
UNIT 13 TRADITIONAL THEORIES

Structure

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13.0 OBJECTIVES

After going through this unit you should be able to:

- identify different types of unemployment;
- explain the classical and Keynesian views on unemployment;
- establish a relationship between unemployment and inflation; and
- identify the costs of unemployment and inflation.

13.1 INTRODUCTION

Labour is demanded by firms as it contributes to production of goods and services. In return of its contribution, labour is rewarded with wages. In the market for labour the wage rate is determined at a level where supply of and demand for labour are equal. While human beings supply more labour at higher wage rate, firms demand lower quantity of labour when wage rate is high. Thus supply of labour has a positive relationship with wage rate (implying upward sloping supply curve) while demand for labour has a negative relationship with wage rate (implying downward sloping demand curve).

A fact that has perturbed everyone, no less economists, is that total labour force is not fully employed at the prevailing wage rate. Certain percentage, which fluctuates over time, of the labour force remains unemployed at any point of time. The nature of and the reasons behind unemployment in the economy have been put to much debate in economics. Economists have come up with varied explanations of unemployment, which we will consider in this unit.

13.2 TYPES OF UNEMPLOYMENT

A person can be either in the labour force or not in the labour force of an economy. The person not included in the labour force includes those who are retired, too ill to work, keeping the house, or simply not looking for work. On the other hand, persons counted under the category labour force includes those who are employed or unemployed. By employed persons we mean those who perform any paid work (thus housewives are not included) and those who have jobs. On the other hand, the unemployed as a category includes people who are

not employed but are actively looking for work. Thus while considering unemployment we do not take into account those who are not in the labour force.

There are three kinds of unemployment, viz., frictional, structural and cyclical. Fictional unemployment takes place because people switch over from one job to another. In many cases the tenure of job gets over and workers remain unemployed till they get another job. In other cases workers migrate from one region to another in search of better jobs or opt to remain out of job for short time periods. Frictional unemployment takes place because in an economy with imperfect information job search and matching is not smooth and there are frictions in the economy. Structural unemployment, on the other hand, results from the mismatch between supply and demand for different kinds of jobs. For example, in India in early 1990s, when the information technology sector witnessed a surge in growth, there was a scarcity of computer professionals. In recent years, in response to policy changes, a number of private airlines have come up in India and there is an acute shortage of pilots. Structural unemployment takes place largely due to structural shifts in an economy and adjustments to such shifts take time. Cyclical unemployment arises due to fluctuations in aggregate demand. When aggregate demand declines, there is simultaneous decline in the demand for labour and consequent increase in unemployment. On the other hand, a general boom in the economy increases demand for labour and unemployment decreases. Thus overall employment is pro-cyclical in nature.

Empirical data shows that the labour force in an economy is much less than the total population in the working age group. In the US, for example, for which data are readily available, labour force constitutes about two-third of the adult population. The percentage of population in the labour force, however, varies across countries and depends upon the level of development and social traditions. The rate of unemployment u is defined as the ratio of unemployed persons to total labour force. The rate of unemployment varies across countries and for a country, over time.

13.3 CLASSICAL VIEW ON UNEMPLOYMENT

The classical economists, as we observed in Unit 1 of this course, were of the view that full employment prevailed in the economy all the time. This was consistent with the view that whatever amount of labour was supplied got demanded by firms. A basic assumption in the classical framework was the flexibility in wage rate and prices. Thus the gap between supply of and demand for labour got wiped out through adjustments in wage rate.

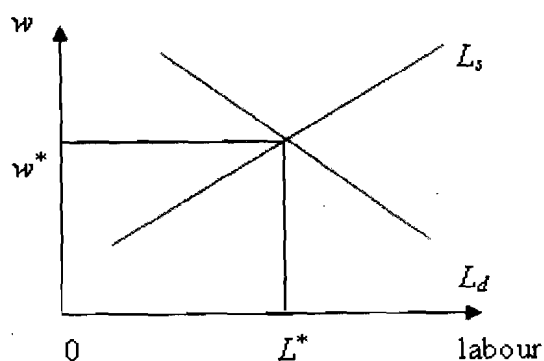


Fig. 13.1: Equilibrium Level of Employment

In Fig. 13.1 we measure real wage rate (w) on y-axis and quantity of labour (L) on x-axis. The equilibrium wage rate reached through interaction of supply of

labour (L_s) and demand for labour (L_d) is w^* and quantity of labour employed is L^* , which represents full employment.

As we learnt in Unit 1, the aggregate supply curve according to classical economists is a vertical straight line at the full employment output level. At the equilibrium wage rate everyone seeking employment gets engaged. If the wage rate is above w^* (see Fig.13.1) there is excess supply of labour compared to its demand. In their efforts to get employed some of the currently unemployed workers will be willing to work at a wage lower than the prevailing one and in the process will bring down the wage rate till it reaches w^* . On the other hand, when wage rate is below w^* there will be excess demand compared to supply. Due to shortage of labour firms will compete with each other and will be willing to pay higher wage, as a result of which wage rate will increase. Remember that classical economists were concerned with real wage in the economy, which is defined as the ratio of nominal wage (W) to price level (P) such that $w = \frac{W}{P}$.

Thus flexibility in real wage assured that a rise in price level is accompanied by a proportionate rise in nominal wage. In fact the dichotomy between real and monetary sectors of the economy, as envisaged in classical model, ensures such proportional changes. The classical economists did not rule out the possibility of decrease in nominal wage rate. Nonetheless, it was always in response to decrease in money supply and price level.

In theory, the classical model appears to have a sound base. When compared with reality, however, it does not explain the obvious phenomenon of unemployment in the economy. As we will see below, there is much rigidity in the economy, which does not allow smooth and instantaneous changes in wage rate. Moreover, some amount of frictional unemployment is always present in an economy as workers switch over from one job to another. The neoclassical economists recognized the limitations of classical model and made amendments to the classical position of zero unemployment. They assumed that the economy in normal times has certain minimum unemployment called 'natural rate of unemployment'.

13.4 KEYNESIAN VIEW ON UNEMPLOYMENT

Keynes in his *General Theory* presented a view that fluctuations in aggregate demand (AD) influences the equilibrium level of output. Thus the economy is not necessarily at the full employment output level all the time and equilibrium can be realized at a level of output below full employment and corresponding to that level, part of the labour force remains unemployed. Recall that the Keynesian view emerged on the aftermath of the Great Depression when there was widespread unemployment in the economy accompanied by declining prices and output. At this point Keynes analysed the problem in the short run context and assumed that the aggregate supply (AS) curve is horizontal. It implies that AS is infinitely elastic and any level of output can be supplied without increase in prices so long as unemployment persisted. Keynes diagnosed the problem during the Great Depression to be a result of demand deficiency and suggested that AD should be increased, may be through increases in government expenditure. In fact, fiscal policy through appropriate designing of tax rates and government expenditure emerged as a major policy instrument largely due to the pioneering work of Keynes.

In Fig. 13.2 we present an infinitely elastic AS curve and a downward sloping AD curve, the intersection of which provides us with equilibrium output (Y^*) and prices (P^*). In response to a decline in aggregate demand there is a downward shift in AD to AD_1 . Corresponding to this shift there is a decline in

equilibrium output from (Y^*) to (Y_1^*) . Note that price level remains unchanged in the above model. In synchronization with the level of output, the quantity of labour used in production varies. For example, corresponding to a decline in equilibrium output the quantity of labour decreases. Simultaneously there is an increase in unemployment.

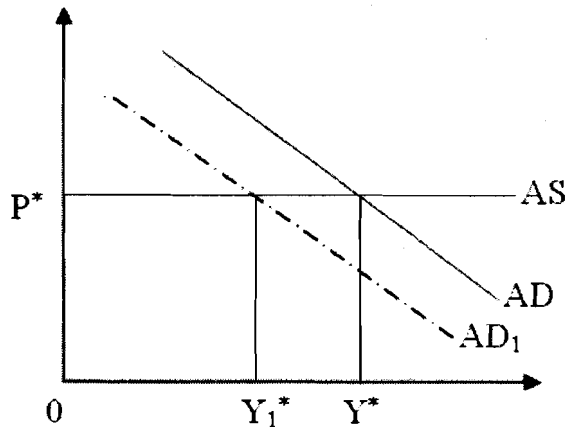


Fig. 13.2: Equilibrium Output in Keynesian Model

On the behaviour of wage rate, Keynes assumed that there is downward rigidity in nominal wage in the sense that workers oppose decline in the money wage, as they perceive it to be a decline in their income. During periods of recession when there is a decline in price level, real wage increases in spite of the fact that nominal wage remains fixed. Recall that we defined real wage as $w = \frac{W}{P}$; hence

decline in P would increase w when W is constant. The basic idea behind the simplest Keynesian model is that w varies inversely with P as W remains fixed. Thus in periods of boom, when there is an increase in prices, real wage tend to decline. Consequently, firms hire more labour and unemployment in the economy is lower.

In Fig. 13.2 we discussed the extreme Keynesian case where AS curve is horizontal. On the basis of Keynesian ideas, economists analyse the unemployment issue by resorting to an upward sloping AS curve. As mentioned above, real wage falls when prices increase, as a result of which more labour is demanded. The outcome of such an increase is production of more output. Thus as price level increases we have increasing level of output, implying an upward sloping AS curve. The change in level of employment due to change in price level can be explained through the following diagram.

Fig. 13.3 comprises three segments. In panel-a we have described a production function such that corresponding to each level of output we can find out the level of employment. Thus when output produced is at full employment level (Q_f) we have corresponding level of employment at L_f . In panel-b we plot the AS curve which depicts the output supplied (Q) at each price level (P). Thus when Q_f is the output produced prevailing prices is P_f . In panel-c we depict real wage (W/P) on y-axis and employment level on x-axis. Note that we assume nominal rigidity in prices so that W is fixed. Thus real wage (w) increases as P decreases. Through the interaction of L_s and L_d we have full employment (L_f) in the economy corresponding to real wage $W_f = W/P_f$. Thus we assume the initial position of the economy to be full employment corresponding to Q_f , L_f , P_f and W/P_f .

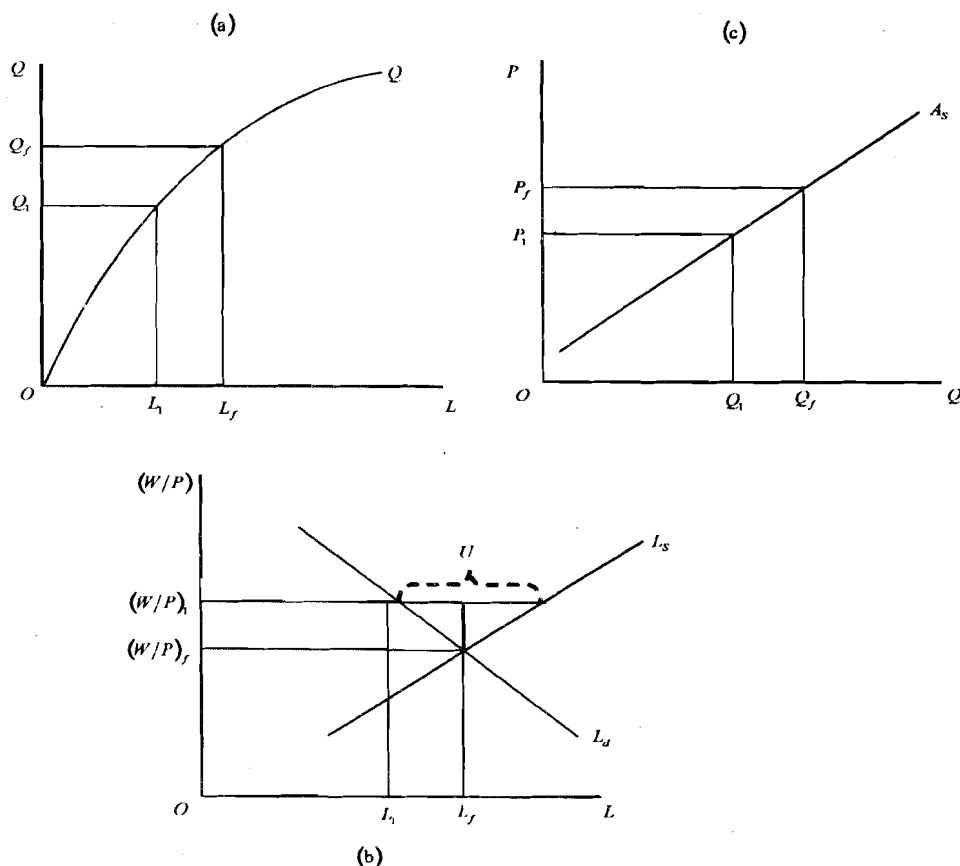


Fig. 13.3: Unemployment in Keynesian Model

Suppose there is a decline in AD (not given in the figure). Consequently, there is a decline in equilibrium output from Q_f to Q_1 and decline in prices from P_f to P_1 (see Fig. 13.3 (b)). Corresponding to the new output level Q_1 , the level of employment is L_1 , which is less than L_f . In fig. 13.3(c) we see that a decrease in prices from P_f to P_1 leads to an increase in real wage from W/P_f to W/P_1 . At this level of real wage there is excess supply of labour compared to its demand. Thus unemployment to the extent 'U' (as shown in Fig. 13.3(c)) takes place.

