UNIT 4 AGGREGATE DEMAND*

Structure

4.0 Objectives

4.1 Introduction

4.2 Limitations of Simple Keynesian Model

4.3 Aggregate Demand Curve

- 4.3.1 Derivation of Aggregate Demand Curve
- 4.3.2 Slope of the Aggregate Demand Curve

4.4 Shift in the Aggregate Demand Curve

4.5 Multiplier Analysis with Aggregate Demand curve

4.6 Let Us Sum Up

4.7 Answers/Hints to Check Your Progress Exercises

4.8 Key Words

4.0 OBJECTIVES

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

- derive the aggregate demand curve with the help of IS-LM schedules;
- recognize the aggregate demand equation;
- discuss the factors responsible for the negative slope of the aggregate demand curve;
- explain the reasons behind the shifts in aggregate demand curve; and
- explain the changes in aggregate demand curve with the help of multiplier analysis

4.1 INTRODUCTION

In the previous block we learnt about the IS and LM curves which indicate the equilibrium in the goods market and the money market respectively. To identify the simultaneous equilibrium in both the markets we brought together both the curves. The interaction of the IS and the LM curves helped us in finding out the equilibrium levels of output and prices. Recall that we assumed the price level to be fixed. In this Unit we will relax this assumption and assume that there are changes in price level. We will derive the Aggregate Demand (AD) curve with the help of IS-LM analysis by keeping prices flexible. The position, slope and shifts of the Aggregate Demand curve will also be discussed.

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4.2 LIMITATIONS OF SIMPLE KEYNESIAN MODEL

Keynes argued that the Great Depression was not caused by a drop in the ability of the economy to supply goods, which is dependent on the amount of labour, physical capital, or technology. He argued that the economy often produced less than its full potential.

Such decline is not because it is technically impossible to produce more with the existing workers and machines. According to him, it is because of a lack of demand in the economy as a whole. Inadequate demand leads to inadequate incentives for firms to produce. As there is no demand for goods and services, firms cut down on their production. Keynes argued that the level of GDP in the economy was not primarily determined by the potential of what the economy could supply but rather by the level of aggregate demand (AD). Keynes' views seem to apply fairly well in the short run of a few months to a few years. In the short run there could be either of two situations: (i) many firms may experience a drop in demand for their output during a recession, and (ii) there is excessive demand such that firms have trouble producing enough during an economic boom. You should remember, however, that demand cannot tell the whole macroeconomic story. Supply of goods and services are equally important.

Suppose, aggregate demand were all that mattered at the macroeconomic level. In that case, the government could make the economy as large as it wanted just by pumping up more money into the economy and increasing total demand. The government could resort to large increase in government spending or by legislating large tax cuts to push up consumption. Economies do face genuine limits as to how much they can produce. Such limits are determined by the quantity of labour, physical capital, technology, and market structure that bring these factors of production together. The institutional set up, rules and regulations are also important. These factors constrain on what an economy can supply at the macroeconomic level. In view of this, these factors deserve equal importance in the discussion of macroeconomics.

Another way to look at the missing point in the simple Keynesian model is that it discusses aggregate demand without looking at the money market. The 'Keynesian Cross' only talks about the real sector of the economy, without looking at the relation between interest rate and the money market. Hence the analysis remains 'partial' than 'general' and it becomes important to understand aggregate demand in terms of equilibrium across sectors (goods market and money market).

Recall that the equilibrium in the economy is analysed through the IS and LM curves. Thus we derive the AD curve from the IS-LM model.

4.3 AGGREGATE DEMAND CURVE

It is important for us to understand that the aggregate demand curve is not the sum of all market demand curves in the economy.

Further, it is not a market demand curve itself (as you studied in microeconomics). It shows the relation between overall price level (P) in the economy with the total output produced in the economy.

While studying the goods market and the money market, we kept the price level fixed. In this Unit we relax that assumption, and deal with flexible prices.

4.3.1 Derivation of Aggregate Demand Curve

In Unit 5 of 'BECC 133: Principles of Macroeconomics-I' we presented the simple Keynesian model. In that model the intersection between the 45^0 line and the aggregate expenditure (C+I+G) determined the equilibrium level of output. We assumed that the price level is constant. Thus aggregate expenditure meant real expenditure.

Suppose there is an increase in the price level (P) as a consequence of which the demand for money increases. Consequently, the money demand curve shifts to the right and this leads to excess demand for money at the existing interest rate.

To derive the aggregate demand curve, we need to go back to the demand for money curve (see Unit 9 of BECC 133: Principles of Macroeconomics – I). As per our knowledge, if output *Y* increases, the money demand curve shifts to the right. An implication of the above is that there is an increase in the interest rate (r). In case of a decrease in Y, the reverse process takes place (see Fig. 4.1). Thus, we note that money demand depends on *Y*. Remember that in the money demand model, the demand for money depends on nominal income (PY) and the interest rate (r). Since we assumed *P* to be constant, an increase in real income (*Y*) led to an increase in nominal income (PY). As you know, nominal income (*PY*) can increase in either of two ways: increase in real income (Y) and increase in price level (P). As pointed out above, an increase in nominal income shifts the money demand curve to the right, which leads to an increase in the interest rate. Thus, we can say that an increase in *P*, with *Y* constant, shifts the money demand curve to the right.

