
UNIT 7 INFLATION: CONCEPT, TYPES AND MEASUREMENT*

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7.0 OBJECTIVES

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

- explain the concept of inflation;
- explain how inflation is measured;
- distinguish between various types of price indices to measure inflation; and
- identify the types of inflation;

7.1 INTRODUCTION

We come across the term inflation very often in newspapers. The reason why it holds such importance is because of its adverse effects on an economy as well as people. A question that could arise at this point is in what way does inflation affect our everyday life? Let us illustrate with the help of a single household. Inflation, in simple words, is a steady rise in the prices of various goods and services. Given the level of the money income, a household consumes a group of commodities at a given price level. With inflation, the price level goes up. So with the same level of money income, the household could consume a smaller amount of the commodities than it was consuming earlier. Alternately, to maintain the earlier level of consumption this household now needs to have more money.

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For example, suppose the household has a monthly income of Rs.100, consumes the entire income on a single commodity A and does not save anything. If the price of commodity A is assumed to be Rs. 4 then the household consumes 25 units of A in a month. Now suppose, the price of commodity A goes up from Rs.4 to Rs.5. The household will be able to consume only 20 units of commodity A.

To maintain the level of consumption at 25 units of A per month, the household needs to have a monthly income of Rs. 125. Thus, we see that with inflation, one unit of money purchases a smaller amount of goods than it was doing earlier. In other words, with inflation, purchasing power of money goes down.

In the above example, consumption of the household comprises one commodity only. But for a typical household, consumption involves a variety of goods and services. As a result, increase in the price of one commodity need not affect household consumption adversely if there is a decline in the price of some other good. Therefore, to ascertain the effect of inflation we need to take into account the change in the prices of all the goods consumed by the household. To do that, we need to find the change in the general level of prices. Therefore, before defining inflation we discuss the meaning of price level and the changes in it.

7.2 MEASUREMENT OF PRICE LEVEL

We are familiar with the term ‘price’ of a product. What do we mean by the term ‘price level’? What is the difference between the two? And how do we measure price level? These are some of the questions we try to answer in the present section.

In simple terms price is defined as the rate at which goods and services are exchanged for money. It is the amount of money received for selling or, paid for buying, one unit of a commodity (or services) in an exchange economy.

The term price level is an aggregate concept. It relates to the price of a basket of goods and services. See that we do not refer to the price of a single commodity but to a group of goods and services taken as a whole. Therefore, when we talk of a change in the price level it is always in reference to a group of commodities. Since the prices of commodities differ, in order to measure a change in the price level of a group of commodities, it is necessary to use index numbers. More specifically, we have to use price index. Let us understand the idea of an index number in an elementary form.

7.2.1 Definition of Index Number

An index number is a concept which enables us to compare the changes in a group of distinct, but related, variables in two or more time periods.

A price index is used for comparing changes in the general level of prices of a group of commodities. Generally a price index refers to changes in the prices obtained over time. It is expressed by putting a particular period (called the

‘base period’) equal to 100 and the price level for other periods are expressed relative to this base. For example, when we say, the wholesale price index has gone up this year with respect to last year, we are taking last year price level as the base or, the reference point = 100. With respect to it we measure the change in the price level this year.

The *price relative* of an individual item is the ratio of its current price to its price in a base period. The simplest price index for a given commodity can be expressed as

$$I_{t,0} = 100 (p_t / p_0) \quad \dots (7.1)$$

where p_t and p_0 denote prices in the current period ‘t’ and the base period ‘0’ respectively.

For instance, if price of a kilo of potato goes up from Rs. 8 in 2017 to Rs. 10 in 2018, then the price index in this case would be:

$$I_{2017,2018} = 100 (10/8) = 125 \quad \dots(7.2)$$

This index shows a 25 per cent increase in the price of potato over the year. In other words, you need 25 per cent more money to maintain your consumption of potatoes at the same old level.

7.2.2 Types of Index Numbers

Index numbers could be of various types, depending upon its purpose and methodology. So far as price index is concerned, there are two main types of price indices, viz., Wholesale Price Index (WPI) and Consumer Price Index (CPI). Both the price indices are different in terms of i) the goods and services included, ii) the weights assigned to each category of goods and services, and iii) the prices (whether wholesale or retail) taken into account.

As it is not possible to consider all goods and services (because of time and resource constraints), the index numbers are estimated on the basis of a sample survey. The numerical value of two price indices will be different depending upon three factors, viz., (i) the commodities included in construction of the index, (ii) the weights assigned to each commodity, and (iii) the base year of the price index. Thus while comparing two price indices we should take into account the above factors. We will discuss about index numbers in greater detail later in the course ‘Statistical Methods for Economics’.

Wholesale Price Index (WPI)

The WPI is the price of a representative basket of wholesale goods. This index measures the changes in price of goods and services at the wholesale market. In India the WPI is published by Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government of India.

The data are collected at the first point of *bulk sale* in the domestic market. The prices used are ‘wholesale prices for primary articles, administered prices for fuel

items and ex-factory prices for manufactured products'. One advantage of the WPI is that it has a long history, dating back to January 1942, which makes it useful for assessing long-term trends in inflation. The WPI also covers a broad range of goods, from raw materials to finished manufactures. A major limitation of the WPI is that it excludes the services sector which has a major contribution to GDP.

Consumer Price Index (CPI)

Consumer Price Index measures changes over time in general price level of goods and services that households acquire for consumption purposes. The CPI numbers in India are widely used i) as a macroeconomic indicator of inflation, ii) as a tool for inflation targeting by the RBI, iii) for monitoring price stability by the government, iv) for indexation of dearness allowance to employees, and v) as deflator for national accounts. The CPI is published by the Central Statistics Office (CSO), Government of India. You might have come across the term 'headline inflation' in newspapers and various reports. It refers to inflation based on the comprehensive consumer price index.

Check Your Progress 1

- 1) If a country is experiencing inflation, the change in the nominal national product will (choose the correct alternative)
 - a) be falling faster than the rate of inflation
 - b) equal the change in the real national product
 - c) understate the value of national income
 - d) overstate the change in the real value of production

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- 2) Distinguish between wholesale price index and consumer price index.

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7.3 INFLATION DEFINED

With the background of prices and price level in view we go on to the definition of inflation. We mentioned earlier that inflation is defined as a *persistent* rise or, a tendency towards persistent rise in the *general level of prices*. The adjective 'persistence' has to be taken note of. The reason is, if price level goes up today but falls tomorrow then it may not imply inflation, but

only short-term fluctuations in prices. The term 'general price level' is also important since, over a period of time, prices of some commodities may have gone up while some others may have actually fallen. As a result, on the whole, the average of these prices may remain constant or even go down. Similarly if the price of a group of commodities, which constitute a small fraction of the total value of output of the economy, would go up, then again it might not be inflationary as such. That is, the effect of rise in prices of such commodities might be too small so as to affect the average price level of all the commodities. Thus we see that inflation is a macroeconomic phenomenon and is not concerned with the rise in the price of a particular commodity, or, a small group of commodities.