In Fig. 13.2 where we assumed the short run AS curve to be horizontal, upward shift in AD resulted in increase in output, keeping prices unchanged. In Fig. 13.3, on the other hand, AS is assumed to be upward-sloping and shift in AD influenced both output and prices.

We observe that nominal wage is not completely sticky in an economy. Keynes in fact recognized that nominal wage would adjust to the requirement of labour market equilibrium. However, such adjustments would be too slow so that full employment may not prevail always. Adjustments in nominal wage in response to price changes is always with a lag. For example, if nominal wage adjusts in period 2 but prices increase in period 1, there is a decline in real wage in period 1. In period 2, however, nominal wage can be increased proportionately and real wage at the previous level be maintained. Salary indexation followed in India on a six-monthly basis is an example of such a lag in wage adjustments.

When we compare the classical and Keynesian positions we find that rigidity in wage rate gives rise to unemployment in the economy. We will learn more about real and nominal rigidities and their implications on unemployment in Unit 15.

Check Your Progress 1

- 1) Under certain basic assumptions the classical economists could rule out the possibility of unemployment. Elaborate.

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2) In the Keynesian model why does unemployment take place?

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13.5 PHILLIPS CURVE

The Phillips curve, named after A. W. Phillips, describes the relationship between unemployment and inflation. In 1958 Phillips, then professor at London School of Economics, took time series data on the rate of unemployment and the rate of increase in nominal wage rate for the United Kingdom for the period 1861-1957 and attempted to establish a relationship. He took a simple linear equation of the following form:

$$\dot{w} = a - bu$$

where $\dot{w}$ is the rate of wage increase, a and b are constants and u is the rate of unemployment. He found that there exists an inverse relationship between $\dot{w}$ and u , with the implication that lower rate of unemployment is associated with higher rate of wage increase. The policy implication of such a result was astounding – an economy cannot have both low inflation and low unemployment simultaneously. In order to contain unemployment an economy has to tolerate a higher rate of wage increase and vice versa.

Subsequent to the publication of the results by Phillips, economists followed suit and attempted similar exercises for other countries. Some of the studies carried out refinements to the simple equation estimated by Phillips such as the use of inflation (the rate of increase in prices) instead of wage rate increase. In many cases the scatter of plot of variables appeared to be a curve, convex to the origin. As empirical studies reinforced the inverse relationship between the rate of inflation and the rate of unemployment the Phillips curve soon became an important tool of policy analysis. The prescription was clear: during periods of high unemployment the government should follow an expansionary monetary policy which leaves more money in the hands of people. It may accelerate the rate of inflation while lowering unemployment.

13.6 COSTS OF UNEMPLOMENT AND INFLATION

In an economy both unemployment and inflation have adverse effects and policy makers formulate policy instruments to contain both the problems. The costs of unemployment at the macro level could be loss of potential output and wastage of valuable resources (manpower). At the household level it is a loss of income and consequent deterioration in standard of living of the household. It is difficult to measure the human cost of unemployment with precision as social stigma and psychological trauma of the problem are also involved. On the whole, policy makers and political leaders see to the fact that the cost of unemployment is minimal. Ideally the economy should not have a rate of unemployment higher than the natural rate of unemployment.

Inflation is defined as a situation of persistent price rise. While the rate of inflation varies over time and across countries there is much debate on permissible rate of inflation. While inflation rate has been moderately high in certain countries, there are instances of hyperinflation in some countries where rate of inflation has been more than 1,000 per cent per year (for example, Latin American countries in 1980s and former socialist economies in 1990s).

Inflation is widely considered as a social evil. Policy makers are always on the look out for price trend so that high inflation can be checked through appropriate policy measures. General public also are widely vigilant about price movements so that pressure can be exerted on the government if there is acceleration in inflation rate. During inflation money loses its purchasing power and nominal costs of goods and services increase. Moreover, there is a reduction in real income of fixed income groups (salaried class, for example), as their income does not change at the same pace as price rise. When there is a price rise borrowers gain in fixed interest rate environment as the value money they return is lower than anticipated at the time of borrowing. On the other hand, lenders stand to lose as the value of money they receive after a lapse of time gets eroded.

During periods of high inflation, there is fair chance that government revenue is much less than government expenditure resulting in huge fiscal deficits. In order to finance the deficit the government has three options: borrow from public, run down on foreign exchange reserve, and print money. Usually a government running huge deficit is already under heavy debt and paying a high amount of interest. Hence, further borrowing becomes difficult. Moreover, such governments also have low foreign exchange reserve and therefore, printing money becomes an easy option which fuels the rate of inflation further. You can recall the Indian condition in 1990-91 when it was loaded with heavy debt, foreign exchange reserve was abysmally low and there was double-digit inflation. In general, high inflation put the economy out of gear and it becomes difficult to maintain economic stability.

When inflation is anticipated correctly then individuals take precaution and adjust their future payments/receipts keeping the rate of inflation in mind. However, unexpected inflation provokes income re-distribution between income groups. Usually the wage earning class who have a fixed nominal wage are the looser as real wage gets deteriorated due to price rise while profit earning class gain handsomely.

13.7 NON-ACCELERATING INFLATION RATE OF UNEMPLOYMENT

During 1970s economists encountered a puzzle in the sense that inflation and unemployment data did not fit into the Phillips curve for many developed economies. In fact many countries witnessed 'stagflation' – a combination of stagnation (a situation of high unemployment) and high inflation. The instability in the Phillips curve prompted economists to look into the possible reason of high inflation in spite of high unemployment in the economy.

A limitation of the Phillips curve is that both workers and employers take decisions on the basis of real wage, not nominal wage. As we mentioned earlier when we enter into a contract on a future date we incorporate expected inflation into it. Milton Friedman and Edmund Phelps suggested that since real wage is what matters, the change in nominal wage has to be corrected by inflationary expectations. In the short-run the Phillips curve is stable but in the long run it shifts from one level to another, which makes the long run. Phillips curve a

vertical straight line. We explain the process through which shifts in Phillips curve takes place in Fig. 13.4.

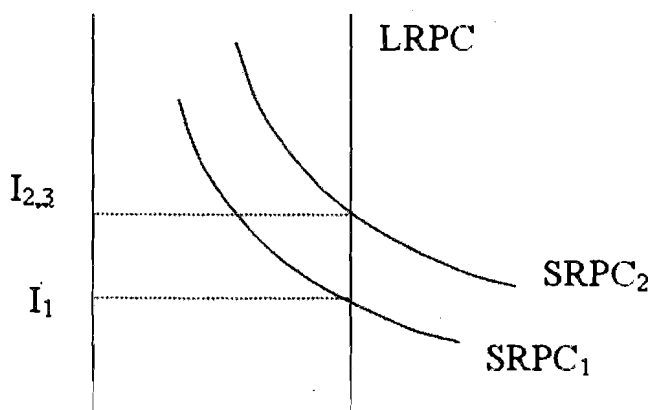


Fig. 13.4: Shift in Phillips Curve

In order to explain the long run Phillips curve (LRPC) we take an example from Samuelson (2005). Let us assume an economy which is operating at the natural rate of unemployment (u^*). The economy is operating at point A with low inflation rate I_1 as in Fig. 13.4. People expect inflation rate to continue at I_1 in the next period also.

In the second period suppose the government follows an expansionary policy so that unemployment declines and is lower than u^* . In this environment firms compete with each other to hire workers as a result of which wage rate increases. With little scope for further expansion in output the expansionary policy results in an increase in wage rate and prices so that the economy moves to point B on $SRPC_1$ in Fig. 13.4. We note that inflation expectation has not changes so far and the economy is operating on $SRPC_1$.

In the period 3 workers and employers perceive that there is an unexpected increase in inflation rate. Such a surprise prompts them to revise their inflationary expectations and they incorporate inflation at the rate I_2 into their decisions. This results in an upward shift in the short run Phillips curve from $SRPC_1$ to $SRPC_2$. Note that we have drawn $SRPC_2$ with inflation rate I_3 which is equal to I_2 . With inflation at the rate I_3 , there is a decline in demand for labour the unemployment rate starts increasing and the economy moves to point C in Fig. 13.4.

The outcome of the above process is that the economy ends up with higher inflation rate although the rate of unemployment remains the same. Real GDP of the economy remains unchanged while nominal GDP is higher.

The natural unemployment rate mentioned above is called non-accelerating inflation rate of unemployment (NAIRU). When unemployment is equal to NAIRU there will be stability in the rate of inflation. When unemployment departs from NAIRU, there is acceleration or deceleration in inflation rate. Thus if actual unemployment is less than u^* , inflation will continue to accelerate-higher and higher in subsequent years. The concept of NAIRU and expectations formation explains the hyperinflation witnessed by some Latin American countries. Unless unemployment returns to its natural rate inflation spiral will keep on accelerating. The recessionary trend can also be explained by NAIRU. When unemployment is more than u^* , inflation will tend to fall as long as unemployment is above u^* . You have already read about expectations formation in Unit 5, Block 3 of this course. The details of inflation-unemployment trade off under adaptive and rational expectations have been given there. We have recapitulated the basic results in this Unit.

Researchers have attempted to estimate NAIRU for certain countries. It is observed that NAIRU varies across countries, and over time for the same country.

Check Your Progress 2

- 1) What are the policy implications of Phillips curve?

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- 2) What do you mean by NAIRU? What are its implications?

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13.8 LET US SUM UP

Unemployment results in loss of not only potential output at the macro level but also in income at the individual level. Many a time widespread unemployment culminates into a crisis situation in the economy. The social stigma and psychological trauma associated with unemployment often compels policy makers to cut down on the rate of unemployment.

The classical economists assumed flexibility in real wage and prices, which ensured full employment in the economy for all the time. Keynesian economists, however, contest such an assumption and speak about rigidities in wage rate and prices. In case of sticky prices there is a possibility of unemployment as per the Keynesian model.

Phillips curve describes the inverse relationship between inflation and unemployment. It shows the possibility, or rather the compulsion on the part of policy makers, that unemployment can be reduced at the cost of higher inflation. Empirical observation from some economies, however, shows that Phillips curve is not stable in the long run. Due to change in inflationary expectations on the part of workers and employers there is a possibility of shifts in the Phillips curve. While short run Phillips curve is convex to the origin, the long run Phillips curve is vertical straight line at an unemployment rate equal to NAIRU.

13.9 KEY WORDS

Aggregate Demand: It tantamount to the sum of expenditure on consumption, investment, government expenditure and net exports. In symbols, $AD = C + I + G + (X-M)$.

Fiscal Policy: The policy of a government with respect to government expenditure and taxation.

Labour Force: The sum of population who are willing to work, and either employed or unemployed.

NAIRU: It is the abbreviation for **non-accelerating inflation rate of unemployment**. It is an unemployment rate that is consistent with a constant inflation rate. The NAIRU is the unemployment rate at which the long-run Phillips curve is vertical.

Phillips Curve: It is a graph named after A. W. Phillips, which shows the trade off between unemployment and inflation.

Real Wage: Nominal wage divided by price level.

13.10 SOME USEFUL BOOKS

Dornbusch, R., S. Fischer and R. Startz, 2004, *Macroeconomics*, Ninth Edition, Tata McGraw-Hill, New Delhi.

Sachs, Jeffrey. D. and Felipe Larrain B., *Macroeconomics in the Global Economy*, Prentice Hall Inc., New York.

Samuelson, P. A. and W. D. Nordhaus, 2005, *Economics*, Eighteenth Edition, Tata McGraw Hill, Delhi.

13.11 ANSWER/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) The basic assumptions underlying classical approach is flexibility in real wage and prices. Elaborate on the classical model based on Section 13.3
- 2) Keynes assumes rigidity in nominal wage rate. In the even of decline in prices, there is an increase in real wage, which does not clear the market for labour. Excess supply of labour compared to demand results in unemployment. Go through section 13.4.

Check Your Progress 2

- 1) Go through Section 13.5 and answer. You have to explain the nature of trade-off between inflation and unemployment.
- 2) Go through Section 13.7 and answer.