Recall that fiscal policy variables of an economy are government expenditure and tax rate. Similarly, money supply is a monetary policy variable. In the money demand analysis, we assumed that fiscal and monetary policy variables, viz., government expenditure (G), taxes (T) and money supply (M_s) are constant. It implies that the government does not take any action to influence the economy when the price level changes.

Let us see what happens if the *price level* changes. Suppose there is an increase in price level (P), because of which there is an increase in nominal income. As a result, there is an increase in the demand for money. The money demand curve shifts to the right from M_d^0 to M_d'. It leads to excess demand for money at the existing interest rate r_0. We assume that money supply (M_S) is constant so that the new equilibrium in the money market will be re-established at a higher rate of interest (r_1).

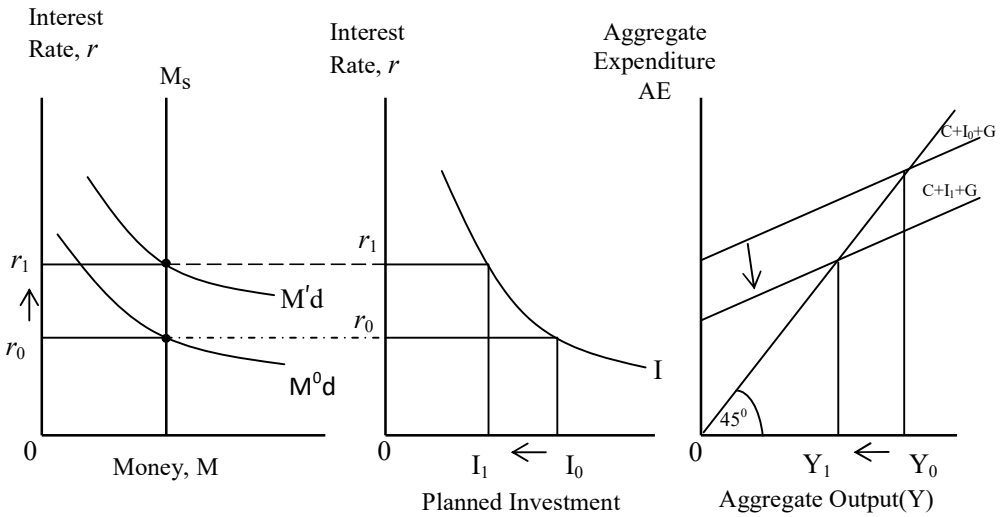


Fig. 4.1: Derivation of the Aggregate Demand curve

The increase in *r* will lead to a decrease in planned investment from I_0 to I_1. As a result, aggregate demand will decrease from ($C+I_0+G$) to ($C+I_1+G$). Consequently, the equilibrium output will decrease from Y_0 to Y_1 (see Fig. 4.1).

Conversely, suppose there is a decrease in *P*. The consequences are as follows: the money demand curve shifts to the left; there is a decrease in r; there is an increase in planned investment; it results in a higher equilibrium value of *Y*. Thus there is a negative relationship between P and AD.

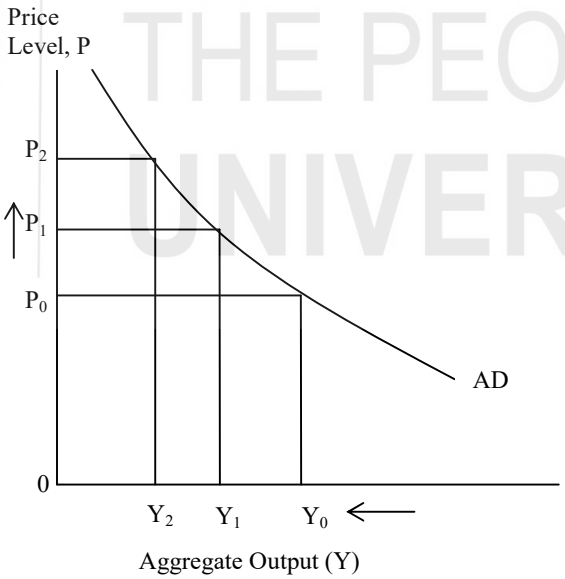


Fig. 4.2: The Aggregate Demand curve

We have established that there is a negative relationship between the price and aggregate output (income) *Y*. This relationship is called the **Aggregate Demand (*AD*) curve** (see Fig 4.2), It is important to remember that we have taken the policy variables G, T, and M_S to be fixed.

Given particular values of the policy variables and given a particular value of P, we can determine the equilibrium values of Y and r. These values correspond to equilibrium in the goods market and the money market for the given value of price and the values of the policy variables. Now we change P but leave the other policy variables unchanged. This gives us new equilibrium values of Y and r. Thus, for each value of P we get an equilibrium value of Y. The AD curve is just a plot of these values. You should note that each point on the AD curve corresponds to equilibrium in the goods market and the money market.