In Section 7.1, it was pointed out how inflation is likely to affect a household with fixed money income. In many cases, however, some of the income classes actually benefit from inflation or at the least may remain unaffected by it. We will discuss the causes and effects of inflation in the next Unit.

7.4 TYPES OF INFLATION

On the basis of the severity of inflation or, the rate of acceleration in prices we can divide inflation into three different types, viz., moderate, galloping and hyper-inflation. Further, there are some other related concepts which we discuss below.

7.4.1 Moderate Inflation

When the general price level increases slowly but steadily, it is known as ***moderate inflation***. In the case of India, the Monetary Policy Committee (MPC) resorts to *inflation targeting* at a rate of 4 per cent annum. The rate of inflation as per targets should not be outside the range of 2 per cent to 6 per cent per annum.

7.4.2 Galloping Inflation

Steady and fairly high rate of increases in the general price level is known as ***galloping inflation***. The rate of inflation runs into two digits (20 per cent, 40 per cent, etc.) and sometimes even as high as three digits (i.e., 200 per cent). Some Latin American countries like Brazil and Argentina had experienced inflation rates of over 100 per cent in the 1970s.

7.4.3 Hyper-Inflation

Hyper-inflation is a situation where the rate of inflation is very high. Thus the value of money gets eroded rapidly. In order to cope with such a situation, households minimize their holdings of local currency. Generally it happens in an economy which faces wars and their aftermath, socio-political upheavals or other crisis. In these situations it is very difficult to impose tax on the residents by the government, which leads to fiscal deficit and government has to finance it primarily through money creation rather than imposing taxes or borrowings. In a

situation of hyper-inflation, certain functions of money such as ‘a store of value’ and ‘a medium of exchange’ are no more valid.

There have been several instances of hyperinflation in various countries. Brazil had hyperinflation during the 1980s. A recent example of hyperinflation is Zimbabwe during 2008-09, where prices almost doubled from one day to the next day. The public used to spend money on food or whatever other commodities they could, rather than holding on to money, as the value of money eroded rapidly. According to some reports, it was impossible to estimate the rate of inflation in 2008 – it was around 79.6 billion per cent in November 2008. As a consequence, the country abandoned its currency and allowed use of foreign currencies for transaction in 2009.

7.4.4 Stagflation

The term stagflation (stagnation plus inflation) refers to the situation where an economy grows very slowly or at zero rate (stagnant) and prices keep rising. The side effects of stagflation are increase in unemployment- accompanied by a rise in prices, or inflation. It raises economic dilemma as the actions designed to lower inflation may worsen unemployment and vice versa. This happened during the 1970s, when crude oil prices rose dramatically, fuelling sharp inflation in developed economies.

7.4.5 Deflation

Deflation is a situation where there is a consistent decline in price level. Here again you have to notice the words ‘consistent’ and ‘price level’. Thus decline in price of a single commodity cannot be terms as deflation. A situation of deflation arises when aggregate demand is lower than aggregate supply. Thus, deflation is characterized by a decrease in output, increase in unemployment, and general slowing down of the economic activities.

The Great Depression of 1930s is an example of an acute deflation when prices crashed, unemployment increased to a very high level, and GDP of the developed countries fell sharply. There are many adverse effects of deflation. Deflation in a modern economy is bad because it increases the real value of debt, and discourages production in the economy as prices keep falling.

7.4.6 Core inflation

The measurement of inflation after removing the transitory or temporary price volatility is known as ‘core inflation’. If temporary price shocks are taken into account, they may affect the estimated overall inflation numbers, which may not match with the actual inflation number. To eliminate this possibility, core inflation is considered to assess actual inflation by removing the temporary shocks and volatility. In India core inflation is calculated on the basis of price increase in manufactured products excluding food products. Thus it does not include agricultural commodities, fuel and energy and food products.

Check Your Progress 2

- 1) A price index in years after the base year (Tick the correct option)
 - a. is never 100.
 - b. is always greater than 100.
 - c. is always less than 100.
 - d. can be less than, greater than, or equal to 100.

- 2) The CPI in 2017 was 111.5 and in 2018 was 114.1. The inflation rate is (Tick the correct option)
 - a. 2.3%
 - b. 2.6%
 - c. 112.8
 - d. Insufficient information

- 3) Briefly discuss the various types of inflation.

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7.5 LET US SUM UP

Inflation is a persistent rise in the price level. When there is a rise in the price level, there is a decline in the purchasing power of money. For measuring change in the price level we take the help of the price index. An index number is a device for comparing the magnitude of a group of distinct, but related, variables in two or more time periods. There are two important types of price indices, viz., wholesale price index and consumer price index.

Deflation is a persistent decline in the price level. Hyper-inflation is a situation of very high inflation, which could arise in the aftermath of wars or serious economic crisis in an economy. The severity of most of the costs of inflation enhances during hyperinflation. Stagflation is commonly referred to a situation of stagnation in growth coupled with high inflation.

Core inflation is an inflation measure which excludes transitory or temporary price volatility as in the case of some commodities such as food items, energy products, etc.

**7.6 ANSWERS/ HINTS TO CHECK YOUR
PROGRESS EXERCISES**

Check Your Progress 1

- 1) d
- 2) Refer to Sub-Section 7.2.2 and answer.

Check Your Progress 2

- 1) d
- 2) a
- 3) Refer to Section 7.4 and answer.



UNIT 8 CAUSES AND EFFECTS OF INFLATION*

Structure

- 8.0 Objectives
- 8.1 Introduction
- 8.2 Causes of Inflation
 - 8.2.1 Demand-Side Inflation
 - 8.2.2 Supply-Side Inflation
 - 8.2.3 Quantity Theory of Money
 - 8.2.4 Structural Theory of Inflation
- 8.3 Effects of Inflation
 - 8.3.1 Debtors and Creditors
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 - 8.3.3 Traders and Investors
 - 8.3.4 Agriculturists
 - 8.3.5 Government
- 8.4 Cost of Dis-inflation
- 8.5 Let Us Sum Up
- 8.6 Answers/ Hints to Check Your Progress Exercises

8.0 OBJECTIVES

After going through this Unit you will be in a position to

- explain the major causes of inflation;
- distinguish between demand pull inflation and cost push inflation;
- explain the quantity theory of money and structural theory of inflation; and
- appreciate the effects of inflation on various sections of people.

8.1 INTRODUCTION

In the previous Unit we explained the concept and types of inflation. In this Unit we look into the causes and effects of inflation. According to Nobel Laureate Milton Friedman, “Inflation is always and everywhere a monetary phenomenon”. By this he meant that inflation is always higher when money supply exceeds economic growth for a period of time. Monetarists also regard inflation as “too much money chasing too few goods”. Apart from money supply there are several other factors that cause inflation. Further, as we discuss below, inflation affects various sections of society differently.

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8.2 CAUSES OF INFLATION

The causes underlying inflation are generally ascribed to the source through which inflation originates. You have learnt from microeconomics that price of a commodity is determined at the level where supply equals demand. If demand exceeds supply there is an increase in price. On the other hand, if supply exceeds demand, price will go down. In either case the price adjustment takes place till demand and supply are equal. However, the source of the change in one case originates from the demand side while in the other case it originates from the supply side. A similar process applies in the case of aggregate demand and aggregate supply also. Depending upon the initial process, we classify inflation into two types, viz., (i) demand-pull or demand-side inflation, and (ii) cost-push or supply-side inflation.