UNIT 14 SEARCH THEORY AND UNEMPLOYMENT

Structure

- 14.0 Objectives
- 14.1 Introduction
- 14.2 Search Theory and Theories of Unemployment
- 14.3 Search Theories – A Brief Historical Overview
- 14.4 A Search and Matching Model
 - 14.4.1 Model Specification
 - 14.4.2 Model Solution and the Equilibrium Rate of Unemployment
 - 14.4.3 Optimality of the Equilibrium Unemployment Rate
 - 14.4.4 Dynamics of Unemployment and Real Wages through Productivity Shocks
- 14.5 Some Alternative Search Models
- 14.6 Significance of the Concept and Theory of Search Unemployment
- 14.7 Let Us Sum Up
- 14.8 Key Words
- 14.9 Some Useful Books
- 14.10 Answers/ Hints to Check Your Progress Exercises

14.0 OBJECTIVES

After going through this unit you should be in a position to

- explain the basic difference between Walrasian and non-Walrasian theories of unemployment;
- appreciate that the search and matching models are an extension of the neoclassical/monetarist theories of employment and unemployment;
- appreciate the context in which the search theory of unemployment was developed;
- explain the use of a specific search and matching model to determine unemployment and its variation over time; and
- explain some alternative search and matching models.

14.1 INTRODUCTION

Traditional theories of aggregate employment and output can broadly be classified into two categories:

- a) Neoclassical/ Monetarist theories
- b) Keynesian theories

The neoclassical/ monetarist theories are elegant, but have the drawback that they are unable to explain prolonged periods of involuntary unemployment that characterise the real world. In these theories the prevailing unemployment is always voluntary unemployment. Keynesian theories, on the other hand, explain the real world phenomenon of unemployment as involuntary unemployment by invoking the idea of deficiency of aggregate demand, but these theories lack the elegance of the neoclassical/monetarist models of employment and output. In particular, the models do not provide microeconomic foundations for the

rigidities in prices and wages that are postulated to show the existence of involuntary unemployment in the economy.

In this and the next two units of this block we will examine further developments of these traditional theories. The main difference between the developments based on the neoclassical theories and the developments springing from the Keynesian theories is that the former are based on the Walrasian general equilibrium model of perfectly competitive markets, whereas the latter are based on some non-Walrasian features introduced into the analysis, e.g., imperfect competition. In a Walrasian general equilibrium model, labour market is, like all other markets in the economy is a perfectly competitive one and there is no reason why the market should not clear. Involuntary unemployment is inconsistent with a Walrasian setting, so that if unemployment exists, it must be due to some non-Walrasian characteristics of the labour market.

The search theory that we are going to study in this unit becomes important because it shows that unemployment can exist as an equilibrium phenomenon even in a Walrasian setting of perfectly competitive labour markets. We begin, in Section 14.2, placing the search theory in the context of other theories of unemployment that you have studied, or are going to study in this block.

14.2 SEARCH THEORY AND THEORIES OF UNEMPLOYMENT

You must understand the search and matching theories of unemployment in the context of other theories of unemployment. With this objective in view, we classify, in this section, the theories of unemployment that we are studying into four kinds. The classification is based on Chapter 9, Section 9.1, of Romer (2001).

If there is unemployment in a Walrasian labour market, unemployed workers would immediately bid down wages until supply and demand for labour are again in balance. If this process of bidding down wages is not working freely, there must be distinct reasons for it. We classify the theories of unemployment according to whether the process of wage adjustment is working or not, and according to the reason why it is not working in cases where it does not work. In particular, consider an unemployed worker, who claims to be identical to a firm's current workers, and who offers to work for the firm at a marginally lower wage than the one the firm is currently paying to its workers. There are four possible responses of the firm, giving us four kinds of theories of unemployment. These responses are:

- i) If the firm accepts the worker's offer, we can conclude that the market for labour is Walrasian. In this view all observed unemployment is voluntary unemployment – unemployment of people moving between jobs and of those who are ready to work only at wages higher than the prevalent wage rate. This is really the *neoclassical model* of unemployment referred to above.
- ii) Secondly, the firm can respond to the unemployed worker's offer by saying that it does not accept the premise that the unemployed worker is identical to the firm's current employees. In this view, the labour market is not a market for a homogenous commodity, but is characterised by heterogeneity. Each job is unique and requires the unique skills that are embodied in an individual. The unemployed workers are matched with existing vacancies not through the market, but through a complex process of search and match. The models of unemployment that postulate such a process are called *search and matching models*.

- iii) Thirdly, the firm can respond by saying that, even though it would like to cut the wages and employ the additional worker, it cannot do this because it is bound by implicit and explicit agreements with its workers, arrived at through collective bargaining, regarding the wages that have to be paid. Wages are thus institutionally determined in these models known as *contracting models*.
- iv) Lastly, the firm may respond by saying that it does not want to reduce real wages – it believes that the benefits accruing to it from higher wages are more than the costs of maintaining wages high. Theories that build up on this idea are called *efficiency-wage theories* in an obvious reference to the fact that higher wages impart benefits to the employing firm by improving the efficiency of labour.

In this unit, you will study in detail one of the search and matching models of unemployment referred to in (ii) above. You will study the contracting models and the efficiency-wage theories of unemployment, referred to respectively in (iii) and (iv) above, under the rubric of the New Keynesian Theories of Unemployment in Unit 16.

Check Your Progress 1

- 1) Why is a Walrasian general equilibrium model inconsistent with unemployment?

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- 2) Suggest a classification of theories of unemployment based on the postulated responses of a firm to an offer by an unemployed worker to work for it at a slightly lower wage.

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14.3 SEARCH THEORIES – A BRIEF HISTORICAL OVERVIEW

A search theory of unemployment is found even in the writings of A. C. Pigou in the inter-war period. To explain the high unemployment prevalent at that time Pigou used an idea you are very familiar with – that workers are unemployed because wages are too high. Keynes contested this idea in the development of his *General Theory of Employment, Interest and Money*. But initially Pigou had tried to explain the high unemployment of the inter-war period with reference to another idea – the idea of frictional unemployment, where unemployment arises as workers shift between jobs, moving to jobs where their productivity is higher. Search and matching unemployment is actually a form of frictional unemployment – unemployment which arises because of the frictions in shifting between jobs generated by the fact that skills are to be matched with vacancies in the job ‘market’. Pigou himself was aware

though that jobs were not shifting around too much in the 1920s, so that he ultimately banked more on ‘workers pricing themselves out of the market through trade union activities’ as an explanation for the inter-war unemployment.

The idea of search unemployment was subsequently formalised in the 1970s and 1980s to make the neoclassical Walrasian model accord with the reality of the empirically observed and varying unemployment in the labour market, as has been indicated to you in the introductory section. The importance of search in decentralised markets was first emphasized in an influential book edited by Edmund Phelps in 1970 (*Microeconomic Foundations of Employment and Inflation Theory*, Norton, New York). This book contains some of the first formal models using search theory to explain unemployment as an equilibrium phenomenon. Lucas and Prescott presented in 1974 a general equilibrium model of unemployment. In this model stochastic sectoral shocks induce workers to move between sectors, but there is a one-period lag by workers in moving between sectors, brought about through search and matching kind of considerations. Unemployment is generated in the model by this lag.

In the 1980s, search models were built up as continuous time general equilibrium models, in the tradition of the models built under the real business cycle theory. Noteworthy amongst these are the models by Peter Diamond: the paper titled “Mobility Costs, Frictional Unemployment, and Efficiency” published in the *Journal of Political Economy* in 1981, and by Christopher Pissarides: the paper titled “Short-Run Equilibrium Dynamics of Unemployment, Vacancies, and Real Wages” published in the *American Economic Review* in 1985. We have reproduced the titles of the papers for you because they provide a flavour of the concepts and mechanisms used to rationalize unemployment as an equilibrium phenomenon in a Walrasian model. We will examine, very briefly, the model by Pissarides in Section 14.5. Before that, however, let us develop a more complete model of search unemployment in the next section.

Check Your Progress 2

- 1) Why was it necessary to augment the neoclassical/ monetarist theory of employment through search and matching kind of models?
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- 2) What is frictional unemployment?
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14.4 A SEARCH AND MATCHING MODEL

It should be clear to you from the earlier section that there are a variety of models under the rubric of search theory. In this section we examine one such

model at close quarters. Peter Howitt originally developed the model as “Business Cycles with Costly Search and Recruiting” in the *Quarterly Journal of Econometrics* in 1988. The exposition here is based on Blanchard and Fischer (2000). Unlike in other sections of this unit, the exposition in this section is necessarily more technical. It is important to follow it through, perhaps with the help of the book, in order to get a flavour of the kind of analysis that you will find in the literature today. The approach is descriptive and the use of equations is minimised. Going through equations, however, can add to the understanding of the expounded ideas and you are advised to follow the equations-based exposition of the model in Blanchard and Fischer (2000).

14.4.1 Model Specification

We proceed with the model specification in the following steps.

- 1) The economy is composed of competitive firms (F in number) and identical workers (N in number). In each discrete time period a fraction δ of the employed is laid off and joins the unemployment pool. The fraction δ is called the ‘rate of separation’ in the literature. Firms hire workers from the pool, not directly from other firms.
- 2) The marginal cost of hiring for each firm is an increasing function of its level of hiring. This captures the idea that a high rate of hiring may force firms to increase their search intensity or, in a more general model with heterogeneous workers, to accept poor matches between workers and jobs. The marginal cost is also a decreasing function of aggregate unemployment – high aggregate unemployment makes it easier and cheaper for the firm to find willing and competent workers.
- 3) Since each firm chooses the rate of hiring by equating the marginal cost of hiring to the net marginal benefit of hiring, it is important to determine, in the model, the marginal benefit of hiring to the firm. Assuming a firm to be risk neutral, the marginal value to the firm of a worker hired in this period is the expected present value of his marginal product so long as he works with the firm. The marginal value, denoted by q_t , is therefore an infinite sum of discounted marginal productivities from the present period onwards to infinity. Two discounting factors are used on each term: one, as usual, to take account of time and the other to take account of the probability that a given worker will have left the job by time $(t + 1)$.
- 4) The net marginal benefit of hiring is equal to this marginal value *minus* the discounted present value of wages to be paid to the worker who is newly hired. It is in the spirit of search and matching models to assume that there is no labour market in which the wage is set – job matches require an explicit search process. The wage is set through bargaining so as to divide the surplus from the job between the worker and the firm. To simplify matters, it is assumed in the present model that the worker experiences neither costs nor benefits from unemployment, so that the total surplus from the job is just the marginal value determined in paragraph 3 above. It is assumed that the worker obtains a share ξ of the surplus and the firm gets $(1 - \xi)$ with the size of ξ reflecting the bargaining power of the worker. Thus the marginal benefit of hiring to the firm is given as a fraction of the marginal value q_t :

$$\lambda_t = (1 - \xi) \cdot q_t$$

- 5) Each firm chooses the rate of hiring, h_t , by equating the marginal benefit of hiring specified in paragraph 4 above with the marginal cost of hiring determined in paragraph 2 above

14.4.2 Model Solution and the Equilibrium Rate of Unemployment

Given the above specification, the model can be solved for the marginal benefit of hiring, λ_t , and the hiring rate, h_t . If the employment in the firm is denoted by n_t , it follows that $n_t = (1 - \delta)n_{t-1} + h_t$, since employment in period t is given by employment in period $(t - 1)$, as adjusted for the rate of separation and the rate of hiring. Assuming that there are F identical firms in the economy, the unemployment rate, denoted by u_t , is given by $1 - (F.n_t)/N$, where N is the total number of workers in the economy. These four equations for λ_t , h_t , n_t and u_t can be solved to obtain the equation characterising the dynamics of the equilibrium unemployment rate:

$$u_t = \delta + \{1 - \delta - (F/G)\lambda_t\}.u_{t-1}$$

In the above equation, G is a parameter in the cost of hiring function, such that a larger parameter value denotes higher difficulty of locating workers. The equation clearly shows that the unemployment rate depends on its own lagged value and the constant rate of separation, δ . It also depends on the state of technology via its dependence on the net marginal benefit of hiring, λ_t , since the latter depends on the marginal product of worker.

When the marginal productivity of labour is postulated to have zero variance, the natural rate of unemployment is given by

$$u^* = \delta / \{\delta + (F/G).k\}$$

A clear result emerges from this equation: the larger the separation rate, δ , and the larger the parameter G (reflecting the difficulty of locating workers), the higher is the rate of unemployment.

