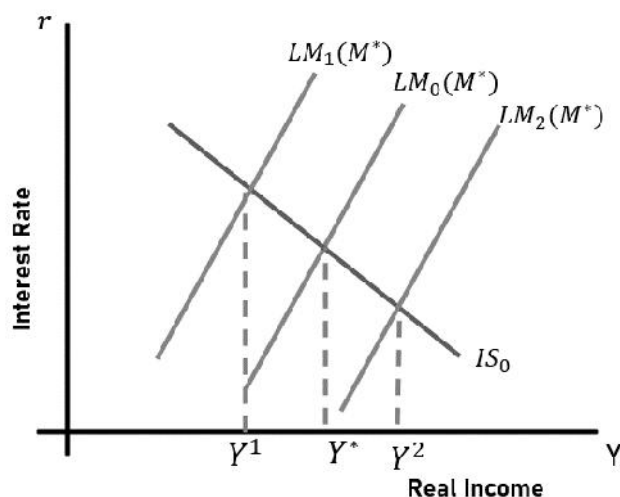
Situation 2

We must assume that the money demand function is perfectly stable. There are no unpredictable shifts in money demand that will shift the LM schedule for a given value of the money supply. The income target will be achieved only if the IS schedule is at the predicted level of IS_0 . If the IS schedule shifts, then the income target will not be achieved. Now we are taking a situation where the money demand function is not perfectly stable (Fig. 9.3A). There are unpredicted shifts in money demand for given levels of income and the interest rate. Such shocks to money demand shift the LM schedule. Even if the central bank hits the money supply target the LM schedule is not fixed. Here we assume that the prediction of the central bank regarding the real factors is correct at the IS schedule is at IS_0 . To peg the interest rate, the Central Bank supplies whatever amount of money is necessary for money market equilibrium at the target interest rate.

In Figure 9.3B, we consider a case in which the money demand function is not perfectly stable. There are unpredicted shifts in money demand for given levels of income and the interest rate. Such shocks to money demand shift the LM schedule. In this case, even if the Central Bank hits its money supply target, the LM schedule will not be fixed. In Figure 9.3B, assume that, on the basis of a forecast of money demand, the Central Bank predicts that the LM schedule will be at LM_0 (M^*). To isolate the effects of uncertainty about money demand clearly, let us assume that the Federal Reserve's forecast about the real sector is correct: The predicted and actual position of the IS schedule is IS_0 .

Fig. 9.3 Less-Than-Ideal Cases for Targeting a Monetary Aggregate





If the Central Bank is using the money supply as an intermediate target and hits the money supply target (M^*), it will hit the income target (Y^*) only if the prediction of money demand is correct—only if the LM schedule is at $LM_0(M^*)$ as predicted. This outcome can be seen in Figure 9.3B. If an unpredicted shock increases the demand for money above the predicted level and the LM schedule is at $LM_1(M^*)$ instead of $LM_0(M^*)$, income (Y^1) will fall short of the target level.

In the reverse case, when an unpredicted shock reduces money demand below the predicted level and the LM curve is at a position such as $LM_2(M^*)$, income will be at Y^2 , above the target level. Again, hitting the money supply target does not guarantee that the income target will be hit.

Implications Of Targeting the Interest Rate

Here too the goal for the central bank is to maintain a certain level of real income. When the interest rate is targeted the LM schedule becomes horizontal. The LM schedule depicts equilibrium in the money market. To peg the interest rate, the Central Bank supplies whatever amount of money is necessary for money market equilibrium at the target interest rate.

Uncertainty about the IS Schedule

In the first two cases, we assume that the only uncertainty is about the IS schedule. Figure 17-4 depicts the situation in which, as in Figure 9.4, the predicted position of the IS schedule is IS_0 . But positions IS_1 and IS_2 might occur, respectively, if demand is weaker or stronger than expected. In addition to the horizontal LM schedule, which is relevant when the interest rate is pegged (solid line), we show (as a dashed line) the position of the LM schedule that would have resulted if we had targeted the money supply (at M^*). In Figure 9.4, we assume that money demand is totally interest inelastic (zero interest elasticity). Therefore, if the money supply were the intermediate target, the LM schedule would be vertical. We see from Figure 9.4 that, with the interest rate targeted at r^* , we will hit the income target, Y^* , only if the IS schedule turns out to be in the predicted position IS_0 . If, for example, investment demand were lower than predicted and the IS schedule were at IS_1 , income would fall below the desired level (to $Y_{r,1}$). In the case depicted in Figure 9.4, we are better off with a money supply target, where we stay at Y^* , regardless of the position of the IS schedule.

Fig. 9.4 Targeting the Interest Rate with IS Uncertainty: Zero Interest Elasticity of Money Demand

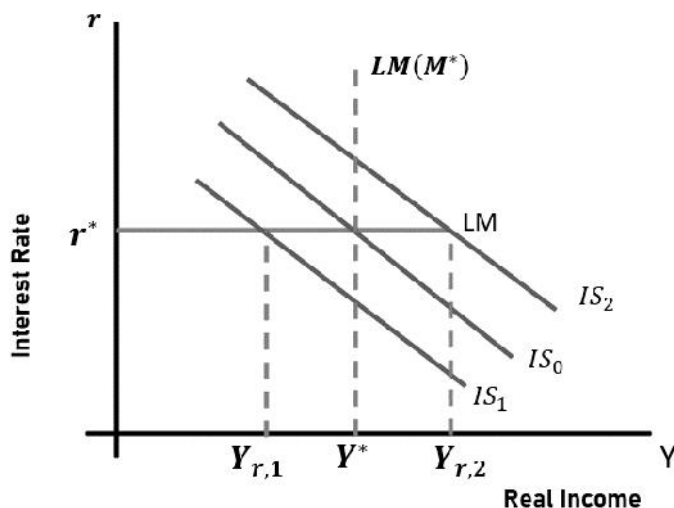


Figure 9.5 depicts the case in which we allow only for uncertainty about the IS schedule but will no longer assume that money demand is completely interest inelastic. The assumption about the interest elasticity of money demand has no effect on the LM schedule when the interest rate is the target. That LM schedule (the solid LM line in the figure) is horizontal because the Federal Reserve supplies whatever money is required to keep the interest rate at r^* . The LM schedule with a money supply target, shown as a dashed line in Figure 9.5, $LM(M^*)$, will be upward sloping, not vertical. Again, the predicted position of the IS schedule is IS_0 , but the schedule may turn out actually to be at IS_1 or IS_2 , respectively, if private-sector demand is weaker or stronger than predicted. As in Figure 9.4, the money supply target is superior to the interest rate in keeping income close to Y^* when the IS schedule is not at the predicted level. If the IS schedule turns out to be at IS_1 or IS_2 , income will be at $Y_{r,1}$ or $Y_{r,2}$, respectively, with a money supply target. With an interest-rate target, income would be at $Y_{r,1}$ or $Y_{r,2}$, respectively, for the same positions of the IS schedule; both levels are farther from Y^* . We see then that, regardless of whether the LM schedule is vertical or upward-sloping, a money supply target is superior to an interest-rate target when the uncertainty facing the policymaker concerns the IS schedule. The reason is that, when the IS schedule shifts away from its predicted position, the movement in the interest rate dampens the effect of the shift on income. When the interest rate is targeted, this monetary dampener is shut off

Uncertainty about Money Demand

Figure 9.6 depicts the case in which money demand is not perfectly stable. With the interest rate as a target, the LM schedule is horizontal and does not shift when there is a shift in the money demand function. If a positive shock (positive shift in liquidity preference) increases the demand for money at a given level of income and the interest rate, the Central Bank increases the money supply. Shocks to money demand, therefore, do not affect income with an interest-rate target. Real income remains at the target level Y^* .

Fig. 9.5 Targeting the Interest Rate with IS Uncertainty: Nonzero Interest Elasticity of Money Demand

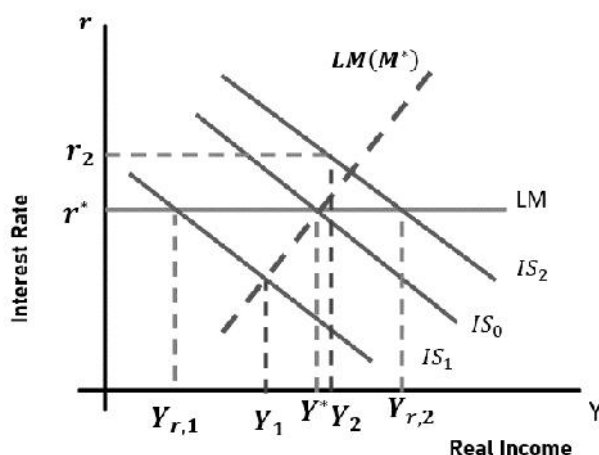
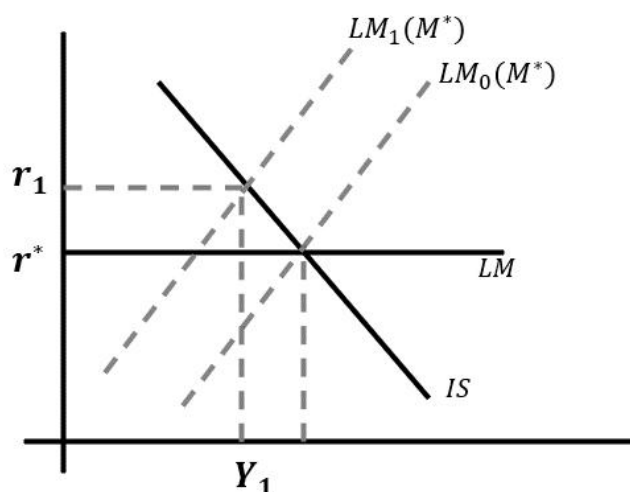


Fig. 9.6 Targeting the Interest Rate with LM Uncertainty



If the interest rate is targeted, the LM schedule is horizontal and does not shift when there is a shock to money demand. The money demand shock does not displace income from the target level. If the money supply is the target, a positive shock to money demand will shift the LM schedule from $LM_0(M^*)$ to $LM_1(M^*)$; income will fall below the target level to Y_1 .

The Relative Merits of the Two Strategies

What can we conclude about the relative merits of a monetary aggregate versus an interest rate as a target for monetary policy?

The Sources of Uncertainty and The Choice of a Monetary Policy Strategy

The uncertainty faced by the policymaker decides the target. If the predominant sources of uncertainty are unpredictable shifts in the IS schedule, a money supply target is superior to an interest rate target. The implication for the actual economy is that when uncertainty comes from sources such as unpredictable shifts in the business sector's investment spending, residential construction investment, and consumer durable purchases—all private sector demands for output—the money supply target is preferable.

9.2 Central Banks

The Time Inconsistency Problem

Monetary policy strategy should change over time as the sources of uncertainty facing policymakers vary. This view argues for flexibility or policy by discretion. Recognition of time inconsistency problems in policy formation, however, lends support to the argument for policy by rules. A time (or dynamic) inconsistency problem for policy arises when, as Stanley Fischer explains, a “future policy that forms part of an optimal plan formulated at an initial date is no longer optimal from the viewpoint of a later date, even though no new information has appeared in the meantime.” In other words, a policy announcement will be time-inconsistent if economic agents know that the policymaker will want to renege on the decision when it comes time to act.

At one point, say the beginning of the year, the policymaker might announce a noninflationary rate of monetary growth of zero. But later in the year, after wages and prices have been set, the policymaker may find it optimal to renege on this commitment and generate “surprise” inflation. Firms and workers, knowing the policymaker’s preferences (remember, here we assume rational expectations), will anticipate that the policymaker will cheat. There will be no output gain. There will be higher inflation than at zero money growth. The time-inconsistency problem causes an inflationary bias in monetary policy. If, instead, a monetary policy rule-bound the policymaker to a zero-inflation policy, society would be better off than with policy by discretion. The rule would give credibility to the policymaker’s announcement. It is worth noting that time-inconsistency problems exist in contexts other than monetary policy. For example, consider the patent system. Before inventions are made, it is optimal to offer patents as an incentive.

Other Arguments for Inflation Targeting

If not to solve the time-inconsistency problem, what is the motivation behind the move to inflation-targeting rules in many countries? There seem to be more pragmatic considerations. One is to reduce the effect of political pressures on central banks. In general, the move to inflation targeting coincides with a grant of greater independence to central banks. Giving the central bank independent control of its policy instruments and a clear mandate to target inflation greatly limits a government’s ability to manipulate monetary policy for political purposes. Even before explicit inflation-targeting rules were common, central bank independence was positively associated with lower inflation. Inflation targeting is a way of giving central banks independence for their instruments while keeping them accountable for goals.

Another pragmatic motivation for the move to inflation targeting in several countries was that they experienced problems similar to those the United States experienced with monetary aggregates as intermediate targets. As the money-income relationship became more unstable, they relied more on short-term interest rates to implement monetary policy. As explained previously, this approach leaves monetary policy without any anchor that serves as an anti-inflation guarantee. Direct targeting on inflation provides such an anchor.

9.3 Taylor Rule

The Taylor rule This refers to a rule used by central banks to determine the right interest rate for the economy based on changes in price inflation and other economic conditions. The rule is often proposed as a solution to the problem of discretion involved in the framing of monetary policy due to the influence of political populism. It provides a formula to determine how much a central bank should target an increase or decrease in interest rates depending on the economy’s health. The rule proposed by him was the following:

$$r = p + .5y + .5(p - 2) + 2 \quad (9.1)$$

- r = the federal funds rate
- p = the rate of inflation
- y = the percent deviation of real GDP from a target

Taylor rule predicts that the Federal Open Market Committee will raise the federal funds rate (tighten monetary policy) by one-half percentage point:

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1. for each percentage point that inflation rises relative to the Fed's target, assumed to be 2 percent;
2. for each percentage point that that output rises relative to its potential.

The Taylor rule also predicts that when inflation is at target and output is at potential (the output gap is zero), the Federal Open Market Committee will set the real federal funds rate at 2 percent—about its historical average.

Taylor criticised the Fed policy on the following grounds:

1. Taylor was critical of the Federal Bank that it kept the interest rates much lower than what prescribed by the rule which was a major source of the housing bubble in USA.
2. He asserts that the Fed's monetary policy since the financial crisis has not been sufficiently rule-like, and that policy has been too easy.

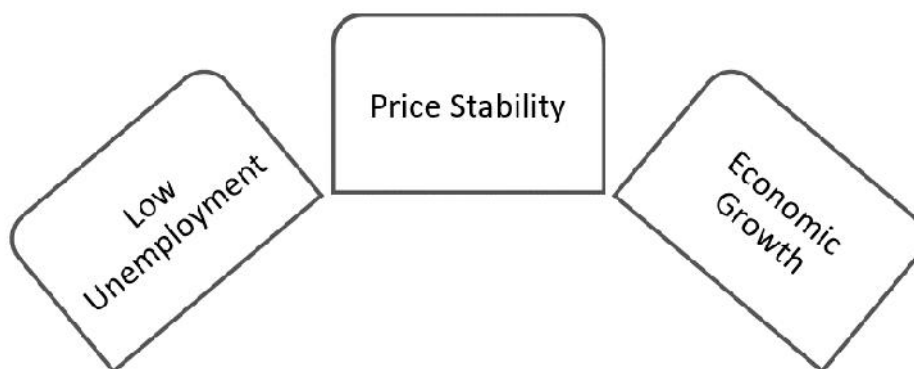
However, Taylor was also criticised. The main criticisms levelled against him were:

1. The Taylor rule assumes that policymakers know, and can agree on, the size of the output gap. In reality it is very difficult to measure the gap.
2. The Taylor rule also assumes that the equilibrium federal funds rate (the rate when inflation is at target and the output gap is zero) is fixed, at 2 percent in real terms (or about 4 percent in nominal terms).
3. The Taylor rule provides no guidance about what to do when the predicted rate is negative, as has been the case for almost the entire period since the crisis.
4. There is no agreement on what the Taylor rule weights on inflation and the output gap should be, except with respect to their signs.

9.4 The Goals of Macroeconomic Policymakers

The policymakers are debating whether to use Monetary policy or Fiscal policy for economic stabilization? Are large fiscal deficits “termites to the basement” or “the devil at the door”? Figure 9.7 shows the goals of the policymakers.

Fig. 9.7 Goals of Macroeconomic Policymakers



Minimize Social Loss Function

The question of optimal conduct of macroeconomic policy would then be how to set the policy instruments to come as close as possible to the target levels. One of the ways to formulate this problem is when policymakers minimize the social loss function.

$$L = a_1(U - U^*) + a_2(P - P^*) + a_3(Y - Y^*) \quad a_1, a_2, a_3 > 0 \quad 9.2$$

Where L: social loss

U: level of unemployment

P: inflation rate

Y: rate of growth in real income

a_1, a_2, a_3 : relative weights attached to different targets

Equation (9.2) is only one representation of the social-welfare-loss function that is relevant to macroeconomic policies. The key assumption for formulating this type of optimal policy is simply that the policymaker minimizes some social welfare-loss function. The problem is to find the settings of the instruments that result in the minimum loss. We can further investigate whether various rules, such as a balanced-budget rule, outperform more activist policy prescriptions.

There are people who have questioned the realism of the social loss function. In the next part, we will look at two branches of this literature questioning the equation. They are

1. Public Choice View
2. The Partisan Theory

Public Choice View

The policymakers are more inclined to do their own good than the public good. Such policies are skewed away from public welfare. As **Gordon Tullock**, a proponent of the public-choice view, puts it: "Bureaucrats are like other men. . . . If bureaucrats are ordinary men, they will make most (not all) [of] their decisions in terms of what benefits them, not society as a whole." Rather than the social welfare-loss function as given by equation (9.2), the relevant loss function is one that measures variables of direct importance to policymakers. In the case of elected officials making fiscal policy decisions, this alternative approach emphasizes votes as the central goal motivating policymakers.

Within the public-choice framework, one representation of the appropriate loss function that the policymaker seeks to minimize is

$$L = b_1 VL \quad b_1 > 0 \tag{9.3}$$

Where L: Loss

VL: vote loss

b_1 : weight given to vote loss

Macroeconomic goal variables enter the picture because the behavior of the economy affects votes. For example, vote loss might be represented as

$$VL = c_0 + c_1(U - U^*) + c_2(P - P^*) + c_3(Y - Y^*) \tag{9.4}$$

Where VL: vote loss

U: level of unemployment

P: inflation rate

Y: rate of growth in real income

c_1, c_2, c_3 : the loss of votes resulting from deviations of the macroeconomic goal variables from target levels

Suppose that vote loss is given by equation (9.4) and the policymaker acts to minimize vote loss; the relevant loss function is equation (9.3). Will policy actions differ from those that would result from the policymaker's acting altruistically and minimizing the social loss function given by equation (9.2)? Advocates of the public-choice view of policymaker behaviour argue that they would. To see why we examine the condition necessary for behaviour in the two cases to be the same and then explain why the advocates of the public-choice view do not believe that this condition will be met in practice. First, assume that voter behaviour is governed by what we may call collective rationality, meaning that vote loss because of macroeconomic concerns is proportional to social-welfare loss. This assumption means that when macroeconomic variables affect voting behaviour, voters reward or punish incumbent politicians, depending on their performance in minimizing social-welfare loss. In this case, the optimal strategy to minimize vote loss [equation (9.3)] is to minimize social-welfare loss [equation (9.2)]. As has been recognized in the public-choice literature, when this type of collective rationality does not exist, the behaviour of the vote-maximizing policymaker will deviate from social-welfare-maximizing behaviour.

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The following hypotheses about voter behaviour have been advanced in the public-choice literature.

Voters are myopic. Advocates of the public-choice view argue that voting behaviour is heavily influenced by the state of the economy over the few quarters before the election and that the level of economic activity, not the inflation rate, is the variable whose recent performance determines votes. "Incumbent politicians desire re-election and they believe that a booming pre-election economy will help to achieve it." As a consequence, we have a political business cycle, in which aggregate demand is overly expansionary in the pre-election period, with inflation following after the election.

Unemployment is more likely to result in vote loss than is inflation. The inflation process is presumed to be sufficiently complex and ill-understood so that politicians can avoid blame for inflation more easily than for unemployment: "At any moment of time the inflation is blamed on events which are not under the control of the political party in power, but ideally on the political party previously in power." 5 As a consequence, advocates of the public-choice view argue that elected officials rarely respond to inflation with restrictive policies, but respond to unemployment with expansionary policies. Thus, fiscal policy has an inflationary bias.

A deficit bias exists in the budget process. This inflationary bias is reinforced by a bias toward deficits that public-choice writers believe to be characteristic of democratic government fiscal policies. For example, as James Buchanan and Richard Wagner argue,

Elected politicians enjoy spending public monies on projects that yield some demonstrable benefits to their constituents. They do not enjoy imposing taxes on these same constituents. The pre-Keynesian norm of budget balance served to constrain spending proclivities so as to keep governmental outlays roughly within the revenue limits generated by taxes. The Keynesian destruction of this norm, without an adequate replacement, effectively removed the constraint. Predictably politicians responded by increasing spending more than tax revenues, by creating budget deficits as a normal course of events.

The Partisan Theory

In partisan theory, political factors also affect macroeconomic policy. The partisan theory, views politicians as ideologically motivated leaders of competing parties. The parties, in turn, represent constituencies with different preferences concerning macroeconomic outcomes. In the most common partisan party model, there is a liberal (or labour) party and a conservative party. The liberal party primarily emphasizes full employment and income redistribution, whereas the conservative party values price stability most highly. Rather than a political business cycle, the partisan theory predicts party cycles as macroeconomic policy varies, depending on which party is in power. In the case of fiscal policy, for example, the partisan model predicts that if the liberal party gains office, government spending will rise as politicians try to stimulate demand and, hence, employment. Government outlays may also rise as transfer payments are increased to redistribute income. In most circumstances, the more expansionary fiscal policy will also increase the rate of inflation. If the liberal party loses office at a later point, fiscal policy will become more restrictive as the conservatives seek to combat inflation. Unemployment will rise, and a recession may result. Like political business cycles, partisan party cycles would be mitigated by a fiscal policy rule such as a balanced-budget rule. A rule for fiscal policy would limit the ability of each party to pursue its goals by manipulating aggregate demand. Also, redistribution efforts by the liberal party would be hampered if any increased transfer payments required new taxes.

9.5 Fiscal Policy Controversies

Even though the issue of the need and scope for stabilization policy remains topical in macroeconomics, the view among academic circles regarding the usefulness of fiscal policy has dramatically changed over the last years. Empirical examples show that states have used fiscal policy for countering cyclical changes. The theoretical adequacy of the mainstream view regarding the counterproductive effects of fiscal policy runs into common misunderstandings.

Fiscal Policy before the 1930s

Fiscal policy was not part of the lexicon of economists. Fiscal debt was associated with wars and therefore had negative connotations. William Petty's remedy for unemployment in Ireland was public works. James Lauderdale had a developed idea that huge taxes would lower consumption,

increase saving and put huge sums of money into the hands of bondholders who would not be disposed to consume them. In general, we could say quite safely that the public finance inherited knowledge only dealt with selective market failures in the provision of public goods. The early generation of Chicago economists that argued in favor of the use of the fiscal policy to absorb changes in the business cycle, asserted that fiscal policy could play an important role especially in contractions and when the instruments of monetary policy had outlasted their purpose and usefulness. Keynes initially supported the Chicago economists. In *The Means to Prosperity* (in 1931) that he argued for public works programs using the logic of Kahn's multiplier. Keynes found no conflict between policies for increasing employment and schemes for balancing the budget.