8.2.1 Demand-Side Inflation

Factors which increase aggregate demand, while there is no increase in aggregate supply, can cause demand-side or demand-pull inflation. According to the Keynesian view, demand-pull inflation occurs when aggregate demand exceeds aggregate supply at full employment level of output thereby attributing inflation to the relationship between aggregate demand (C+I+G) and full employment level of output. Increase in aggregate demand will take place if there is an increase in (i) Consumption (could be due to increase in income, reduction in saving, or reduction in tax rate), (ii) Investment (due to reduction in rate of interest or optimism in business sentiments), and (iii) increase in government expenditure.

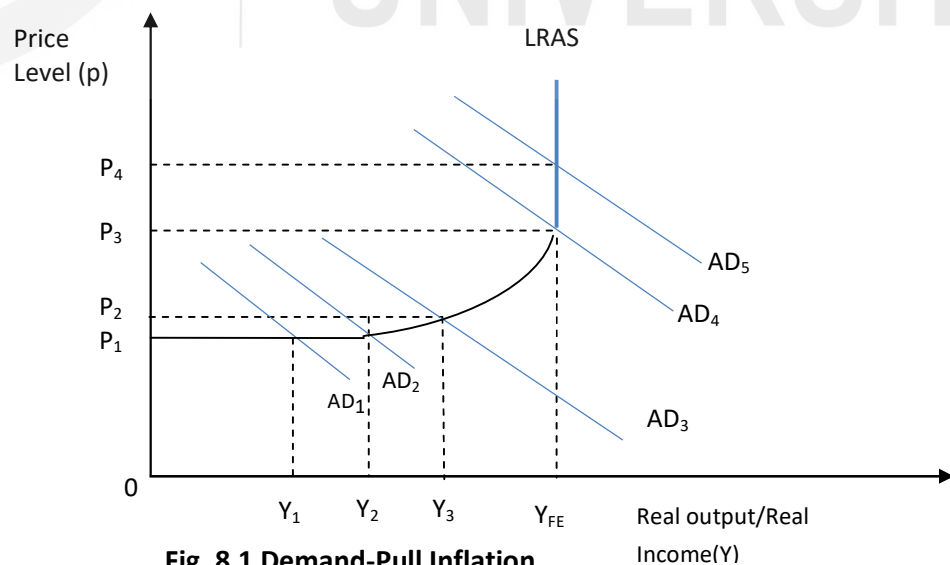


Fig. 8.1 Demand-Pull Inflation

Remember that in the Keynesian framework aggregate supply curve is horizontal, upward sloping, and then vertical based on the time period under consideration (LRAS in Fig. 8.1). Let us assume that the current level of aggregate demand is AD_1 . The equilibrium price level is P_1 and the level of real output is Y_1 . As you can observe from Fig. 8.1, at output level Y_1 , there is under-utilisation of production capacity. In other words, the economy is operating below the full employment level Y_{FE} . An increase in aggregate demand (from AD_1 to AD_2) in this situation (for example, due to a rise in government spending), will lead to an increase in real output (from Y_1 to Y_2). You should note that there is no increase in prices in this situation as the supply curve is infinitely elastic (horizontal part of the LRAS curve in Fig. 8.1).

Further increase in government spending however would result in increases in output and prices. A shift in the AD curve from AD_2 to AD_3 will increase real output (from Y_2 to Y_3) but the price level will also rise (from P_1 to P_2). This is because producers are not willing to supply more at the existing price P_1 ; they are willing to supply output Y_3 only at a higher price, that is, P_2 . The result is similar if AD increases from AD_3 to AD_4 . At this stage, the economy is approaching the full employment level of output (Y_{FE}); some production units have some spare capacity but others are operating at full capacity. Under such a situation increase in aggregate demand will result in price rise in some industries, and so a rise in the average price level when AD rises. Further increase in AD (from AD_4 to AD_5), when the economy is at full employment output, will result in price rise without any increase in the level of output.

8.2.2 Supply-Side Inflation

Keynesian theory of cost-push inflation attributes the basic cause of inflation to supply-side factors such as increase in wage rate or unexpected rise in raw material prices. Cost-push inflation is usually regarded as wage inflation process as wages constitute a substantial part of total costs of production. Powerful and militant trade unions often bargain for higher wages. If increase in wage rate is the same as the growth rate in productivity of labour, then average cost of production does not increase. If trade unions succeed in negotiating a higher wage increase, not matched by productivity growth, then cost of production increases. Such a situation forces producers to increase prices of the goods and services they produce. This kind of inflation is known as **wage-push inflation**. A pre-requisite for wage-push inflation is unionization of labour.

The workers, faced with inflation in the economy, often demand a rise in wage rate. The producers often comply with such demands. As the cost of production increases, the firms increase the price of the product.

Further, the firms increase the price of their products so that they can have higher profits. When the prices of goods and services increase, workers demand higher wages to compensate for price rise. In this process, a series of increase in wage rate leads to a series of increase in prices. This sort of a situation leads to a **wage-**

price spiral. A pre-requisite for firms to increase prices is market imperfection. In a market with many competitors, a firm would have limited scope for increasing prices.

Suppose AD is the aggregate demand curve and AS₁ is the aggregate supply curve. Thus, the economy operates at equilibrium output Y₁ and equilibrium price level P₁ (see Fig. 8.2). Suppose there is a shift in the aggregate supply curve from AS₁ to AS₂ due to increase in the cost of production. The shift in the AS curve indicates that the supply of the same level of output can be made only at a higher price. The new equilibrium point is E' with equilibrium output Y₂ and equilibrium price level P₂. Note that, in this case, there is a decline in output and increase in price level.

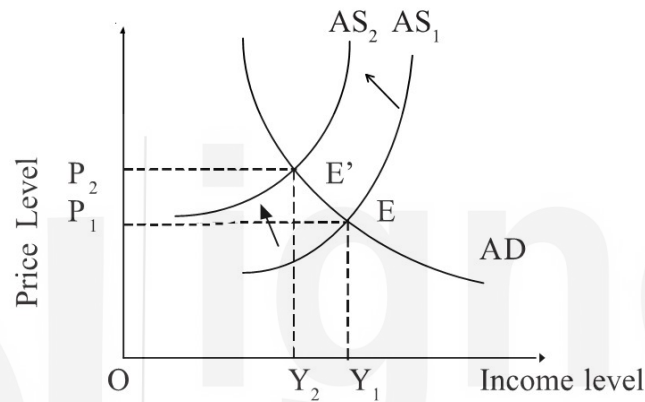


Fig. 8.2 Cost-Push Inflation

8.2.3 Quantity Theory of Money

The discussion above reflects the explanation offered by Keynesian economists. The Monetarist view, however, is different from the Keynesian explanations. The Monetarists use the 'Quantity Theory of Money' (discussed in another Unit of this course) to explain the causes of inflation. Recall the 'equation of exchange' used in the Quantity Theory of Money

$$MV = PY$$

where:

- M = quantity of money in circulation in the economy
- Y = real national income
- P = price level
- V = velocity of circulation, the speed at which money circulates in the economy

The quantity theory of money is based on two assumptions, viz., (i) that money is 'neutral', and (ii) velocity of circulation (V) is constant for any given situation. The neutrality of money, based on the dichotomy of the market, implies that changes in money supply do not affect the level of output. The monetarists argue that output (Y) is a real variable, which is driven by real factors only. Aggregate output (Y) is constant (AS curve is vertical) as there is full employment in the

economy. Full employment is maintained through flexibility in wage rate and prices.