We can plot the aggregate demand curve from the IS-LM equilibrium. Suppose the price level in the economy is P_1 as shown in Fig. 4.3. The real money supply, which determines the position of the LM_1 curve, is $\bar{M}/\bar{P}_1$. The intersection of IS and LM_1 curves gives the level of aggregate demand corresponding to price P_1 and is so marked in the lower panel (E_1). Suppose the price level increases to P_2. The curve LM_2 shows the LM curve based on the real money supply $\bar{M}/\bar{P}_2$. The LM_2 curve is to the left of the LM_1 curve since $\bar{M}/\bar{P}_2 < \bar{M}/\bar{P}_1$ (remember that money supply remains unchanged at $\bar{M}$). The new equilibrium is at E_2. Behind the equilibrium lies dynamic adjustment process wherein excess demand for money leads to an increase in the interest rate from i_1 to i_2. Point E_2 shows the corresponding point on the aggregate demand curve in the lower panel (E_2).

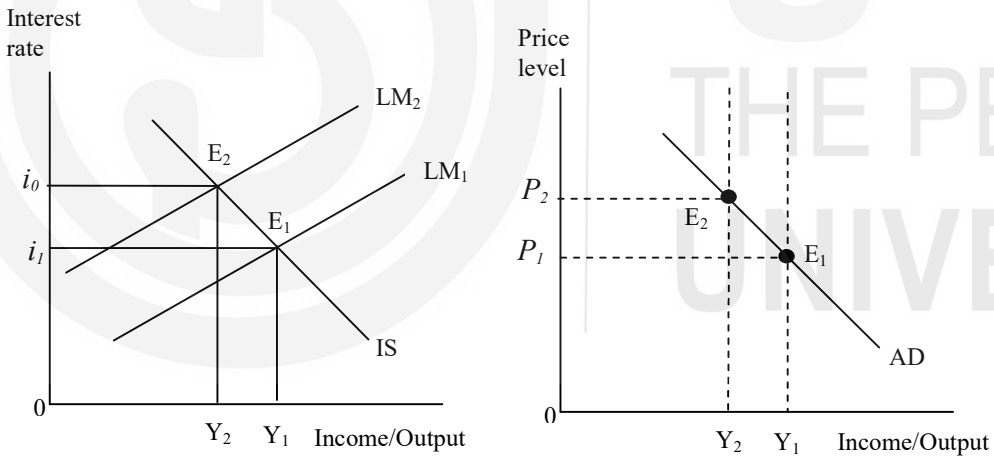


Fig. 4.3: Derivation of the Aggregate Demand curve

If we repeat this for various levels of price, then we get a number of points indicating the intersection between price and output. If we join together these points we get the aggregate demand (AD) curve. So, the aggregate demand curve is downward sloping showing that if overall price level increases the total output in the economy falls and vice-versa. You should also note that all the points on the aggregate demand curve indicate equilibrium in the goods market as well as the money market (since these points are derived from the intersection of IS and

LM curves). It means that if there is any point away from the AD curve then simultaneous equilibrium in both the markets does not exist.

4.3.2 Slope of the Aggregate Demand Curve

We just found that Y and P have a negative relationship and the aggregate demand (AD) curve slopes downwards. For a given level of the nominal money supply ($\bar{M}$), higher prices mean a lower real money supply ($\bar{M}$/P). Quite simply, higher prices mean that the value of the number of available rupees is low. As a result, a high price level means a low level of aggregate demand. Similarly, a lower price level means a higher level of aggregate demand. Thus, the aggregate demand curve slopes downwards. In other words, the factors which are responsible for the slope of IS and LM curves also are responsible for the slope of aggregate demand curve.

Further to understand why the aggregate demand curve slopes downwards we need to recall that economy's GDP is the sum of its consumption, investment, government expenditure and net exports. Each of these four components contributes to the aggregate demand for goods and services. If we assume that government spending is fixed by the policy, the other three components of spending which are consumption, investment and net exports depend on economic conditions and in particular, on the price level. Hence, we must examine how the price level affects the quantity of goods and services demanded for consumption, investment and net exports.

1. Price level and consumption: The effect of price level on consumption is also known as the 'wealth effect'. We all keep some amount of cash always with us. A decrease in the price level increases the real value of money and makes us wealthier which in turn encourages us to spend more. An increase in consumer spending means a larger quantity of goods and services demanded. Conversely, an increase in the price level reduces the real value of money, in turn reducing wealth, consumer spending and the quantity of goods and services demanded.

2. Price level and investment: It is also known as the 'interest rate effect'. A lower price level reduces the interest rate, encourages greater spending on investment good and thereby increases the quantity of goods and services demanded. Conversely, a higher price level raises the interest rate, reducing investment spending and the quantity of goods and services demanded.