Pros and Cons of Fiscal Policy

Economists who accept the public-choice view of the budget process tend to favor fiscal policy rules. The major opponents of rules that set fiscal policy to balance the budget (or to meet other arbitrary deficit goals) are Keynesians, who argue that such rules impede the stabilization role that fiscal policy should play—a role that at times requires budget deficits. The role of the tax-transfer system as an automatic fiscal stabilizer requires that the budget be allowed to go into deficit (or surplus) at appropriate points in the business cycle. During a recession, as the level of economic activity falls, in the Keynesian view, the budget should sometimes go into deficit. Raising tax rates or cutting expenditures would only exacerbate the recession. Keynesians cite the 1932 tax increase as an example of the misguided fiscal policies that result from pursuing the goal of a balanced budget. In addition to impeding the working of automatic stabilizers, a balanced-budget rule would limit the ability of policymakers to take discretionary countercyclical fiscal actions. These are changes in government spending and in tax rates aimed at stabilizing private-sector aggregate demand.

Cyclical versus Structural Deficits

Cyclical deficits are the portion of the federal deficit that results from the economy's being at a low level of economic activity. In the Keynesian view, cyclical deficits that reflect the working of automatic stabilizers are desirable. The portion of the deficit that would exist even if the economy were at its potential output is called the structural deficit. A structural deficit is not directly attributable to the behaviour of the economy and is the part of the deficit for which policymakers are directly responsible. To break the deficit into cyclical and structural components, we need a measure of potential output—the level of output achieved when both capital and labour are utilized at their highest sustainable rates.

Fiscal Policy and India

Taxation Enquiry Commission Report of 1953 was formed to review the tax system. Nicholas Kaldor was invited to review the system and he found the maximum marginal income tax rate at 92% too high. He suggested reducing it to 45%. India's fiscal policy in the phase of planned development commencing from the 1950s to economic liberalisation in 1991 was largely characterised by a strategy of using the tax system to transfer private resources to the massive investments in the public sector industries and also achieve greater income equality. The result was high maximum marginal income tax rates and the consequent tendency of tax evasion. Tax reforms focused on lowering rates and broadening the tax base. There were attempts to curb subsidies and disinvest the government holdings in the public sector industries. The Indian economy weathered the global crisis rather well with growth going down to 5.8 per cent in the second half of 2008-09 and then bouncing back to 8.5 per cent in 2009-10. The government is currently focusing on tax reforms and better targeting of social expenditures to achieve fiscal consolidation while maintaining the process of inclusive growth.

Keywords

Time inconsistency problems arise when a future policy plan is no longer optimal at a later date even when no new information has arrived in the meantime

Public choice is the application to macroeconomic policymaking of the microeconomic theory of how decisions are made.

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Partisan theory views macroeconomic policy outcomes as the result of ideologically motivated decisions by leaders of different political parties. The parties represent constituencies with different preferences concerning macroeconomic variables

Cyclical deficits are the portion of the federal deficit that result from the economy's being at a low level of economic activity

Structural deficits are the portion of the federal deficit that would exist even if the economy were at its potential level of output

Summary

- With The growing instability of the money-income relationship, the Central Banks has moved to interest-rate targeting.
- The same has been true in other major industrialized nations.
- The move to interest-rate targeting has left monetary policy without an anti-inflation anchor such as that provided by a money supply target.
- Inflation targeting has given an anchor to anti-inflation when interest rate targeting was carried out in place of monetary aggregate targeting.
- The Taylor rule has been a useful yardstick for assessing monetary policy performance.
- Specifically, in some major advanced economies, policy rates were below the level implied by the Taylor rule, and monetary policy therefore systematically too accommodative from the perspective of this benchmark, during the "Great Inflation" of the 1970s.
- In contrast, policy rates were broadly consistent with the Taylor rule during the "Great Moderation" between the mid-1980s and early 2000s, a period characterised by low inflation and low macroeconomic volatility.
- The macroeconomic policies want stability in the economy.
- The social loss is to be brought to minimum.

Self Assessment

1. Who among the following is not a member of the current MPC of India?
 - A. Shaktikant Das
 - B. Ashima Goyal
 - C. ShahshankaBhide
 - D. R H Dholakia

2. Unpredicted shifts in the IS schedule will cause a shift in
 - A. Price level
 - B. Rate of interest
 - C. Output
 - D. Money supply

3. If the predominant sources of uncertainty are unpredictable shifts in the IS schedule, a money supply target isto an interest rate target.
 - A. Inferior
 - B. Superior
 - C. Equal
 - D. None of the above

4. The time inconsistency problem advocates for.....

- A. Policy by rules
 - B. Policy by discretion
 - C. None of the above
 - D. Depends on the central bank of the country.
5. The time inconsistency problem causes an bias in monetary policy.
- A. Discretionary
 - B. Deflationary
 - C. Inflationary
 - D. Real
6.has become the main target for most of the central banks across the world.
- A. Interest rate
 - B. Inflation rate
 - C. Money supply
 - D. All the above
7. Taylor rule provides a solution to the problem ofinvolved in the framing of monetary policy.
- A. Inflation
 - B. Deflation
 - C. Discretion
 - D. Circumspection
8. The Taylor rule advocates the setting ofas per the health of the economy.
- A. Inflation rate
 - B. Interest rate
 - C. Price level
 - D. Money supply
9. Did the Taylor rule assign any specific weights to inflation and output gap?
- A. Yes
 - B. No
10. Which of these is an optimal policy choice?
- A. Public choice view
 - B. Partisan theory
 - C. Both the above
 - D. None of these
11. $L=b_1VL$, as per this function, what does b_1 stand for
- A. Weight given to loss
 - B. Wight given to vote loss
 - C. Weight given to inflation rate
 - D. Wight given to growth in real income
12. In the partisan theory, the role of theis prominent.
- A. Policy makers

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- B. Bureaucrats
 C. Technocrats
 D. Politicians
13. What did William Petty advocate to counter unemployment in Ireland?
 A. Minting more money
 B. Establishing new plants
 C. Public works
 D. All the above
14. Cyclical deficits are the portion of the federal deficit that result from the economy's being at a level of economic activity.
 A. High
 B. Low
 C. Stable
 D. None of the above
15. What was the target given by Kaldor for maximum marginal income tax?
 A. 92%
 B. 50%
 C. 45%
 D. 85%

Answers for Self Assessment

1. D 2. B 3. B 4. B 5. C
 6. B 7. A 8. A 9. B 10. C
 11. B 12. D 13. C 14. B 15. C

Review Questions

1. Explain the central element of the partisan theory of fiscal policymaking. Contrast the implications of the partisan theory concerning the relationship of fiscal policy to the business cycle with those of the public-choice view.
2. Describe the difference between an ultimate target and an intermediate target in the conduct of monetary policy
3. Using the IS - LM framework, analyze whether an increase in the instability of the money demand function would increase or decrease the desirability of intermediate targeting a monetary aggregate.
4. Explain the fiscal policy evolution in India. Which is more stabilizing in the Indian economy- monetary policy or fiscal policy.
5. How does the goals of the policymakers differ in developed countries and developing countries?



Further Readings

Macroeconomics: Theories and Policies By Richard T. Froyen, Pearson Publications

Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 10: The Open Economy

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Introduction

10.1 Balance of Payment

10.2 Foreign Exchange Market

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Answers for Self Assessment

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Objectives

Understand the concept of Balance of Payment.

Evaluate the various components of the Balance of Payment.

Understand the concept of foreign exchange.

Evaluate floating and fixed exchange rates.

Introduction

Benjamin Franklin wrote, *“No nation was ever ruined by trade”*. In the post-WTO era, this is all the truer as the level of integration between the countries is too high. In the initial years of conceptual advancement, a major assumption was the economy being closed. However, in modern times this assumption has been done away with. In this chapter, we will be looking at the concept of Balance of Payment and its components of it. We will then discuss foreign exchange which is related to trade. In an open economy with external trade and financial transactions, how are the key macro variables (GDP, inflation, the balance of payments, exchange rates, interest rates, etc) determined and interact with each other? What are the effects of fiscal and monetary policies? These questions will be answered with the help of the Mundell-Fleming model. In the last section of the chapter, we will discuss capital mobility.

10.1 Balance of Payment

The balance of payments is a summary statement in which, in principle, all the transactions of the residents of a nation with the residents of all other nations are recorded during a particular period of time, usually a calendar year. Let us look at some of the definitions of the balance of payment.

As per Bo Sodersten, *“The BOP is merely a way of listing receipts and payments in international transactions for a country.”*

“It is a systematic record of all economic transactions of a country with the rest of the world in a given period of time.” - Prof. Kindleberger

Its main purpose is to inform monetary authorities of the international position of the nation and to aid banks, firms, and individuals engaged in international trade and finance in their business decisions. When we look at the definitions of the balance of payment we find that it is obvious that

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the literally millions of transactions of the residents of a nation with the rest of the world cannot appear individually in the balance of payments. As a summary statement, the balance of payments aggregates all merchandise trade into a few major categories. Similarly, only the net balance of each type of international capital flow is included. Furthermore, the balance of payments includes some transactions in which the residents of foreign nations are not directly involved – for example, when a nation's central bank sells a portion of its foreign currency holdings to the nation's commercial banks.

The Balance of Payments: Book-Keeping

The balance of payments is essentially an application of double-entry bookkeeping since it records both transactions and the money flows associated with those transactions. Transactions, which give rise to money receipts from the rest of the world, are recorded in the credit side of the balance of payments. On the other hand, transactions, which lead to monetary payments abroad, are recorded on the debit side of the balance of payments accounts. If we do this in a proper way debits and credits will always be equal, so that in an accounting sense the balance of payments will always be in balance. An accounting balance is however not synonymous with the balance of payments equilibrium. It is important to keep in mind that a balance-of-payments account record flows between countries over a specified period of time (usually a year for the full accounts, but often less for some components of the accounts). Some items in the balance of payments are readily identified as flows, such as exports.

Other items, however, are flows arising from changes in stocks. Traditionally there are two basic elements in a perfectly compiled set of balance-of-payments accounts: the current account and the capital account. Each of these is usually subdivided, the former into visible and invisible trade and unrequited transfers, the latter into long-term and short-term private transactions and changes in official reserves. The essential difference between the two is that capital account transactions necessarily involve domestic residents either acquiring or surrendering claims on foreign residents, whereas current account transactions do not. In practice, there is a third element, the 'balancing item' or "errors and omissions", which reflects our inability to record all international transactions accurately.

The Current Account

The current account records imports and exports of goods and services and unilateral transfers. Balance-of-payments accounts usually differentiate between trade in goods and trade in services. The balance of exports and imports of the former is referred to as the balance of visible trade or as the balance of merchandise trade. It is often useful for economic purposes to distinguish between factor and non-factor services. Trade in the latter, of which shipping, banking and insurance services, and payments by residents as tourists abroad are usually the most important, is in economic terms little different from trade in goods. That is, exports and imports of such services are flows of outputs whose values will be determined by the same variables that would affect the demand and supply for goods. Factor services, which consist of interest, profits and dividends, are on the other hand payments for inputs. Unilateral transfers, or 'unrequited receipts', are receipts, which the residents of a country receive 'for free, without having to make any present or future payments in return. Receipts from abroad are entered as positive items, payments abroad & negative items.

The Capital Account

The capital account records all international transactions that involve a resident of the country concerned changing either his assets with or his liabilities to a resident of another country. As we noted earlier, transactions in the capital account reflect a change in stock - either assets or liabilities. It is often useful to make distinctions between various forms of capital account transactions. The basic distinctions are between private and official transactions, between portfolio and direct investment, and by the term of the investment (i.e. short or long term). Direct investment is the act of purchasing an asset and at the same time acquiring control of it (other than the ability to re-sell it). Portfolio investment by contrast is the acquisition of an asset that does not give the purchaser control. An obvious example is a purchase of shares in a foreign company or of bonds issued by a foreign government. Loans made to foreign firms or governments come into the same broad category. Such portfolio investment is often also distinguished by the period of the loan (short, medium or long are conventional distinctions, although in many cases only the short and long

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categories are used). The distinction between short-term and long-term investment is often confusing but usually relates to the specification of the asset rather than to the length of time for which it is held. The purchase of an asset in another country, whether it is direct or portfolio investment, would appear as a negative item in the capital account for the purchasing firm's country, and as a positive item in the capital account for the other country. That capital outflows appear as a negative item in a country's balance of payments, and capital inflows as positive items often cause confusion. One way of avoiding this is to consider the direction in which the payment would go (if made directly). The purchase of a foreign asset would then involve the transfer of money to the foreign country, as would the purchase of an (imported) good, and so must appear as a negative item in the balance of payments of the purchaser's country (and as a positive item in the accounts of the seller's country).

The Other Elements of Balance of Payments Account

The balance-of-payments accounts are completed by the entry of: other minor items that can be identified but do not fall comfortably into one of the standard categories; errors and omissions, which reflect transactions that have not been recorded for various reasons and so cannot be entered under a standard heading, but which we know must appear since the full balance-of-payments account must sum to zero; and changes in official reserves and in official liabilities that are part of the reserves of other countries. Errors and omissions (or the balancing items) reflect the difficulties involved in recording accurately if at all, a wide variety of transactions that occur within a given period (usually 12 months). In some cases, there may be such a large number of transactions that a sample is taken rather than recording each transaction, with the inevitable errors that occur when samples are used. In other cases, problems may arise when one or other of the parts of a transaction takes more than one year. For example, with a large export contract covering several years some payment may be received by the exporter before any deliveries are made. But the last payment will not be made until the contract has been completed. Dishonesty may also play a part, as when goods are smuggled, in which case the merchandise side of the transaction is unreported although payment will be made somehow and will be reflected somewhere in the accounts. Similarly, the desire to avoid taxes may lead to the under-reporting of some items in order to reduce tax liabilities. Finally, there are changes in the reserves of the country whose balance of payments we are considering, and changes in that part of the reserves of other countries that are held in the country concerned. Reserves are held in three forms: in foreign currency, usually but not always the US dollar, as gold, and as Special Drawing Rights (SDRs) borrowed from the IMF. Note that reserves do not have to be held within the country. Indeed most countries hold a proportion of their reserves in accounts with foreign central banks. The changes in the country's reserves must of course reflect the net value of all the other recorded items in the balance of payments. These changes in reserves will of course be recorded accurately, and it is the discrepancy between the changes in reserves and the net value of the other recorded items that allow us to identify the errors and omissions.

10.2 Foreign Exchange Market

A foreign exchange market (sometimes informally called the forex market, or denoted FEM) is a market in which different currencies are bought and sold. Foreign exchange markets arise because various countries have different monetary systems and require different currencies to buy goods, services and financial assets. So, people demand different currencies since they have demand for goods, services and financial assets of other countries. Naturally, there is a supply element to this as well. To carry out these transactions between individuals and firms of different countries, there arises a demand and supply of various currencies. So related but independent markets arise, big organised markets, where currencies themselves are all the time being traded for each other. The markets for foreign exchange facilitate foreign trade. The forex market is not a market say, where Germans give dollars to import jeans from America. Or the American exporter of jeans says, "fine, you can pay me in Marks and I will get the marks changed to dollars in my country." The forex market is a cash inter-bank or inter-dealer market. To understand how foreign exchange markets work, we need to understand the concept of exchange rates.

The exchange rate represents the number of units of one currency that exchanges for a unit of another. There are two ways to express an exchange rate between two currencies (e.g. the \$ and rupee). One can write \$/Rs. or Rs. /\$. These are reciprocals of each other. Thus, if E is the \$/Rs. exchange rate and V is the Rs./\$ exchange rate then $E = 1/V$. It is important to note that the value of a currency is always given in terms of another currency. Thus, the value of a US dollar in terms

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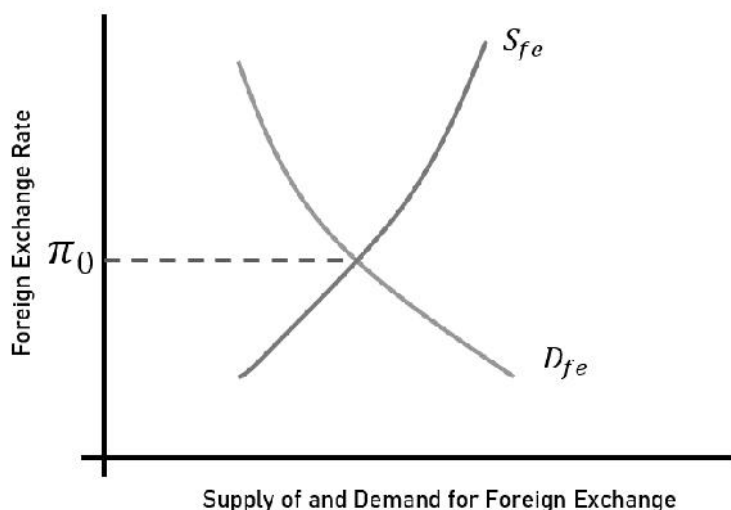
of Indian rupees is the Rs/\$ exchange rate. The value of the Japanese yen in terms of the dollar is the \$/¥ exchange rate. We always express the value of all items in terms of something else. Thus, the value of a litre of milk is given in rupees, not in milk units. The value of a car is also given in rupee terms, not in terms of cars. Similarly, the value of a rupee is given in terms of something else, usually another currency. Hence the rupee/dollar exchange rate gives us the value of the dollar in terms of rupees. Exchange rate quotes by participants in the forex market may be direct or indirect. A direct quote is the number of units of a local currency exchangeable for one unit of a foreign currency. An indirect quote is the number of units of a foreign currency exchangeable for one unit of a local currency. Thus, the indirect quote is the reciprocal of a direct quote. We know that a currency appreciates with respect to another when its value rises in terms of the other. The Rupee appreciates with respect to the yen if the ¥/Re exchange rate rises. On the other hand, a currency depreciates with respect to another when its value falls in terms of the other. The Rupee depreciates with respect to the yen if the ¥/Re exchange rate falls. Note that if the ¥/ Re rate rises, then it's reciprocal, the Re/¥ rate falls. Since the Re/¥ rate represents the value of the yen in terms of rupees, this means that when the rupee appreciates with respect to the yen, the yen must depreciate with respect to the rupee. The rate of appreciation (or depreciation) is the percentage change in the value of a currency over some period of time. Thus, an appreciation means a decline in the direct quotation.

Demand And Supply in The Foreign Exchange Market

Exchange rates between national currencies are determined in the foreign exchange market. In our discussion of this process, we make the following simplifying assumptions. Initially, we exclude official reserve transactions by central banks. In the jargon of international economics, we assume that central banks do not intervene in the foreign exchange market. We relax this assumption later in this section. Also, for simplicity, we assume that there are only two countries: the United States, whose domestic currency is the dollar, and "Europe," whose domestic currency is the euro. 4 The exchange rate in this simple situation is the relative price of the two currencies, which we express as the price of the euro in terms of dollars. For example, if the price of the euro is 1 dollar, then 1-euro trades for 1 dollar; at 1.25 dollars, the exchange rate (the price of the euro) is higher, and 1 euro equals 1.25 dollars, (0.80 euro = 1 dollar). It is important to remember that with the exchange rate expressed in this manner, a higher exchange rate means that the price of foreign currency (or foreign exchange) has risen. When the exchange rate rises, we say that the foreign currency has appreciated, or the dollar has depreciated. Alternatively, a fall in the exchange rate means that the price of foreign exchange (the price of the euro) has declined. The euro has depreciated while the dollar has appreciated.

Figure 10.1 shows the supply and demand schedules for foreign exchange plotted against the exchange rate (π). As was explained, foreign expenditures by U.S. residents (imports, purchases of foreign assets, and foreign transfers) are demands for foreign exchange. How will this demand for foreign exchange vary with the price of foreign exchange? In Figure 10.1, the demand curve (D_{fe}) is downward sloping, indicating that as the price of foreign exchange (the price of euros) rises, the demand for foreign exchange falls. The reason is that a rise in the price of foreign exchange will increase the cost in terms of dollars of purchasing foreign goods. Imports will therefore decline, and less foreign exchange will be demanded. Note that here we are holding all prices other than the exchange rate constant. Suppose that you are considering the purchase of a German camera that costs 200 euros. If the exchange rate, the price of the euro in terms of dollars, is 1.00, the camera will cost \$200 (200 euros = \$200 at 1.00 euro to the dollar). If the exchange rate rises to 1.25, the camera will cost \$250 (200 euros = \$250 at 0.8 euro to the dollar). The higher the exchange rate, the higher the dollar cost of imported goods and the lower the demand for foreign exchange.

Fig. 10.1 Foreign Exchange Market



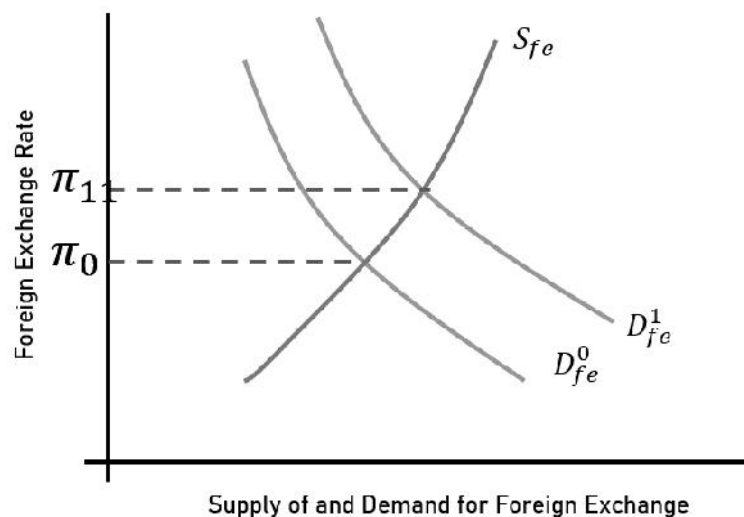
Now consider the demand for foreign exchange for the purchase of foreign assets and for foreign transfers. With respect to the latter, there is no reason for a definite relationship between the amount of foreign transfers and the exchange rate. It is not clear what effect the change in the exchange rate would have on foreign aid programs, pension payments to persons living abroad, or gifts to foreign nationals. In the case of purchases of foreign assets, an increase in the exchange rate will, as in the case of imported goods, push up the price in dollars of the foreign stocks or bonds. The rise in the exchange rate will, however, also result in a proportional increase in the interest or dividend payment on the foreign bond or stock, again as measured in dollars. For example, a French bond costing 800 euros and paying interest of 80 euros per year will cost \$800 and pay interest of \$80 per year at an exchange rate of 1.00 (1.00 euro = 1 dollar). At an exchange rate of 1.25 (0.80 euro = 1 dollar), the bond will cost \$1,000 and pay interest of \$100 per year. In either case, the bond represents an asset that pays a return of 10 per cent per year. Consequently, we would not necessarily expect any effect on the demand for foreign assets as a result of a change in the exchange rate. 5 The downward slope of the demand for foreign exchange schedule results only from the fact that imports decline as the exchange rate rises.