The Monetarists use the equation of exchange to simplify the explanation of how monetary policy works. The two sides of the equation of exchange must always be in balance. If V is constant and Y cannot be changed by an increase in M , then the *only* part of the equation that can be changed by an increase in M is P . So, if the Central Bank increases the money supply leading to a rise in M , the result *has to be* a proportional increase in P . The observed long-run relationship between money and prices supports the monetarist view that over expansion of money supply could result in higher inflation, and that inflation can be prevented by appropriate regulation of money supply.

8.2.4 Structural Theory of Inflation

The structural theory of inflation, as developed by Myrdal, Streeten and several other Latin American economists, attributes the phenomenon of inflation to structural factors or structural rigidities, generally found in developing economies. The structural theory refers to the resource gap (i.e., saving is less than investment), food-shortages (resulting from dependence of agriculture on rainfall), foreign exchange scarcity, and poor infrastructural facilities. All these structural factors, according to the structural theory of inflation, are the real causes of inflation in developing countries.

The structural theory came to the fore in the 1970s when the world was confronted with a situation of rising prices coupled with high unemployment (stagflation), something that demand-pull theories could not explain. It was observed that the two oil price shocks in the 1970s, which were essentially supply-side shocks (because they increased the cost of production), were capable of producing such a situation. Structural economists, on their part, argue that in developing countries, in addition to money, structural factors such as supply and demand conditions also play an equally important role in determining price in the economy. Financing public investment through money expansion increases productive capacity and real output, while real output, at the same time, would increase the demand for money. Further, the concern of the government to maintain a desired level of real public expenditure leads to increase in nominal expenditure of the government leading to rise in prices.

Although this strand of thought invited criticism, we should not deny that supply of goods and services matters. Government intervention to increase productivity for example by encouraging research and development, may well contribute in combating inflation in the longer term.

Check Your Progress 1

- 1) Match the following:

1. Inflation	a. when inflation is due to excess demand
2. Hyper-inflation	b. sustained increase in the price level
3. Demand-pull inflation	c. inflation due to rise in production costs
4. Cost-push inflation	d. an accelerating increase in the price level

- 2) An increase in oil prices, such as the oil shocks in the 1970s, lead to _____, thereby causing _____.
- a) a movement along the AS curve; cost-push inflation
 - b) a leftward shift in the AS curve; demand-pull inflation
 - c) a rightward shift in the AS curve; cost-push inflation
 - d) a leftward shift in the AS curve; cost-push inflation
- 3) Distinguish between demand-pull and cost-push inflation.

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8.3 EFFECTS OF INFLATION

Inflation reduces the value of money thereby leading to erosion of purchasing power. If the nominal income of a person is increasing at a rate higher than the rate of inflation, her real income (i.e., nominal income divided by price level) will be increasing. On the other hand, if the nominal income of a person is increasing at a rate lower than the inflation rate, her real income is declining.

Broadly, there are two economic groups in every society, the fixed income group and the variable income group. The fixed income group usually suffers as their real income declines with inflation. On the other hand, people with variable income such as industrialists, traders, real estate holders, and speculators may gain during rising prices. Generally speaking, which income group of the society gains or losses from inflation depends on who anticipates inflation and who does not. Those who correctly anticipate inflation can adjust their present earnings, borrowing and lending activities accordingly.

Some people, mainly from poorer background, are habituated to hold cash; even they do it during high inflation. The value of money erodes during inflation; therefore, there is a cost associated with holding of cash.

The cost accrued for such a feature is often called 'inflation tax'. This is not an actual legal tax paid to the government; rather it refers to the penalty for holding cash at a time of high inflation. For example, suppose you are holding Rs. 1000 in cash and the inflation rate is 10 per cent. After one year, the cash you are holding will be the same (i.e., Rs. 1000) while purchasing power of money will decline by 10 per cent (i.e., goods which are available for Rs. 100, will be priced

at Rs. 110 after one year). Thus, the cash you are holding will be equivalent to Rs. 900 only in today's prices.

If an investor is holding securities, real estate or other assets, the effect of inflation may be negligible. We discuss below the effect of inflation on different segments of society.

8.3.1 Debtors and Creditors

During periods of rising prices, debtors gain and creditors lose. When prices rise the value of money falls. Though debtors return the same amount of money (or nominal money), they pay less in terms of goods and services (or real money). This is because the value of money is less than when they borrowed the money. Thus, the burden of the debt is reduced and debtors gain.

On the other hand, creditors lose. Although they get back the same amount of money which they lent, they receive less in real terms because the value of money falls. Thus, inflation brings about a redistribution of real wealth in favour of debtors at the cost of creditors.

8.3.2 Fixed Income Groups

Persons with fixed salary are at a loss when there is inflation. The reason is that their salaries are slow to adjust when prices are rising. Workers may gain or lose depending upon the speed with which their wages adjust to rising prices. If the labour unions are strong, workers may get their wages linked to the cost of living index. In this way, workers may be able to protect themselves from the adverse effects of inflation. There is often a time lag between the raising of wages by employers and the rise in prices. Thus, workers lose because by the time wages are hiked, the cost of living index has increased further. Moreover, if the workers have entered into contractual wages for a fixed period, they lose when prices continue to rise during the period of contract. Overall, the wage earners are in the same position as the white-collar workers.

The recipients of 'transfer payments' such as pensions, unemployment benefits, social security, etc. and recipients of interest and rent live on fixed incomes. All such persons lose during inflation because they receive fixed payments for a period, while the value of money continues to fall.

8.3.3 Traders and Investors

Proprietary income earners such as producers, traders and real estate holders gain during periods of rising prices. Let us discuss the case of the producers. When prices are rising the value of their inventories (goods in stock) rise in the same proportion. So, their profits go up as their sales go up. The same is the case with traders in the short run. But producers receive more profit in another way – input prices do not increase in the same proportion as output prices. This is because wage rate and prices of certain raw materials increase with a time lag. The owners of real estates are gainers during inflation because the prices of landed property usually increase faster than the general price level.

8.3.4 Agriculturalists

Agriculturists are of three types, viz., landlords, peasant proprietors, and landless agricultural workers. Landlords lose during rising prices because they get fixed rents. Peasant proprietors, however, who own and cultivate their farms gain. During periods of high inflation, prices of farm products increase faster than the cost of production – wage rate and land revenue do not rise to the same extent as the rise in the prices of farm produce. Landless agricultural workers, however, are hit hard by rising prices. Their wages are not raised by the farm owners; government does not revise minimum wages frequently and trade unionism is absent among them.