14.4.3 Optimality of the Equilibrium Unemployment Rate

The above model rigorously rationalizes the existence of unemployment. As we will see below, shocks to productivity can also be used to explain the variability of the equilibrium rate of unemployment over time. You should, however appreciate that the equilibrium rate of unemployment obtained in the above model is unlikely to be socially optimal. This is so for two reasons:

- 1) Hiring decision by a firm is beneficial to it to the extent that the net marginal benefit of hiring is positive, but it imposes a cost on other firms, an externality that is not taken into account by the hiring firm. By hiring an extra worker, the firm decreases unemployment, and since the marginal cost of hiring is a decreasing function of aggregate unemployment, the marginal cost of hiring to other firms is increased. This effect leads to too much hiring compared to the social optimum, and thus to too low an equilibrium rate of unemployment.
- 2) There is also a divergence between the social and private marginal benefit of hiring: the former is given by q_t , whereas the latter (the private benefit to the hiring firm) is given by a fraction $(1 - \xi)$ of q_t , depending on the bargaining power of the worker *vis-à-vis* the hiring firm. Since the private benefit is less than the social benefit ($\xi > 0$), there is too little hiring and thus too high an equilibrium rate of unemployment.

The two effects, in (1) and (2) above, work in opposite directions, one tending to increase the equilibrium rate above the socially optimum rate and the other tending to keep it below the social optimum. The net effect on the equilibrium rate of unemployment *vis-à-vis* the socially optimum rate is ambiguous in the model.

14.4.4 Dynamics of Unemployment and Real Wages through Productivity Shocks

The model that you are studying here is in the tradition of the real business cycle theory that you have studied in earlier units. As you know, this kind of a model works out the implications of shocks to productivity. The model has the following implications to employment and wages.

- 1) A temporary adverse shock to productivity decreases hiring (as it decreases the marginal productivity of labour and hence the benefit of hiring the marginal unit of labour) and increases unemployment. As the shock is, by definition, temporary, productivity and the net marginal value of labour return to their original level, but, it can be shown that the unemployment rate only slowly returns to normal through increased hiring. Moreover, since it is cheaper for the firm to hire when there are more unemployed, a productivity shock has greater effect on unemployment when it is high than when it is low. This is, of course, implicit in the non-linearity of the equation explaining u^* , the natural rate of unemployment.
- 2) The model explains why fluctuations in employment may be associated with smaller fluctuations in real wages. This will happen if ξ , the share obtained by workers, is constant, as is assumed in the model, and small. Real wages vary in the model with productivity and high rates of hiring are associated with high real wages. The model thus explains the observed empirical fact of a pro-cyclical increase in real wages, but to a smaller extent than the increase in employment, if the share obtained by workers is small in relation to that obtained by the hiring firms.

Check Your Progress 3

- 1) Explain why introduction of search and matching introduces equilibrium unemployment in a Walrasian model.
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- 3) Why is the equilibrium unemployment rate obtained in the Howitt (1988) model unlikely to be socially optimal?
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- 4) How does the Howitt (1988) model explain
 - a) An increase in unemployment
 - b) A smaller pro-cyclical response of real wages in relation to employment?
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14.5 SOME ALTERNATIVE SEARCH MODELS

In this section we look, briefly, at two more papers emphasizing frictions arising due to search and matching considerations: one by Pissarides that has been already referred to and another by David Lilien. The exposition here is again based on Blanchard and Fischer (2000).

The model developed in Section 14.4 is just one of the many search and matching models developed in the literature. In this section we examine, briefly, some alternative search and matching models. One of the shortcomings of the Howitt (1988) model that was discussed in Section 14.4 is that it simply postulates that search and matching is undertaken by workers and firms, but does not specify the search technology and the matching process used by workers and firms. Also the Howitt model takes the share of workers parameter, ξ , as given. Pissarides developed a closely related model in 1985 wherein these shortcomings were addressed. The model clearly shows that unemployment emerges as an equilibrium phenomenon in an otherwise neoclassical model that is characterised by workers moving from one job to another and remaining unemployed in the interim during their search for the right kind of job as a replacement for the job they have discarded. The approach shows explicitly the dependence of the rate of hiring on the characteristics of the labour markets. Moreover, unlike in the Howitt model, the Pissarides model helps in thinking about what determines the share of workers parameter ξ in the bargaining process between the workers and the firms – the parameter value depends on the option that the workers have in turning down the match and looking for another match.

Models have also been developed to capture the effects of sectoral shocks – changes in relative productivity or changes in relative demand for goods – on aggregate equilibrium unemployment. David Lilien emphasized frictions arising due to the inability of labour to relocate instantaneously and costlessly between sectors in a paper titled “Sectoral Shifts and Cyclical Unemployment” published in the *Journal of Political Economy* in 1982. Consider an economy with two sectors. Labour is immobile between sectors within periods but fully mobile across sectors over periods. Workers in each sector supply one unit of labour inelastically if the wage exceeds a reservation wage. Assume that the wage is sufficiently higher than the reservation wage in both sectors and that labour is fully employed between the two sectors. Assume further that labour demand shifts away from sector 1 toward sector 2, so that within the period wage increases in sector 2 and falls in sector 1. Since labour cannot shift from sector 1 to sector 2 within the period, employment cannot increase in sector 2, but falls in sector 1 due to the decrease in labour demand. The sectoral shift hence increases unemployment in the current period. In the following period labour reallocates itself and aggregate employment returns to normal.

14.6 SIGNIFICANCE OF THE CONCEPT AND THEORY OF SEARCH UNEMPLOYMENT

From what has been said earlier, you understand the significance of the theory of search unemployment as an attempt to endow realism to the elegant neoclassical model of employment and output. You should also understand the practical significance of the concept of search unemployment as it has worked itself out in the United States and in some of the countries of the European Union.

The idea of search unemployment gained importance in the US economy in the 1990s when the social security system was being restructured in that country. It

is easily understandable that the ability and desire of a person to keep looking for a better job and to remain unemployed in the mean time depends in part on the availability of unemployment benefits under such a system. The unemployment that arises when a person quits a job to have more time to look for a better job, or when an unemployed delays accepting a job in the hope of finding a better one, is of course the search unemployment that we have been discussing. If all jobs are the same, an unemployed person will take the first one offered. If some jobs are better than others, it is worthwhile searching and waiting for a good one. The higher the unemployment benefits, the more likely people are to keep searching for a better job, and the more likely they are to quit their current job to try to find a better one. It was consideration of these kinds that prompted the United States to restructure their unemployment benefits system in the 1990s. If unemployment rates in the European Union are by and large higher than those prevailing in the United States in recent years, part of the explanation is the fact that it is not as easy, as in the countries of the European Union, to obtain unemployment benefits in the United States after the revamping of their unemployment benefits system.

Check Your Progress 4

- 1) Explain briefly the ways in which the search model of Pissarides goes beyond the Howitt model.

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- 2) Why should a sectoral shift in labour demand generate higher aggregate unemployment?

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- 3) How will you use the concept of search unemployment to explain the differences between the United States and the European Union vis-à-vis their unemployment rates?

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14.7 LET US SUM UP

The neoclassical theory of employment and output is theoretically elegant, but does not accord with the empirically observed fact of prolonged periods of high unemployment. The search theory of unemployment attempts to remedy this drawback of the neoclassical theory. The existence of unemployed workers in the context of the neoclassical model would imply a fall in wages in the market for labour. In the context of search and matching models, though, the labour market is not a market for a homogenous commodity, but is characterised by heterogeneity. Each job is unique and requires the unique skills that are embodied in an individual worker. Unemployed workers are matched with existing vacancies not through the market, but through a complex process of

search and match. This generates a frictional kind of unemployment. Indeed the origins of the search and matching models can be traced all the way back to Pigou's explanation of the inter-war unemployment as the unemployment of workers moving between jobs. More recent approaches to the theory involve construction of models wherein the unemployment emerges as an equilibrium phenomenon when, for example, firms decide on hiring by equating the marginal benefits and costs of hiring, where the costs include search costs. Such an equilibrium rate of unemployment is not a social optimum due to the divergence between, e.g., private and social benefits of hiring. Such models can be used to explain variation of unemployment over time by postulating shocks to productivity, as in the models of real business cycles. Unemployment can also emerge in models where sectoral, as versus aggregate, shocks are postulated to productivity/ demand, in the context of frictions in moving from one job to another.

14.8 KEY WORDS

Adverse Shock to Productivity: A decline in productivity

Equilibrium Unemployment: Unemployment that emerges in a model wherein agents (workers and firms) optimise in the context of a process of search and matching.

Frictional Unemployment: Unemployment of workers who are moving between jobs. Frictions in the job market, e.g., due to the process of matching the requirements of a vacancy with the skills of an unemployed, imply that those who give up a job do not find a new job instantaneously and are unemployed in the interim. Such unemployment is frictional unemployment.

Natural Rate of Unemployment: Equilibrium unemployment (as defined above) as a percentage of the labour force.

Neoclassical/Monetarist theory of Employment/Output: Theory of employment/ aggregate output in the Walrasian general equilibrium set-up wherein markets clear through price adjustments.

Pro-cyclical Increase in Real Wages: Real wage increase accompanying the upward phase of a business cycle.

Search Theory: Theory of unemployment wherein each vacancy has unique features and requires unique skills that are embodied in individual workers. The frictions in the process of matching vacancies with the unemployed generate unemployment.

Voluntary Unemployment: Unemployment of workers who are not ready to work at the going wage for a similar job.

14.9 SOME USEFUL BOOKS

Blanchard, O.J. and S. Fischer, 2000, *Lectures on Macroeconomics*, Prentice-Hall of India, New Delhi

Dornbusch, R., S. Fischer and R. Startz, 2004, *Macroeconomics*, Ninth Edition, Tata McGraw-Hill, New Delhi.

Romer, D., 2001, *Advanced Macroeconomics*, Second Edition, McGraw-Hill International, New Delhi

14.10 ANSWERS/ HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) Walrasian general equilibrium model is inconsistent with involuntary unemployment. Labour market in this model is assumed to be competitive and it always clears through wage adjustments at a point where labour demand is equal to labour supply. Any unemployment in the model is hence voluntary, i.e., of those who do not want to supply labour at the going wage rate.
- 2) Your answer to this question should be based on Section 14.2. If the firm accepts the offer of the outside worker and employs him/her at a lower wage, you are in the realm of the neoclassical model. If the firm believes that the outsider-workers do not necessarily possess the skills of the insider-workers you are postulating a search and matching model. If the firm is unable to lower the wage fixed through collective bargaining, in spite of the firm wanting to accept the outsider worker's offer to work at the lower wage, you are subscribing to a contracting theory of unemployment. Finally, if you postulate that the firm does not reduce wage because it believes that its benefits exceed the cost of paying a higher wage, then you are working in the realm of New Keynesian theories like the efficiency-wage theory.

Check Your Progress 2

- 1) The neoclassical model was theoretically elegant, but did not accord with the observed phenomenon of high and varying unemployment in the real world. It was hence necessary to augment the model to bring it more in tune with reality. The search theory attempts to do this by modelling unemployment as an equilibrium phenomenon.
- 2) Frictional unemployment is unemployment of workers moving between jobs. In the search models workers are unemployed because they do not take up the first job that is offered to them and keep searching to find the best job that matches their skills. The unemployment is frictional, in as much as workers and jobs are not continuously matched.

Check Your Progress 3

- 1) You will have to explain this by using the model expounded in Sub-sections 14.4. 1 and 14.4.2. Alternatively, you could use ideas from two or three different search models to explain why unemployment occurs as an equilibrium phenomenon in such models. You will be helped further in this by the alternative models in Section 14.5.
- 2) Answer to this question is in Sub-section 14.4.3. Hiring generates a private benefit, but imposes a social cost to other firms that is not accounted for by the hiring firm. There is also a divergence between the private and social benefits generated by hiring.
- 3) Refer to Sub-section 14.4.4 to be able to answer these questions. The variability in unemployment is explained by productivity shocks that change the benefit of hiring and hence generate more or less unemployment in equilibrium. The pro-cyclical response of real wages is explained by the fact that, in the model, workers obtain a constant share, and an increase in productivity leads to an increase in real wages. Real wages increase to a smaller extent if the share of the workers is smaller compared to the share of firms in output.

Check Your Progress 4

- 1) Unlike the Howitt model, the Pissarides model specifies the search technology used by the workers and firms. Further, the Pissarides model also helps in understanding the factors determining the share of workers in output.
- 2) In a frictionless world, a sectoral shift in demand cannot generate unemployment because a decrease in employment in the declining sector is made up for by an increase in employment in the expanding sector. However, if, for example, it takes time for labour to relocate perhaps due to search and matching considerations, labour released from the declining sector can be unemployed in the interim that it locates itself in the expanding sector firms.
- 3) You will have to explain the difference in the unemployment rates between the US and the EU with reference to the differences in the two regarding obtaining unemployment benefits. The more liberal scheme in the EU means that a larger number of workers can remain unemployed over longer period of time in search for a better job. However, this is not the full explanation of the observed differences in the unemployment rates.