The demand schedule for foreign exchange is downward sloping because the demand for foreign exchange to finance imports falls as the exchange rate rises, making foreign goods more expensive. The supply schedule for foreign exchange is upward sloping, reflecting the assumption that the foreign exchange proceeds from export sales rise as the exchange rate rises, making domestic goods less expensive to foreign buyers. The equilibrium exchange rate is π_0 , the rate that equates demand and supply.

Flexible Exchange Rate

When the market forces decide on the exchange rate, it is known as a flexible or floating exchange rate system. The government does not interfere with the determination of exchange rates. The Central Banks of the country have a clear mandate to not interfere in the free-market mechanism working which decides the exchange rate until and unless there is a serious situation. The equilibrium rate of exchange is determined at the point of equilibrium between demand and supply. We now take a situation where there is a shock that pushes the demand for foreign exchange. The demand for foreign exchange goes up because of the increased demand for imports. As a result of the increase in the demand for foreign exchange the demand curve shifts to the right.

Fig. 10.2 Increase in the Demand of Foreign Exchange



An autonomous increase in import demand shifts the demand schedule for foreign exchange from D_{fe}^0 to D_{fe}^1 . At the initial equilibrium exchange rate, there is an excess demand for foreign exchange (XD_{fe}). The exchange rate rises to π_1 to re-equilibrate supply and demand in the foreign exchange market.

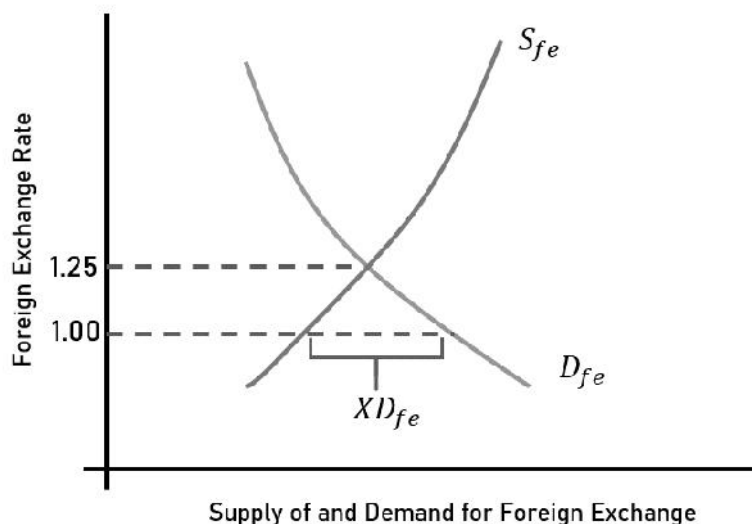
Fixed Exchange Rate

Some countries (for e.g. China, Mexico and many others), instead, do not allow the market to determine the value of their currency. Instead, they “peg” the value of the foreign exchange rate to a fixed parity, a certain amount of rupees per dollar. In this case, we say that a country has a regime of fixed exchange rates. In order to maintain a fixed exchange rate, a country cannot just announce a fixed parity: it must also commit to defending that parity by being willing to buy (or sell) foreign reserves whenever the market demand for foreign currency is greater (or smaller) than the supply of foreign currency.

Pegging the Exchange Rate

To see how a system of fixed exchange rates functions, we examine the way a country can “peg,” or fix, the level of its exchange rate. To do so we return to our two-country example and assume that the United States wants to fix its exchange rate against the euro, which we are using to represent the currencies of the rest of the world. We ignore the 1 per cent margin just mentioned and assume that the U.S. central bank wishes to fix an exact par value for the dollar, say at an exchange rate of 1 euro equals 1 dollar. The working of the foreign exchange market with this fixed exchange rate system is illustrated in Figure 10.3.

Fig. 10.3 Fixed Exchange Rate System



We assume that this official fixed exchange rate, 1.0, is below the equilibrium exchange rate in a flexible rate system, the equilibrium rate in Figure 10.3 being 1.25 (0.80 euro = 1 dollar). At the fixed exchange rate in such a situation, the dollar would be said to be overvalued and the euro undervalued. This terminology means that, if the exchange rate were market-determined, the price of the euro relative to the dollar (the exchange rate) would have to rise to clear the market. What prevents this from happening? Recall that the demand and supply schedules we constructed for the foreign exchange market measure only autonomous transactions; they do not take account of accommodating transactions undertaken by central banks to finance payments imbalances. It is precisely such intervention by central banks that is required to peg the exchange rate at a nonequilibrium value such as 1.0 dollar in Figure 10.3. To keep the rate at 1.0, the United States must stand ready to buy and sell dollars at that exchange rate. If the U.S. central bank will buy euros for 1 dollar, the exchange rate cannot fall below that point because no one would sell elsewhere for less. Similarly, the exchange rate cannot rise above 1.0 because the central bank will be willing to sell euros at that price. In the situation depicted in Figure 10.3, with the exchange rate below the equilibrium rate, there is an excess demand for foreign exchange (euros), shown as XD_{fe} in the figure. To keep the exchange rate from rising, the U.S. central bank can supply foreign exchange; that is, it can exchange euros for dollars in the foreign exchange market. Alternatively, the European Central Bank might be the one to intervene. This bank would supply euros (sell euros and buy dollars) to satisfy the excess demand for euros and to keep the price of the euro at the official exchange rate.

10.3 Mundell Fleming Model

The world is still a closed economy, but its regions and countries are becoming increasingly open. . . . The international economic climate has changed in the direction of financial integration, and this has important implications for economic policy.

—Robert Mundell, 1963

This section is dedicated to the Mundell-Fleming model which was developed in the early 1960s. This model is very similar to the IS-LM model which assumes a fixed price level and looks at the interaction between the goods market and the money market. The model explains the causes of short-run fluctuations in aggregate income (or, what comes to the same thing, shifts in the ad curve) in an open economy.

Key Assumptions of the Model

1. Price level is fixed.
2. The economy is open.
3. A small economy with perfect mobility of capital.

4. The goods market is similar to the IS curve but net exports are added.
5. The money market is the same as given by the LM curve.

The Goods Market and the IS* Curve

The interest rate in this economy r is determined by the world interest rate r^* . The world interest rate is assumed to be exogenously fixed. The economy is sufficiently small relative to the world economy that it can borrow or lend as much as it wants in world financial markets without affecting the world interest rate. In particular, the goods market is represented with the following equation:

$$Y = C(Y - T) + I(r) + G + NX(e)$$

This equation states that aggregate income Y is the sum of consumption C , investment I , government purchases G , and net exports NX . Consumption depends positively on disposable income $Y - T$. Investment depends negatively on the interest rate, which equals the world interest rate r^* . Net exports depend negatively on the exchange rate e . As before, we define the exchange rate e as the amount of foreign currency per unit of domestic currency—for example, e might be 100 yen per dollar. If e is the nominal exchange rate then, eP/P^* is the real exchange rate where

P = domestic price level

P^* is the foreign price level

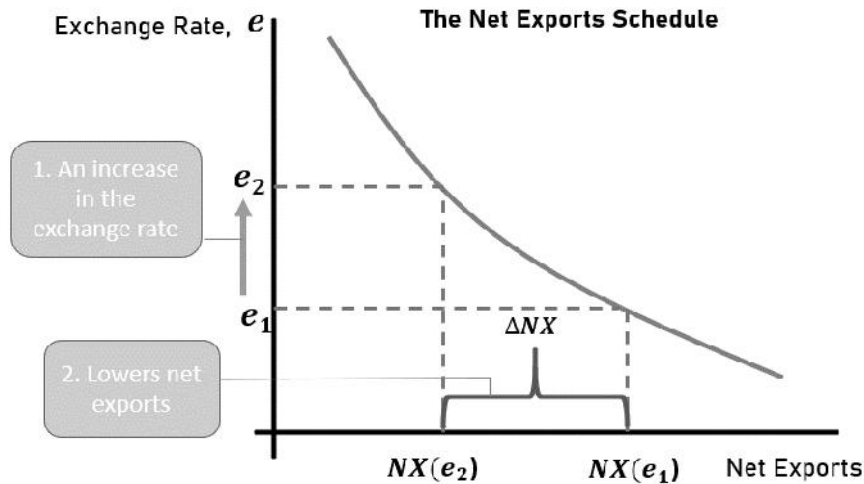
The Mundell-Fleming model, however, assumes that the price levels at home and abroad are fixed, so the real exchange rate is proportional to the nominal exchange rate. That is, when the nominal exchange rate appreciates (say, from 100 to 120 yen per dollar), foreign goods become cheaper compared to domestic goods, and this causes exports to fall and imports to rise. If perfect capital mobility is assumed then the equation becomes

$$Y = C(Y - T) + I(r^*) + G + NX(e)$$

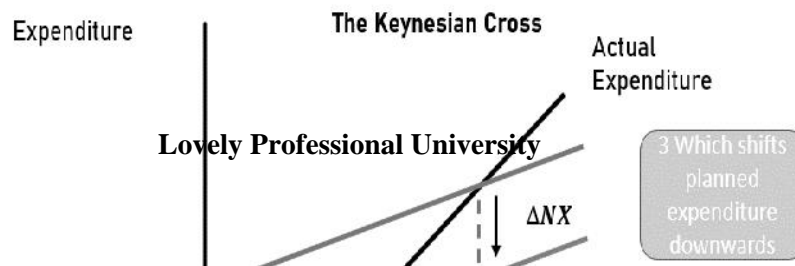
This is the IS equation. r^* infers that the interest rate is held constant at the world interest rate.

Fig. 10.4 The IS Curve

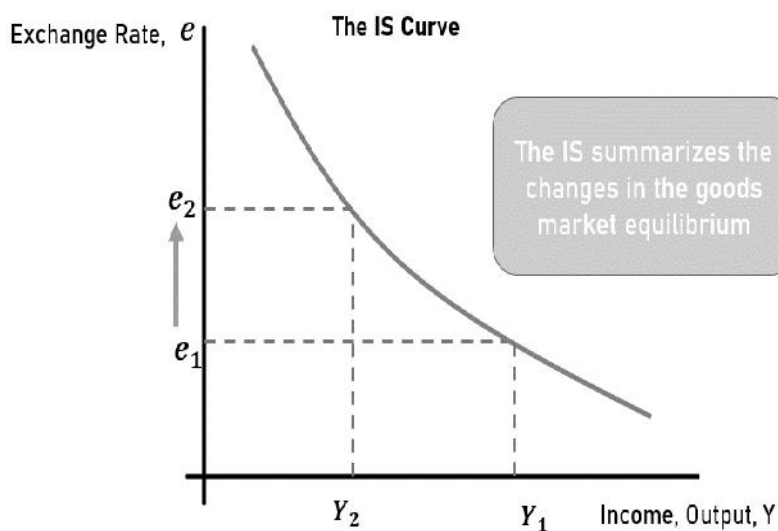
(A)



(B)



(C)



We can illustrate this equation for goods market equilibrium on a graph in which income is on the horizontal axis and the exchange rate is on the vertical axis. This curve is shown in panel (c) of Figure 10.4 and is called the IS^* curve. The new label reminds us that the curve is drawn holding the interest rate constant at the world interest rate r^* . The IS^* curve slopes downward because a higher exchange rate reduces net exports, which in turn lowers aggregate income. To show how this works, the other panels of Figure 10.4 combine the net-exports schedule and the Keynesian cross to derive the IS^* curve. In panel (A), an increase in the exchange rate from e_1 to e_2 lowers net exports from $NX(e_1)$ to $NX(e_2)$. In panel (B), the reduction in net exports shifts the planned-expenditure schedule downward and thus lowers income from Y_1 to Y_2 . The IS^* curves summarize this relationship between the exchange rate e and income Y .

The Money Market and the LM Curve

The Mundell-Fleming model represents the money market with an equation that should be familiar from the IS-LM model, with the additional assumption that the domestic interest rate equals the world interest rate:

$$M/P = L(r, Y)$$

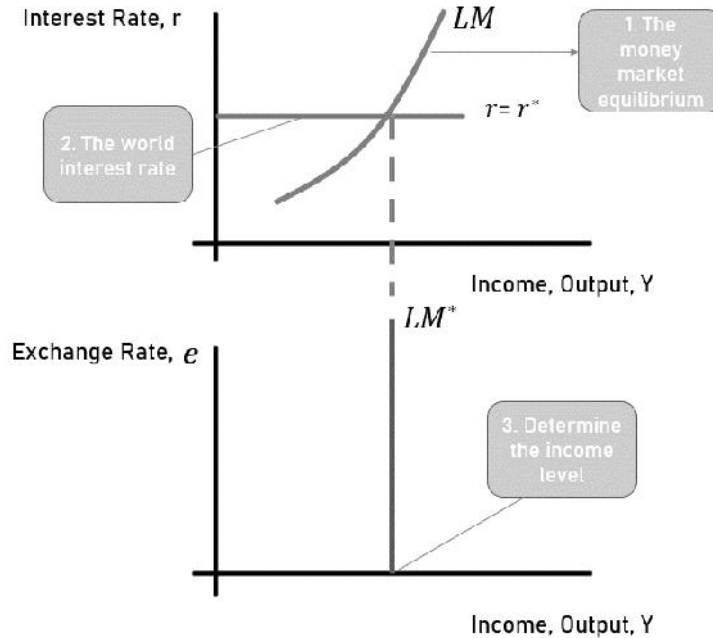
M/P = real money

M and P exogenously determined. Demand for real balances (M/P) depends negatively on the interest rate and positively on income (Y). Added assumption domestic interest rate equals the world interest rate ($r = r^*$)

$$M/P = L(r^*, Y)$$

This equation states that the supply of real money balances, M/P , equals the demand, $L(r, Y)$. The demand for real balances depends negatively on the interest rate, which is now set equal to the world interest rate r^* , and positively on income Y . The money supply M is an exogenous variable controlled by the central bank, and because the Mundell–Fleming model is designed to analyze short-run fluctuations, the price level P is also assumed to be exogenously fixed.

Fig. 10.5 The LM Curve



We can represent this equation graphically with a vertical LM^* curve, as in panel (b) of Figure 10.5. The LM^* curve is vertical because the exchange rate does not enter into the LM^* equation. Given the world interest rate, the LM^* equation determines aggregate income, regardless of the exchange rate. Figure 12-2 shows how the LM^* curve arises from the world interest rate and the LM curve, which relates the interest rate and income.

The IS-LM Curve together

Two equations define the Mundell-Fleming model.

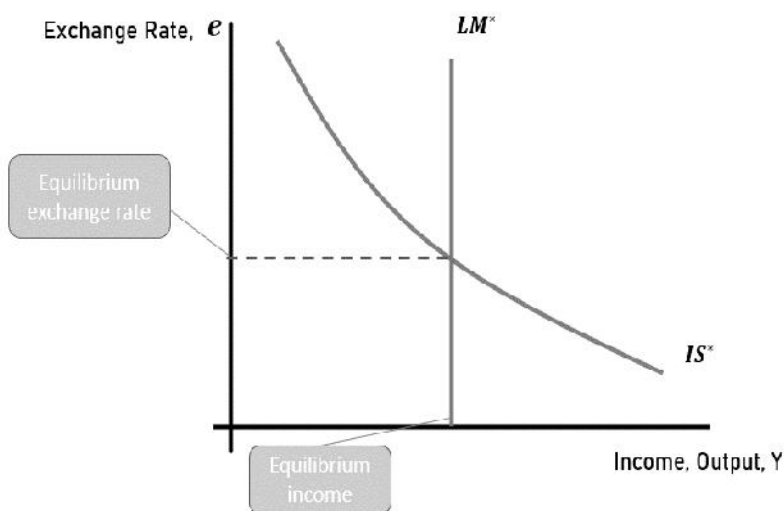
$$Y = C(Y - T) + I(r^*) + G + NX(e) \quad IS^*$$

And

$$M/P = L(r^*, Y) \quad LM^*$$

The first equation describes equilibrium in the goods market, and the second equation describes equilibrium in the money market. The exogenous variables are fiscal policy G and T , monetary policy M , the price level P , and the world interest rate r^* . The endogenous variables are income Y and the exchange rate e .

Fig. 10.6 Mundell-Fleming Model



The changes in the policy in the small open economy will depend on what type of exchange rate system is adopted by the country.

There are two exchange rate systems discussed:

1. Floating exchange rate system
2. Fixed exchange rate system

The Small Open Economy with Floating Exchange Rate System

Fiscal Policy

The government can change two things- simultaneously or individually.

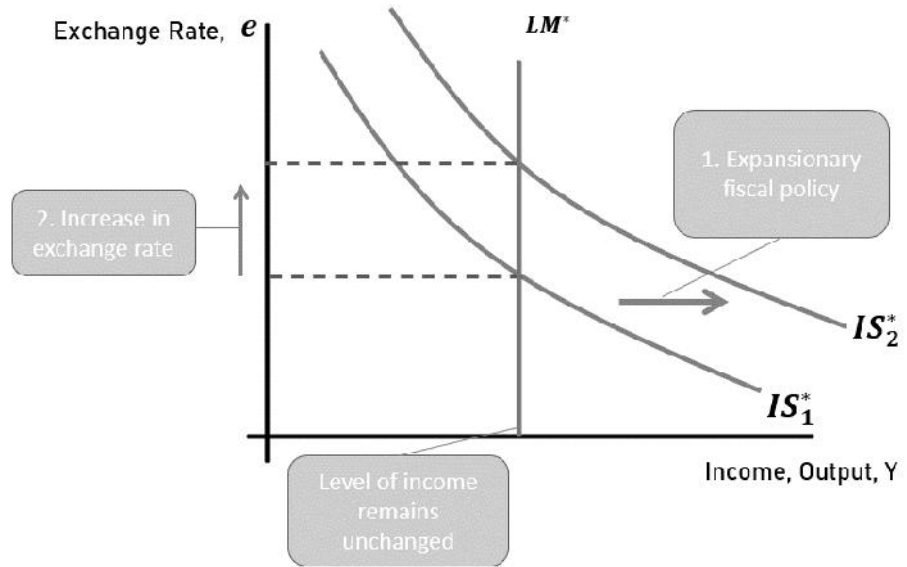
1. Government expenditure
2. Taxes

Fig. 10.7 shows the increase in the expenditure as a result of fiscal measures which pushes the IS curve rightwards. The role of fiscal policy is different in different types of economies. In a closed economy model, fiscal expansion raises income, whereas, in a small open economy with a floating exchange rate, a fiscal expansion leaves income at the same level. There are reasons for the difference between the two. When income rises in a closed economy, the interest rate rises, because higher income increases the demand for money. That is not possible in a small open economy: as soon as the interest rate tries to rise above the world interest rate r^* , capital flows in from abroad. This capital inflow increases the demand for the domestic currency in the market for foreign-currency exchange and, thus, bids up the value of the domestic currency. The appreciation of the exchange rate makes domestic goods expensive relative to foreign goods, and this reduces net exports. The fall in net exports offsets the effects of the expansionary fiscal policy on income.

Why is the fall in net exports so great that it renders fiscal policy powerless to influence income? To answer this question, consider the equation that describes the money market:

$M/P = L(r, Y)$. In both closed and open economies, the quantity of real money balances supplied M/P is fixed, and the quantity demanded (determined by r and Y) must equal this fixed supply. In a closed economy, a fiscal expansion causes the equilibrium interest rate to rise. This increase in the interest rate (which reduces the quantity of money demanded) allows equilibrium income to rise (which increases the quantity of money demanded). By contrast, in a small open economy, r is fixed at r^* , so there is only one level of income that can satisfy this equation, and this level of income does not change when fiscal policy changes. Thus, when the government increases spending or cuts taxes, the appreciation of the exchange rate and the fall in net exports must be large enough to offset fully the normal expansionary effect of the policy on income.

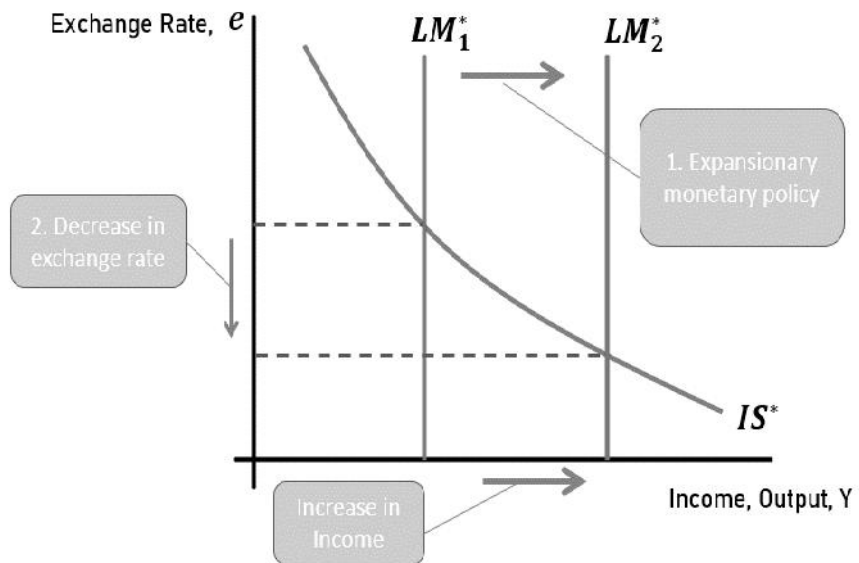
Fig. 10.7 Fiscal expansion under floating exchange system



Monetary Policy

The central bank of the country can impact the economy by changing the money supply as this will have a direct effect on prices. If the central bank increases the money supply in the market, the prices are fixed, therefore this increase will lead to a change in real balances. As a result of this the LM curve shifts to the right.

Fig. 10.8 Monetary expansion under floating exchange system



Although monetary policy influences income in an open economy, as it does in a closed economy, the monetary transmission mechanism is different. Recall that in a closed economy an increase in the money supply increases spending because it lowers the interest rate and stimulates investment. In a small open economy, the interest rate is fixed by the world interest rate. As soon as an increase in the money supply puts downward pressure on the domestic interest rate, capital flows out of the economy as investors seek a higher return elsewhere. This capital outflow prevents the domestic interest rate from falling. In addition, because the capital outflow increases the supply of the domestic currency in the market for foreign-currency exchange, the exchange rate depreciates. The fall in the exchange rate makes domestic goods inexpensive relative to foreign goods and, thereby, stimulates net exports. Hence, in a small open economy, monetary policy influences income by altering the exchange rate rather than the interest rate.

Trade Policy

The change in the trade policy will have similar conclusions to fiscal policy. The net exports curve will shift depending on whether the liberal or conservative policy is adopted. The income will not change but the exchange rate will change.