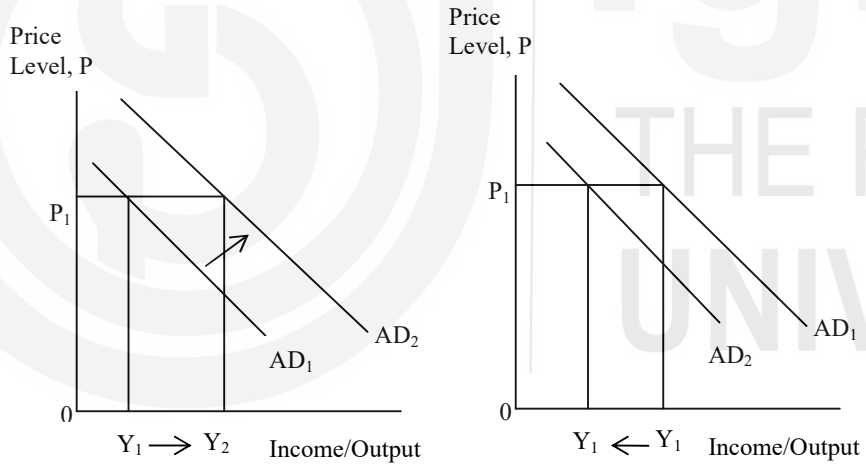
3. Price level and net exports: It is also known as the 'exchange rate effect' or the 'international trade effect'. Exchange rate is the price of foreign currency in terms of domestic currency. Suppose there is a fall in India's price level. This will stimulate Indian net exports and thereby increase the quantity of Indian goods and services demanded by the rest of the world. Thus a decrease in prices would result in higher aggregate demand. Conversely, when India's price level rises, foreign goods become relatively cheaper. The quantity of Indian goods and services demanded by the rest of the world would decline, as

a result of which aggregate demand will decrease. This brings the point that price level and AD are inversely related.

4.4 SHIFT IN THE AGGREGATE DEMAND CURVE

It is important to keep in mind that aggregate demand curve is drawn holding other things equal except the price level. Thus a change in the price level leads to movement along the AD curve. On the other hand, if there is a change in any other factor, that we assumed to be constant while deriving the AD curve, there would be a shift in the AD curve.

We gave three explanations of the downward sloping aggregate demand curve, while assuming that the money supply is fixed. So, the change in the money supply can shift the AD curve. Similarly, we have assumed that government expenditure and taxes are also fixed while drawing the aggregate demand curve in Sub-Section 4.3.1. Hence the shift in aggregate demand curve will be due to any change in the government expenditure and taxes. Essentially, it means that any factor which was kept constant while drawing the aggregate demand curve will be the reason behind the shift in aggregate demand curve. We describe the impact of changes in five factors on the AD curve. These are (i) investment, (ii) consumption, (iii) government expenditure, (iv) changes in taxes, (v) changes in net exports.



Panel (a) Panel (b)

Fig. 4.4: Shifts in Aggregate Demand curve

In Fig. 4.4 we have shown two types of shifts in the AD curve. In Panel (a) we describe a situation where the aggregate demand curve shifts to the right, from AD_1 to AD_2. Here, at each level of P, the equilibrium output (Y) is higher. In Panel (b), on the other hand, the AD curve shifts to the left from AD_1 to AD_2. In this case, there is a decrease in the equilibrium output (Y) at each price level (P).

Let us refer to Fig.4.4 and discuss certain cases which shift the aggregate demand curve.

i) **Investment:** If firms are optimistic about future they plan to increase their investment. Technological advancements in computer, for example, will lead to an increase in aggregate demand, which will shift the AD curve to the right. Conversely, if firms become pessimistic about future business conditions, they would not undertake further investment. This will shift the AD curve towards the left.

ii) **Consumption:** Let us assume that there are certain changes in economic environment such that households save a higher amount at each level of income. This could arise because of certain incentives provided by the government, or an increase in the rate of interest on saving. An increase in saving will have the effect of reduction in consumption. Due to reduction in consumption, there will be a leftward shift of the AD curve (similar to Panel (b) of Fig. 4.2). Let us consider another scenario. Suppose there is a stock market boom, which leads to windfall gains for households. It leads to unexpected increase consumption. This is likely to increase consumption, thereby shifting AD curve to the right (similar to Panel (a) of Fig.4.2).

iii) **Government Expenditure**: Due to change in government purchases. If we drop our assumption of fixed government purchases and we let it be flexible then it is the most direct way used by the policy makers which shift the aggregate demand curve. In case there is an increase in government purchase, then the AD curve shifts to the right, and vice versa.

iv) **Taxes**: Another factor that causes shift in the AD curve is change in the level of taxation. If there is increase in tax rates, there is decrease in the level of disposable income. A reduction in disposable income of households will lead to a reduction in aggregate consumption. On the other hand, if there is a decrease in tax rate, there is an increase in consumption of households. There are certain taxes that influence investment. If the investment tax credit increases (it is a tax rebate tied to a firm's investment spending) then it increases the investment and hence the AD curve shift rightwards.

v) **Net Exports**: Net exports are defined as exports minus imports (X – M). If there is an increase in exports (X) while imports are constant, the net exports (NX) will increase. Similarly, if there is a decrease in imports while exports remain unchanged, we witness an increase in NX. Let us discuss the impact of NX on the AD curve through an example. When Europe experiences a recession, for example, Europe buys fewer goods from the US. This reduces the US net exports at every price level. It shifts the AD curve for the US economy to the left (similar to panel (b) of Fig.