UNIT 15 NOMINAL AND REAL RIGIDITIES

Structure

- 15.0 Objectives
- 15.1 Introduction
- 15.2 New Classical School *versus* New Keynesian School
- 15.3 Nominal Rigidities *versus* Real Rigidities
- 15.4 Nominal Rigidities and Menu Costs
 - 15.4.1 Menu Costs
 - 15.4.2 Mankiw Model of Nominal Rigidities
- 15.5 Real Rigidities
 - 15.5.1 Real Rigidities in the Goods Market
 - 15.5.2 Real Rigidities in the Credit Market
 - 15.5.3 Real Rigidities in the Labour Market
- 15.6 Let Us Sum Up
- 15.7 Key Words
- 15.8 Some Useful Books
- 15.9 Answers/ Hints to Check Your Progress Exercises

15.0 OBJECTIVES

After going through this unit you should be in a position to:

- explain the characteristics of New Keynesian Macroeconomics as distinct from the New Classical Macroeconomics;
- distinguish between the two schools in their conclusions about the possibility of booms and busts in the real world;
- distinguish between nominal and real rigidities;
- explain why prices need not be flexible in the real world;
- identify the different kinds of rigidities in the real world goods, credit and labour markets; and
- explain why nominal and real rigidities have macroeconomic consequences like unemployment.

15.1 INTRODUCTION

The classical theory of the macro economy assumes that the economy is perfectly competitive and that wages and prices are perfectly flexible. It is this characteristic of perfect flexibility of wages and prices that enables the classical economists to conclude that the perfectly competitive economy will always be at full employment irrespective of aggregate demand conditions. According to the classical and, subsequently, the new classical schools, when aggregate demand goes up it is the aggregate price level that increases because the economy is at full employment and the aggregate output cannot increase. On the other hand, when demand falls at the full employment level of output, wages and prices fall in the goods and the labour markets, respectively. The aggregate price level falls and the employment of labour is not affected.

The Keynesians, on the other hand, & postulate rigidity of wages and/or prices. Suppose the economy is at full employment and aggregate demand goes down. The adjustment in the economy happens not through a downward adjustment of wages/ prices, but through a fall in employment and output. It is this different

response of the economy to changes in aggregate demand that is at the basis of the different conclusions that the classical and the Keynesian economists reach about the possibility of the existence of persistent unemployment in the economy. The flexibility *versus* rigidity of prices and wages hence becomes an important theoretical issue in determining whether an economy can exhibit persistent unemployment. In practice, since prices will neither be fully rigid nor perfectly flexible, the issue reduces to the rate of adjustment of wages and prices to changes in aggregate demand

This basic difference between the classical and the Keynesian economists continues to exist between the New Classical and the New Keynesians. In this unit we study how the New Keynesians rationalise the rigidity of prices and wages in a modern economy and how they thereby conclude that an economy will be subjected to booms and busts. We begin by understanding the important differences between the New Classical and the New Keynesian Schools.

15.2 NEW CLASSICAL SCHOOL *VERSUS* NEW KEYNESIAN SCHOOL

We know that Keynesian economics was propounded as a revolution against the then prevailing orthodoxy of the classical school. In time, however, the Keynesians themselves established orthodoxy. The Keynesians were helped in establishing their own orthodoxy, initially through the neoclassical synthesis of the classical and Keynesian schools involving the IS-LM model, and then through the AS-AD model. You have studied these models in Block 1. This latter synthesis through the AS-AD curves produced a model that had Keynesian properties in the short-run and classical properties in the long run. As aggregate demand falls, the downward rigidities of prices and wages produces unemployment in the short-run, but full employment is restored in the long run as prices and wages adjust slowly. The Keynesian revolution was appropriated within the mainstream through the AS-AD model.

The ideas of rational expectations (see Block 3) and real business cycles (see Block 5) that came up in the 1970s developed into the New Classical School. This School was a revolution against the Keynesian orthodoxy that had by now established itself. It propounded wage-price flexibility in a perfectly competitive setting of optimising individuals so that there was no basis for the existence of Keynesian unemployment even in the short run.

The New Classical ideas, though theoretically elegant and intellectually appealing, flew in the face of empirical realities in a world characterised by periodic booms and busts. The Keynesian ideas, on the other hand, attempted to explain the real world, but did not rely on the tools of mainstream economics like optimisation in the context of individuals who form expectations rationally. We can say that the microeconomic foundations underlying the Keynesian macroeconomics were weak.

Thus, a question could be asked to the Keynesians: Why would rational firms not increase product prices when money supply is known to have increased, since economic theory predicts that prices would ultimately increase as a consequence of increase in money supply and rationally formed expectations require the individuals to increase prices? We understand this particular question to a greater extent in Sections 15.3 and 15.4. It suffices to say, for now, that the New Keynesian School emerged in the 1980s as a counter-revolution against the New Classical ideas of the 1970s. The New Keynesians attempted to construct models that were empirically well grounded in the sense that they made more realistic assumptions about the macroeconomic world. Moreover, these models were theoretically elegant in that they explained through models

of rational optimising individuals why firms would not, increase prices in the face of increased money supply. Upward rigidity in prices would prevail in spite of the fact that not increasing prices could, apparently at least, lead to a fall in profits.

You should note two characteristics of the New Keynesian School at this point. The first makes it very different and the second not so different, from the New Classicals:

- i) We have been asking questions like why do firms not change prices. This presumes that the firm have the power not to change prices if they so wish, i.e., they have the power to set prices. Unlike in the New Classical world, the New Keynesian firms are operating in markets with some degree of monopoly power. That is an important difference between the two schools: the New Classicals assume perfect competition and the New Keynesians work in the context of imperfectly competitive markets. We also had this in mind when we said that the New Keynesian models are empirically well grounded.
- ii) Yet when it comes to the use of analytical tools, the New Keynesians are no different from the New Classicals. They build models to show why *optimising, rational* individuals do hold prices fixed when macroeconomic conditions demand that prices be changed. In setting up their counter-revolution, the New Keynesians meet the New Classicals on their home grounds, using the same tools of optimising behaviour of individuals in their models. You must note, in this context, that though we have associated the rational expectations revolution (along with the real business cycle theory) with the New Classical School, there is nothing intrinsic about rationally-formed expectations that make them any closer to the New Classical way of doing things than to the New Keynesian. The New Keynesian models can as much be propelled by individuals who are not only rational in the sense that they optimise, but also in the sense that they form expectations rationally.

Check Your Progress 1

- 1) Why is the distinction between flexibility and rigidity of prices important in macroeconomic theory?
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- 2) Based on your answer to Question 1 above, bring out a few points of distinction between the New Classicals and the New Keynesians.
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15.3 NOMINAL RIGIDITIES *VERSUS* REAL RIGIDITIES

Before we proceed further we must make an important distinction – that between nominal and real rigidities. In Section 15.2 above, we have been referring to nominal rigidities. Nominal rigidities are said to exist when nominal

prices and wages do not change in the face of conditions that call for their change. As you have seen in earlier units, this will lead to Keynesian unemployment. But unemployment can also come about because of certain real rigidities in the economy. Such rigidities can exist in the goods market, the labour market or even the market for credit.

Thus, as we will see in Unit 18, there could exist reasons why the *real* wage paid in the labour market is higher than the market-clearing wage. This will, of course, lead to unemployment of some of those who are willing to work at a lower (market-clearing) wage. We are not talking here about the nominal wage not changing when it needs to change, but about firms rationally and voluntarily deciding to pay higher real wages to their workforce because they find it to their advantage in some way. We will explain this concept of real rigidities better when we list out all such rigidities in Section 15.5 and the sub-sections therein.

The New Keynesian economists stress both the nominal and real rigidities to explain the presence of booms and bust/ persistent unemployment in the real world. We explain nominal rigidities further in Section 15.4 and then consider real rigidities in greater detail in Section 15.5.

Check Your Progress 2

- 1) Distinguish between nominal and real rigidities.

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15.4 NOMINAL RIGIDITIES AND MENU COSTS

In this section we examine a simplified New Keynesian model to understand why rational profit-maximising firms would not want to change prices in the face of macroeconomic conditions that call for such a change, a rise in money supply. For example, a firm would not increase prices in the event of a rise in money supply.

These kinds of models owe their existence to the work of the likes of N. Gregory Mankiw (“Small Menu Costs and Large Business Cycles: A Macroeconomic Model of Monopoly”, *Quarterly Journal of Economics*, May 1985); and George A. Akerlof and Janet L. Yellen (“A Near Rational Model of the Business Cycle, With Wage and Price Inertia”, *Quarterly Journal of Economics*, Supplement, 1985). As indicated above, these papers use the analytical tools of the New Classics to arrive at Keynesian conclusions. As the title of Mankiw’s paper indicates, an important concept in understanding the nominal price rigidity is the concept of ‘menu costs’. We examine the concept, briefly, before we explain the model proper.

15.4.1 Menu Costs

Why do firms not change their prices very frequently? Obviously, the costs of changing prices at frequent intervals and in small amounts must be more than the benefits obtained from such a change. Firms prefer to wait before they make price changes in relatively large amounts and in the mean time absorb the losses that they would suffer by not changing prices. This of course presumes that the firms have some monopolistic price setting power and the losses referred to

above include lower profits than would have been possible if prices had been raised, and not necessarily actual out-of-pocket losses.

It is easy to understand this behaviour of monopolistically competitive firms through the example of restaurants competing with each other. The term 'menu costs' immediately becomes meaningful as the costs that would be incurred in changing the menu cards every time there is a change in the prices of items on the menu. These printing costs are surely negligible, but the more important costs are in terms of the loss of customers that a firm would face if it subjects its clientele to the 'irritability' of continuous, small changes in prices.

The concept of menu costs in a modern economy is indeed broad. It is also widely applicable, given the proliferation of automatic dispensers (e.g., coffee machines) and pay telephones that operate on coins. It is easy to imagine the cost that would be incurred by the suppliers if these ubiquitous machines were to be adjusted every time a price change is effected. The firms would rather not change their prices. It is this idea of weighing the costs of changing prices against the benefits obtained from changing prices that is formalised in the Mankiw model that we consider below.

15.4.2 Mankiw Model of Nominal Rigidities

There are two related reasons for which firms do not frequently change prices. First, as we saw in the discussion on menu costs, the costs of price changes are not negligible and could exceed the private benefits that can be obtained by the firms in the form of increased profits. More importantly, however, the benefits to be reckoned from price changes are not so much in the private realm, but in the social realm. Price rigidity leads to unemployment, the social costs of which are much higher than the private costs reckoned by the firms in terms of menu costs. The microeconomics-based models by Mankiw, and Akerlof and Yellen clearly show that the private benefits of changing a price can be much smaller than the social benefits if there is substantial monopoly power in the economy.

We follow Dornbusch, Fischer and Startz (2004) in presenting a simplified version of the formal Mankiw model. The model relies on the fact that in monopolistic markets firms face a downward-sloping (less than infinitely elastic) demand curve and can set a price that deviates from the optimum profit-maximising price without a large swing in demand away from the firm. This is not possible in a perfectly competitive market, where every firm faces a horizontal (infinitely elastic) demand curve – a small deviation from the optimal price can in this situation lead to a large swing demand and profits away from the firm. Even if a competitive firm faces the same kind of menu costs as an imperfectly competitive firm, the loss of profits by not changing the price can be big enough to outweigh the menu costs. A competitive firm is not, of course, a price setter.

Not so for the imperfectly competitive firm. Mankiw showed that the potential profits from raising prices could be very small for such firms especially if the elasticity of demand for firm's output is low, i.e., if monopoly power of the firm is high, and if the deviation of the actual price from the optimal profit-maximising price is small. The menu cost could well be higher than the potential profits in such a case and the firm does not change its price. Other firms are likely to be similar and they too leave their prices unchanged, with the result that the nominal price level remains unchanged.

The Keynesian conclusion of an increase in money supply on output rather than on prices follows from this. An increase in money supply, prices remaining unchanged, leads to an increase in real money supply. This leads to an increase in aggregate output, either through a decrease in the rate of interest (*à la*

Keynes) or through a real-balance effect. You should note that there would have been no output effects in a classical model if prices were free to vary. An important difference between the classicals and the Keynesians is hereby established.

As Dornbusch, Fischer and Startz (2004, p. 566) put it about the papers of Mankiw, and Akerlof and Yellen:

This work provides a rigorous microeconomic justification for nominal price stickiness. Since New Classical economists attack the rigor of the underpinnings of Keynesian models, such justification is a key piece of Keynesian response to rational expectations and real business cycle models. Not everyone agrees on the empirical significance of the formulation by Mankiw and by Akerlof and Yellen, but the work is certainly a mile stone in the New Keynesian counterrevolution.

Check Your Progress 3

- 1) What are menu costs?

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- 2) How can the concept of menu costs be used to rationalise nominal price rigidities?