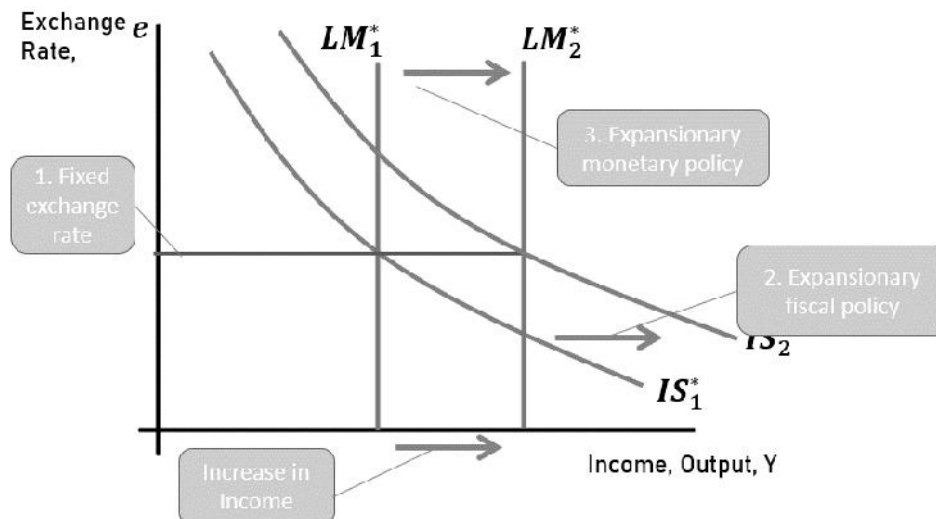
The Small Open Economy with Fixed Exchange Rate System

Under a system of fixed exchange rates, a central bank stands ready to buy or sell the domestic currency for foreign currencies at a predetermined price. A fixed exchange rate dedicates a country's monetary policy to the single goal of keeping the exchange rate at the announced level. In other words, the essence of a fixed-exchange-rate system is the commitment of the central bank to allow the money supply to adjust to whatever level will ensure that the equilibrium exchange rate equals the announced exchange rate. Moreover, as long as the central bank stands ready to buy or sell foreign currency at the fixed exchange rate, the money supply adjusts automatically to the necessary level.

Fiscal Policy

If the government stimulates domestic spending. The IS Curve will shift to the right. This will push the exchange rate upwards. There will be an automatic monetary expansion causing a shift in LM curve. Fig. 10.9 shows this shift due to fiscal expansion.

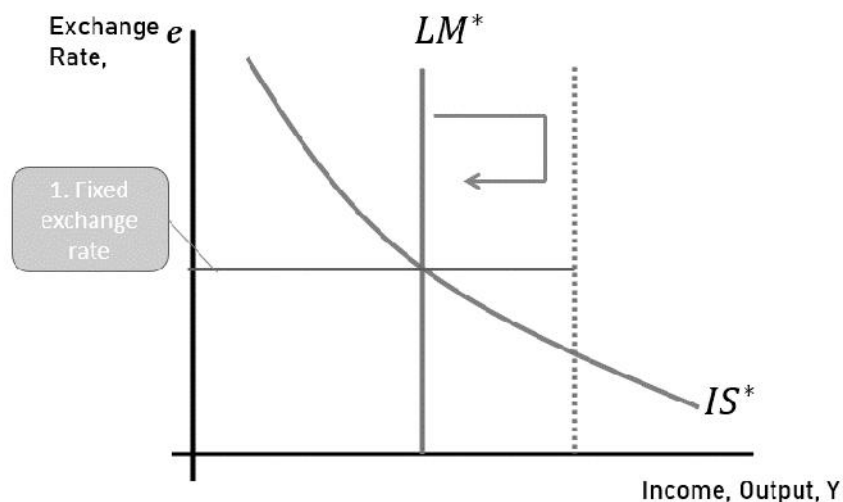
Fig. 10.9 Fiscal Expansion under Fixed Exchange Rate System



Monetary Policy

Under a fixed exchange rate system, the normal monetary policy is ineffectual. The aim is to maintain a fixed exchange rate, therefore any shift in the LM curve will be temporary. A country with a fixed exchange rate can, however, conduct a type of monetary policy: it can decide to change the level at which the exchange rate is fixed. A reduction in the value of the currency is called a devaluation, and an increase in its value is called a revaluation. In the Mundell-Fleming model, a devaluation shifts the LM* curve to the right; it acts like an increase in the money supply under a floating exchange rate. A devaluation thus expands net exports and raises aggregate income. Conversely, a revaluation shifts the LM* curve to the left reduces net exports and lowers aggregate income. In fig. 10.10 the monetary expansion under fixed exchange rate is explained.

Fig. 10.10 Monetary Expansion under Fixed Exchange Rate System



Trade Policy

If the government goes for trade restriction then a tariff or an import quota shifts the IS^* curve to the right. This induces an increase in the money supply to maintain the fixed exchange rate. Hence, aggregate income increases. The result of a trade restriction under a fixed exchange rate is very different from that under a floating exchange rate. In both cases, a trade restriction shifts the net-exports schedule to the right, but only under a fixed exchange rate does a trade restriction increase net exports NX . The reason is that a trade restriction under a fixed exchange rate induces monetary expansion rather than an appreciation of the exchange rate. The monetary expansion, in turn, raises aggregate income.

Summary

- BOP tells us about the foreign exchange position of the country.
- The terms of trade are indicated which shows the trade relations that a country has with the world.
- Foreign exchange rate determines the rate at which one currency is exchanged with the other.
- There are two systems- floating exchange system and fixed exchange system.
- Role of the central bank determines which system is followed.
- The functioning of a small economy in short-run was analysed.
- The impact of exchange rate system on policies was analysed.

Keywords

Balance of Payment: The balance of payments is a summary statement in which, in principle, all the transactions of the residents of a nation with the residents of all other nations are recorded during a particular period of time, usually a calendar year.

Fixed Exchange Rate System: A fixed exchange rate is a regime applied by a government or central bank that ties the country's official currency exchange rate to another country's currency or the price of gold.

Floating Exchange Rate System: A floating exchange rate is a regime where the currency price of a nation is set by the forex market based on supply and demand relative to other currencies.

SelfAssessment

1. The receipt from foreigners is recorded on the side of the Balance of Payments account.
 - A. Debit
 - B. Credit
 - C. Official settlement account
 - D. Capital account

2. Do gifts form a part of a nation's balance of payment accounts?
 - A. Yes
 - B. No

3. An Indian diplomat deputed in America is a national of which country?
 - A. India
 - B. USA
 - C. Has international citizenship
 - D. None of the above

4. Does the Balance of Payment account balances every year?
 - A. Yes
 - B. No

5. Higher exchange rate means that the price of foreign currency (or foreign exchange) has.....
 - A. Increased
 - B. Decreased
 - C. Remained the same
 - D. None of the above

6. When the exchange rate rises, the foreign currency has
 - A. Appreciated
 - B. Depreciated
 - C. Remained the same
 - D. None of the above

7. The demand for foreign exchange to finance imports as the exchange rate rises.
 - A. Increases
 - B. Decreases
 - C. Remains the same
 - D. None of the above

8. A system of exchange rate determination, in which there is no central bank intervention, is a exchange rate system.
 - A. Fixed
 - B. Floating
 - C. Managed floating
 - D. None of the above

Macroeconomic Theory and Analysis-II

9. The Bretton Woods system collapsed in
- A. 1944
 - B. 1971
 - C. 1973
 - D. 1979
10. The developing countries have exchange rate system.
- A. Fixed
 - B. Floating
 - C. Managed float
 - D. Depends on the government
11. The currency is adjusted periodically in small amounts at a fixed rate or in response to changes in selective quantitative indicators- this is done in which system of foreign exchange determination.
- A. Exchange arrangements with no separate legal tender
 - B. Currency board arrangement
 - C. Crawling pegs
 - D. Managed floating with no pre-determined path for the exchange rate
12. The Bretton Woods system was that of
- A. Pegged exchange rate system
 - B. Adjustable peg
 - C. Floating
 - D. Managed float
13. The Mundell-Fleming model is very similar to themodel
- A. IS-LM model
 - B. Solow model
 - C. Gunnar Myrdal model
 - D. Harrod- Domar model
14. In the Mundell-Fleming model, the prices are assumed to be
- A. Fixed
 - B. Flexible
 - C. Depends whether the economy is open or closed
 - D. Depends on the size of the economy
15. Which of the following are endogenous variables?
- A. Interest rate
 - B. Exchange rate
 - C. Income
 - D. Both income and exchange rate

Answers for Self Assessment

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. B | 2. A | 3. A | 4. A | 5. A |
| 6. A | 7. A | 8. B | 9. B | 10. B |
| 11. C | 12. B | 13. A | 14. A | 15. D |

Review Questions

1. What are the components of a Balance of Payments account?
2. In the Mundell-Fleming model with floating exchange rates, explain what happens to aggregate income, the exchange rate, and the trade balance when taxes are raised. What would happen if exchange rates were fixed rather than floating? If there is a negative shock of technology, then how would the real business cycle model change.
3. How is the demand and supply of foreign exchange help in determining the exchange rate in a country?
4. What are the merits of fixed rate and floating rate of exchange? What method should be followed by a developing country like India?
5. If the money supply is reduced, what would happen to aggregate income, exchange rate in the Mundell Fleming model.

**Further Readings**

Macroeconomics: Theories and Policies By Richard T. Froyen, Pearson Publications

Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 11: Alternative Perspectives on Stabilization Policy

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Objectives

Describe how policymaking is done in uncertainty.

Evaluate the various reasons for the active or passive role of the state in policymaking.

Discuss policymaking by rules or discretion.

Analyze the various conditions of policymaking.

Introduction

The stabilization policy is a debate that has been going on for many years among economists. The question is whether economies are self-stabilizing or economic policies are required to stabilize the economy. Keynes and economists following him were of the view that policymakers need to take deliberate steps to stabilize the economy. The business cycles affect the working of the economy which leads to the fall in aggregate demand. He disputed the fact that the economy would recover on its own after a recession. There are uncertainties in the mind of the consumers and the investors which would lead to less demand, insufficient spending and unemployment. This would lead to another vicious cycle. This is the reason that increasing aggregate demand is the main tool suggested by Keynesians to counter a recession. The same tool can be used in case of excessive inflation that is aggregate demand can be brought down to counter inflation.

What we need is not a skilled monetary driver of the economic vehicle continuously turning the steering wheel to adjust to the unexpected irregularities of the route, but some means of keeping the monetary passenger who is in the back seat as ballast from occasionally leaning over and giving the steering wheel a jerk that threatens to send the car off the road.

— Milton Friedman

Milton Friedman on the other hand was of the view that policymakers interfere with the functioning of the economy which creates instability. Bad policymaking leads to problems in the economy and fine-tuning of it by policymakers is not required. The stabilization role of the state got pronounced after the Great Depression. The supporters of active policymakers believe that depression and instability will continue till the government does not intervene.

In this chapter, we will discuss whether the policy should be active or passive, policy by rule or discretion, making policy in an uncertain world.

11.1 Should Policy be Active or Passive?

The stabilization role of the state got pronounced after the Great Depression. The supporters of active policymakers believe that depression and instability will continue till the government does not intervene. To many economists, the case for active government policy is clear and simple. Recessions are periods of high unemployment, low incomes, and increased economic hardship. The model of aggregate demand and aggregate supply shows how shocks to the economy can cause recessions. It also shows how monetary and fiscal policy can prevent recessions by responding to these shocks. These economists consider it wasteful not to use these policy instruments to stabilize the economy. Other economists are critical of the government's attempts to stabilize the economy. These critics argue that the government should take a hands-off approach to macroeconomic policy. At first, this view might seem surprising. If our model shows how to prevent or reduce the severity of recessions, why do these critics want the government to refrain from using monetary and fiscal policy.

Arguments by Opposers of State Intervention



Lags in the Implementation and Effects of Policies

Economic stabilization is effective if policies do not have a time lag. Economic stabilization would be easy if the effects of policy were immediate

Economists distinguish between two types of lags:

1. Inside lag
2. Outside lag

The inside lag is the time between a shock to the economy and the policy action responding to that shock. This lag arises because it takes time for policymakers first to recognize that a shock has occurred and then to put appropriate policies into effect. A long inside lag is a central problem with using fiscal policy for economic stabilization. Countries with the parliamentary system have shorter time lags. Monetary policy has a much shorter inside lag than fiscal policy.

The outside lag is the time between a policy action and its influence on the economy. This lag arises because policies do not immediately influence spending, income, and employment. Monetary policy has substantial outside lag. The long and variable lags associated with monetary and fiscal policy certainly make stabilizing the economy more difficult. Advocates of the passive policy argue that, because of these lags, a successful stabilization policy is almost impossible. Indeed, attempts to stabilize the economy can be destabilizing. Suppose that the economy's condition changes between the beginning of policy action and its impact on the economy. In this case, an active policy may end up stimulating the economy when it is overheated or depressing the economy when it is cooling off. Advocates of active policy admit that such lags do require policymakers to be cautious. But,

they argue, these lags do not necessarily mean that policy should be completely passive, especially in the face of a severe and protracted economic downturn.

Difficulty in Forecasting

The success of a stabilization policy depends on how successfully the future has been predicted as there is a lag between the implementation of a policy and its visible impacts. If we cannot predict whether the economy will be in a boom or a recession in six months or a year, we cannot evaluate whether monetary and fiscal policy should now be trying to expand or contract aggregate demand. Unfortunately, economic developments are often unpredictable, at least given our current understanding of the economy. One-way forecasters try to look ahead is with leading indicators. A leading indicator is a data series that fluctuates in advance of the economy. A large fall in a leading indicator signal that a recession is more likely. Another way forecasters look ahead is with macro-econometric models, which have been developed both by government agencies and by private firms for forecasting and policy analysis. The large-scale computer models are made up of many equations, each representing a part of the economy. After making assumptions about the path of the exogenous variables, such as monetary policy, fiscal policy, and oil prices, these models yield predictions about unemployment, inflation, and other endogenous variables. Keep in mind, however, that the validity of these predictions is only as good as the model and the forecasters' assumptions about the exogenous variables.

Ignorance, Expectations and Lucas Critique

The prominent economist Robert Lucas once wrote,

"As an advice-giving profession, we are in way over our heads."

Even many of those who advise policymakers would agree with this assessment. Economics is a young science, and there is still much that we do not know. Economists cannot be completely confident when they assess the effects of alternative policies. This ignorance suggests that economists should be cautious when offering policy advice. Although economists' knowledge is limited about many topics, Lucas has emphasized the issue of how people form expectations of the future. Expectations play a crucial role in the economy because they influence all sorts of economic behaviour. For instance, households decide how much to consume based on expectations of future income, and firms decide how much to invest based on expectations of future profitability. These expectations depend on many things, including the economic policies being pursued by the government. Thus, when policymakers estimate the effect of any policy change, they need to know how people's expectations will respond to the policy change. Lucas has argued that traditional methods of policy evaluation – such as those that rely on standard macro-econometric models – do not adequately take into account this impact of policy on expectations. This criticism of traditional policy evaluation is known as the Lucas critique.

The Lucas critique leaves us with two lessons. The narrow lesson is that economists evaluating alternative policies need to consider how policy affects expectations and, thereby, behavior. The broad lesson is that policy evaluation is hard, so economists engaged in this task should be sure to show the requisite humility

The Historical Record

In judging whether government policy should play an active or passive role in the economy, we must give some weight to the historical record. If the economy has experienced many large shocks to aggregate supply and aggregate demand, and if the policy has successfully insulated the economy from these shocks, then the case for active policy should be clear. Conversely, if the economy has experienced few large shocks, and if the fluctuations we have observed can be traced to inept economic policy, then the case for passive policy should be clear. In other words, our view of stabilization policy should be influenced by whether the policy has historically been stabilizing or destabilizing. For this reason, the debate over macroeconomic policy frequently turns into a debate over macroeconomic history. Yet history does not settle the debate over stabilization policy. Disagreements over history arise because it is not easy to identify the sources of economic fluctuations. The historical record often permits more than one interpretation.

The Great Depression is a case in point. Economists' views on macroeconomic policy are often related to their views on the cause of the Depression. Some economists believe that a large contractionary shock to private spending caused the Depression. They assert that policymakers should have responded by stimulating aggregate demand. Other economists believe that the large fall in the money supply caused the Depression. They assert that the Depression would have been avoided if the Fed had been pursuing a passive monetary policy of increasing the money supply at a steady rate. Hence, depending on one's beliefs about its cause, the Great Depression can be viewed either as an example of why active monetary and fiscal policy is necessary or as an example of why it is dangerous.

11.2 Should Policy be Conducted by Rule or Discretion?

The second topic of debate among economists is whether the economic policy should be conducted by rule or by discretion. The policy is conducted by rule if policymakers announce in advance how policy will respond to various situations and commit themselves to follow through on this announcement. The policy is conducted by discretion if policymakers are free to size up events as they occur and choose whatever policy seems appropriate at the time. The debate over rules versus discretion is distinct from the debate over passive versus active policy. A policy can be conducted by rule and yet be either passive or active. For example, a passive policy rule might specify steady growth in the money supply of 3 per cent per year. An active policy rule might specify that

$$\text{Money Growth} = 3\% + (\text{Unemployment Rate} - 6\%)$$

Under this rule, the money supply grows at 3 per cent if the unemployment rate is 6 per cent, but for every percentage point by which the unemployment rate exceeds 6 per cent, money growth increases by an extra percentage point. This rule tries to stabilize the economy by raising money growth when the economy is in a recession. We begin this section by discussing why policy might be improved by a commitment to a policy rule. We then examine several possible policy rules.

Distrust of Policymakers and the Political Process

Some economists believe that economic policy is too important to be left to the discretion of policymakers. Although, this view is more political than economic, evaluating it is central to how we judge the role of economic policy. If politicians are incompetent or opportunistic, then we may not want to give them the discretion to use the powerful tools of monetary and fiscal policy. Incompetence in economic policy arises for several reasons. Some economists view the political process as erratic, perhaps because it reflects the shifting power of special interest groups. In addition, macroeconomics is complicated, and politicians often do not have sufficient knowledge of it to make informed judgments. This ignorance allows charlatans to propose incorrect but superficially appealing solutions to complex problems. The political process often cannot weed out the advice of charlatans from that of competent economists. Opportunism in economic policy arises when the objectives of policymakers, conflict with the well-being of the public. Some economists fear that politicians use macroeconomic policy to further their own electoral ends. If citizens vote on the basis of economic conditions prevailing at the time of the election, then politicians have an incentive to pursue policies that will make the economy look good during election years. A president might cause a recession soon after coming into the office to lower inflation and then stimulate the economy as the next election approaches to lower unemployment; this would ensure that both inflation and unemployment are low on election day. Manipulation of the economy for electoral gain, called the political business cycle, has been the subject of extensive research by economists and political scientists.

Distrust of the political process leads some economists to advocate placing economic policy outside the realm of politics. Some have proposed constitutional amendments, such as a balanced-budget amendment, that would tie the hands of legislators and insulate the economy from both incompetence and opportunism.

The Time Inconsistency of Discretionary Policy

If we assume that we can trust our policymakers, discretion at first glance appears superior to a fixed policy rule. The discretionary policy is, by its nature, flexible. As long as policymakers are

Unit 11: Alternative Perspectives on Stabilization Policy

intelligent and benevolent, there might appear to be little reason to deny them flexibility in responding to changing conditions. Yet a case for rules over discretion arises from the problem of time inconsistency of policy. In some situations, policymakers may want to announce in advance the policy they will follow in order to influence the expectations of private decision-makers.

But later, after the private decision-makers have acted on the basis of their expectations, these policymakers may be tempted to renege on their announcement. Understanding that policymakers may be inconsistent over time, private decision-makers are led to distrust policy announcements. In this situation, to make their announcements credible, policymakers may want to make a commitment to a fixed policy rule. Time inconsistency is illustrated most simply in a political rather than an economic example—specifically, public policy about negotiating with terrorists over the release of hostages.

The announced policy of many nations is that they will not negotiate over hostages. Such an announcement is intended to deter terrorists: if there is nothing to be gained from kidnapping hostages, rational terrorists won't kidnap any. In other words, the purpose of the announcement is to influence the expectations of terrorists and thereby their behaviour. But, in fact, unless the policymakers are credibly committed to the policy, the announcement has little effect. Terrorists know that once hostages are taken, policymakers face an overwhelming temptation to make some concession to obtain the hostages' release. The only way to deter rational terrorists is to take away the discretion of policymakers and commit them to a rule of never negotiating. If policymakers were truly unable to make concessions, the incentive for terrorists to take hostages would be largely eliminated.

The same problem arises less dramatically in the conduct of monetary policy. Consider the dilemma of a Federal Reserve that cares about both inflation and unemployment. According to the Phillips curve, the tradeoff between inflation and unemployment depends on expected inflation. The Fed would prefer everyone to expect low inflation so that it will face a favourable tradeoff. To reduce expected inflation, the Fed might announce that low inflation is the paramount goal of monetary policy. But an announcement of a policy of low inflation is by itself not credible. Once households and firms have formed their expectations of inflation and set wages and prices accordingly, the Fed has an incentive to renege on its announcement and implement expansionary monetary policy to reduce unemployment. People understand the Fed's incentive to renege and therefore do not believe the announcement in the first place. Just as a president facing a hostage crisis is sorely tempted to negotiate their release, a Federal Reserve with discretion is sorely tempted to inflate in order to reduce unemployment. And just as terrorist discounts announced policies of never negotiating, households and firms discount announced policies of low inflation.

The surprising outcome of this analysis is that policymakers can sometimes better achieve their goals by having their discretion taken away from them. In the case of rational terrorists, fewer hostages will be taken and killed if policymakers are committed to following the seemingly harsh rule of refusing to negotiate for hostages' freedom. In the case of monetary policy, there will be lower inflation without higher unemployment if the Fed is committed to a policy of zero inflation.

The time inconsistency of policy arises in many other contexts. Here are some examples:

- To encourage investment, the government announces that it will not tax income from capital. But after factories have been built, the government is tempted to renege on its promise to raise more tax revenue from them.
- To encourage research, the government announces that it will give a temporary monopoly to companies that discover new drugs. But after a drug has been discovered, the government is tempted to revoke the patent or to regulate the price to make the drug more affordable.
- To encourage good behaviour, a parent announces that he or she will punish a child whenever the child breaks a rule. But after the child has misbehaved, the parent is tempted to forgive the transgression, because punishment is unpleasant for the parent as well as for the child.
- To encourage you to work hard, your professor announces that this course will end with an exam. But after you have studied and learned all the material, the professor is tempted to cancel the exam so that he or she won't have to grade it.

In each case, rational agents understand the incentive for the policymaker to renege, and this expectation affects their behaviour. And in each case, the solution is to take away the policymaker's discretion with a credible commitment to a fixed policy rule.

11.3 Rules for Monetary Policy

Even if we are convinced that policy rules are superior to discretion, the debate over macroeconomic policy is not over. If the Fed were to commit to a rule for monetary policy, what rule should it choose? Let's discuss briefly three policy rules that various economists advocate. Some economists, called monetarists, advocate that the Fed keep the money supply growing at a steady rate. The quotation at the beginning of this chapter from Milton Friedman – the most famous monetarist – exemplifies this view of monetary policy. Monetarists believe that fluctuations in the money supply are responsible for most large fluctuations in the economy. They argue that slow and steady growth in the money supply would yield stable output, employment, and prices.

Although a monetarist policy rule might have prevented many of the economic fluctuations we have experienced historically, most economists believe that it is not the best possible policy rule. Steady growth in the money supply stabilizes aggregate demand only if the velocity of money is stable. But sometimes the economy experiences shocks, such as shifts in money demand, that cause velocity to be unstable. Most economists believe that a policy rule needs to allow the money supply to adjust to various shocks to the economy.