8.3.5 Government

The government as a debtor gains at the expense of households who are its principal creditors. This is because interest rates on government bonds are fixed and are not raised to offset expected rise in prices. The households however stand to gain as tax payers. The taxes are paid with a lag, on income earned during the year, and the real value of taxes is reduced because of inflation. Thus, the net effect on households while dealing with the government is complex. As creditors, real value of their assets declines and as tax-payers, real value of their liabilities declines during inflation.

8.4 COST OF DIS-INFLATION

In the previous section we saw that inflation results in re-distribution of income and the lower income groups suffer the most. High inflation is seen to have led to discontent among people; sometimes leading to political instability and fall of government in many countries. Thus, the consequences of inflation are not only economic, but also social and political. In view of this, policy makers always try to control inflation. In fact, many countries, including India, pursue 'inflation targeting' as the only objective of monetary policy. When there is high inflation, the government has to adopt a tight monetary policy so that aggregate demand is brought under control. The policies are geared towards reduction of the inflation rate, that is, dis-inflation.

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, viz., (i) borrow from public, (ii) run down on foreign exchange reserve, and (iii) 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. 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 puts the economy out of gear and it becomes difficult to maintain economic stability.

For reducing the rate of inflation, policy makers in an economy have to reduce aggregate demand, through imposition of restrictions on consumption and investment, and cutting down on government expenditure. When investment (both private and public) is reduced, there is an adverse effect on economic growth (remember that the multiplier effect works for decrease in investment also). Further, with the decline in investment, there is a fair chance that unemployment in the country will increase. In fact, the ‘Phillips Curve’ (to be discussed in another Unit) describes the relationship between inflation and unemployment. Empirically it is observed that the relationship between inflation and unemployment is inverse, at least in the short run. An implication of the *Phillips Curve* is that a lower rate of inflation is possible only if the government is willing to accept a higher rate of unemployment. Thus, there could be a trade-off between inflation and unemployment in the short run. Higher unemployment brings in another set of problems – lower economic growth, growing poverty, social discontent, and possibility of political instability.

Sacrifice Ratio

Slower economic growth puts pressure on fiscal targets – revenue generation is adversely affected as growth rate slows down while government expenditure increases due to cost escalation. The high fiscal deficit is a source of not only inflation, but also government debt. Very often we measure the cost of inflation in terms of ‘Sacrifice Ratio’, which is defined as follows:

$$\text{Sacrifice ratio} = \frac{\text{Percentage loss of output}}{\text{Percentage decline in inflation rate}}$$

For example, for a country, inflation declined by 2 per cent while output declined by 5 per cent. Thus, sacrifice ratio is 5/2, that is, 2.5. The sacrifice ratio indicates the potential output that has to be sacrificed for reducing inflation by one per cent.

Cold Turkey or Gradualism

In the process of disinflation, a question arises: whether the policy makers should go for a rapid decline in inflation rate or they should follow such a policy that reduction in inflation is gradual. The classical economists suggest that disinflation process should be rapid – this strategy is sometimes referred to as ‘cold turkey’. According to this view, government policy of disinflation should be visible, and people should believe that the government is sincerely trying to reduce inflation.

In the process it will reduce expected inflation. The Keynesian economists however suggest a ‘gradual approach’, as there are several frictions in the economy. In an economy there are several wage contracts which require time to expire and thus some time is required for the economy to adjust to the new inflation target set by the government. During the adjustment period the

unemployment rate could be very high. According to the Keynesian view, the cold turkey approach may not lower inflation expectations, because people may doubt whether it is possible to bring down inflation so rapidly. Further, according to them, the cost of rapid decline in inflation would be enormous in terms of high unemployment and unsustainable politically.

Check Your Progress 2

- 1) Unexpected inflation will (tick the correct answer)
 - a. Hurt borrowers.
 - b. Hurt lenders.
 - c. Hurt borrowers and lenders equally.
 - d. Have no effect on either borrowers or lenders.

- 2) Give a brief account the cost of dis-inflation for an economy.

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8.5 LET US SUM UP

There are mainly two types of inflation, viz., (i) demand-pull inflation, and (ii) cost-push inflation. Both types of inflation cause an increase in the overall price level within an economy. Demand-pull inflation occurs when aggregate demand for goods and services in an economy rises more rapidly than an economy's productive capacity. Cost-push inflation, on the other hand, occurs when prices of production process/factor inputs increase. Rapid wage increases or rising raw material prices are common causes of this type of inflation. In the long run, inflation occurs because of expanding money supply. However, there are several factors such as business cycles, international oil prices, and changes in exchange rate that can cause inflation in the short run. Also, we learnt from the structural theory of inflation that structural factors such as saving-investment gap, food shortages, foreign exchange scarcity, and infrastructural bottlenecks are the real causes of inflation in developing countries.

Inflation has economic, social and political implications. Inflation leads to re-distribution of wealth, usually in favour of the rich.

Further, we discussed the effect of inflation on various sections of society. Certain groups of people in society are affected by inflation more adversely than others. Generally, people with fixed incomes such as workers, salaried persons, teachers, pensioners, interest and rent earners, are made worse off during inflation because their incomes do not increase as fast as the prices.

8.6 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) 1-b, 2-d, 3-a, 4-c.
- 2) d
- 3) According to the Keynesian view, demand-pull inflation occurs when aggregate demand exceeds aggregate supply at full employment level of output thereby attributing inflation to the relationship between the aggregate expenditure (C+I+G) and full employment level of output. Refer to Sub-Section 8.2.1.

Keynesian theory of cost-push inflation attributes the basic cause of inflation to supply side factors, particularly to the possibility that rising production costs will lead to inflation. Refer to Sub-Section 8.2.2.

Check Your Progress 2

- 1) b
- 2) Refer to Section 8.3 and answer.



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UNIT 9 PHILLIPS CURVE*

Structure

- 9.0 Objectives
- 9.1 Introduction
- 9.2 Types of Unemployment
- 9.3 Phillips Curve
- 9.4 Natural Rate of Unemployment
- 9.5 Expectations in Economics
 - 9.5.1 Adaptive Expectations
 - 9.5.2 Rational Expectations
- 9.6 Expectation-Augmented Phillips Curve
 - 9.6.1 Phillips Curve under Adaptive Expectations
 - 9.6.2 Phillips Curve under Rational Expectations
- 9.7 Let Us Sum Up
- 9.8 Answers/ Hints to Check Your Progress Exercises

9.0 OBJECTIVES

After going through this unit you should be able to

- identify various types of unemployment;
- explain the concept of natural rate of unemployment;
- establish a relationship between unemployment and inflation;
- describe the concepts of adaptive and rational expectations;
- explain how the short-run Phillips curve shifts; and
- reconcile the difference in shape of the Phillips curve in short-run and long-run.

9.1 INTRODUCTION

As you know from the previous two units, inflation is a situation where there is a general and sustained increase in prices of goods and services. With inflation, there is a decrease in the value of money and resultant decrease in the purchasing power of households. Increase in the rate of inflation also adversely affects the exchange rate. Inflation is caused by various factors that are concerned with demand and supply. Accordingly, inflation can be classified into two types – demand pull (caused by increase in demand) and cost push (cause by increase in cost of production). An important social issue, apart from inflation, is unemployment.