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15.5 REAL RIGIDITIES

As we brought out in Section 15.3, the New Keynesian economists rely both on nominal and real rigidities to arrive at their conclusion that nominal changes in money supply have real, and not merely nominal, effects on the economy. As we indicated in Section 15.4, an increase in money supply can lead to a rise in the aggregate output and not in the price level. The flip side of this is, of course, that a fall in the money supply can lead to a fall in output and an increase in unemployment.

There is, however, a view that introducing price-setting in imperfectly competitive markets and menu costs into an economy is however not enough to generate substantial nominal rigidity at the micro level. Further, as per this view, menu costs can have important macroeconomic effects only in the presence of real instead of nominal, rigidities. This is so because it can be shown that for realistic values of elasticity of labour supply and elasticity of output demand, price-setting firms have strong incentives to change price when aggregate demand changes even by incurring menu costs required for changing nominal prices. Thus if the elasticity of demand for a firm's output is high, say 5, and the elasticity of labour supply is low, say 0.1, then Romer (2001) shows that, for a 3 per cent fall in output, the increase in profits by changing the price is about one-fourth of the revenue. This clearly suggests that firms will be ready to bear even up to one-fourth of the revenue as menu costs needed for changing the prices, if the elasticity of output demand is high and the elasticity of labour

supply is low. If these elasticity values are realistic, then the existence of menu costs for changing prices cannot be used as a rationale for nominal price rigidity and consequent unemployment. Some other factors have to be invoked to explain the constancy of nominal prices, in the face of, e.g., changes in money supply.

The other factors that have been invoked have to do with the characteristics of the goods, labour and credit markets. These markets differ in important ways from the competitive model. In particular, the goods and labour markets appear to be such that shifts in demand translate into a smaller variation in prices and a larger variation in quantities than would be predicted in a competitive set-up. In the goods market, for example, shifts in demand for goods, in an imperfectly competitive set-up, are not accompanied by changes in mark-ups but by changes in output. Again, in the labour market, shifts in the demand for labour lead to large changes in employment and small changes in real wages. Here we are referring the rigidity in real prices in relation to quantities. Such rigidities occurring because of specific characteristics of the goods, labour and credit markets are referred to as real rigidities.

The argument in Section 15.4 was based on nominal rigidities in the price level. In this section we look at real rigidities in the goods, credit and labour markets to examine how these can translate into less than full employment output. The characteristics of the labour market that produce unemployment are examined in further details in Unit 18.

15.5.1 Real Rigidities in the Goods Market

The most important factor associated with real rigidity in the goods market is the existence of imperfect competition. Imperfect competition enables producers to be price-setters and generates rigidity in real prices in relation to quantities.

Under imperfect competition price is set, not equal to marginal cost, but as a mark-up over cost. The mark-up covers fixed costs of production including profits. One of the important propositions of the New Keynesian economics is that the mark-up behaves in a countercyclical fashion, i.e., it decreases during booms and increases over the downward phase of a business cycle. It is these countercyclical movements of the mark-up that produce rigidity in prices of goods. An increase in aggregate demand translates, not into an increase in prices, but into an increase in quantities of goods produced, and thereby of employment.

Why do mark-ups behave in a countercyclical manner? Several reasons have been postulated:

- i) Higher level of economic activity during booms reduces the importance of costs of acquiring and disseminating information and thus makes markets more competitive. This has been referred to in the literature as “thick-market” effects.
- ii) It has been suggested that increased profits created by greater economic activity make it difficult for oligopolists to maintain collusion – incentives are generated to break away from oligopolistic structures. This puts downward pressures on mark-ups.
- iii) It has also been suggested that mark-up is countercyclical because marginal costs are pro-cyclical. Marginal costs are considered to be pro-cyclical because overtime paid to workers is highly pro-cyclical and hence expensive to firms. This, however, begs the question about why prices are rigid in the goods market. The argument here seems to be that, because prices are rigid, the mark-up is compressed as marginal costs rise. We have been attempting

to explain the rigidity of prices by postulating that mark-ups fall over booms *in spite of* costs rising (and not *because of* increase in costs) for reasons independent of the rise in costs.

When price rigidities exist in imperfectly competitive goods markets, the impact of increase (decrease) in aggregate demand is borne by quantities leading to an increase (decrease) in aggregate output and employment.

15.5.2 Real Rigidities in the Credit Market

You have seen in Section 15.5.1 how imperfections in the goods markets enable firms to set prices so as to generate price rigidities, e.g., because of countercyclical mark-ups used in setting the prices oligopolistically. You know that such price rigidities have macroeconomic consequences, e.g., changes in aggregate demand influence output and employment rather than prices. Imperfections in the credit market too similarly have macroeconomic consequences. The imperfections in the credit market which have macroeconomic consequences are broadly classified as rigidities in the credit market. In this sub-section we examine some of the macroeconomic consequences of these credit-market rigidities.

Imperfections arise in the credit market primarily because of asymmetric information between lenders and borrowers. Borrowers are better informed than the lenders about the quality of their investment projects and even the probability of success of the projects. It has been shown that these type of information asymmetries can have important microeconomic consequences like equilibrium credit rationing, need for financial intermediation, and need for government intervention.

But, more importantly for us, credit market imperfections such as information asymmetries have macroeconomic consequences. It has been shown that in the monetary policy transmission mechanism

- i) credit channel is more important than money supply channel, and
- ii) credit-rationing is more important than rise in interest rate in the implementation of a restrictive monetary policy.

Thus when a restrictive monetary policy reduces reserve money, i.e., the quantity of bank reserves, the ability of the banks to lend is affected. The shortfall in credit is not necessarily made up by other lenders, given the imperfections in the credit market in the form of information asymmetries between lenders and borrowers. Banks are actually in a better position than many of the other lenders to overcome the adverse effects of information asymmetries through their role of a financial intermediary. Thus, the transmission mechanism operates largely through availability of loans. The process of credit rationing that takes place when loans are curtailed become more important in reducing aggregate demand than the process initiated by an increase in the rate of interest through the reduction of money supply.

Given this importance of credit markets, credit-market imperfections can propagate and magnify the effects of real disturbances. Shocks that act initially to reduce output or to redistribute wealth from borrowers to lenders cause credit markets to function less efficiency which leads to a further decline in output through the credit channel. It has been shown that disturbances that would have mild effects with Walrasian credit markets (e.g., with no asymmetries of information between lenders and borrowers) can cause a financial collapse in the presence of such imperfections because of the magnification effects.

15.5.3 Real Rigidities in the Labour Market

New Keynesian theories of the labour market help in explaining the existence of involuntary unemployment. The theories also attempt to explain why changes in

aggregate demand lead to larger changes in employment and relatively smaller changes in the real wage in the labour market. One of the reasons postulated for the existence of unemployment in the labour market is that firms voluntarily pay higher real wages, as compared to the market-clearing wage, to the workers on their rolls with a view to increasing their efficiency and/ or with a view to providing them the incentives not to shirk work in a situation where the effort level of the workers cannot be perfectly monitored. The imperfections caused thereby in the labour market lead to unemployment. We will consider efficiency wage model postulated in New Keynesian theories of unemployment in greater details in the next unit (Unit 18).

Check Your Progress 4

1) Why do real rigidities occur in the following markets?

i) Goods market

ii) Labour market

iii) Credit market

.....

15.6 LET US SUM UP

The distinction between the Classical and the Keynesian school revolves around their assumption about flexibility/ rigidity of wage and prices. The Classics assumed prices to be flexible and thereby postulated full employment of resources, whereas the Keynesians assumed wage/ price rigidity and thereby rationalised the existence of persistent unemployment. This distinction between the Classics and the Keynesians continues between the New Classics and the New Keynesians.

The New Keynesian theory largely rationalises existence of unemployment through the existence of nominal and real rigidities. Nominal rigidities refer to the inflexibility of nominal wages and prices. Real rigidities refer to imperfections in the goods, credit and labour markets which lead to the relative prices and real wages being different from what would be predicted by a competitive Walrasian model.

Mankiw builds up a model to show why nominal rigidity exists and why it could lead to large macroeconomic consequences like aggregate unemployment. The concept used in showing this is that of menu costs – the costs incurred in changing prices in a situation where the firm has a price-setting power. Such costs are large in relation to incremental profits obtained by changing the price especially when the elasticity of demand is low and the deviation of the actual price from the profit-maximising optimal price is not too high. The nominal price rigidity that follows leads to unemployment.

Macroeconomic consequences like unemployment also follow from imperfections in the goods, credit and labour markets. Such imperfections are referred to as real rigidities. In the labour market they occur because, for example, the real wage paid is higher than the market clearing wage for reasons that will be dealt with in details in Unit 18. In the goods market, the real rigidity follows from, e.g., countercyclical mark-ups used by price-setting firms, whereas in the credit market the imperfections occur basically because of information asymmetries.

15.7 KEY WORDS

Countercyclical behaviour of the Mark-up: The behaviour whereby the price mark-up ratio decreases during the upward phase of a business cycle and increases during the downward phase.

Efficiency wage: A wage higher than the market-clearing wage voluntarily paid by firms to their workers to increase their efficiency and to prevent them from shirking.

Information asymmetry (in the credit market): A situation wherein borrowers have more information than the lenders about the characteristics of their investment projects. This generates inefficiencies in the credit market that leads to credit-rationing and may call for government intervention.

Mark-up: Ratio of price to marginal cost $\left(\frac{P}{MC} \right)$

Menu cost: A small fixed cost of changing a nominal price. The name comes from the costs incurred by restaurants to print new menu cards when nominal prices increase.

Microeconomic Foundations of Keynesian Economics: Derivation of macroeconomic relationships and results of Keynesian economics by postulating optimising behaviour by rational individuals.

Nominal price rigidity: The state of prices not changing as much as they would have changed in money terms under competitive conditions.

Real rigidity: The state wherein relative prices in the goods market and real wages in the labour market do not change as much as would be expected under competitive conditions. Quantities change more than prices in response to, e.g., changes in aggregate demand. This happens because of certain imperfections of the markets concerned.

Transmission mechanism: The mechanism through which monetary policy-induced changes affect the economy in general and output and employment in particular.

15.8 SOME USEFUL BOOKS

Blanchard, O.J. and S. Fischer, 2000, *Lectures on Macroeconomics*, Prentice-Hall of India, New Delhi

Dornbusch, R., S. Fischer and R. Startz, 2004, *Macroeconomics*, Ninth Edition, Tata McGraw-Hill, New Delhi. See Chapter 20, Section 6

Romer, D., 2001, *Advanced Macroeconomics*, Second Edition, McGraw-Hill International, New Delhi

15.9 ANSWERS/ HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) The distinction between flexibility and rigidity of prices is important because the assumption of flexibility leads to the classical conclusion of full employment, whereas the assumption of rigidity leads to the Keynesian conclusion of existence of persistent unemployment. The two assumptions give us two different ways of looking at macroeconomic phenomenon.

- 2) The New Classicals assume price flexibility and hence perfect competition, whereas the New Keynesians assume price-setting power for firms in the context of imperfect competition. There is no distinction, though in the analytical tools of the two schools: both use optimisation models peopled by rational individuals.

Check Your Progress 2

- 1) Nominal rigidities exist when prices in money terms do not change as much as they would under competitive conditions. Real rigidities, on the other hand, refer to certain imperfections in the goods, labour and credit markets which prevent relative prices and real wages from changing as much as they would under Walrasian conditions.

Check Your Progress 3

- 1) Menu costs are costs incurred by price-setting firms in changing the price that they charge. Such costs can be quite high in absolute terms if, for example, price changes require costly adjustments to automatic dispensing machines.
- 2) Even if menu costs are not high in absolute terms they may turn out to be higher in relation to the private benefit that would be obtained in terms of increased profits by changing the price.
- 3) The distinction between private and social benefits becomes important in the context of the Mankiw model because, under certain conditions defined by, *inter alia*, the elasticity of demand, not much of private benefits are obtained by a price-setting firm in terms of higher profits by changing the price. If menu costs are higher than these private benefits, the firms do not change the price. The price rigidity that this entails leads to unemployment. If only the price had been changed the social benefit obtained by way of reduction in unemployment would perhaps be higher than the menu costs.

Check Your Progress 4

- 1) Real rigidities occur in goods market because, in an imperfectly competitive set-up, firms do not change prices – they accept instead a change in the mark-up that they charge to fix the price. In credit markets, rigidities occur ultimately because of the existence of imperfections in the form of information asymmetries – borrowers being more informed of their investment projects than lenders. Rigidities exist in the labour market in as much as real wages paid are higher than the market-clearing wage. This could happen because of efficiency wage considerations.