A second policy rule that economists widely advocate is nominal GDP targeting. Under this rule, the Fed announces a planned path for nominal GDP. If nominal GDP rises above the target, the Fed reduces money growth to dampen aggregate demand. If it falls below the target, the Fed raises money growth to stimulate aggregate demand. Because a nominal GDP target allows monetary policy to adjust to changes in the velocity of money, most economists believe it would lead to greater stability in output and prices than a monetarist policy rule.

A third policy rule that is often advocated is inflation targeting. Under this rule, the Fed would announce a target for the inflation rate (usually a low one) and then adjust the money supply when the actual inflation deviates from the target. Like nominal GDP targeting, inflation targeting insulates the economy from changes in the velocity of money. In addition, an inflation target has the political advantage that it is easy to explain to the public. Notice that all these rules are expressed in terms of some nominal variable – the money supply, nominal GDP, or the price level. One can also imagine policy rules expressed in terms of real variables. For example, the Fed might try to target the unemployment rate at 5 per cent. The problem with such a rule is that no one knows exactly what the natural rate of unemployment is. If the Fed chose a target for the unemployment rate below the natural rate, the result would be accelerating inflation. Conversely, if the Fed chose a target for the unemployment rate above the natural rate, the result would be accelerating deflation. For this reason, economists rarely advocate rules for monetary policy expressed solely in terms of real variables, even though real variables such as unemployment and real GDP are the best measures of economic performance.

Summary

- Policymaking under uncertainty is difficult.
- There is no clear method to choose the correct process.
- Economists do play a role in policymaking.
- “[T]he ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else. Practical men, who believe themselves to be quite exempt from intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back.” J M Keynes

Keywords

Inside lag: The inside lag is the time between a shock to the economy and the policy action responding to that shock. This lag arises because it takes time for policymakers first to recognize that a shock has occurred and then to put appropriate policies into effect.

Lucas Critique: It argues that it is naive to try to predict the effects of a change in economic policy entirely on the basis of relationships observed in historical data, especially highly aggregated historical data.

Outside lag: The outside lag is the time between a policy action and its influence on the economy. This lag arises because policies do not immediately influence spending, income, and employment. Monetary policy has substantial outside lag.

Time Inconsistency: In economic policy and economics, dynamic inconsistency or time inconsistency is a situation in which a decision maker's preferences change over time in such a way that a preference can become inconsistent at another point in time.

Self Assessment

1. The monetarists believed that the economy would stabilize
 - A. With the help of monetary policy
 - B. Automatically
 - C. By correcting aggregate demand in the economy
 - D. All the above

2. How many types of lags are there in implementing economic policies?
 - A. One
 - B. Two
 - C. Three
 - D. Four

3. The time lag between policy action and its impact on the economy is known as
 - A. Inside lag
 - B. Outside lag
 - C. Parliamentary lag
 - D. Foreign lag

4. "As an advice-giving profession we are in way over our heads." This statement was given by whom.
 - A. Robert Lucas
 - B. Milton Friedman
 - C. Thomas Sargent
 - D. Robert Mundell

5. Automatic stabilizers are designed to reduce the associated with stabilization policy.
 - A. Lags
 - B. Volatility
 - C. Price changes

- D. Employment changes
6. The is the time between a shock to the economy and the policy action responding to that shock.
- A. Inside lag
B. Outside lag
C. Parliamentarian lag
D. Foreign lag
7. "Countries with parliamentarian system have shorter time lags." Is this statement
- A. True
B. False
8. Monetary policy has a much shorter inside lag than fiscal policy.
- A. True
B. False
9. Does the central bank of India practice inflation target?
- A. Yes
B. No
10. If the nominal GDP of a country increases beyond the target, then the central bank of the country wouldmoney supply toaggregate demand.
- A. Increase, increase
B. Decrease, decrease
C. Increase, decrease
D. Decrease, increase.
11. If a target is set for nominal GDP, it helps the central bank to adjust theof money.
- A. Changes in velocity
B. Changes in value
C. Both the above
D. None of the above
12. If a country is a young democracy, it would practice
- A. Policy by rule
B. Policy by discretion
C. Follow the developed countries
D. Depend on external agencies for help in policy making
13. If a policy is announced in advance, then it is a type of
- A. Policy by rule
B. Policy by discretion
C. Policy by coercion
D. Policy by popular vote

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14. In India, people vote as per the economic development in their area.

- A. Yes
- B. No

15. The inflation target has been set in India as per the FRBM act?

- A. True
- B. False

Answers for Self Assessment

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. B | 2. B | 3. B | 4. A | 5. A |
| 6. A | 7. A | 8. A | 9. A | 10. B |
| 11. A | 12. B | 13. A | 14. B | 15. A |

Review Questions

1. What are the inside lag and the outside lag? Which has the longer inside lag – monetary or fiscal policy? Which has the longer outside lag? Why?
2. What is meant by the “time inconsistency” of economic policy? Why might policymakers be tempted to renege on an announcement they made earlier? In this situation, what is the advantage of a policy rule?
3. Explain Lucas critique.
4. Why would more accurate economic forecasting make it easier for policymakers to stabilize the economy? Describe two ways economists try to forecast developments in the economy.
5. What are the steps that have been taken by the Reserve Bank of India to stabilize the economy?
6. Suggest measures that Reserve Bank of India should take to stabilize the economy in light of the pandemic.



Further Readings

Macroeconomics: Theories and Policies by Richard T. Froyen, Pearson Publications

Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 12: Government Debt and Budget Deficits

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Objectives

- Understand the concept of government deficit.
- Analyze the various problems in the measurement of government deficit.
- Understand the traditional and the Ricardian view of government debt.
- Evaluate the two views on government debt.

Introduction

The state is entrusted with the task to take care of the citizens of the country. It requires revenue to finance various expenditures whether planned or unplanned. Most of the time the revenue generated by the government falls short of the requirements. In such cases, the government borrows funds from internal as well as external sources. The accumulation of government borrowings is known as public debt. The growth of external debt has more serious implications than the growth of internal debt:

- Internal debt may be deferred or even annulled. The same for external debt would not only affect the country's international relations but may upset further inflow of capital and disturb trade.
- Internal debt can be monetized, i.e., repaid by printing money but external debt cannot be repaid that way.
- Internal debt can be repaid by privatization. But selling off assets to foreigners to repay external debt may seriously harm a country's sovereignty.
- Internal debt can be serviced if the return on capital invested is more than the cost of borrowing and amortization. In the case of external debt, however, this will not be adequate. In addition, the foreign exchange earnings of the country through exports or otherwise must rise in relation to external debt service.

In this chapter, we are going to look at the concept of public debt and how it leads to the government deficit. We will look at the external debt of India. We will look at the problems in the measurement of debt. Conceptually we will be studying the traditional and the Ricardian view on

government debt. After reading and understanding the two views we will then evaluate the to see what suits an economy the best.

12.1 The Size of The Government Debt

The discussion on the size of government debt of any country is incomplete if the sources of funds are not referred to. In the case of India too, the government borrows from internal sources and external sources. (The discussion in this part of the chapter is in context to India).

Internal Debt

Internally, the government may borrow from citizens, commercial banks, other financial institutions in the money market and the central banks. Normally the government of the country has a large variety of debt obligations. Therefore, public debt may be defined in several different ways covering their attractive combinations and suit the purpose of the definitions. Thus, at one extreme it may include all financial liabilities of a government (including its currency) while at the other extreme, it may include only a few of them. A clear-cut stand has also to be taken regarding inter-governmental obligations like loans from the central government to the states. Similarly, a decision is required as to whether the central bank of the country is to be considered a part of the government or not for the purpose of estimating the volume and composition of public debt. It would be helpful if we have a brief idea of the type of obligations, which the government of a country usually incurs.

Firstly - there is the currency itself generally, however the government creates a part of the currency; the rest is created by the central bank of the country. Therefore, the entire currency circulating in the market can be a part of public debt only if the central bank is classified as a part of the government sector. In any case, currency obligation normally remains dormant or inactive and the government does not "pay them off" - at the most one set of currency is replaced by another set and that is all.

Secondly - Another set of obligations of government constitutes its short-term debt; these obligations are normally of maturity of less than one year at the time of issue and consist of items like treasury bills.

Thirdly - some obligations do not have any specific maturity but may be repayable subject to various terms and conditions. They are referred to as floating debt. Examples of this category include provident funds, small saving reserve funds and deposits and so on. In India, the Government of India has also issued certain special securities to meet its obligations towards international institutions like the International Bank for reconstruction and development and the International Monetary Fund. These special securities may be called Special floating debt.

Fourthly category of government obligations consists of permanent or funded debt such loans have as the maturity of more than one year at the time of issue. In practice, their maturity is usually between three and thirty years. Some of them may even be non-terminable (or perpetuities) so that the government is only to pay the interest on such debt without ever repaying the principal amount.

Fifthly - obligations owned to a foreigner's government, institutions, firms and individuals are called external loans. They may have a variety of terms and conditions.

Thus, depending upon the purpose and contact, institutional arrangements and so on, different people could define public debt differently. At one extreme all financial obligations of the government including the demand debt (that is currency obligations) are sought to be included in the definition of public debt, while in other cases only some of the above-mentioned categories of obligations are considered. In general, however, the currency obligations of the government are usually excluded from the definition of the public debt and only the floating, funded, external and other obligations are included in it.

External Debt

External debt (or foreign debt) is that part of the total debt in a country that is owed to creditors outside the country. The debtors can be the government, corporations or private households. The

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debt includes money owed to private commercial banks, other governments, or international financial institutions such as the IMF and World Bank. IMF defines it as “Gross external debt, at any given time, is the outstanding amount of that actual current, and not contingent, liabilities that require payment(s) of principal and/or interest by the debtor at some point(s) in the future and that are owed to nonresidents by residents of an economy.” Generally, external debt is classified into four heads i.e.

1. public and publicly guaranteed debt,
2. private non-guaranteed credits,
3. central bank deposits, and
4. loans due to the IMF.

However, the exact treatment varies from country to country. In India, it is classified into seven heads namely

- (i) **Multilateral Debt** This refers to loans and credits extended by multilateral organizations to the Government or, in some cases, with Government guarantees, to Public and Private sector corporate bodies. This includes long term credits (40 years) of the International Development Association (IDA) and long-term loans from the world bank or the Asian Development Bank (ADB) which have market interest rates and a long repayment period (15-20 years).
- (ii) **Bilateral Loans** This refers to borrowing on varying degrees of concessionally, from other governments. Such loans are given to the government and in some cases to public sector organizations.
- (iii) **Loans from the International Monetary Fund (IMF)** The IMF debt assumed significance in the early 1980s when India resorted to withdrawals under the Extended Fund Facility (EFF)/supplementary Financing Facility (SFF) to ease out the balance of payments difficulties.
- (iv) **Export Credit** This comprises buyers’ credit, suppliers’ and export credit for defence purchases. Buyers’ credit and suppliers’ credit are treated as forms of commercial borrowing.
- (v) **Commercial Borrowing** This includes market borrowings abroad by corporate entities and public sector undertakings and includes commercial bank loans, securitized borrowings (including India Development Bonds) and loans or securitized borrowings with multilateral or bilateral guarantees. Commercial borrowings also include loans from International Finance Corporation (IFC), Washington, and self-liquidating loans.
- (vi) **Non-Resident Deposits** This refers to various types of Non-Resident (NR) deposits and Foreign Currency (Banks & others) Deposits (FC(B&O)D) with maturities of over one year.
- (vii) **Rupee Debt** This refers to debt denomination in rupees owed to Russia (with some very small amounts owed to other East European Countries) and paid through exports. Rupee debt is broken up into defence and a civilian component. Since March 1990, the civilian component of rupee debt has also included rupee suppliers’ credits.
- (viii) **Short-term Debt** This refers to debt with a maturity period of upto one year. This is usually trade-related debt.

Size of the external debt of India

The Reserve Bank of India estimates the size of the debt of the country. The outstanding internal and external debt and other liabilities of the Government of India at the end of 2022-2023 is estimated to be INR 152,17,910.29 crore, as against INR 135,87,893.16 crore at the end of 2021-2022

(RE). Table 12.1 and 12.2 show the key deficit indicators of the state and the gross fiscal deficit of the government and its financing.

Fig.12.1 Key deficit Indicators of the Central Government

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(₹ Crore)

Year	Gross fiscal deficit	Net fiscal deficit	Gross primary deficit	Net primary deficit	Revenue deficit	Primary revenue deficit	Drawdown of cash balances	Net RBI credit
1	2	3	4	5	6	7	8	9
1982-83	10627	5973	6689	4887	1308	-2630	1656	3388
1983-84	13030	7770	8235	5643	2540	-2255	1417	3949
1984-85	17416	10972	11442	8981	4225	-1749	3745	6055
1985-86	21858	13544	14348	10627	5889	-1623	5316	6190
1986-87	26342	17036	17096	13143	7777	-1469	8261	7091
1987-88	27044	18431	15793	12935	9137	-2114	5818	6559
1988-89	30923	20770	16645	13473	10515	-3763	5642	6503
1989-90	35832	23722	17875	14439	11914	-5843	10592	13813
1990-91	44832	30692	23134	17924	18562	-2936	11347	14746
1991-92	36325	24622	9729	8961	16261	-10335	6855	5508
1992-93	40173	30232	9098	11644	18574	-12501	12312	4257
1993-94	60257	45994	23516	24331	32716	-4025	10960	280
1994-95	57703	40313	13644	12050	31029	-13031	961	2130
1995-96	60243	42432	10198	10806	29731	-20314	9807	19855
1996-97	66733	46394	7255	9022	32654	-28824	13184	1934
1997-98	89937	63062	23300	22748	46449	-19188	-910	12914
1998-99	113349	79944	35468	32138	66976	-10906	-209	11800
1999-00	104716	89910	14467	33556	67596	-22653	864	-5588
2000-01	118816	107854	19502	41351	85234	-14080	-1197	6705
2001-02	140955	123074	33495	51152	100162	-7298	-1496	-5150
2002-03	145072	133829	27268	53647	107879	-9925	1893	-28399
2003-04	123273	115558	-815	30008	98261	-25827	-3942	-76065
2004-05	125794	128252	-1140	31705	78338	-48596	-1461	-60177
2005-06	146435	145743	13805	35145	92300	-40331	-20888	28417
2006-07	142573	151245	-7699	23497	80222	-70050	4517	-3024
2007-08	126912	120714	-44118	-29256	52569	-118461	-27171	-115632
2008-09	306992	329024	144788	157537	253539	61335	43834	174789
2009-10	418482	411448	205389	220139	338998	125905	-1386	150006
2010-11	373591	361026	139569	146738	252252	18230	6430	184969
2011-12	515990	514103	242840	261205	394348	121198	-15990	139183
2012-13	490190	484450	177020	192041	364282	51112	-51012	54840
2013-14	502858	496157	128604	143771	357048	-17206	-19171	106130
2014-15	510725	495245	108281	116605	365519	-38925	77752	-334185
2015-16	532791	527289	91132	111008	342736	-98923	13170	60472
2016-17	535618	516438	54904	51953	316381	-164333	-8895	195816
2017-18	591062	588668	62110	73290	443600	-85352	4091	-144847
2018-19	649418	639249	66770	68746	454483	-128165	-1321	325987
2019-20	933651	927553	321581	327832	666545	54475	4971	190241
2020-21	1848655	1756236	1155755	1077340	1455989	763089	-17358	107494
2021-22	1506812	1479438	697111	681279	1140576	330875	71383	-

Table 12.2 Central Government's Gross Fiscal Deficit and its Financing

Year	GFD receipts	GFD expenditure	Gross fiscal deficit (3-2)	Financing of GFD					Total (6+7+8)
				External finance	Internal finance			Total	
					Market borrowings	Other borrowings	Draw down of cash balances		
1	2	3	4	5	6	7	8	9	
1992-93	76089	116262	40173	5319	3676	18866	12312	34854	
1993-94	75405	135662	60257	5074	28928	15295	10960	55183	
1994-95	96691	154394	57703	3582	20326	32834	961	54121	
1995-96	111527	171770	60243	318	34001	16117	9807	59925	
1996-97	126734	193468	66733	2987	19093	31469	13184	63746	
1997-98	134798	223735	88937	1091	32499	56257	-910	87846	
1998-99	155359	268707	113349	1920	68988	42650	-209	111429	
1999-00	183206	287922	104716	1180	62076	40597	864	103537	
2000-01	194730	313546	118816	7505	73431	39077	-1197	111311	
2001-02	204952	345907	140955	5601	90812	46038	-1496	135354	
2002-03	233985	379057	145072	-11934	104126	50997	1883	157006	
2003-04	280765	404038	123273	-13488	88870	51833	-3942	136761	
2004-05	310415	436209	125794	14753	50940	61562	-1461	111041	
2005-06	348658	495093	146435	7472	106241	53610	-20888	138963	
2006-07	434921	577494	142573	8472	114801	14782	4517	134101	
2007-08	580659	707571	126912	9315	130600	14168	-27171	117597	
2008-09	540825	877817	336992	11015	246975	35168	43834	325977	
2009-10	597392	1015874	418482	11038	394371	14460	-1386	407444	
2010-11	811317	1184908	373591	23556	326399	17206	6430	350035	
2011-12	769525	1285515	515990	12448	484111	35421	-15990	503542	
2012-13	905122	1395312	490190	7201	507445	26556	-51012	482989	
2013-14	1044092	1546950	502858	7292	475626	39111	-19171	495566	
2014-15	1139209	1649935	510725	12933	457617	-37485	77752	497884	
2015-16	1237157	1769948	532791	12748	414931	91942	13170	520043	
2016-17	1421946	1957564	535618	17997	338149	188368	-8895	517622	
2017-18	1535278	2126340	591062	7931	450728	128312	4091	583131	
2018-19	1647642	2297060	649418	5519	422735	222485	-1321	643899	
2019-20	1734363	2668014	933651	8682	473968	446030	4971	924969	
2020-21	1587153	3435808	1848655	54522	1052788	758703	-17358	1794133	
2021-22	1963424	3470236	1506812	1514	924708	509207	71383	1505298	

12.2 Problems in Measurement

The government budget deficit equals government spending minus government revenue, which in turn equals the amount of new debt the government needs to issue to finance its operations. This is the concept behind government deficit. However, when the actual measurement of government deficit comes, there are many problems in measuring it. In this section we discuss four major problems in the measurement of government deficit.

Inflation

The least controversial of the measurement issues is the correction for inflation. Almost all economists agree that the government's indebtedness should be measured in real terms, not in nominal terms. The measured deficit should equal the change in the government's real debt, not the change in its nominal debt. The budget deficit as commonly measured, however, does not correct for inflation. To see how large an error this induces, consider the following example. Suppose that the real government debt is not changing; in other words, in real terms, the budget is balanced. In this case, the nominal debt must be rising at the rate of inflation. That is

$$\frac{\Delta D}{D} = \pi$$

Where π = rate of inflation

ΔD = change in nominal debt

D = government debt

This can be written as

$$\Delta D = \pi D$$

The government would look at the change in the nominal debt ΔD and would report a budget deficit of πD . Hence, most economists believe that the reported budget deficit is overstated by the amount πD .

We can make the same argument in another way. The deficit is government expenditure minus government revenue. Part of expenditure is the interest paid on the government debt. Expenditure should include only the real interest paid on the debt rD , not the nominal interest paid iD . Because the difference between the nominal interest rate i and the real interest rate r is the inflation rate π , the budget deficit is overstated by πD .

Capital Assets

Many economists believe that an accurate assessment of the government's budget deficit requires accounting for the government's assets as well as its liabilities. In particular, when measuring the government's overall indebtedness, we should subtract government assets from government debt. Therefore, the budget deficit should be measured as the change in debt minus the change in assets.

Certainly, individuals and firms treat assets and liabilities symmetrically. When a person borrows to buy a house, we do not say that he is running a budget deficit. Instead, we offset the increase in assets (the house) against the increase in debt (the mortgage) and record no change in net wealth. Perhaps we should treat the government's finances the same way. A budget procedure that accounts for assets as well as liabilities is called capital budgeting, because it takes into account changes in capital. For example, suppose that the government sells one of its office buildings or some of its land and uses the proceeds to reduce the government debt. Under current budget procedures, the reported deficit would be lower. Under capital budgeting, the revenue received from the sale would not lower the deficit, because the reduction in debt would be offset by a reduction in assets. Similarly, under capital budgeting, government borrowing to finance the purchase of a capital good would not raise the deficit. The major difficulty with capital budgeting is that it is hard to decide which government expenditures should count as capital expenditures. For example, should the interstate highway system be counted as an asset of the government? If so, what is its value? What about the stockpile of nuclear weapons? Should spending on education be treated as expenditure on human capital? These difficult questions must be answered if the government is to adopt a capital budget. Economists and policymakers disagree about whether the federal government should use capital budgeting. (Many state governments already use it.) Opponents of capital budgeting argue that, although the system is superior in principle to the current system, it is too difficult to implement in practice. Proponents of capital budgeting argue that even an imperfect treatment of capital assets would be better than ignoring them altogether.

Uncounted Liabilities

Some economists argue that the measured budget deficit is misleading because it excludes some important government liabilities. For example, consider the pensions of government workers. These workers provide labor services to the government today, but part of their compensation is deferred to the future. In essence, these workers are providing a loan to the government. Their future pension benefits represent a government liability not very different from government debt. Yet this liability is not included as part of the government debt, and the accumulation of this liability is not included as part of the budget deficit. According to some estimates, this implicit liability is almost as large as the official government debt. Similarly, consider the Social Security system. In some ways, the system is like a pension plan. People pay some of their income into the system when young and expect to receive benefits when old. Perhaps accumulated future Social Security benefits should be included in the government's liabilities. Estimates suggest that the government's future Social Security liabilities (less future Social Security taxes) are more than three times the government debt as officially measured. One might argue that Social Security liabilities are different from government debt because the government can change the laws determining Social Security benefits. Yet, in principle, the government could always choose not to repay all of its debt: the government honors its debt only because it chooses to do so. Promises to pay the holders of government debt may not be fundamentally different from promises to pay the future recipients of Social Security.

A particularly difficult form of government liability to measure is the contingent liability—the liability that is due only if a specified event occurs. For example, the government guarantees many forms of private credit, such as student loans, mortgages for low- and moderate-income families, and deposits in banks and savings-and-loan institutions. If the borrower repays the loan, the government pays nothing; if the borrower defaults, the government makes the repayment. When the government provides this guarantee, it undertakes a liability contingent on the borrower's default. Yet this contingent liability is not reflected in the budget deficit.

The Business Cycle

Many changes in the government's budget deficit occur automatically in response to a fluctuating economy. For example, when the economy goes into a recession, incomes fall, so people pay less in personal income taxes. Profits fall, so corporations pay less in corporate income taxes. More people become eligible for government assistance, such as welfare and unemployment insurance, so government spending rises. Even without any change in the laws governing taxation and spending, the budget deficit increases. These automatic changes in the deficit are not errors in measurement, because the government truly borrows more when a recession depresses tax revenue and boosts government spending. But these changes do make it more difficult to use the deficit to monitor changes in fiscal policy. That is, the deficit can rise or fall either because the government has changed policy or because the economy has changed direction. For some purposes, it would be good to know which is occurring. To solve this problem, the government calculates a cyclically adjusted budget deficit (sometimes called the full-employment budget deficit). The cyclically adjusted deficit is based on estimates of what government spending and tax revenue would be if the economy were operating at its natural rate of output and employment. The cyclically adjusted deficit is a useful measure because it reflects policy changes but not the current stage of the business cycle.