4.2). Thus we observe that a decrease in NX will shift the AD curve to the left. Similarly, an increase in the NX will shift the AD curve to the right.

vi) **Money Supply**: An increase in money supply will lead to a reduction in the rate of interest. It is likely to increase the investment spending in the economy and finally the output level will increase. The AD curve will shift to the right. Similarly, a decrease in money supply will lead to an increase in interest rate. It will lead to a reduction in investment, which in turn will decrease AD. Thus the AD curve will shift to the left, in the case of a decrease in money supply.

We should not forget that the price level is held constant in all the above cases. In the above discussion we have included most factors that influence the IS and LM curves. The price level also influences the LM curve. But it will not result in a shift in the AD curve; rather a change in P will lead to movement along the AD curve.

Check Your Progress 1

1) Derive the aggregate demand curve with the help of IS-LM analysis.

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2) Why does aggregate demand curve slope downward?

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3) Give any two reasons for a shift in the AD curve to the right.

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4.5 MULTIPLIER ANALYSIS WITH AGGREGATE DEMAND CURVE

In general, any change in autonomous aggregate expenditure shifts the aggregate demand curve. The amount of the shift is always equal to the change in

autonomous aggregate expenditures times the multiplier (refer to Unit 5 of BECC 133). The multiplier effect refers to the idea that an increase in spending can lead to an even greater increase in national income.

An increase in autonomous aggregate expenditure shifts the AD curve to the right. On the other hand, a reduction in autonomous aggregate expenditure shifts the AD curve to the left. If we assume a constant price level and constant interest rate, the multiplier is α_G. If we consider flexible price level and interest rates (as in the case of IS-LM analysis), then we obtain two multipliers: (i) fiscal policy multiplier, and (ii) monetary policy multiplier. The fiscal policy multiplier shows the impact of changes in government spending on equilibrium income when money supply is kept constant. It is defined as the amount of change in national income for a given change in government spending, while holding the real money supply constant. The monetary policy multiplier, on the other hand, is defined as the amount of change in national income for a given change in the real money supply, while holding government spending and tax rate constant.