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It has economic implications for people – unemployment is a situation where a healthy person, who is willing to work, fails to get employment at the prevailing wage. It not only results in loss of income to the family, it puts the person's morale down. At the aggregative level, it results in a loss of valuable human resources – the services of the unemployed persons could have been productively utilized in the production of goods and services. In fact, inflation and unemployment are considered to be two important evils of society. Social implications of inflation and unemployment are far more serious. These problems could lead to social stress and political instability in a country.

Economists have long been intrigued by the relationship between inflation and unemployment. Recall that the classical economists advocated independence of real sector from the monetary sector. While unemployment is a real variable, inflation pertains to the monetary sector. Thus classical economists could not visualise a relationship between inflation and unemployment. According to the classical economists, an increase in money supply will lead to an increase in price level (refer to the quantity theory of money), leaving behind the level of output unchanged. The assumption of flexibility in wage rate ruled out the possibility of a person being unemployed. Thus, the classical economists never thought of unemployment as a problem; they believed it to be a transitory issue. Keynes, on the other hand, suggested that monetary variables have real implications. The transmission mechanism suggested by him is as follows: As money supply increases, there is a decline in the rate of interest. Lower interest rate leads to an increase in investment. An increase investment leads to an increase in employment and output.

As you know from microeconomics, 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 labour market, equilibrium wage rate is determined at a level where the supply of labour is equal to the demand for labour. 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).

In this Unit we will consider the relationship between inflation and unemployment, given by the Phillips curve. We will analyse the difference in the shape of the Phillips curve between short run and long run.

9.2 TYPES OF UNEMPLOYMENT

'Labour force' as a concept includes all persons in the age group of 16 years to 64 years who are willing to work. Thus it includes both employed and unemployed persons. The persons not included in the labour force include those who are retired, too ill to work, keeping the house, or simply not looking for work.

‘Work force’ as a concept is somewhat narrower – it includes the employed persons only. Thus the difference between the labour force and the work force gives us the number of unemployed.

By employed persons we mean those who perform any paid work (thus homemakers 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. While considering unemployment we do not take into account those who are not in the labour force. We define unemployment rate as the number of unemployed divided by the total labour force. You should remember that the concept of unemployment implies ‘involuntary unemployment’. This concept implies that a person is willing to work at the prevailing wage rate, but cannot find work.

There are three types of unemployment, viz., frictional, structural and cyclical. We explain the differences below.

(i) Frictional unemployment: It 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.

(ii) Structural unemployment: It results from the mismatch between supply and demand for different kinds of jobs. For example, in recent years, the number of engineers and management professionals looking for jobs in India has been much higher than available jobs. This has resulted in a number of persons with technical qualification opting for low qualification jobs. Structural unemployment takes place largely due to structural shifts in an economy and adjustments to such shifts take time. A large number of educational institutions in India have discontinued their engineering education programmes.

(iii) Cyclical unemployment: It arises due to fluctuations in aggregate demand, which is a part of business cycles. 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 the demand for labour and unemployment decreases. Thus cyclical unemployment is pro-cyclical in nature.

Empirical data shows that the labour force in an economy is much less than the total population. Total labour force in India, according to certain sources, is about 50 crores compared to an estimated population of 138 crores in 2020. Persons above 65 years and children below 15 years of age however should not be taken into consideration while comparing the size of the labour force to total population. A relevant ratio in this context is the ‘Labour Force Participation Rate (LFPR)’. It is defined as follows:

$$\text{LFPR} = \frac{\text{Size of the labour force}}{\text{Size of population in the age group of 16 – 64 years}}$$

The labour force participation rate (LFPR) varies across countries, and over time for the same country. If we take gender into account, there could be male labour force participation rate and female labour force participation rate. Usually, there is a gap between male LFPR and female LFPR. In India, for example, female LFPR is much lower compared to male LFPR. Further, there is a sharp decline in female LFPR in recent years. Such a decline could be due to cultural and structural issues.

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.

9.3 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. Phillips found that there exists a stable and inverse relationship between \dot{w} and u , with the implication that lower rate of unemployment is associated with higher rate of wage increase.

Subsequent to the publication of the results by Phillips, many economists followed suit and attempted similar exercises for other countries. Subsequently, it was established that there is a stable relationship between rising wage rate and rising price level. This led some economists to refine the simple equation estimated by Phillips and 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 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 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. Thus the Phillips curve justifies the discretionary stabilization policy of a government.

In Fig. 9.1 we depict a typical Phillips curve. Suppose the economy is operating at point A with inflation rate of π_1 and unemployment rate of u_1 . If the

government wants to reduce the rate of inflation to u_2 , the economy has to tolerate a higher rate of inflation (π_2).

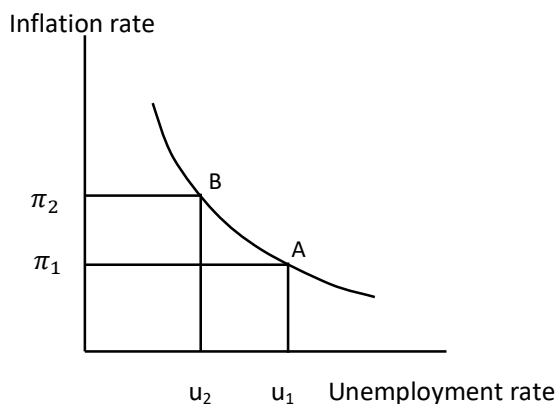


Fig. 9.1: Phillips Curve

During the 1960s and early 1970s the Phillips curve was considered to be an important tool of policy analysis. The prescription was simple and straight forward: During periods of high unemployment the government could follow an expansionary monetary policy which leaves more money in the hands of people. Such a policy may accelerate the rate of inflation while lowering unemployment. Conversely, during periods of high inflation the government could follow a contractionary economic policy so as to reduce inflation rate; the cost of such a policy however was supposed to be higher rate of unemployment. Thus, economists believed that there was a trade-off between inflation and unemployment. The government could choose any combination of inflation rate and unemployment rate depending upon the slope and position of the Phillips curve.

During the late 1970s and early 1980s, however, such a belief got shattered. The prescriptions of the Phillips curve did not work at all. Economies suffered from both high inflation and high unemployment. As unemployment increased, there was a lower level of output implying stagnation in economic growth. When governments tried to follow Keynesian policy prescription of higher government expenditure so as to increase aggregate demand, the rate of inflation accelerated. Thus, what most countries experienced was ‘stagflation’ – a combination of stagnation and inflation. The reason for stagflation was found to be supply shocks due the ‘oil crisis’ of 1973 and 1979 (refer to Unit 6). Stagflation prompted economists to explore further into the reasons for stagflation.

Check Your Progress 1

1. Write a brief note on the various types of unemployment.

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2. Explain how the Phillips curve could offer policy options before the government.