12.3 Traditional and Ricardian View of Debt

Traditional View

Academic views regarding the burden of public debt have been changing according to the changes in general economic thinking about state intervention. In the eighteenth century, public debt was favoured by economists as they had great faith in the role of the state in economic activities. Their favourable attitude towards public debt was a part of the mercantilist doctrine. But in the Nineteenth Century and the early part of the Twentieth Century public debt was condemned by early classical economists mainly because of their lack of faith in the role of the state in economic activities. David Hume, Adam Smith and David Ricardo had identical views about the consequences of public debt. Their opposition to public debt was on the ground that public expenditure is wasteful and unproductive. David Hume opposed public debt and said that "nations once they began to borrow, would be unable to resist until they reached the point of bankruptcy." Adam Smith thought that, once the sovereign started to borrow, his political power was increased because he was no longer dependent on tax exactions from his subjects. Therefore, borrowing encouraged the sovereign to wage needless wars. On the other hand, if taxes were raised to meet current costs, the war would in general be more speedily concluded and less wantonly undertaken. In short, the ability to engage in loan finance makes for irresponsibility in a sovereign." Ricardo characterized national debt as '...one of the most terrible scourges, which was ever invented to afflict a nation. However, subsequent thinkers like Malthus, Mill, Sidgwick and Cairnes had some liberal views about the consequence of public debt. As Malthus said that "The material debt is not evil which is generally supposed to be. Those who live on the interest from the national debt, like statesmen, soldiers and sailors.....contribute powerfully to distribution and demand.... They ensure that effective consumption which to necessary to give the proper stimulus to production..... therefore, the debt, once created, is not a great evil".

The Ricardian View

The traditional view of government debt presumes that when the government cuts taxes and runs a budget deficit, consumers respond to their higher after-tax income by spending more. An alternative view, called Ricardian equivalence, questions this presumption. According to the

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Ricardian view, consumers are forward-looking and, therefore, base their spending not only on their current income but also on their expected future income. The Ricardian view of government debt applies the logic of the forward-looking consumer to analyze the effects of fiscal policy. In recent years this thesis has been taken forward by Barro.

According to Ricardian equivalence, a debt-financed tax cut has no effect on consumption, national saving, the real interest rate, investment, net exports, or real GDP, even in the short run.

The Logic of Ricardian Equivalence

Consumers are forward-looking, know that a debt-financed tax cut today implies an increase in future taxes that is equal—in present value—to the tax cut. Thus, the tax cut does not make consumers better off, so they do not raise consumption. The general principle is that government debt is equivalent to future taxes, and if consumers are sufficiently forward-looking, future taxes are equivalent to current taxes. They save the full tax cut in order to repay the future tax liability. Result: Private saving rises by the amount public saving falls, leaving national saving unchanged.

The logic of Ricardian equivalence does not mean that all changes in fiscal policy are irrelevant. Changes in fiscal policy do influence consumer spending if they influence present or future government purchases. For example, suppose that the government cuts taxes today because it plans to reduce government purchases in the future. If the consumer understands that this tax cut does not require an increase in future taxes, he feels richer and raises his consumption. But note that it is the reduction in government purchases, rather than the reduction in taxes, that stimulates consumption: the announcement of a future reduction in government purchases would raise consumption today even if current taxes were unchanged, because it would imply lower taxes at some time in the future.

Arguments against Future Tax

The critics of the Ricardian view are of the opinion that future taxes do not play a very significant role in current consumption as claimed by Ricardo. The Ricardians believe that consumers look at the future tax while choosing their current consumption. The arguments put forward by the critics are as follows:

Myopia

Proponents of the Ricardian view of fiscal policy assume that people are rational when making decisions such as choosing how much of their income to consume and how much to save. When the government borrows to pay for current spending, rational consumers look ahead to the future taxes required to support this debt. Thus, the Ricardian view presumes that people have substantial knowledge and foresight. One possible argument for the traditional view of tax cuts is that people are shortsighted, perhaps because they do not fully comprehend the implications of government budget deficits. It is possible that some people follow simple and not fully rational rules of thumb when choosing how much to save. Suppose, for example, that a person acts on the assumption that future taxes will be the same as current taxes. This person will fail to take into account of future changes in taxes required by current government policies. A debt-financed tax cut will lead this person to believe that his lifetime income has increased, even if it hasn't. The tax cut will therefore lead to higher consumption and lower national saving.

Borrowing Constraints

The Ricardian view of government debt assumes that consumers base their spending not only on current income but on their lifetime income, which includes both current and expected future income. According to the Ricardian view, a debt-financed tax cut increases current income, but it does not alter lifetime income or consumption. Advocates of the traditional view of government debt argue that current income is more important than lifetime income for those consumers who face binding borrowing constraints. A borrowing constraint is a limit on how much an individual can borrow from banks or other financial institutions. A person who would like to consume more than his current income—perhaps because he expects higher income in the future—has to do so by borrowing. If he cannot borrow to finance current consumption or can borrow only a limited amount, his current income determines his spending, regardless of what his lifetime income might be. In this case, a debt-financed tax cut raises current income and thus consumption, even though

future income is lower. In essence, when the government cuts current taxes and raises future taxes, it is giving taxpayers a loan. For a person who wanted to obtain a loan but was unable to, the tax cut expands his opportunities and stimulates consumption.

Future Generations

Besides myopia and borrowing constraints, a third argument for the traditional view of government debt is that consumers expect the implied future taxes to fall not on them but on future generations. Suppose for example, that the government cuts taxes today, issues 30-year bonds to finance the budget deficit and then raises taxes in 30 years to repay the loan. In this case, the government debt represents a transfer of wealth from the next generation of taxpayers (which faces the tax hike) to the current generation of taxpayers (which gets the tax cut). This transfer raises the lifetime resources of the current generation, so it raises their consumption. In essence, a debt-financed tax cut stimulates consumption because it gives the current generation the opportunity to consume at the expense of the next generation. Economist Robert Barro has provided a clever rejoinder to this argument to support the Ricardian view.

Barro argues that because future generations are the children and grandchildren of the current generation, we should not view them as independent economic actors. Instead, he argues, the appropriate assumption is that current generations care about future generations. This altruism between generations is evidenced by the gifts that many people give their children, often in the form of bequests at the time of their deaths. The existence of bequests suggests that many people are not eager to take advantage of the opportunity to consume at their children's expense. According to Barro's analysis, the relevant decision-making unit is not the individual, whose life is finite, but the family, which continues forever. In other words, an individual decides how much to consume based not only on his own income but also on the income of future members of his family. A debt-financed tax cut may raise the income an individual receives in his lifetime, but it does not raise his family's overall resources. Instead of consuming the extra income from the tax cut, the individual saves it and leaves it as a bequest to his children, who will bear the future tax liability.

Making a Choice

Having seen the traditional and Ricardian views of government debt, you should ask yourself two sets of questions.

First, with which view do you agree? If the government cuts taxes today, runs a budget deficit and raises taxes in the future, how will the policy affect the economy? Will it stimulate consumption, as the traditional view holds? Or will consumers understand that their lifetime income is unchanged and, therefore, offset the budget deficit with higher private saving?

Second, why do you hold the view that you do? If you agree with the traditional view of government debt, what is the reason? Do consumers fail to understand that higher government borrowing today means higher taxes tomorrow? Or do they ignore future taxes, either because they are borrowing-constrained or because future taxes fall on future generations with which they do not feel an economic link? If you hold the Ricardian view, do you believe that consumers have the foresight to see that government borrowing today will result in future taxes levied on them or their descendants? Do you believe that consumers will save the extra income to offset that future tax liability?

We might hope that the evidence could help us decide between these two views of government debt. Yet, when economists examine historical episodes of large budget deficits, the evidence is inconclusive. History can be interpreted in different ways.

12.4 Other Perspectives of Government Debt

According to the traditional view, a government budget deficit expands aggregate demand and stimulates output in the short run but crowds out capital and depresses economic growth in the long run. According to the Ricardian view, a government budget deficit has none of these effects, because consumers understand that a budget deficit represents merely the postponement of a tax burden. With these two views in the backdrop, we are going to look at the other views that are present with regards to government debt.

Balanced Budget versus Optimal Fiscal Policy

The debate is whether the government should have a balanced budget, or the objective is to have an optimum fiscal policy. In many countries, the government is expected to have a balanced budget. Economists all around the world opposed this approach. The arguments given in favour of optimal fiscal policy are:

Stabilization

A budget deficit or surplus can help stabilize the economy. In essence, a balanced-budget rule would revoke the automatic stabilizing powers of the system of taxes and transfers. When the economy goes into a recession, taxes automatically fall and transfers automatically rise. Although these automatic responses help stabilize the economy, they push the budget into deficit. A strict balanced-budget rule would require that the government raise taxes or reduce spending in a recession, but these actions would further depress aggregate demand.

Tax Smoothing

A budget deficit or surplus can be used to reduce the distortion of incentives caused by the tax system. As you probably learned in microeconomics courses, high tax rates impose a cost on society by discouraging economic activity. A tax on labour earnings, for instance, reduces the incentive that people have to work long hours. Because this disincentive becomes particularly large at very high tax rates, the total social cost of taxes is minimized by keeping tax rates relatively stable rather than making them high in some years and low in others. Economists call this policy tax smoothing. To keep tax rates smooth, a deficit is necessary in years of unusually low income (recessions) or unusually high expenditure (wars).

Intergenerational Redistribution

A budget deficit can be used to shift a tax burden from current to future generations. For example, some economists argue that if the current generation fights a war to maintain freedom, future generations benefit as well and should bear some of the burden. To pass on some of the war's costs, the current generation can finance the war with a budget deficit. The government can later retire the debt by levying taxes on the next generation.

These considerations lead most economists to reject a strict balanced-budget rule. At the very least, a rule for fiscal policy needs to take account of the recurring episodes, such as recessions and wars, during which a budget deficit is a reasonable policy response.

Fiscal Effect on Monetary Policy

One way for a government to finance a budget deficit is simply to print money – a policy that leads to higher inflation. Indeed, when countries experience hyperinflation, the typical reason is that fiscal policymakers are relying on the inflation tax to pay for some of their spendings. The ends of hyperinflations almost always coincide with fiscal reforms that include large cuts in government spending and therefore a reduced need for seigniorage. In addition to this link between the budget deficit and inflation, some economists have suggested that a high level of debt might also encourage the government to create inflation. Because most government debt is specified in nominal terms, the real value of the debt falls when the price level rises. This is the usual redistribution between creditors and debtors caused by unexpected inflation – here the debtor is the government and the creditor is the private sector. But this debtor, unlike others, has access to the monetary printing press. A high level of debt might encourage the government to print money, thereby raising the price level and reducing the real value of its debts.

During the pandemic, when both demand and supply-side constraints were prevalent in the economy, many economists suggested that India should monetise its deficit without paying much heed to inflation. Raghuram Rajan- ex-Governor of RBI was of the view that monetization of debt was not a game-changer during a catastrophe. He said that it helps the government at the margins but it does not solve the problem of the government. However, the fear of monetization or inflation should not discourage the government from spending the required amount in the economy.

Summary

- Economists differ in the importance they place on these measurement problems.

- Some believe that the problems are so severe that the budget deficit as normally measured is almost meaningless.
- Most take these measurement problems seriously but still view the measured budget deficit as a useful indicator of fiscal policy.
- In the traditional view, a debt-financed tax cut increases consumption and reduces national savings.
- In a closed economy, this leads to higher interest rates, lower investment, and a lower long-run standard of living.
- In an open economy, it causes an exchange rate appreciation, a fall in net exports (or an increase in the trade deficit).
- The Ricardian view holds that debt-financed tax cuts do not affect consumption or national saving, and therefore do not affect interest rates, investment, or net exports.

Keywords

Government deficit: The difference between total revenue and total expenditure of the government is termed a fiscal deficit.

Internal Debt: In public finance, internal debt or domestic debt is the component of the total government debt in a country that is owed to lenders within the country.

External Debt: External debt is the portion of a country's debt that is borrowed from foreign lenders, including commercial banks, governments, or international financial institutions. These loans, including interest, must usually be paid in the currency in which the loan was made.

SelfAssessment

1. When a government spends more than it collects in taxes, it has a deficit?
 - A. Revenue
 - B. Budget
 - C. Government
 - D. All the above
2. "Public debt is a public curse" was said by
 - A. Alexander Hamilton
 - B. Herbert Hoover
 - C. James Madison
 - D. Milton Freidman
3. Historically the primary cause of debt was
 - A. Deficiency of gold
 - B. Deficiency of silver
 - C. Loss in trade
 - D. War
4. The government's indebtedness should be measured in terms, not in terms.
 - A. Real, nominal
 - B. Nominal, real
 - C. Money, gold
 - D. None of the above

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5. Does the budget deficit take inflation into consideration?
- A. Yes
 - B. No
6. If the government sells its assets to pay off its debt, then it is
- A. Reduction of debt
 - B. Reduction in assets
 - C. Depends whether capital budgeting is followed
 - D. All the above
7. The cyclically adjusted budget deficit takes the government spending and tax revenue if the economy is operating at
- A. Natural level of output and employment
 - B. Potential level of output and employment
 - C. Target level of output and employment
 - D. Nominal level of output and employment
8. "Blessed are the young, for they shall inherit the national debt." This statement was given by
- A. Alexander Hamilton
 - B. Herbert Hoover
 - C. James Madison
 - D. Ronald Regan
9. In the short run as per the IS-LM curve model, if there is a tax cut and corresponding increase in government debt, income would
- A. Increase
 - B. Decrease
 - C. Remain constant
 - D. None of the above
10. Does a tax cut today implies a tax rate increase in the future?
- A. Yes
 - B. No
11. A debt finance tax cut would lead to increase in tax rate in the future is a concept given by
- A. Traditional view
 - B. Ricardian view
 - C. Keynesian view
 - D. Monetarist view
12. If there is a tax cut today which may lead to higher taxes in the future and the consumers are aware of this phenomenon, then they wouldconsumption.
- A. Increase
 - B. Decrease
 - C. Remain at the same level

- D. Depends on individual consumer
13. As per the Ricardian view, do they assume that the consumers are rational.
- A. Yes
- B. No
14. As per the traditional view if there is tax cut and increase in government debt in a closed economy, then the rate of interest would
- A. Increase
- B. Decrease
- C. Remain the same
- D. None of the above
15. The Ricardian view was promoted by
- A. J M Keynes
- B. Robert Lucas
- C. Robert Barro
- D. Gregory Mankiw

Answers for Self Assessment

1. B 2. C 3. D 4. A 5. B
6. C 7. A 8. B 9. A 10. A
11. B 12. C 13. A 14. A 15. C

Review Questions

1. Describe four problems affecting the measurement of the government budget deficit.
2. Write a note on the size of the debt of the Indian government.
3. Explain the merits and demerits of the traditional and the Ricardian view of debt.
4. Do you believe the traditional or the Ricardian view of government debt? Why?
5. What are the arguments in favour of optimal fiscal policy of a country?

**Further Readings**

- Macroeconomics: Theories and Policies By Richard T. Froyen, Pearson Publications
- Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 13: Opportunities and Dangers in the Financial System

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Objectives

- Understand the concept of the financial system
- Evaluate the various components of the financial system
- Define the term “financial crisis.”
- Discuss the major financial crisis
- Review the central lessons of macroeconomics.

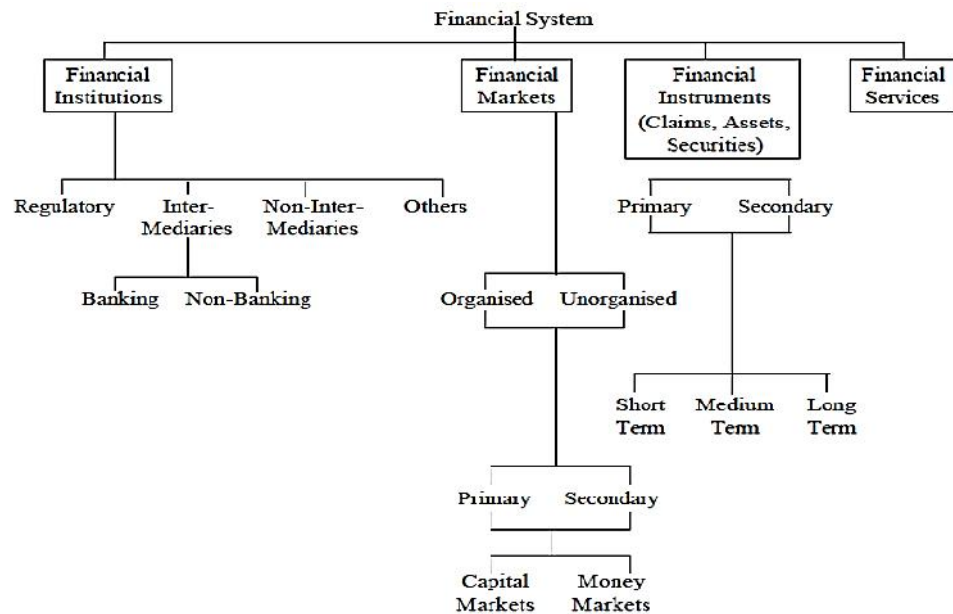
Introduction

The word ‘system’ in the term ‘Financial System’ implies a set of complex and closely connected or intermixed instructions, agents, practices, markets, transactions, claims and liabilities in the economy. Finance is the study of money, its nature, creation, behaviour, regulations and administration. Therefore, Financial System includes all those activities dealing with finance, organised into a system. The financial system plays a crucial role in the functioning of the economy because it allows the transfer of resources from savers to investors. The financial system consists of financial institutions, financial markets, financial instruments and the services provided by the financial institutions. Figure 13.1 gives a bird’s eye view of the financial system of an economy. As stated earlier, the financial system comprises four major components. These components are:

1. Financial Institutions
2. Financial Markets
3. Financial Instruments
4. Financial Services

Financial Institutions mobilise the savings either directly or indirectly through financial markets, by using various financial instruments and in the process utilising the services of various financial services providers. Before we go on to the main topic of this course which is Financial Services, let us, briefly, know about the four components of the financial system.

Fig.13.2 Financial System



Financial Institutions: These are institutions that mobilise and transfer the savings or funds from surplus units to deficit units. As can be seen from Figure 13.1 these institutions can be classified into, Regulatory, Intermediaries, Non-intermediaries and Others. These institutions unlike commercial Organisations deal with only financial assets like deposits, securities, loans, etc. These institutions participate in financial markets and mobilise the savings from the surplus units either directly or indirectly.

Financial Markets: This is a place or mechanism where funds or savings are transferred from surplus units to deficit units. These markets can be broadly classified into money markets and capital markets. The money market deals with short-term claims or financial assets (less than a year) whereas capital markets deal with those financial assets which have a maturity period of more than a year. This classification is artificial as both these markets perform the same function of transferring surplus funds to needy units. Another classification could be primary markets and secondary markets. Primary markets deal in new issues of securities whereas secondary markets deal with securities that are already issued and available in the market. Primary markets by issuing new securities mobilise the savings directly. Secondary markets provide liquidity to the securities and thereby indirectly help in mobilising the savings. A detailed discussion on the financial markets is available in subsequent sections of this unit itself.

Financial Instruments: As already stated, the commodities that are traded or Financial System dealt in a financial market are financial assets or securities or financial instruments. There is a variety of securities in the financial markets as the requirements of lenders and borrowers are varied. Financial assets represent a claim on the repayment of principal at a future date and/or payment of a periodic or terminal sum in the form of interest or dividend. Some of the examples of these financial instruments are equity shares, preference shares debentures, bonds, etc.

Financial Services: Financial services include the services offered by both types of companies – Asset Management Companies and Liability Management Companies. The former includes the leasing companies, mutual funds, merchant bankers, issue/portfolio managers. The latter comprises the bill discounting houses and acceptance houses. The financial services help not only to raise the required funds but also ensure their efficient deployment. They help to decide the financing mix and extend their services up to the stage of servicing of lenders. In order to ensure efficient management of funds, services such as bill discounting, factoring of debtors, parking of short-term funds in the money market, e-commerce and securitisation of debts are provided by the financial services firms. Besides banking and insurance, this sector provides specialised services such as credit rating, venture capital financing, lease financing, factoring, mutual funds, merchant

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banking, stock lending, depository, credit cards, housing finance, book building, etc. These services are provided by stock exchanges, specialised and general financial institutions, banks and insurance companies, and are regulated by the Securities and Exchange Board of India (SEBI), Reserve Bank of India and the Department of Banking and Insurance, Government of India, through a plethora of legislations. As the main focus of this course is on financial services, you will have an opportunity to know more about these financial service companies and the services offered by them in the subsequent Units and Blocks.

Financial institutions and financial markets facilitate the functioning of the financial system through financial instruments. In order to fulfil the tasks assigned, they require a number of services of financial nature. Financial services are, therefore, regarded as the fourth element of the financial system. An efficient and well-ordered functioning of the financial system depends a great deal on the range of financial services extended by the providers and their efficiency and effectiveness.

13.1 Financial Crisis

In a financial crisis, asset prices see a steep decline in value, businesses and consumers are unable to pay their debts, and financial institutions experience liquidity shortages. A financial crisis is often associated with a panic or a bank run during which investors sell off assets or withdraw money from savings accounts because they fear that the value of those assets will drop if they remain in a financial institution.

“A disturbance to financial markets, associated typically with falling asset prices and insolvency amongst debtors and intermediaries, which ramifies through the financial system, disrupting the market’s capacity to allocate capital.”- (Eichengreen and Portes).

“Bank runs, sharp increases in default rates accompanied by large losses of capital that result in public intervention, bankruptcy or forced merger of financial institutions.” Schularick & Taylor

Both the definitions given above show that financial crises are caused by disturbances in the economy that may lead to a fall in asset prices, or the central bank may change the interest rates or both. Overall, the economy gets disrupted and currently, in the globalized world in which we live, there is a domino effect as was very evident from the 2008-09 US crisis. The widespread impact of the latest global financial crisis underlines the importance of having a solid understanding of crises.

13.2 Types of Financial Crisis

In this section we will broadly classify the financial crisis into four types.

Currency Crisis

A currency crisis is brought on by a sharp decline in the value of a country's currency. This decline in value, in turn, negatively affects an economy by creating instabilities in exchange rates, meaning one unit of a certain currency no longer buys as much as it used to in another currency. To simplify the matter, we can say that, from a historical perspective, crises have developed when investor expectations cause significant shifts in the value of currencies. But a currency crisis—such as hyperinflation—is often the result of a shoddy real economy underlying the nation's currency. In other words, a currency crisis is often the symptom and not the disease of greater economic malaise. Some places are more vulnerable to currency crises than others. For instance, although it's theoretically possible for the U.S. dollar to collapse, its status as a reserve currency makes it unlikely.

How to fight a Currency Crisis?

Central banks are the first line of defence in maintaining the stability of a currency. In a fixed exchange rate regime, central banks can try to maintain the current fixed exchange rate peg by dipping into the country's foreign reserves or intervening in the foreign exchange markets when faced with the prospect of a currency crisis for a floating-rate currency regime. When the market expects devaluation, downward pressure placed on the currency can be offset in part by an increase in interest rates. In order to increase the rate, the central bank can lower the money supply, which in turn increases demand for the currency. The bank can do this by selling off foreign reserves to create a capital outflow. When the bank sells a portion of its foreign reserves, it receives payment in the form of the domestic currency, which it holds out of circulation as an asset.