UNIT 16 NEW KEYNESIAN THEORIES OF UNEMPLOYMENT

Structure

- 16.0 Objectives
- 16.1 Introduction
- 16.2 Keynesian and New-Keynesian Theories of Unemployment and the Behaviour of Real Wages
- 16.3 Efficiency-Wage Theories of Unemployment
- 16.4 Efficiency-Wage Model: An Example
 - 16.4.1 Specification of the Model
 - 16.4.2 Solution of the Model
 - 16.4.3 Implications of the Model Solution
 - 16.4.4 Possible Extensions of the Model
- 16.5 Contracting and Insider-Outsider Models of Unemployment
- 16.6 Let Us Sum Up
- 16.7 Key Words
- 16.8 Some Useful Books
- 16.9 Answers/ Hints to Check Your Progress Exercises

16.0 OBJECTIVES

After going through this unit you should be in a position to:

- explain clearly what is meant by non-Walrasian features of the labour market;
- appreciate that, empirically, real wages behave moderately pro-cyclically;
- explain some reasons why efficiency of workers could increase when firms pay higher than market-clearing wages;
- develop an efficiency-wage model and examine its solution;
- indicate the directions for extending the efficiency wage model;
- explain why real wage rigidity and unemployment can emerge because of contracting; and
- find out the implications to unemployment of the existence of employed workers (insiders) along with unemployed workers (outsiders).

16.1 INTRODUCTION

In this unit we consider in detail some New Keynesian theories of unemployment. These theories are essentially non-Walrasian theories of unemployment. This means that the observed phenomenon of unemployment is not brushed aside as the working out of unimportant frictions as workers move between jobs; or even as involuntary unemployment of workers who are ready to work only at a higher wage than that which is available on the market. You have already looked at the difference between Walrasian and non-Walrasian theories of unemployment in Section 14.2 of Unit 14 where we considered an unemployed worker, who claimed to be identical to a firm's current workers, and who offered to work for the firm at a marginally lower wage than the one the firm is currently paying its workers. At this stage, you are advised to revise the four possible responses of the firm that were considered in Section 14.2. The

- 2) The New Classicals assume price flexibility and hence perfect competition, whereas the New Keynesians assume price-setting power for firms in the context of imperfect competition. There is no distinction, though in the analytical tools of the two schools: both use optimisation models peopled by rational individuals.

Check Your Progress 2

- 1) Nominal rigidities exist when prices in money terms do not change as much as they would under competitive conditions. Real rigidities, on the other hand, refer to certain imperfections in the goods, labour and credit markets which prevent relative prices and real wages from changing as much as they would under Walrasian conditions.

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Check Your Progress 4

- 1) Real rigidities occur in goods market because, in an imperfectly competitive set-up, firms do not change prices – they accept instead a change in the mark-up that they charge to fix the price. In credit markets, rigidities occur ultimately because of the existence of imperfections in the form of information asymmetries – borrowers being more informed of their investment projects than lenders. Rigidities exist in the labour market in as much as real wages paid are higher than the market-clearing wage. This could happen because of efficiency wage considerations.

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labour market can be considered to be Walrasian in the first response, whereby the firm accepts the worker's offer – any unemployment leads to a decrease in the real wage. The observed unemployment in this case is purely frictional or involuntary. The remaining sections of Unit 14 dealt with search and matching models of unemployment, which explained persistent unemployment as the equilibrium response of a heterogeneous labour market wherein specialised vacancies in a firm were matched with unemployed workers with specific skills through an elaborate search process. We considered there the second response of the firm whereby the firm did not accept that the unemployed are homogenous *vis-à-vis* the employed.

In this unit we deal with the third and the fourth responses of the firm (see section 14.2 of Unit 14). The third response was that the firm was not in a position to cut wages and employ additional workers, however much it would have liked to do this, because it was bound by implicit and explicit agreements with its workers, arrived at through collective bargaining, regarding the wages that have to be paid. This leads us to institutionally determined wages in models known as *contracting models*. The fourth response, on the other hand, was that the firm did not want to reduce real wages – it believed that the benefits accruing to it from higher wages were more than the costs of maintaining wages at a higher level. The higher wages paid are referred to as efficiency wages and the theories rationalising such wages are called *efficiency-wage theories*.

Section 16.3 deals with efficiency wage theories, whereas Section 16.4 deals with contracting models. We will evaluate these theories on the basis of the extent to which the theories help to explain empirical realities. In particular we would like our theories to explain the following two observed empirical facts about the labour markets in developed capitalist economies:

- i) Existence of persistent unemployment
- ii) The moderately pro-cyclical behaviour of real wages

The very purpose of the theories is to explain persistent unemployment. The theories should, however, also explain the observed behaviour of real wages. We deal with this latter point below in Section 16.2.

16.2 KEYNESIAN AND NEW-KEYNESIAN THEORIES OF UNEMPLOYMENT AND THE BEHAVIOUR OF REAL WAGES

As mentioned above, two phenomena about the labour market need to be explained: the persistence of unemployment and the moderately pro-cyclical behaviour of real wages. When aggregate demand increases, labour markets respond typically by a larger increase in employment and a relatively smaller increase in real wages, i.e., quantities respond more than prices. But real wages do respond cyclically, however moderately.

This point helps us to understand the difference between Keynesian and New-Keynesian theories of unemployment. Though both kinds of theories help explain persistent unemployment, it is only some of the new-Keynesian theories that explain why wages behave pro-cyclically, though only moderately so. The Keynesian theory clearly implies that wages behave counter-cyclically. This follows from the assumption of a constant nominal wage. Given the nominal wage rate W , the real wage W/P falls during an expansion as the price level P gradually increases. It is this fall in the real wage that induces firms to employ more labour and produce higher output as aggregate demand increases. During contraction, on the other hand, real wages rise as prices fall, nominal wages remaining unchanged. The Keynesian model thus implies a counter-cyclical

behaviour of real wages. This is not in accordance with the empirically observed behaviour of real wages. In real world we see that real wage increases during periods of boom and decreases during recession.

The new-Keynesian models imply an advance over the Keynesian model to the extent that they imply a pro-cyclical behaviour for real wages, in accordance with empirical observations.

Check Your Progress 1

- 1) Show that the Keynesian model implies a counter-cyclical movement of real wages.
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16.3 EFFICIENCY-WAGE THEORIES OF UNEMPLOYMENT

Efficiency wage theories are clearly non-Walrasian theories in as much as they postulate payment of wages that are higher than market-clearing wages. The persistence of unemployment follows as a direct consequence of higher wages. The efficiency wage theories rationalise the existence of higher than market clearing real wages.

Broadly speaking, firms pay higher than market-clearing real wages because the benefits accruing from higher wages are more than the cost of paying higher wages. The higher benefits can accrue for the following reasons:

- i) At a very basic level, higher wages enable higher consumption for workers, including higher nutrition, and this is expected to increase the *work capacity* of the hired workers. The point is more valid at lower levels of standards of living than are prevalent in the developed economies.
- ii) Higher wages may get into the pool of workers with a higher *reservation wage*, i.e., the minimum wage that should be offered to a worker to induce him to supply his labour on the market. Workers with a higher reservation wage are expected to have superior abilities along directions that cannot be directly observed and duly compensated for on the market. These higher abilities in the pool of employed workers are expected to benefit the firm.
- iii) A higher than market wage can build *loyalty* and a *sense of belonging* among workers and induce higher effort. This point is better understood in the context of the opposite situation of a lower wage, which is expected to have effects like generating anger and a desire for revenge, thereby leading even to a sabotage by the workers.
- iv) At a more sophisticated level, a higher wage generates incentives for workers to avoid *work-shirking* behaviour in situations where the firms cannot monitor the work effort perfectly. Workers do not want to be caught shirking in such valuable jobs, for they could be fired if caught shirking and may be able to replace the job, if at all, by one which pays only a market-clearing and hence a lower wage.

Some of the above ideas have been developed into more formal models in the literature. In the next Section you will go through one such model that analyses the determination of efficiency wages.

16.4 EFFICIENCY WAGE MODEL: AN EXAMPLE

As you know, we construct a model by making many simplifying assumptions. We specify the model, indicate its solution, and bring out all the implications of the solution. In this section we present an efficiency wage model in line with of Romer (2001).

16.4.1 Specification of the Model

We consider a model with M firms and analyse a representative firm. We specify a simple neoclassical production function with a single input, labour. However labour enters the production function, not in physical units, but in efficiency units. The production function for a representative firm is hence of the form:

$$Y = F(e.L)$$

Y is the total output produced. L is the number of physical units of labour hired by the firm. $e.L$ is the efficiency units of labour. You can look upon $e.L$ as the total effort undertaken by the L units of hired labour. Higher the index of effort, e , exerted by individual units of labour, higher the total labour input in efficiency units.

By saying that the production function is of the neoclassical kind, we mean that the total output increases as the efficiency units of labour used increase, but at a decreasing rate. In other words, marginal product of the efficiency units of labour is positive but decreases as the total labour effort expended in the production process increases. In symbols it amounts to the standard assumptions you have seen in Unit 3, that is, $F' > 0; F'' < 0$

The model further specifies that the individual effort, e , depends on the wage rate – higher the wage rate, w , higher is the effort exerted by individual physical unit of labour. The effort function can be specified as:

$$e = e(w)$$

It is also assumed that there are N workers in the economy, each supply one unit of labour inelastically: an increase in wage rate leads, not to an increase in physical labour supplied by an individual worker, but to an increase in the effort expended.

16.4.2 Solution of the Model

The model is solved by making the usual behaviouristic assumption about the firm: that the firm hires labour so as to maximise its profits. The profits of the firm are defined as:

$$\Pi = Y - w.L$$

w is the real wage paid by the firm and, as you have seen above, Y is the total output of the firm. L is of course the number of units of physical labour hired by the firm.

After substituting for Y in the above profit function, the problem reduces to the following two-variable maximisation problem in calculus, viz., determine L and w so as to maximise $z = F(e(w).L) - w.L$. Following the usual calculus techniques to solve a maximisation problem, this problem is solved by taking the partial derivatives of z respectively with respect to w and L and equating each of these to zero. This gives us two equations in two unknowns, w and L , which can be solved simultaneously to obtain the equilibrium, profit maximising, values of w and L .

Instead of obtaining the solution explicitly, we can characterise it by examining the first of the above two equations obtained by equating the partial derivative of z with respect to L to zero. The equation reduces to

$$w \cdot e'(w)/e(w) = 1$$

$e'(w)$ is the derivative of the effort function with respect to w , giving the increase in effort per unit increase in the real wage, for infinitely small increases in the wage rate. You will be able to recognise the L.H.S. expression of the above equation as the elasticity of the effort function $e(w)$ with respect to the real wage rate w . What the equation states is that, at the optimum, the elasticity of effort with respect to wage is unity, i.e., the real wage rate is so determined that, at the optimum, a one per cent increase in the wage rate leads to one percent increase in effort. This means that, at the optimum, the ratio $w/e(w)$ remains constant, for infinitely small changes in w . This suggests that the ratio $w/e(w)$ is at its minimum at the optimum.

What do you think is the economic interpretation of this ratio being a minimum at the optimum real wage? When a firm buys one physical unit of labour at the cost given by w , it is effectively buying e units of labour, since one physical unit of labour expends e units of effort. That is why we said above that L physical units of labour effectively provide $e \cdot L$ efficiency units of labour. The ratio $w/e(w)$ hence gives the per unit cost of effective units of labour. The firm sets the real wage so as to minimise this per unit cost of effective units of labour that it obtains by buying physical labour on the market. This means that the firm sets the real wage rate so as to maximise the effective labour obtained for a given outlay, assuming that the effort expended by labour is an increasing function of the real wage. It is presumed here that, as the real wage increases, the effort increases, first at an increasing rate and subsequently at a decreasing rate. The real wage is set such that the rate of increase of effort with respect to the wage is just equal to the wage. For wage rates below the optimum wage, increasing the wage leads to a larger increase in effort; whereas for wage rates above the optimum, increasing the wage any further leads to a lower increase in effort. At the optimum, the marginal product of effective labour equals its cost.

16.4.3 Implications of the Model Solution

Let w^* and L^* be the optimum levels of the real wage and physical units of labour hired obtained as a solution to the model for the representative firm. Since there are M such firms, the total demand for labour is given by $M \cdot L^*$. We bring out some of the implications of this solution.