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3. Define the following concepts:

- a) Involuntary Unemployment
- b) Natural Rate of Unemployment
- c) Labour Force Participation Rate
- d) Inflation-Unemployment Trade-Off

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9.4 NATURAL RATE OF UNEMPLOYMENT

You might have come across the term full employment, which implies that all workers in the economy are employed. Have you ever thought of such a situation? Can it be attained? When we say that an economy is operating at ‘full employment’ level, we do not mean that there is zero unemployment. Because of imperfections in markets, rigidities in wages and prices, and various frictions in the economy it is not possible to obtain zero unemployment.

For example, at any point of time, some workers are in the transition process from one job to another (frictional unemployment). Similarly, a fraction of workers cannot be employed because of mismatch between the skill they possess and the skill required (structural unemployment).

In view of the above, a new concept termed ‘natural rate of unemployment’ was introduced in the 1960s independently by Milton Friedman and Edmund Phelps. Natural rate of unemployment takes into account the frictions and imperfections in the economy and assumes that it is natural for an economy to have certain fraction of its labour force unemployed, at any point of time. We observe that any unemployment that is not natural could be due to business cycle, or policy related.

For empirical purposes natural rate of unemployment is the total of frictional unemployment and structural unemployment in an economy.

It varies across countries, and over time for the same country. For the US economy, for example, natural rate of unemployment is estimated to be between 3.5 per cent and 4.5 per cent. Many countries do not report any estimate of natural rate of unemployment.

The concept of natural rate of unemployment reshaped macroeconomic analysis in subsequent years. As we will see later in this Unit, expectations of economic agents (such as households, firms and government) about future economic environment play a major role in the shape and position of the Phillips curve.

9.5 EXPECTATIONS IN ECONOMICS

Expectations play an important role in decision-making. During rainy season when you move out, you look at the sky or listen to the weather forecast. If you expect that it might rain later in the day, you carry an umbrella. Further, if you expect that you may have to stay back, you make necessary arrangements. In a similar manner, economic agents form expectations about economic variables (such as prices, demand, government policy, etc.) and take decisions. If a producer expects that demand for his products will increase in the coming years, he would plan to increase his production capacity. He may consider several factors such as i) possible advances in production technology that might make the currently installed machinery obsolete, ii) appearance of new substitutes might affect demand for output, iii) changes in industrial, labour, trade and tax policies of the government might affect revenues and costs, iv) wars, trade embargoes and changing international relations might affect possibilities of production and sale. If a worker expects that demand for labour will be somewhat higher in the coming months, he may demand for a hike in his salary. On the other hand, if demand for labour is on the decline, he would like to retain his job and may not ask for a raise. Further, if the worker expects that prices of goods and services are increasing faster (i.e., inflation is higher) he would demand for higher wage rate so that his real wage rate is maintained.

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 classes who have a fixed nominal wage are the looser as real wage gets deteriorated due to price rise.

Economists have recognized the role of expectations in economic behavior for a long time. Keynes speaks about expectations of people, but he does not include it in his analysis. Formal treatment of expectations in economic theory however began in the 1950s. There are two important hypotheses of expectations, viz., (i) adaptive expectations, and (ii) rational expectations. We present a brief description of these two hypotheses.

9.5.1 Adaptive Expectations

Adaptive expectations takes into account past behavior of a variable. Suppose price level for time period (t) is P_t and we put a superscript 'e' to indicate expected price level. Thus expected price level in period (t) is P_t^e . According to adaptive expectations,

$$P_t^e = P_{t-1}^e + \lambda(P_{t-1} - P_{t-1}^e)$$

where P_{t-1} is the price level in the previous time period, and λ is a parameter such that it takes values between 0 and 1.

We interpret the above equation as follows: During previous year economic agents (say, households and firms) expected price level to be P_{t-1}^e . Actual price however turned out to be P_{t-1} . Thus, there is a forecast error of $(P_{t-1} - P_{t-1}^e)$. Of these forecast error, people will update their expectations by adding $\lambda(P_{t-1} - P_{t-1}^e)$ to previous year's expected price. Note that people would like to update their expectations, and rectify part of the error they committed during previous year.

Let us take an example. Suppose, in 2019 firms expected the inflation rate (π) to be 3 per cent (π_{t-1}^e). In reality, inflation rate turned out to be 6 per cent (π_{t-1}), thereby resulting in an error of 3 per cent. What should be the expected inflation rate in 2020 (value of π_t^e)? Obviously, firms would update their expected inflation rate for the current year and they would expect a higher rate of inflation in 2020. Suppose, firms have learnt from past experience that about 50 per cent of the forecast errors needs to be corrected (it means, $\lambda = 0.5$) while updating their forecast about price level. Thus, the expected inflation rate in 2020 would be $\pi_t^e = \pi_{t-1}^e + \lambda(\pi_{t-1} - \pi_{t-1}^e)$

$$= 3 + 0.5(6 - 3) = 4.5 \text{ per cent.}$$

Adaptive expectations hypothesis is simple to operate. It also brings in an important concept, i.e., expectations into macroeconomics thereby making it more realistic. There are however two major limitations of adaptive expectations hypothesis. First, the model assumes that people do not learn from past mistakes – they adjust current year expectations by λ times the forecast error. Thus, they consistently underestimate the rate of inflation, if the actual inflation rate is more than the expected inflation rate. Similarly, they consistently overestimate the rate of inflation, if the actual inflation rate is less than the expected inflation rate. Second, the model assumes that people base their expectations on past information only. It does not take into account the present or future events. For example, under adaptive expectations, when government pursues an expansionary monetary policy people do not expect that inflation rate will go up. Similarly, when there is a natural disaster such as drought, people do not expect that aggregate supply will decline and prices will go up.

The limitations of adaptive expectations prompted economists to look for alternative theories of expectations.

9.5.2 Rational Expectations

Rational expectations hypothesis assumes that households and firms take decisions on the basis of the best possible information available to them. Thus, they consider not only past trends but also present and expected future events. According to rational expectations, people learn from past mistakes. People may be wrong in their forecast sometimes; but on average they will be correct.

In simple terms, expected rate of inflation in period t is given by

$$\pi_t^e = \pi_t + \varepsilon_t$$

In the above equation ε_t is a stochastic error, with expected value of zero. While some people may have positive errors in their forecast, others will have negative errors. When aggregated, such errors cancel out in the sense that the sum of positive errors is equal to the sum of negative errors. Secondly, the errors do not show any pattern; they are random in nature. Recall that under adaptive expectations, errors were systematic (it followed a pattern).

There are two versions of the rational expectations hypothesis: weak and strong. In the weak version, it is assumed that people have access to limited information; but they make best use of the information. Let us take a concrete example. You buy wheat flour (*atta*) every week for household consumption. You do not know the relative prices and nutrient levels of all the brands of wheat flour available in the market. With limited information available to you, however, you usually stick to the same brand (and may be the same shop, without knowing that other shops are charging a lower price!).

In the strong version of rational expectations hypothesis, it is assumed that people have access to all information. Decisions taken are based on all information. Thus, their expectations are equal to the actual values. Any error in forecast is due to unexpected developments.