If the central banks inflate the exchange rate for a long period of time, then it depletes the foreign exchange reserve of the country. The devaluation of the currency helps to boost demand in the domestic market as the goods become cheaper. In the short run, devaluation also leads to an increase in the interest rate which is offset by the central bank by increasing the supply of currency in the economy and boosting the foreign reserves.

Investors are well aware that a devaluation strategy can be used and can build this into their expectations—much to the chagrin of central banks. If the market expects the central bank to devalue the currency—and thus increase the exchange rate—the possibility of boosting foreign reserves through an increase in aggregate demand is not realized. Instead, the central bank must use its reserves to shrink the money supply which increases the domestic interest rate.



Examples of Currency Crisis

1. Latin American Crisis of 1994

On Dec. 20, 1994, the Mexican peso was devalued. The Mexican economy had improved greatly since 1982 when it last experienced upheaval, and interest rates on Mexican securities were at positive levels.

Several factors contributed to the subsequent crisis:

- Economic reforms from the late 1980s—which were designed to limit the country's oft-rampant inflation—began to crack as the economy weakened.
- The assassination of a Mexican presidential candidate in March of 1994 sparked fears of a currency sell-off.
- The central bank was sitting on an estimated \$28 billion in foreign reserves, which were expected to keep the peso stable. In less than a year, the reserves were gone.
- The central bank began converting short-term debt, denominated in pesos, into dollar-denominated bonds. The conversion resulted in a decrease in foreign reserves and an increase in debt.
- A self-fulfilling crisis resulted when investors feared a default on debt by the government.

When the government finally decided to devalue the currency in December 1994, it made some major mistakes. It did not devalue the currency by a large enough amount, which showed that while still following the pegging policy, it was unwilling to take the necessary painful steps. This led foreign investors to push the peso exchange rate drastically lower, which ultimately forced the government to increase domestic interest rates to nearly 80%. This took a major toll on the country's gross domestic product (GDP), which also fell. The crisis was finally alleviated by an emergency loan from the U.S.

2. Asian Crisis of 1997

Southeast Asia was home to the tiger economies—including Singapore, Malaysia, China, and South Korea—and the Southeast Asian crisis. Foreign investments poured in for years. Underdeveloped economies were experiencing rapid rates of growth and high levels of exports. The rapid growth was attributed to capital investment projects, but the overall productivity did not meet expectations. While the exact cause of the crisis is disputed, Thailand was the first to run into trouble.

Much like Mexico, Thailand relied heavily on foreign debt, causing it to teeter on the brink of illiquidity. Real estate dominated investment but was inefficiently managed. Huge current account deficits were maintained by the private sector, which increasingly relied on foreign investment to stay afloat. This exposed the country to a significant amount of foreign exchange risk.

This risk came to a head when the U.S. increased domestic interest rates, which ultimately lowered the amount of foreign investment going into Southeast Asian economies. Suddenly, the current account deficits became a huge problem, and a financial contagion quickly developed. The Southeast Asian crisis stemmed from several key points:

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- As fixed exchange rates became exceedingly difficult to maintain, many Southeast Asian currencies dropped in value.
- Southeast Asian economies saw a rapid increase in privately-held debt, which was bolstered in several countries by overinflated asset values. Defaults increased as foreign capital inflows dropped off.
- Foreign investment may have been at least partially speculative, and investors may not have been paying close enough attention to the risks involved.

Sudden Stop

A sudden stop is an abrupt reduction of capital flows into a nation's economy, which is often accompanied by economic recessions and market corrections. Sudden stops may also be followed by a currency crisis, as foreigners lose faith in a nation's economy. Sudden stops affect small economies disproportionately as foreign capital inflows cease even as domestic capital outflows rise.

A sudden stop is characterized by swift reversals of international capital flows, declines in production and consumption, and corrections in asset prices. It may also be accompanied by a currency crisis, a banking crisis, or both.

There can be two main trigger points for the sudden stop. Foreign investors may withdraw money from an economy, or they may stop the flow of currency in the economy. Similarly, domestic investors may also withdraw their investments from the economy. This phenomenon is known as capital flight. An important point that needs to be kept in mind while dealing with sudden stops is that it is always preceded by a phase of robust growth where the economy is growing. Therefore, an obvious fallout is a recession when the capital flight takes place.



Examples of Sudden Stop

1. In the early to mid-1990s, Indonesia, Malaysia, the Philippines, Singapore, and Thailand ran large current account deficits. Rapid economic growth driven by investment encouraged foreign creditors to maintain capital flows into the region. At the same time, the rapid expansion of the local supplies of money credit combined with exchange rates pegged to the dollar and heavy borrowing in the U.S. denominated assets by governments and central banks contributed to significant financial imbalances. As investors eventually lost confidence in the sustainability of the regional economy, a series of currency crises emerged in these countries leading to an abrupt reversal of capital flows, or sudden stop.
2. From 2010-to 2012, following the global financial crisis, investors and creditors who had for years financed large balance-of-payments deficits in the periphery of the Euro area – Portugal, Ireland, Italy, Greece, and Spain (PIIGS) – lost confidence in the fiscal and financial stability of these countries in the face of local government debt crises. Capital flows from core EU countries, such as Germany and France, ceased and then reversed, inducing a sudden stop.

Sovereign Debt Crisis

Public debt, or sovereign debt, is an important way for governments to finance investments in growth and development. However, it is also critical that governments are able to continue servicing their debt and that their debt burden remains sustainable. Entering into debt distress is often a painful process, which may threaten macro-economic stability and set back a country's development for years. A sovereign debt crisis arises when a lender country is unable to pay off its debts. The trigger point is the availability of huge funds at a very low rate of interest from some foreign country. This mainly happens in countries that are dependent on foreign countries for their consumption. In simple words, we can say that countries that import their consumables from other countries lead to the requirement for huge foreign exchange reserves. When a country does not

have its own reserves, it borrows from other countries. If the country is unable to service its debt then it leads to a debt crisis.



Example of Sovereign Debt Crisis

Debt crisis of Eurozone

It occurred mainly due to the Stability and Growth Pact (SGP), as part of the Maastricht treaty which resulted in government budget deficits in excess of the values stated. Accumulation of unsustainable levels of government debt by various countries of the Eurozone such as Spain, Greece, Ireland, and Portugal, popularly known as the PIGS crisis. Greece had the biggest budget deficit of 12.7% in 2009 and one of the highest levels of public debt (160% public debt to GDP ratio in 2012) in the Euro-zone. Greece was agreed to a bailout by the EU and the International Monetary Fund (IMF) but with conditions to cut budgetary spending, which resulted in a downward spiral.

Banking Crisis

Banks are susceptible to a range of risks. These include credit risk (loans and other assets turn bad and cease to perform), liquidity risk (withdrawals exceed the available funds), and interest rate risk (rising interest rates reduce the value of bonds held by the bank, and force the bank to pay relatively more on its deposits than it receives on its loans).

Banking problems can often be traced to a decrease in the value of banks' assets. Deterioration in asset values can occur, for example, due to a collapse in real estate prices or from an increased number of bankruptcies in the non-financial sector. Or, if a government stops paying its obligations, this can trigger a sharp decline in the value of bonds held by banks in their portfolios. When asset values decrease substantially, a bank can end up with liabilities that are bigger than its assets (meaning that the bank has negative capital, or is "insolvent"). Or, the bank can still have some capital, but less than the minimum required by regulations (this is sometimes called "technical insolvency")

Bank problems can also be triggered or deepened if a bank faces too many liabilities coming due and does not have enough cash (or other assets that can be easily turned into cash) to satisfy those liabilities. This can happen, for example, if many depositors want to withdraw deposits at the same time (depositors run on the bank). It can also happen also if the bank's borrowers want their money back and the bank does not have enough cash on hand. The bank can become illiquid. It is important to note that illiquidity and insolvency are two different things. For example, a bank can be solvent but illiquid (that is, it can have enough capital but not enough liquidity on its hands). However, many times, insolvency and illiquidity come hand in hand. When there is a major decline in asset values, depositors and other banks borrowers often start feeling uneasy and demand their money back, deepening the bank's troubles.

A (systemic) banking crisis occurs when many banks in a country are in serious solvency or liquidity problems at the same time—either because there are all hit by the same outside shock or because failure in one bank or a group of banks spreads to other banks in the system. More specifically, a systemic banking crisis is a situation when a country's corporate and financial sectors experience a large number of defaults and financial institutions and corporations face great difficulties repaying contracts on time. As a result, non-performing loans increase sharply and all or most of the aggregate banking system capital is exhausted. This situation may be accompanied by depressed asset prices (such as equity and real estate prices) on the heels of run-ups before the crisis, sharp increases in real interest rates, and a slowdown or reversal in capital flows. In some cases, the crisis is triggered by depositor runs on banks, though in most cases it is a general realization that systemically important financial institutions are in distress.

Systemic banking crises can be very damaging. They tend to lead affected economies into deep recessions and sharp current account reversals. Some crises turned out to be contagious, rapidly spreading to other countries with no apparent vulnerabilities. Among the many causes of banking crises have been unsustainable macroeconomic policies (including large current account deficits and unsustainable public debt), excessive credit booms, large capital inflows, and balance sheet fragilities, combined with policy paralysis due to a variety of political and economic constraints. In many banking crises, currency and maturity mismatches were a salient feature, while in others off-balance sheet operations of the banking sector were prominent.

How does a Financial Crisis Hits Business Investment?

1. Higher cost of credit – commercial banks become more risk-averse and may raise interest rates on higher risk loans
2. Falling asset prices weaken bank balance sheets and mean they have less money to lend out. Banks restrict credit to rebuild capital.
3. A desire to maintain higher lending of bank liquidity causes a fall in lending to new and small businesses which can hamper entrepreneurial activity
4. The fall in asset prices causes a fall in consumer spending/aggregate demand and economic confidence – businesses are less likely to invest when spare capacity is growing.
5. Fall in share prices hits the ability of listed companies to raise extra capital to fund their investment plans.

Hyman Minsky's Financial Instability Hypothesis

The main purpose of the conventional economic theory has been to show that the market economy is self-regulating and that there is little need for any kind of intervention by the government. Post-Keynesians are unwilling to assume that the market economy is self-regulating, and they believe that active government intervention is necessary to avoid business fluctuations. Prices, according to Post-Keynesians cannot be corrected because markets are likely to be destabilizing as stabilizing. Hence, the need for economic policies by the government and their intervention for active management of the economy. Therefore, Hyman Minsky criticized 'neo-classical synthesis' and develops a novel theory of the working of capitalist economies.

One of Minsky's most significant contributions to the economic field was his Financial Instability Hypothesis (FIH), which has seen a growth in relevance over recent years with the Financial Crisis of 2008. The conventional view is that a modern market economy is fundamentally stable, in the sense that it is constantly equilibrium-seeking and sustaining, and that some exogenous shock is necessary for some crisis to occur. However, Minsky challenged this perception with the FIH. Essentially, Minsky argues that stability is destabilising and that the internal dynamics of a system can be solely responsible for market failures. The FIH maintains that the level of profits determines system behaviour, as aggregate demand determines profit, and so aggregate profits equal aggregate investment plus the government deficit. To Minsky, banks act as profit-making institutions, with an incentive to increase lending, which undermines the stability of the economy. Debt plays a crucial role in determining system behaviour, and so Minsky analyses three distinct income-debt relations for economic units.

The three stages of lending which Minsky identifies are the Hedge, Speculative and Ponzi stages.

1. During the Hedge stage, banks and borrowers are cautious and so loans are issued as modest normal capital repayment loans, where the initial principles and the interest can be repaid. Thus, the economy at this stage is likely to be equilibrium-seeking and containing.
2. Following this period, the Speculative period emerges, where confidence in the banking system grows. As banks are heavily incentivised to make profits, loans are issued where the borrower can only afford to pay the interest, where the loan is against an asset which is rising in value. As a result of the increase in speculation, the economy becomes a 'deviation-amplifying' system. In continuation with the belief that asset prices will continue to rise, the third stage in the cycle, the Ponzi stage, emerges.
3. In the final stage of the FIH, the borrower can neither afford to pay the principal nor the interest on the loans which are issued by banks. Therefore, the three stages of the FIH suggest that, over periods of prolonged prosperity, economies tend towards economic structures which increasingly rely on unstable loans, away from the financial structure of stability in the initial stage. Minsky's FIH proposes that the transition towards instability will inevitably culminate in a financial crash.

Despite not coining the term himself, Minsky's FIH predicts that capitalist economies in the Ponzi stage will experience a 'Minsky moment'. Crucially, the premise that asset prices will continue to rise is what Minsky's FIH seeks to unpick as a naive assumption, which has critical implications in analysing the market - this premise underpins Ponzi finance. However, the 'Minsky moment' emerges when these asset prices begin to decline unexpectedly, and then the banks and the borrowers recognise the debt in the system.

This realisation is fundamental to the FIH, as it is the moment where the loans issued in the Ponzi stage, which the borrower has not the capacity to repay the principal nor the interest, are recognised to be impossible to pay off. In sequence, confidence in the system plummets to a stage where people rush to sell assets, which further results in a greater fall in prices. Minsky's work on the FIH has become increasingly prevalent as of late, mostly due to the Great Recession, which is a testament to the accuracy of Minsky's predictions.

13.3 The Four Most Important Lessons of Macroeconomics

Each lesson tells us how policy can influence a key economic variable—output, inflation, or unemployment—either in the long run or in the short run.

Lesson 1

In the long run, a country's capacity to produce goods and services determines the standard of living of its citizens. Real GDP measures the economy's total output of goods and services and, therefore, a country's ability to satisfy the needs and desires of its citizens. Nations with higher GDP per person have more of all resources. In the long run, GDP depends on the factors of production—capital and labour—and on the technology used to turn capital and labour into output. GDP grows when the factors of production increase or when the economy becomes better at turning these inputs into an output of goods and services. Public policy can raise GDP in the long run only by improving the productive capability of the economy. Policies that raise national savings—either through higher public savings or higher private savings—eventually lead to larger capital stock. Policies that raise the efficiency of labour—such as those that improve education or increase technological progress—lead to more productive use of capital and labour. Policies that improve a nation's institutions—such as crackdowns on official corruption—lead to both greater capital accumulation and more efficient use of the economy's resources.

Lesson 2

In the short run, aggregate demand influences the number and quantity of goods and services that a country produces. Aggregate demand is of key importance because prices are sticky in the short run. Monetary policy, fiscal policy, and shocks to the money and goods markets are often responsible for year-to-year changes in output and employment. As changes in aggregate demand are crucial to short-run fluctuations, policymakers monitor the economy closely.

Lesson 3

In the long run, the rate of money growth determines the rate of inflation, but it does not affect the rate of unemployment. In the long run, a currency loses real value over time if and only if the central bank prints more and more of it. According to the Fisher effect, high inflation raises the nominal interest rate. High inflation leads to a depreciation of the currency in the market for foreign exchange. According to the classical dichotomy—the irrelevance of nominal variables in the determination of real variables—growth in the money supply does not affect unemployment in the long run. The natural rate of unemployment is determined by the rates of job separation and job finding, which in turn are determined by the process of job search and by the rigidity of the real wage. In the long run, there is no tradeoff between inflation and unemployment.

Lesson 4

In the short run, policymakers who control monetary and fiscal policy face a tradeoff between inflation and unemployment. In the short run, there is a trade-off between these two variables, which is illustrated by the short-run Phillips curve. Over time, the short-run Phillips curve shifts for two reasons.

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1. Supply shocks, such as changes in the price of oil, change the short-run tradeoff; an adverse supply shock offers policymakers the difficult choice of higher inflation or higher unemployment.
2. When people change their expectations of inflation, the short-run tradeoff between inflation and unemployment changes.

Summary

- Financial system includes all those activities dealing in Finance, organised into a system.
- The financial system consists of Financial Institutions, Financial Markets, Financial Instruments and Financial Services.
- Financial Institutions include both regulatory and intermediary institutions.
- Economists and policymakers must deal with ambiguity.
- The current state of macroeconomics offers many insights, but it also leaves many questions open.
- The challenge for economists is to find answers to these questions and to expand our knowledge.

Keywords

Financial crisis: A financial crisis is any of a broad variety of situations in which some financial assets suddenly lose a large part of their nominal value.

Financial system: A financial system is a set of institutions, such as banks, insurance companies, and stock exchanges, that permit the exchange of funds. Financial systems exist on firm, regional, and global levels.

Financial Instability Hypothesis: The hypothesis of financial instability was developed by the economist Hyman Minsky. He argued that financial crises are endemic in capitalism because periods of economic prosperity encouraged borrowers and lenders to be progressively reckless.

Self Assessment

1. Which of them is not a component of financial system?
 - A. Financial institutions
 - B. Financial markets
 - C. Financial instruments
 - D. Regulated funds

2. Banks are part of
 - A. Financial institutions
 - B. Intermediary financial institutions
 - C. Regulatory financial institutions
 - D. Non-intermediary financial institutions

3. An IPO is a part of
 - A. Organized capital market
 - B. Organized money market
 - C. Regulatory financial institutions

- D. Non intermediary financial institutions
4. Which of the following is a company which offers financial services?
- A. Asset Management Companies
 - B. Liability Management Companies
 - C. Both the above
 - D. None of the above
5. How many components are there in the financial system?
- A. One
 - B. Two
 - C. Three
 - D. Four
6. Which of the following is not a type of financial crisis?
- A. Foreign exchange crisis
 - B. Sovereign debt crisis
 - C. Banking crisis
 - D. Real estate crisis
7. India was able to come out of the crisis of 2008-09 with minimum harm to the economy because of the strength of thesector.
- A. Manufacturing
 - B. Agricultural
 - C. Banking
 - D. Retail
8. The crisis of 1930s started in which country?
- A. United Kingdom
 - B. Germany
 - C. France
 - D. United States of America
9. If there is a financial crisis in the country, the cost of borrowing funds goes
- A. Up
 - B. Down
 - C. Remains constant
 - D. Depends on the type of government
10. Did Keynesians believe that a laissez-faire policy was the reason for crisis?
- A. Yes
 - B. No
11. If the real GDP of the country is high, then the standard of living of the people is
- A. High
 - B. Low
 - C. Is not connected

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- D. Depends on the allocation of resources
12. In the short run, the aggregate demand is important because
- Wages are sticky
 - Prices are sticky
 - Income is sticky
 - Aggregate supply is changing
13. Does the rate of money growth in the long run effect the rate of unemployment?
- Yes
 - No
14. As per the Fisher effect, if the rate of inflation is high, then the nominal interest rate would be
- Low
 - High
 - They are not related
 - Will remain the same
15. If there is high inflation in the market, then the exports of the country will be
- Low
 - High
 - Will not be affected
 - None of the above

Answers for Self Assessment

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. D | 2. B | 3. A | 4. A | 5. D |
| 6. D | 7. C | 8. D | 9. C | 10. A |
| 11. A | 12. B | 13. B | 14. B | 15. B |

Review Questions

- Explain the South Korean crisis.
- Explain the 2008-09 global crisis. What impact did it have on the Indian economy?
- What role does the central bank play during financial crisis?
- What are the important lessons of macroeconomics?
- Explain the Financial Instability Hypothesis.



Further Readings

- Macroeconomics: Theories and Policies By Richard T. Froyen, Pearson Publications
- Macroeconomics By N. Gregory Mankiw, Cengage Publishers

Unit 14: Stochastic Divergence Equations

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Objectives

- Understand the concept of the Markov Process.
- Analyze Dynamic Programming
- Understand the concept of a complete market.
- understand the concept of recursive competitive equilibrium.
- analyze the uses of recursive competitive equilibrium.

Introduction

This chapter is dedicated to experimental economics where the Markov process is analysed. The Markov process is a stochastic model describing a sequence of possible events in which the probability of each event depends only on the state attained in the previous event. This proposition by Markov was given as an extension of Bernoulli's theorem and a reply to Pavel Nekrasov who claimed that in the case of the law of large numbers independence was required. Markov through his experiments showed the law of large numbers as possible in case of dependent events. He said that in actual world, events are dependent upon the prior events. In this chapter, we look at the Markov process and analyse the various subparts of it. We briefly then analyse the dynamic programming concept given by Bellman. The Recursive Competitive Equilibrium as given by Mehta and Prescott is discussed in the last part of the chapter.

14.1 Markov Process

In a Markov Decision Process, changes in the environment in response to an agent's actions are determined only by the immediate state and actions, and not by any historical information. We can formally describe a Markov Decision Process as $m = (S, A, P, R, \gamma)$, where:

- ❖ **S** represents the set of all states.
- ❖ **A** represents the set of possible actions.
- ❖ **P** represents the transition probabilities.
- ❖ **R** represents the rewards.
- ❖ **Gamma** is known as the discount factor.

The goal of the MDP is to find a policy, often denoted π , that yields the optimal long-term reward. Policies are simply a mapping of each state s to a distribution of actions a . For each state s , the agent should take action a with a certain probability. Alternatively, policies can also be deterministic. The Markovian property means that the next state is fully determined by the current state and action.