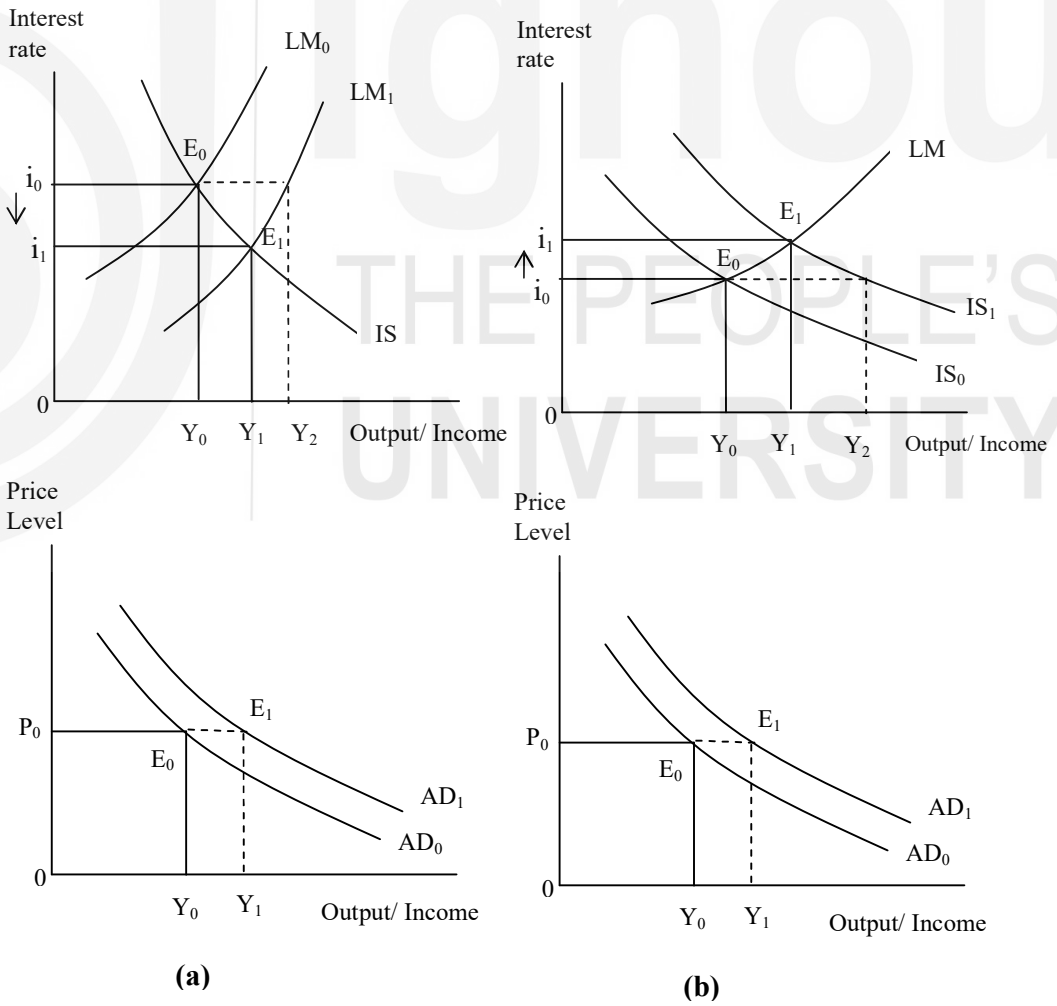

Fig. 4.5: Multiplier Analysis and Aggregate Demand Curve

Let us illustrate the above two concepts through diagrams. In panel (a) of Fig. 4.5 we explain the monetary policy multiplier. Assume that price level is constant. The equilibrium position is given by E_0, where the curves IS and LM_0 intersect. Equilibrium output and interest rate are Y_0 and i_0 respectively. Let us assume that there is an increase in money supply so that the LM curve shifts to the right from LM_0 to LM_1. The new equilibrium point is E_1. If we consider the money market only, the increase in equilibrium output will be from Y_0 to Y_2. However, due to the presence of the real sector, equilibrium output changes from Y_0 to Y_1. The complete shift in the LM curve is not transformed into a shift in national income

In panel (b) of Fig. 4.5 we assume that government spending has increased (IS curve shifts to the right). The equilibrium point changes from E_0 to E_1. It is important to notice that the complete shift in the IS curve has not been transformed into the shift of national income, i.e., Y_2. You should note that aggregate demand curve has shifted in such a manner that the new equilibrium income is Y_1 and not Y_2. This is due to the multiplier effect. At Y_2 level, either the money market is in equilibrium (panel a) or the goods market is in equilibrium (panel b). So, the economy as a whole is not in equilibrium and the impact of change in one market on the other market has to be looked at.

The AD curve shifts not by the amount of change in autonomous expenditure but by the amount of change in autonomous aggregate expenditure times the multiplier, where the multipliers are the fiscal and monetary policy multipliers.

Check Your Progress 2

1) Define Fiscal Policy and Monetary Policy multipliers.

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2) Will the Aggregate demand shift whenever LM curve shifts? Give reason.

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3) Does the equilibrium level of income increase by the same amount with which the IS or LM shifts? Why or why not?

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4.6 LET US SUM UP

After learning about IS-LM analysis in the previous block, we started this unit with an objective of looking at the impact of changes in price level on aggregate demand. We derived the AD curve with the help of IS-LM analysis. The factors which are responsible for the negative slope of aggregate demand curve were explained at length. The shifts in aggregate demand curve were also discussed. The multiplier analysis with aggregate demand curve was explained with the help of fiscal and monetary policy multipliers.

4.7 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) The intersection of the IS and LM curves gives the level of aggregate demand corresponding to a given price. Suppose the price level increases. The LM curve will shift to the left. There will be a new equilibrium now. These equilibrium points provide the AD curve in a different panel with price on the y-axis and output on the x-axis.

2) We have given three reasons in Sub-Section 4.3.1. Refer to it.

3) We have discussed five factors which may result in a shift in the AD curve. You should discuss, in detail, any two. You should draw a diagram to show the shift in the AD curve.

Check Your Progress 2

1) Refer to Section 4.5 and answer.

2) Not necessarily. The LM and IS curves may shift in such a manner that there is no change in equilibrium output. In such a case the AD curve will not shift.

3) Equilibrium level of output does not change by the same amount as the shift in the IS or LM curve. It shifts somewhat less than that. Refer to Section 4.5.

UNIT 5 AGGREGATE SUPPLY*

Structure

5.0 Objectives

5.1 Introduction

5.2 Aggregate Supply in Macroeconomics

5.3 Classical and Keynesian Aggregate Supply Curves

5.4 Aggregate Supply Curve in the Short Run

5.5 Aggregate Supply Curve in the Long Run

5.6 Aggregate Supply Curve in the Medium Run

5.6.1 Slope of Medium Run Aggregate Supply Curve

5.6.2 Shifts in the Medium Run Aggregate Supply Curve

5.7 Let Us Sum Up

5.8 Answers/Hints to Check Your Progress Exercises

5.0 OBJECTIVES

After going through this Unit, you should be in a position to

- distinguish between the concept of Aggregate Supply (AS) curve used in microeconomics and macroeconomics;
- explain the price-output response curve;
- differentiate between the underlying differences between the Classical and the Keynesian views on the AS curve;
- identify the reasons behind the slope and position of the Keynesian AS curve; and
- differentiate between the AS curve in short run, medium run and long run.

5.1 INTRODUCTION

In the previous Unit we discussed about the slope and the shifts of the Aggregate Demand (AD) curve. Now let us look into the other side of the market, i.e., Aggregate Supply (AS). Recall the supply curve of a firm – it shows the maximum quantity that a firm would supply or produce at different prices. The quantity supplied by a firm depends upon the market structure apart from input and output prices. While some firms operate in a perfectly competitive market, some others are monopolistic in nature.

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The AS curve describes the total quantity of goods and services that an economy will produce at different price levels. The AS curve however needs further discussion as several issues come up when we derive the supply curve for the economy.

Time horizon is a very important factor in the case of the AS curve, as the economy behaves differently in the short run and the long run. Hence the shape of AS curve is not the same in the short run and the long run. A reason behind this difference in the shape of the AS curve also is the differences in Classical and Keynesian views on output and prices.