- i) The solution clearly implies that workers could remain unemployed in the model when the wage rate is set at w^* . We have assumed above in the specification of the model that the total number of workers in the model is N . Unemployment can exist if $N > M \cdot L^*$, where $M \cdot L^*$ is the total demand for labour when the real wage rate is the efficiency wage w^* . On the other hand, if $M \cdot L^*$ turns out to be larger than N , then the wage is bid up above the efficiency wage up to the point that demand N for and supply of labour are in balance and there is no unemployment.
- ii) The model implies that the increase in aggregate demand does not lead to an increase in real wage. This is because the efficiency wage is determined entirely by the properties of the effort function $e = e(w)$ and there is no reason for w^* to change when aggregate demand increases. The model hence comes close to rationalizing the empirically observed fact that in cyclical upswings, it is employment, and not real wage, that increases – the real wage is only moderately pro-cyclical.
- iii) Rigidity of prices is also implied in the model. The fact that real wage and, hence, effort do not change during cyclical upswings means that the labour costs of firms do not change and hence price-setting firms do not have incentives to adjust prices. You must connect this up with the conclusions

We thus see that the efficiency wage model not only explains the possibility of the existence of persistent unemployment, but also suggests why the burden of adjustment falls on employment rather than on the real wage during cyclical changes in business activity.

16.4.4 Possible Extensions of the Model

The efficiency wage model that we considered above, however, has an important drawback: it is unable to distinguish between short-run cyclical effects and long run secular effects. In the real world, though the short run effect is in terms of increased employment and hence decreased unemployment, the long run is characterised, not by a trend decrease in unemployment, but by a trend increase in the real wage. The model is not able to make this transition from the short to the long run.

The efficiency wage model can however be extended to deal with the above problem. We only indicate the directions in which such an extension can take place and do not develop the extended model in details. The extension is basically given effect to through modifications in the effort function. The effort function in the earlier model was $e = e(w)$. It is now extended as:

$$e = e(w, w', u)$$

The real wage paid in the representative firm is w , whereas e is the effort. The real wage available to the workers in alternative firms is denoted by w' and the unemployment rate in the economy is u . The inclusion of w' and u in addition to w as arguments in the effort function can be rationalised by examining some of the reasons we set out at the beginning of Section 16.3 for the payment of higher (i.e., efficiency) wages. If higher wages are paid to induce workers not to shirk and to exert greater effort in situations where the effort cannot be continuously monitored, then the higher wages will lead to the desired effect of workers not shirking only if the wage rate obtained in other firms is lower and the unemployment rate is high. If the wage rate obtained in other firms is as high and if the unemployment rate in the economy is low then the worker will not mind getting caught shirking because he can, with a high probability, obtain an alternative job which is as paying as his current one. A higher (i.e., efficiency) wage will not, in such a situation, induce him to exert greater effort. Effort e depends positively on w , given w' and u . Effort e , however, depends negatively on w' and positively on u . We can similarly work out the rationale behind the extended effort function if reasons for paying a higher (i.e., efficiency) wage have to do with tapping higher unobserved abilities or with engendering loyalty or avoiding sabotage by disgruntled workers.

Such an extension of the effort function again leads to a similar solution for the efficiency wage as in the above model with a simpler effort function. Here too the elasticity of effort with respect to the real wage is unity at the optimum real wage. The wage paid by any of the firms has however to be necessarily equal to that paid by the representative firm, i.e., $w = w'$ in the solution. Unemployment can also emerge in this model if, at this common efficiency wage, the total demand for physical units of labour by the firms falls short of the total supply of physical units of labour.

Such an extended model can account for both, a larger effect of increased aggregate demand on employment as compared to real wage in the short run and an absence in trend unemployment in the long run. This is shown with the help of an example in Romer (2001). Interested learners are advised to follow the original.

Check Your Progress 2

- 1) Why do firms pay higher than market-clearing wages? List out some of the reasons.
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- 2) How would you interpret the first-order condition for optimum, viz., that the elasticity of effort with respect to the wage is unity, in the efficiency-wage model that you studied above?
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- 3) Show how unemployment can emerge in an efficiency-wage model.
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- 4) Why does an increase in demand for labour have a larger effect on employment than on the real wage in the efficiency wage model constructed above?
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- 5) Bring out an important drawback of the efficiency wage model that uses a simple effort function.
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16.5 CONTRACTING AND INSIDER-OUTSIDER
MODELS OF UNEMPLOYMENT

The models in Section 16.3 departed from the Walrasian assumption of a market-clearing wage on efficiency considerations – it was postulated that a

higher than market-clearing wage leads to increased efficiency of workers for one reason or another. In this section we consider briefly some models wherein the wage differs from the Walrasian wage because of long-term relations between workers and firms. We consider here, very briefly, two kinds of models – contracting models and insider-outsider models.

The rationale underlying the contracting models is that firms do not hire workers afresh each period. Workers continue to work for a firm for a large number of years because many jobs involve firm-specific skills that are not valued as much outside the firm and also because firms would find it costly to train new workers in these skills afresh each period. Workers are content to stay in their current jobs so long as their expected earnings over a much longer period than just, say, the current year are more than the opportunities that the workers would have outside the firm, even if in the current year their earnings are low. A worker in the United States, for example, lasts in a job, on an average, for ten years. In such a situation wages do not have to adjust every period to clear the labour market and the labour market clearly becomes non-Walrasian.

The relationships between workers and firms are determined in such cases by long-term contracts, arrived at through collective bargaining between worker unions and firms. We can consider two kinds of contracts. The first kind is a fixed-wage contract under which the wage is pre-determined and the firm is free to choose the level of employment that it provides depending on the state of the economy that emerges in each period. Workers agree to supply all the labour demanded by the firm. Wage rigidity and unemployment emerge immediately in such a model. A fall in labour demand does not affect the real wage because of the contract. The labour supply too cannot fall. The only thing that can happen when labour demand falls is that firms reduce employment at the fixed real wage.

The problem with this type of fixed-wage, variable employment contract is, however, that it is not an efficient contract because, under it, the marginal product of labour is generally not equal to the marginal disutility of work, and so it is possible to make both parties to the contract better off. You should recollect from your microeconomics units that contracts are said to be efficient if it is not possible to make one of the parties better off without making the other one worse off (pare to efficiency). This takes us to the idea of implicit contracts, which are efficient contracts unlike the simple fixed-wage contracts.

Implicit contracts are contracts between the firm and workers wherein the firm specifies the real wage and the employment that it will provide for each possible state of the economy. The contracts are so called because actual contracts in the real world do not *explicitly* specify employment and wage as a function of the state of the economy. Not only are these contracts efficient, but also imply real wage rigidity and the consequences of real wage rigidity that we have examined in other contexts.

The insider-outsider models are a development on the contracting models, wherein three categories of agents are recognised, viz., the firms, the workers that are employed (insiders), and the unemployed workers (outsiders). It is in the interest of the unemployed workers that the firms and the insider workers sign contracts providing for lower real wages and higher employment. But the unemployed, being outsiders, are not on the bargaining table. The real wage rigidity, that is implied, provides a non-Walrasian characteristic to the labour market and explains the existence of unemployment. Rich models have been built up in the literature analysing the interactions between the three categories of agents to explain some of the empirically observed characteristics of the labour market.

Check Your Progress 3

- 1) Why are fixed-wage contracts inefficient?
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- 2) What is the difference between wage contracts and implicit contracts?
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- 3) How do insider-outsider models explain the existence of unemployment?
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16.6 LET US SUM UP

The new Keynesian theories of unemployment are non-Walrasian theories – the real wage in the new Keynesian models is generally not a market-clearing wage. Most of the new Keynesian models however accord with the empirically observed fact of a moderately pro-cyclical real wage. This is unlike the Keynesian theory of unemployment, where real wage is counter-cyclical. In most of the new Keynesian models, an increase in aggregate demand and in the demand for labour has a larger effect on employment and a smaller effect on the real wage in the short run.

The new Keynesian models of unemployment include models such as the efficiency wage models, the contracting models and insider-outsider models.

The efficiency wage models postulate and rationalise a higher than market-clearing wage on the ground that the benefits accruing from higher wages are more than the costs of maintaining wages at a higher level. The benefits come from increased efficiency of workers. The increased efficiency could be due to increased physical efficiency of workers obtaining higher wages, or due to the engendering of a sense of loyalty and belonging among workers, or even due to avoidance of work shirking by workers who do not want to lose high paying jobs if caught shirking. The efficiency wage model not only rationalises the existence of persistent unemployment, but also produces a larger effect on employment in the short run. The shortcoming of an efficiency wage model using a simple version of the effort function is that it implies that there is no increasing trend in the real wage even in the long run. This is contrary to empirically observed facts. The shortcoming can be easily remedied by using a more complex effort function.

The contracting and insider-outsider models rationalise wage rigidity with reference to the fact that wages are determined by long term contracts between

workers and firms, and are not necessarily set at the market-clearing level in each period. This immediately rationalises wage rigidity and unemployment. The insider-outsider models provide the insight that though it is in the interest of the unemployed workers (outsiders) that wages are contracted to be low so that employment is higher, the unemployed in a non-competitive economy have no power in the matter, as wages are determined through bargaining between the employed workers (insiders interested in higher wages) and firms.

16.7 KEY WORDS

Efficiency Units of Labour: Units of labour that take into account both the physical units and the 'effort' expended by the physical units. If each of L units of physical labour expends e units of effort, the total number of efficiency units is $e.L$.

Effort Function: The relationship showing the dependence of work effort on, e.g., the real wage. The arguments of the effort function can also include the real wage available in alternative jobs and the unemployment rate.

Fixed-wage Contract: A contract between firms and workers under which the wage is pre-determined and the firm is free to choose the level of employment that it provides depending on the state of the economy that emerges in each period.

Implicit Contract: A contract between firms and workers under which both the wage paid and employment provided are specified as a function of the state of the economy. Since actual contracts do not *explicitly* specify wage and employment as functions of the state, such contracts are called *implicit* contracts.

Insiders: Workers employed in a firm.

Outsiders: Unemployed workers.

Pro-cyclical Real Wage: Real wage that increases during the expansionary and decreases during the contractionary phase of a business cycle.

Reservation Wage: The minimum wage that must be offered to a worker to induce her to supply her labour on the market.

Shirking: Tendency on the part of workers to avoid work in situations where the employers cannot monitor the work effort perfectly. It pays the firms in such situations to offer higher than market wages, so that the workers have an incentive not to shirk – they could lose a valuable job if caught shirking and they may not be able to get a higher than market-clearing wage in their next job.

16.8 SOME USEFUL BOOKS

Dornbusch, R., S. Fischer and R. Startz, 2004, *Macroeconomics*, Ninth Edition, Tata McGraw-Hill, New Delhi.

Romer, D., 2001, *Advanced Macroeconomics*, Second Edition, McGraw-Hill International, New Delhi.

Blanchard, O.J. and S. Fischer, 2000, *Lectures on Macroeconomics*, Prentice-Hall of India, New Delhi.

16.9 ANSWERS/ HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) Keynesian models assume constancy of nominal wages. Prices rise during cyclical expansions. This implies a fall in real wages. Such a fall in real

wages is necessary in Keynesian models to induce firms to employ more labour during phases of increase in aggregate demand.

Check Your Progress 2

- 1) Firms pay higher than market-clearing wages because the benefits from higher wages could outweigh their costs. The benefits come from increasing the work-capacity of the workers, from bringing in workers with higher reservation wage who are expected to have higher abilities along some unobservable dimensions, from engendering a sense of loyalty among workers, and, above all, from generating incentives for workers to avoid shirking in situations where the work effort cannot be perfectly monitored.
- 2) The condition is interpreted by understanding that when the elasticity is equal to one, the firm minimises the per unit cost of buying effective labour, i.e., the firm sets the real wage so as to get the maximum per unit of effective labour at a given cost. The firm can do such a thing because we assume that the effort expended by labour is an increasing function of the real wage.
- 3) In answering this question, you will have to fully specify an efficiency wage model and characterise its solution. Unemployment can arise in such a model if, at the efficiency wage (which is expected to be higher than the market clearing wage) the total demand for physical units of labour by the firms is less than the total available supply of physical units of labour.
- 4) Increase in labour demand has no effect on the real wage in the model because the real wage is determined in the model only by the characteristics of the effort function and not by labour demand conditions. These latter conditions, hence, only affect employment.
- 5) Simple effort function refers to the function wherein effort depends only on the real wage. The efficiency wage model that uses a simple effort function is not able to distinguish between the short run and the long run effects of increase in demand for labour. We need a model that has a relatively larger effect on employment in the short run and on the real wage in the long run, which is what accords with empirical reality. The model that we have developed in details has uniformly larger effect on employment both in the short and the long run.

Check Your Progress 3

- 1) Fixed-wage contracts are inefficient because, under these contracts, the marginal product of labour is not equal to the marginal disutility of workers, so that it is possible to make both parties to the contract better off.
- 2) An important difference between a wage contract and an implicit contract is that the former is generally inefficient, whereas the latter is efficient. Both kinds of contracts, however, imply real wage rigidity and the usual consequences of such real wage rigidity.
- 3) Insider-outsider models explain the existence of unemployment by reference to the fact that in imperfectly competitive economies, the unemployed workers have no power to influence the wage bargains between the employed workers and the firms. Real wages are hence not low enough for employment to increase.