Assumptions of Markov Decision Process

Time assumption:

Time is discrete $t \rightarrow t + 1$

Possible relaxations

- Identify the proper time granularity
- Most of MDP literature extends to continuous time

Reward assumption:

The reward is uniquely defined by a transition (or part of it)

$$r(s, a, s')$$

Possible relaxations

- Distinguish between global goal and reward function
- Move to inverse reinforcement learning (IRL) to induce the reward function from desired behaviors

Stationarity assumption:

The dynamics and reward do not change over time

$$p(s'|s, a) = \mathbb{P}(s_{t+1} = s' | s_t = s, a_t = a) \quad r(s, a, s')$$

Possible relaxations

§ Identify and add/remove the non-stationary components

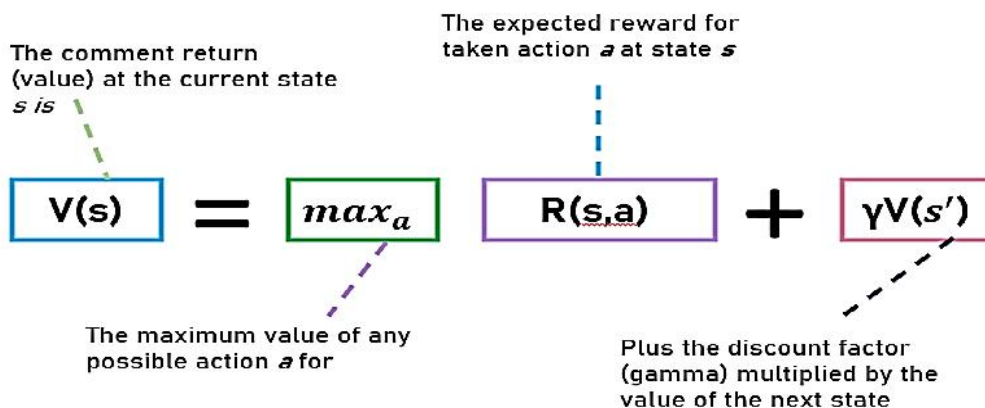
(e.g., cyclo-stationary dynamics)

§ Identify the time-scale of the changes

§ Work on finite horizon problems

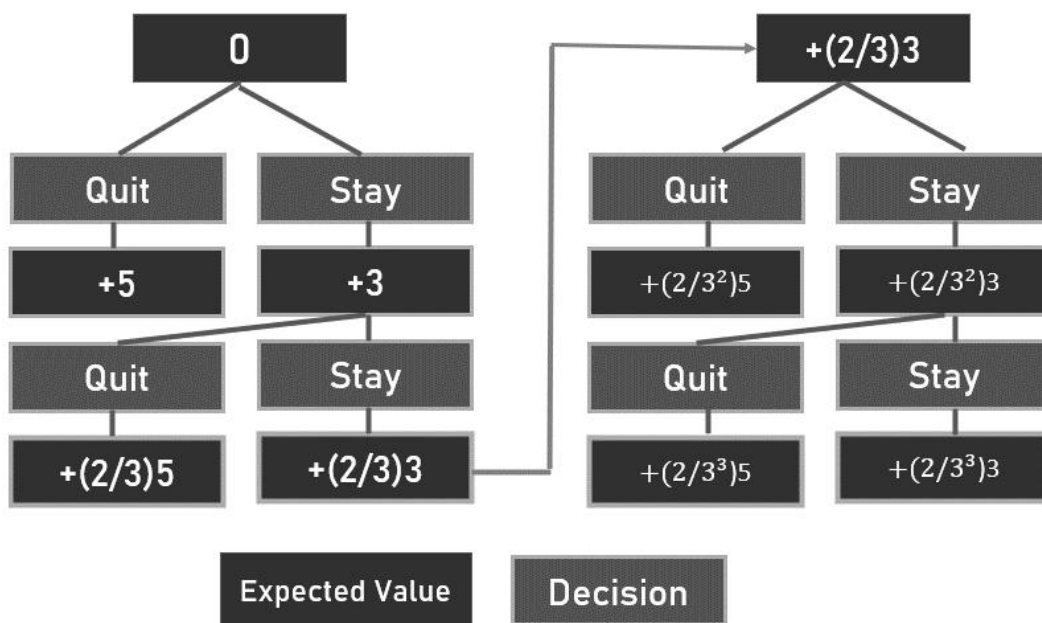
Bellman Equation

The Bellman Equation is one central to Markov Decision Processes. It outlines a framework for determining the optimal expected reward at a state s by answering the question, "what is the maximum reward an agent can receive if they make the optimal action now and for all future decisions?"

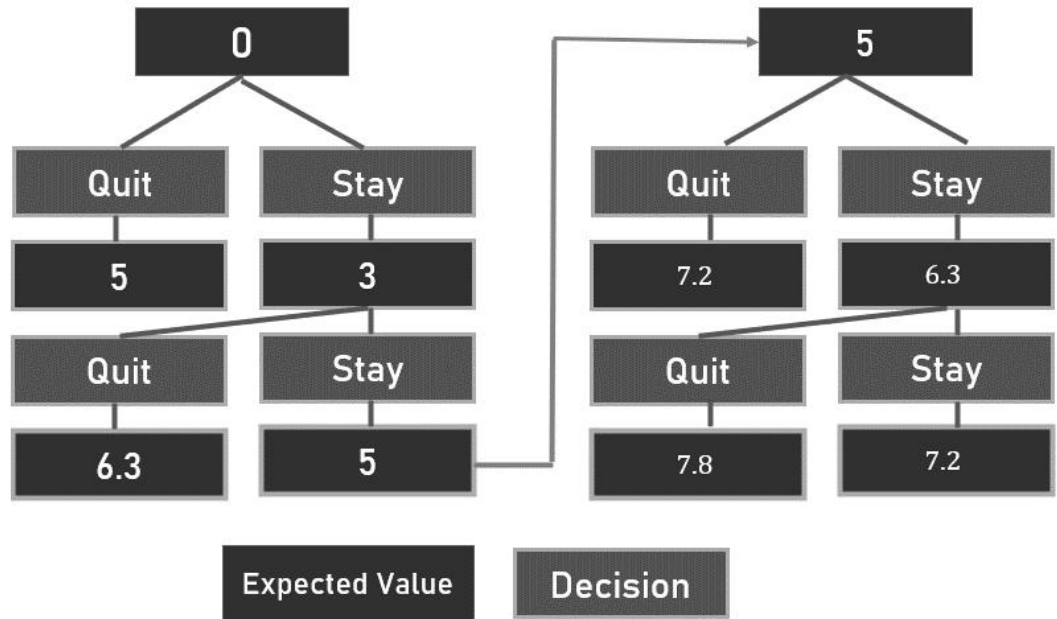


Notice the role gamma – which is between 0 or 1 (inclusive) – plays in determining the optimal reward. If gamma is set to 0, the $V(s')$ term is completely cancelled out and the model only cares about the immediate reward. On the other hand, if gamma is set to 1, the model weights potential future rewards just as much as it weights immediate rewards. The optimal value of gamma is usually somewhere between 0 and 1, such that the value of farther-out rewards has diminishing effects.

 Example



Let's use the Bellman equation to determine how much money we could receive in the dice game. We can choose between two choices, so our expanded equation will look like $\max(\text{choice 1's reward}, \text{choice 2's reward})$. Choice 1 – quitting – yields a reward of 5. On the other hand, choice 2 yields a reward of 3, plus a two-thirds chance of continuing to the next stage, in which the decision can be made again (we are calculating by expected return). We add a discount factor gamma in front of terms indicating the calculating of s' (the next state). At each step, we can either quit and receive an extra \$5 in expected value, or stay and receive an extra \$3 in expected value. Each new round, the expected value is multiplied by two-thirds, since there is a two-thirds probability of continuing, even if the agent chooses to stay.



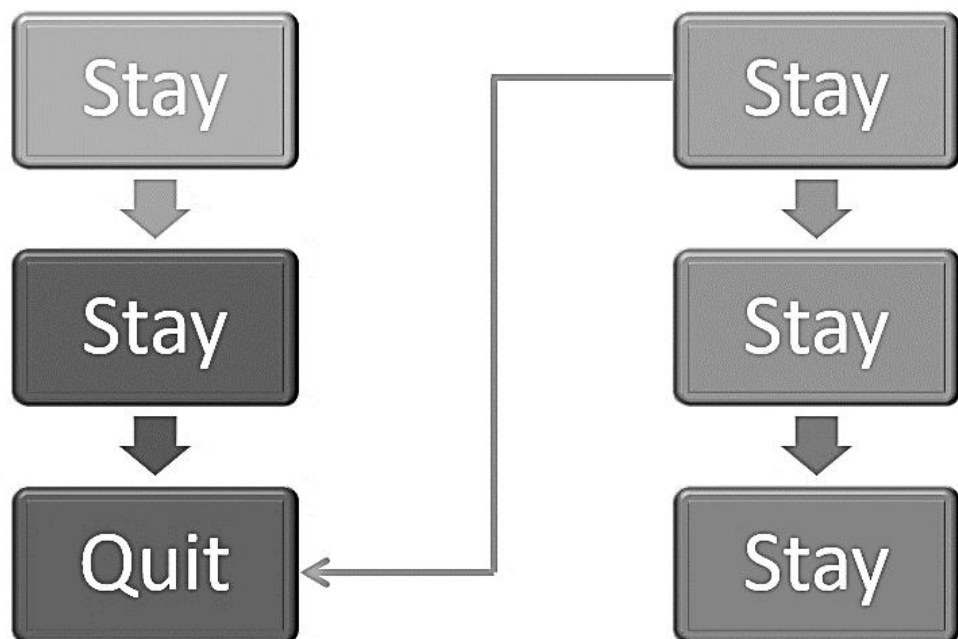
14.2 Dynamic Programming

“[Dynamic] also has a very interesting property as an adjective, and that is its impossible to use the word, dynamic, in a pejorative sense. Try thinking of some combination that will possibly give it a pejorative meaning. Its impossible. Thus, I thought dynamic programming was a good name.” - Richard Bellman.

Most of our applications of optimal control involved choosing something as a function of time. Dynamic programming is another approach to solving optimization problems that involve time. Dynamic programming can be especially useful for problems that involve uncertainty. Dynamic programming has the advantage that it lets us focus on one period at a time, which can often be easier to think about than the whole sequence. Because it only requires maximizing over a few variables at a time, dynamic programming can be a much more efficient way to calculate solutions. The computational advantage of dynamic programming is especially pronounced when some of the variables being maximized over are discrete.



Example of Dynamic Programming



These pre-computations would be stored in a two-dimensional array, where the row represents either the state [In] or [Out], and the column represents the iteration. The number of iterations possible is very high. Useful in a case where the number of combinations is high.

Policy Improvement Methods

Policy Iteration

Policy iteration is when the value of each policy is repeatedly evaluated until it converges at some point. This value is then used to update the policy to produce a better value. This method is more accurate however it also takes more time and computing resources to calculate.

Value Iterations

Value iteration is when we only run through the policy once and use that value to update the policy. This method is very quick to calculate but can also be inaccurate and have wide variance – sampling only one possibility from the MDP. The assumption is that after enough evaluation-update cycles, the policy will converge and perform well generally.

Complete Markets

A complete system of markets is one in which there is a market for every good. The simple statement conceals the significance of the concept however but feeling to specify what is meant by a good. Fully define in good to include the date and environment in which commodities are consumed. Economists are able to consider consumption, production and investment choices in a multi-period uncertain world. Moreover, they can do so using largely the same utility theory originally developed to analyse timeless certainty. In particular state reference theory which was developed to analyse the completeness of a system of markets is a powerful tool with which to study behaviour under uncertainty. Every agent is able to exchange every good, directly or indirectly, with every other agent without transaction costs. Here goods are state-contingent; that is, a good includes the time and state of the world in which it is consumed.

In the real-world systems of markets are not complete as we shall see. The notion of completeness however is of interest for two reasons. First, it serves as a theoretical benchmark relative to which incompleteness can be assessed; such a comparison might for example suggest whether incompleteness implies inefficiency in a particular model. Second, although the notion of market completeness appears most often in theoretical discussions, the ideas involved can also be applied to more realistic problems in the state preference context market for the so-called “derivative” securities- futures and options add value by providing investors with flexibility in fashioning their portfolios. Thus, they make systems of markets less incomplete. The popularity of such securities can be explained from a theoretical perspective that incorporates complete markets. In some cases, theory can even suggest a new market that would alleviate existing incompleteness.

The theoretical apparatus

The tools and results of the theory of complete market represent one of the most significant developments of theoretical economics in this century. At the same time, the concepts embedded in the theory are very general and have been used in many other economic contexts. Thus, our first task is to explore the basic structure of state preference theory. We do this with the simple gambling example because it involves a well-defined and relatively small collection of outcomes and payoffs in an uncertain environment.

State claims defined

One dominant theme of state preference theory and complete markets is uncertainty. State preference theory incorporates uncertainty by defining outcomes or potential future states, only one of which will ultimately be realised. The theory has been fully applied in many areas of economics, especially in the study of financial markets.



Example

There is an imaginary racetrack called RACEPRO. All the bets are placed at fixed odds. Only one race is considered. The state of the world is defined as a complete specification of the values of all

relevant. A state of the world is also called an outcome, or simply a state. At the racetrack, however, matters are much simpler: a state of the world is a complete listing of the finishing position for every horse in today's race. There are three horses

- i. Tricky Bond (T)
- ii. Mastercharger (M)
- iii. Charge Me Interest (C)

There are six possibilities: T-M-C, T-C-M, M-T-C, M-C-T, C-T-M, and C-M-T. Although we may have definite opinions at the start of the day, we cannot know the state of the world for sure until the race has been run. An event is a collection of one or more states, thus, for example, "Mastercharger" wins the race" is an event. It includes two states, M-T-C and M-C-T, both of which are consistent with the stated criterion. In our example, a Rs.2 bet on Mastercharger to win that pays off at 4-to-1 odds can be represented by the vector: $(0, 0, 10, 10, 0, 0)$, where the position in the vector is in the same order. All the bets are placed on events. If the state of the world that ultimately occurs is an element of the event, then the bet pays off at the fixed odds; otherwise, the bet pays nothing.

In state-preference theory, a market is equivalent to a payoff vector: a market represents the ability to exchange goods or payoffs. The key to the theory of complete markets is to deal with such combinations in a systematic fashion.

Do Complete Markets Really Exist?

The answer to the above question is a big NO by the economists. The reason for the non-existence of complete markets is that a huge number of markets are required to make the market complete which is not feasible. Here exist an infinite number of outcomes on already one single asset held by a stakeholder that it would require the existence of an infinite number of other assets to balance possible outcomes. And here is another piece of evidence in favour of this statement. Let's assume it is possible for all stakeholders to allocate their assets in such a way, that in any future state of those assets prices their portfolios would remain of the same in value. But who then will drive the market? To change a price of an asset it is necessary to make transactions among stakeholders. And as soon as a stakeholder engages in trading of one of his/her assets his/her portfolio won't be risk-free anymore.

14.3 Recursive Competitive Equilibrium

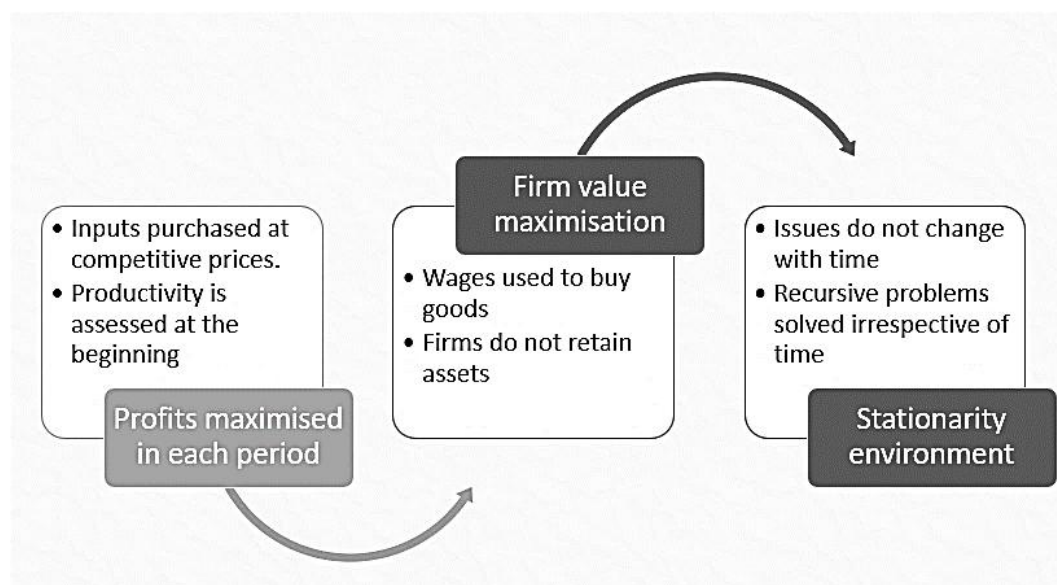
The neoclassical stochastic growth model is the basis of dynamic business cycle and consumption-based asset pricing models. These models look at the role of the central planner and how to allocate the resources so as to optimize the returns to the various economic agents. An important distinction that needs to be made here is that business cycles are not in the hands of the planners. They occur because of the working of the market forces. Given the desirable features of the stochastic growth paradigm--the solution methods are well known and the model generates well-defined proxies for all the major macro aggregates: consumption, investment, output, etc.--it is natural to ask if the allocations arising in that model can be viewed as competitive equilibria.

An alternative approach that has proved very useful in developing testable theories is to replace the attempt to locate equilibrium sequences of contingent functions with the search for time-invariant equilibrium decision rules. These decision rules specify current actions as a function of a limited number of "state variables" which fully summarize the effects of past decisions and current information. Knowledge of these state variables provides the economic agents with a full description of the economy's current state. Their actions, together with the realization of the exogenous uncertainty determines the values of the state variables in the next sequential time period. This is what is meant by a recursive structure. In order to apply standard time series methods to any testable implications, these equilibrium decision rules must be time-invariant.

Recursive Competitive Theory was first developed by Mehra and Prescott (1977) and further refined in Prescott and Mehra (1980). These papers also establish the existence of a recursive competitive equilibrium and the supportability of the Pareto Optimal through the recursive price functions. Excellent textbook treatments are contained in Harris (1987), Stokey, Lucas and Prescott (1989) and Ljungqvist and Sargent (2004). Since its introduction, it has been widely used in exploring a wide variety of economic issues including business-cycle fluctuations, monetary and fiscal policy, trade-related phenomena, and regularities in asset price co-movements.

The recursive equilibrium abstraction postulates a continuum of identical economic agents indexed on the unit interval (again with preferences identical to those of the representative agent in the planning formulation), and a finite number of firms. As in the Valuation Equilibrium approach, consumers undertake all consumption and saving decisions. Firms, which have equal access to a single constant-returns-to-scale technology, maximize their profits each period and are assumed to produce two goods, a consumption good and a capital good. Unlike the Valuation Equilibrium approach, trading between agents and firms occurs every period. At the start of each period, firms observe the technological shock to productivity and purchase capital and labour services, which are supplied inelastically at competitive prices. Capital and labour are used to produce capital and consumption goods. At the close of the period, individuals, acting competitively, use their wages and the proceeds from the sale of capital to buy the consumption and capital goods produced by the firms. Consumers then retain the capital good into the next period when it again becomes available to firms and the process repeats itself. Note that firms are liquidated at the end of each period (retaining no capital assets while technology is freely available) and that no trades between firms and consumer investors extend over more than one time period. Capital goods carried over from one period to the next are the only link between periods, and period prices depend only on the state variables in that period.

Fig.14.1 Overview of Recursive Competitive Concept



Formally, a Recursive Competitive Equilibrium (RCE) is characterized by time-invariant functions of a limited number of 'state variables', which summarize the effects of past decisions and current information. These functions (decision rules) include

- i. a pricing function,
- ii. a value function,
- iii. a period allocation policy specifying the individual's decision,
- iv. period allocation policy specifying the decision of each firm and
- v. a function specifying the law of motion of the capital stock

How Recursive Competitive Equilibrium Works?

Equilibrium objects are the functions instead of variables in RCE. Economic agents with knowledge of these variables assess the current state of the economy, including policies enacted by financial authorities, as well as changes within the business cycle. Their actions will determine, in part, the values of the variables in the next sequential time period. This makes the structure recursive.

An economic agent is a consumer, corporation or organization that makes an impact on the economy by buying, selling, or producing.

Macroeconomic uses of Recursive Competitive Equilibrium

As mentioned above, recursive competitive equilibrium falls under the study of macroeconomics. This is the study of the broader economy. Macroeconomics involves the study of broader economic trends and indicators, such as national income, unemployment rates, and gross domestic product (GDP). It also studies the relationship of such economic factors as inflation, trade, consumption, and income.

Economic equilibrium occurs when economic forces are balanced, which is also known as supply equaling demand. In a competitive equilibrium like RCE, supply equals demand. The RCE helps economists determine the reasons for short-term fluctuations in the business cycle and longer-term reasons for economic growth.

Summary

The chapter looked into the Markov process which is a developed or an advanced method used in economic analysis. This process is widely used because of its simplicity in describing dynamic processes, from the availability of data required for empirical analysis and form its focus on results rather than on the causes. The recursive competitive equilibrium is also discussed which explores a situation when demand and supply are equal. Recursive competitive equilibrium is a mathematical optimization method commonly used in macroeconomics and is characterized by time-invariant equilibrium decision rules that specify actions as a function of a limited number of variables.

Keywords

Bellman Equation: According to the Bellman Equation, long-term- reward in a given action is equal to the reward from the current action combined with the expected reward from the future actions taken at the following time.

Dynamic Programming: Dynamic programming is both a mathematical optimization method and a computer programming method. The method was developed by Richard Bellman in the 1950s and has found applications in numerous fields, from aerospace engineering to economics.

Markov process: A Markov chain or Markov process is a stochastic model describing a sequence of possible events in which the probability of each event depends only on the state attained in the previous event. A countably infinite sequence, in which the chain moves state at discrete time steps, gives a discrete-time Markov chain.

Recursive Competitive Equilibrium: The term recursive competitive equilibrium (RCE) refers to a concept used to explore and study economic issues when supply and demand are equal. Recursive competitive equilibrium is a mathematical optimization method commonly used in macroeconomics and is characterized by time-invariant equilibrium decision rules that specify actions as a function of a limited number of variables.

SelfAssessment

1. Which of the following is not a deterministic cost?
 - A. Fuel cost
 - B. Cost of airplane ticket
 - C. Cost of parking
 - D. Decision cost

2. Rewards depend on
 - A. State
 - B. Agent
 - C. Action

- D. Transition probability
3. What is gamma in the Markov decision process?
- A. State
 - B. Agent
 - C. Action
 - D. Discount factor
4. If the gamma is 0, then the value at the current state is
- A. 0
 - B. 1
 - C. 2
 - D. Gets cancelled out
5. As per the Bellman equation, the value of gamma is
- A. Between 1 and -1
 - B. Between 0 and 1
 - C. Between 2 and -2
 - D. No specified range
6. A complete market is one which has
- A. No competition
 - B. All the goods
 - C. Is not dependent on other markets
 - D. None of the above
7. The concept of complete markets is given by
- A. Harrod and Domar
 - B. Mehra and Prescott
 - C. Arrow and Debreu
 - D. Arrow and Sen
8. In state-preference theory, a market represents the ability to
- A. Exchange goods and services
 - B. Payoff vector
 - C. Both the above
 - D. None of the above
9. Do complete markets really exist in the actual world?
- A. Yes
 - B. No
10. A state of world is also called an
- A. Input
 - B. Outcome
 - C. Intermediary
 - D. None of the above

11. The concept of Recursive Competitive Equilibrium was given by
 - A. Edward Prescott and Rajnish Mehra
 - B. Arrow and Debreu
 - C. Arrow and Sen
 - D. Mankiw and Romer

12. As per the Recursive Competitive Equilibrium, the demand and supply are
 - A. Equal
 - B. Demand greater than supply
 - C. Supply greater than demand
 - D. None of the above

13. Does the Recursive Competitive Equilibrium model considers the previous information?
 - A. Yes
 - B. No

14. The number of firms taken in Recursive Competitive Equilibrium are
 - A. Not known
 - B. Infinite
 - C. Finite
 - D. Depends on type of economy

15. Where is Recursive Competitive Equilibrium used?
 - A. Business cycle fluctuations
 - B. Monetary and fiscal policy
 - C. Trade related phenomena
 - D. All the above

Answers for Self Assessment

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. D | 2. C | 3. D | 4. D | 5. B |
| 6. B | 7. C | 8. C | 9. B | 10. B |
| 11. A | 12. A | 13. A | 14. C | 15. D |

Review Questions

1. Explain the Markov process.
2. What are the applications of the Markov Process in the real economy?
3. Explain the concept of dynamic programming and how is it applied to economics?
4. How does the Recursive Competitive Equilibrium model work?
5. What are the macroeconomic uses of the Recursive Competitive Equilibrium model?

**Further Readings**

Macroeconomics: Theories and Policies by Richard T. Froyen, Pearson Publications

Macroeconomics by N. Gregory Mankiw, Cengage Publishers

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