9.6 EXPECTATION-AUGMENTED PHILLIPS CURVE

The Phillips curve discussed earlier could not explain stagflation in an economy. For explaining stagflation we need to bring in expectations into our analysis. In fact, Phillips curve given in Fig. 9.1 holds true if there is no change in expectations in the minds of people. In case people perceive that there is a change in expectations, then the Phillips curve will shift. Both adaptive expectations and rational expectations have important implications for Phillips curve.

9.6.1 Phillips Curve under Adaptive Expectations

You know from microeconomics that workers and employers take decisions regarding employment on the basis of real wage; not nominal wage. According to Friedman and Phelps, expectations do matter. Thus the 'expected real wage' should be looked into account for determining equilibrium output and wage rate.

Workers usually enter into a contract with the employer regarding their salary for certain time period. During contract period, salary cannot be re-negotiated; it can be changed only after the contract period is over. As the workers are aware of these conditions, they incorporate expected inflation into the contract. For example, if the workers expect that inflation rate would be 3 per cent in the coming year, they will negotiate the wage rate in such a manner that the real wage rate does not decline due to price increase.

For an expected inflation rate of π_1 per cent, suppose the Phillips curve is given by $SRPC_1$ (see Fig. 9.2). Suppose the economy is at point A. At this point the expected inflation rate is π_1 (say 3 per cent) and unemployment rate is at the natural rate u^* (say 6 per cent). At point A, the workers and firms expect an inflation rate of 3 per cent and they are getting it. Thus there is no pressure on the economy for a change.

There is a possibility of trade-off between inflation and unemployment along the curve $SRPC_1$. If there is higher inflation, then real wage will decline (because nominal wage cannot be increased due to existing contracts). Consequently, firms will employ more labour thereby leading to a decline in unemployment.

Suppose the government pursues an expansionist fiscal policy (government expenditure increases or tax rate decreases), which will boost aggregate demand. As a result, there is an increase in prices (means higher inflation rate). An expansionist monetary policy, such as increase in money supply or decrease in interest rate, will also have the same effect. It will lead to an increase in investment which will, to some extent, increase the demand for labour also. In either case, there is an increase in inflation rate to π_2 (say 6 per cent). The rate of unemployment reduces to u_2 (below the natural rate). In Fig. 9.2 we have shown this situation as point B.

Equilibrium at point B, however, is temporary. Workers very soon realize that there is an unexpected increase in inflation rate. In order to compensate for the price rise, workers will demand a higher wage rate. It will lead to a shift in the Phillips curve from $SRPC_1$ to $SRPC_2$. Equilibrium in the economy will be at point C in Fig. 9.2. Consequently, inflation will be at π_3 while unemployment will be at the natural rate, i.e., u^* .

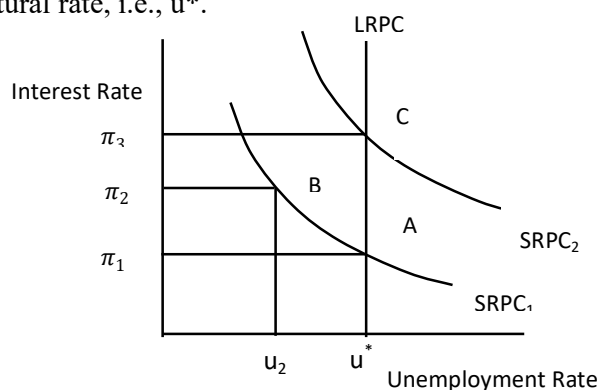


Fig. 9.4: Shift in Phillips Curve

Notice that unemployment in the economy is back at the natural rate (6 per cent). The inflation rate however is much higher (π_3). Thus the attempt of the government to reduce unemployment rate below the natural rate inflation rate, results in higher and higher inflation. In view of this, the natural rate of inflation is often termed as the ‘non-accelerating inflation rate of unemployment’ (NAIRU). When unemployment is at the natural rate or NAIRU, there will be stability in the rate of inflation. When unemployment departs from the natural rate, 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 many countries. Unless unemployment returns to its natural rate the inflation spiral will keep on accelerating.

The above analysis brings us to an important conclusion. Under adaptive expectations, the short run the Phillips curve is downward-sloping. In the long run however, it is vertical. In Fig. 9.2, the vertical line LRPC depicts the long run Phillips curve. Thus there is no trade-off between inflation and unemployment in the long run.

9.6.2 Phillips Curve under Rational Expectations

Under rational expectations economic agents such as firms and households are forward looking. They take into account all available information – past experience as well as present and future developments in the economy. There is no perfect foresight under rational expectations, but the errors cancel out on the whole.

An implication of the above is that actual inflation rate is equal to expected inflation rate. Thus workers and firms do not commit any error regarding wage rate during negotiations. Thus, there is no trade-off between inflation and unemployment under rational expectations. Unemployment rate in the economy is at the natural rate.

Suppose unemployment in the economy is at the natural rate. Firms and workers expect inflation to be at the rate of π_1^e . Suppose, the government pursues an expansionary policy as a result of which there is an increase in aggregate demand. Consequently, there is an increase in the rate inflation. If this policy was expected by the economic agents, they would have factored in the increase in inflation rate into their decision-making. If the policy is unexpected, then it would have the desired effect, that is, reduction in unemployment. This brings us to an important issue: how effective is government policy under rational expectations? If government policy is expected, it will not have any impact.

Check Your Progress 2

Phillips Curve

1. In 2019 the expected rate of inflation was 7 per cent while actual rate of inflation was 5 per cent. If $\lambda = 0.5$, find out the expected inflation rate for 2020.

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2. How do you reconcile the vertical long run Phillips curve with the downward sloping short run Phillips curve? Explain through a diagram.

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3. Explain the following concepts:

- a) Adaptive Expectations
- b) Rational Expectations
- c) Non-Accelerating Inflation Rate of Unemployment (NAIRU)
- d) Long-Run Phillips Curve

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9.7 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 unemployment culminates into a crisis situation when there is widespread unemployment 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 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 that unemployment can be reduced at the cost of higher inflation.

During the 1970s most economies in the world passed through a phase of stagflation. The trade-off between inflation and unemployment was proved to be false. In order to explain such a situation we bring in expectations into our analysis. There are two models of expectations: adaptive and rational.

According to adaptive expectations, the Phillips curve is stable in the short-run but in the long run it shifts. The long run Phillips curve is vertical. Thus there could be some trade-off between inflation and unemployment in the short-run, but in the long-run there is no trade-off. We explained the process through which the shift in the Phillips curve takes place. According to rational expectation, there is no trade-off between inflation and unemployment. Any policy of the government to reduce unemployment becomes ineffective, as people can forecast the expected changes correctly.

9.10 ANSWER/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. Your answer should include frictional, structural and cyclical unemployment. Go through Section 9.2 for details.
2. Go through Section 9.3 and refer to Fig. 9.1.
3. These concepts are discussed in Sections 9.2 and 9.3.

Check Your Progress 2

1. Apply the formula given at Sub-section 9.5.1. Your answer should be 6 per cent.
2. Refer to the text in Section 9.6.1. You should explain Fig. 9.2.
3. These concepts are defined in Sections 9.5 and 9.6.