5.2 AGGREGATE SUPPLY OF AN ECONOMY

It may seem logical to derive the aggregate supply curve by adding together the supply curves of all the firms in the economy. However, the logic behind the relationship between the overall price level in the economy and the level of aggregate output (income) – that is, the AS curve – is very different from the logic behind an individual firm's supply curve. The AS curve is not a market supply curve, and it is not the simple sum of all the individual supply curves in the economy (recall a similar caution provided for the aggregate demand curve in the last unit). Thus you should be cautious in interpreting the AS curve. Let us see how.

The reason is that many firms do not simply respond to market prices. Recall that firms operating in a perfectly competitive market are price takers. Monopoly firms, on the other hand, set their own prices. We see that some firms act as leaders when the market they operate is one of imperfect competition. These firms decide both output and price based on their perceptions of demand and costs. Only in perfectly competitive markets do firms react to prices determined by market forces.

When the overall price level changes, the input prices change and because many firms in the economy set prices as well as output, it is clear that the AS curve in the traditional sense of the world supply does not exist. What exists is the *price output response curve* - a curve that traces out the price decisions and output decisions of all firms in the economy under a given set of circumstances.

Price-setting firms (existing only in the imperfectly competitive structure) do not have individual supply curves because these firms are choosing both output and price at the same time. To derive an individual supply curve, we need to imagine calling out a price to a firm and having the firm tell us how much output it will supply at that price. We cannot do this if firms are also setting prices. If supply curves do not exist for imperfectly competitive firms, we certainly cannot add them together to get an aggregate supply curve.

5.3 CLASSICAL AND KEYNESIAN AGGREGATE SUPPLY CURVES

We discussed about the classical and Keynesian views on determination of output in Unit 4 of BECC 133: Principles of Macroeconomics-I. The classical economists hold the view that resources are fully employed in all the firms and hence the manufacturing units are working at their full capacity.

When the economy is operating at full employment level, further increase in output cannot take place. In case of increase in AD, only the price level will increase and the output level will remain the same as the firms are already working at their capacity. So, the increase in AD does not lead to any increase in output level. Further, if there is a decline in AD, there will be a decline in prices and wage rate. Decline in prices will increase the demand for goods and services. Similarly, decline in wage rate will increase the demand for labour. Therefore, decline in prices and wage rate will ensure full employment of resources. It indicates that the same amount of goods will be supplied whatever be the price level. Such a level of output is also known as the full employment level of output or the 'potential GDP'. Thus, we can say that the classical AS curve is vertical. It is known as the 'classical AS curve'.

The origin of the Keynesian AS curve can be ascribed to the Great Depression, when actual output in most economies was very low compared to potential output. In that environment, Keynes suggested that output can be increased without any rise in prices by putting idle capital and labour to work. Keynes argued that prices are not flexible. There are certain rigidity in prices and wage rate, particularly when a downward change is required. Today we have over-emphasised this notion with what we call 'short-run price stickiness". In the short run, firms are reluctant to change prices when demand shifts. Instead, at least for a little while, they increase or decrease output. As a result, the AS curve is quite flat in the short run. The key point is that in the short run the price level is unaffected by current levels of GDP. Hence, we will see that in the short run, the AS curve is horizontal. It is also known as the 'Keynesian supply curve'.

So, if we consider the output level, we can say that in Classical view economy always operates at the full employment level of all the available resources while from the Keynesian view, the economy observed excess capacity which can be put to use in case of higher demand in order to produce more and achieve a higher output level overall. If we look at the price level, under the Classical view price changes will take place without any movement in the output level but from the Keynesian point of view, the price changes will accompany the output level changes too.

Check Your Progress 1

1) Explain the concept of price-output response curve in macroeconomics.

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2) Bring out the differences between Classical and Keynesian views on aggregate supply.

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3) What are the implications of the classical view on the output and price levels?

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5.4 AGGREGATE SUPPLY CURVE IN THE SHORT RUN

As pointed out above, the short run AS curve (Keynesian AS curve) is horizontal indicating that firms will supply whatever amount of goods is demanded at the existing price level. The idea underlying such a curve is that in the short-run the economy has excess capacity (capital or labour) in hand. It implies that the economy has factors of production which are not needed to produce current level of production. Because there is unemployment, firms can obtain as much labour as they want at the current wage rate. Firms are operating below capacity so the extra cost of producing more output is likely to be small. In such circumstances, there will be no or very little increase in the overall price level.

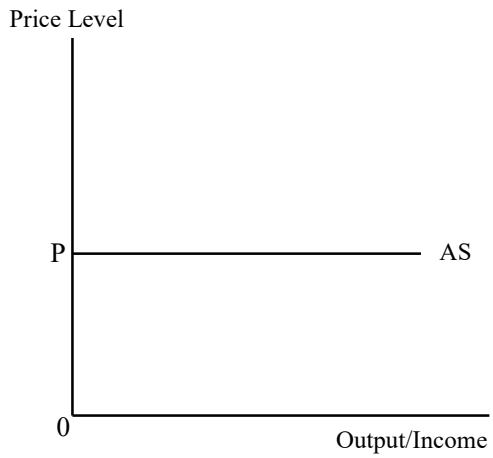


Fig. 5.1: Short Run Aggregate Supply Curve

The average cost of production of firms therefore is assumed not to change as the output level change. Firms are accordingly willing to supply as much as is demanded at the existing price level. The AS curve is likely to be horizontal during periods of recession when the total output in the economy is at lower levels.

As you know, there are two important phases of a business cycle, viz., expansion and recession. During the recession phase, overall output in the economy has a tendency to decline. When the economy is passing through the recession phase, there is excess capacity in the economy. If firms expect the recession in the economy to be short, they would choose to hold the excess capacity. In that case if demand increases the firms would increase output much more than the increase the prices.

5.5 AGGREGATE SUPPLY CURVE IN THE LONG RUN

According to the classical economists the AS curve is vertical, indicating that there is full employment level of output. The classical AS curve is based on the assumption that the labour market is in equilibrium with full employment of the labour force. If in certain sector the manufacturers face high demand, they raise the price for their product. As the sector witnesses high growth due to high demand, they plan to invest more (buy more machineries, more materials, more labour, etc.). It has the side effect of shifting factors of production away from lower demand sectors to high demand sectors. But if higher demand for goods and services is economy wide and all the factors of production are already employed, there is not any way to increase overall production. It will result in price rise while supply will not increase. The level of output corresponding to full employment of the labour force is called the potential GDP, Y* (see Fig. 5.3).

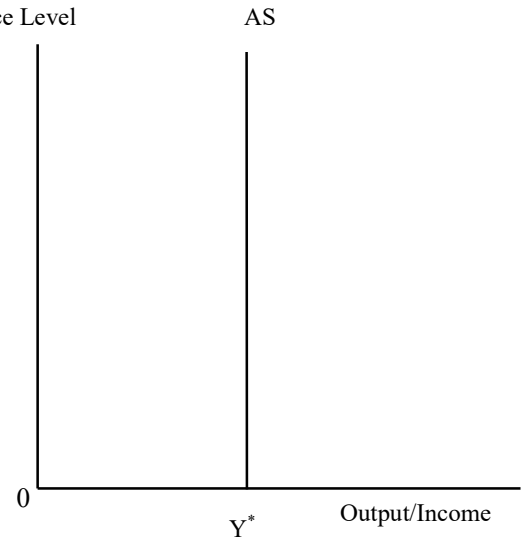


Fig. 5.3: Classical Aggregate Supply Curve

We derived the short-run AS curve under the assumption that wages were sticky. It does not mean, however, that stickiness persists forever. Over time, wage rates adjust to higher prices. When workers negotiate with firms over their wages, they take into account two issues: price rise in the recent past, and expected price rise in near future. In the long run, input prices change at exactly the same rate as output prices. Hence the aggregate supply curve becomes vertical. Thus, actual output in the long is equal to potential output.

Shifts in the Long Run AS Curve

The level of potential output changes over time. Let us find out the reasons for such changes in potential output. You should note that potential output will change if there are changes in the quantity of labour, stock of capital, amount of natural resources, or the state of technology. Thus there are two sources of growth: (i) growth of inputs, and (ii) technological progress. The potential GDP increases over time as the economy accumulates resources. There are more machinery, more buildings, more raw materials, etc. These inputs lead to an in the production capacity of the economy. The other source, i.e., technological progress takes place over time in many fields. You would have noticed how more and more powerful computers and mobile phones have been invented over the years. Such improvement in technology is taking place in most fields. Technological progress leads to increase in productivity or efficiency. It implies we can produce more output from the same level of inputs.

Thus, the position of the classical AS curve moves to the right over a period of time. You should note that the changes in the level of potential output do not depend on the price level.

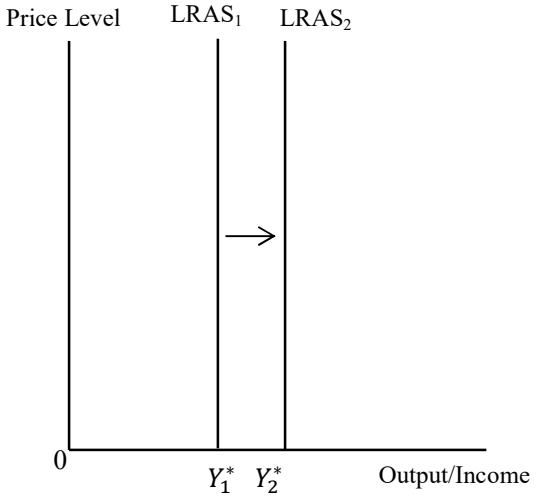


Fig. 5.4: Shifts in Long Run Aggregate Supply Curve

5.6 AGGREGATE SUPPLY CURVE IN THE MEDIUM RUN

Medium run is a period of time during which the economy adjusts its fixed inputs (say, capital) to its long run level. In macroeconomics we can assume a period of about 5 to 10 years to fall under the category of medium rum. We learnt above that the AS curve is vertical in the long run (Classical) and horizontal in the short run (Keynesian). We can say that the AS curve is somewhat in between the two; it is upward sloping in the medium run.

Let us understand the medium run dynamics. In case the firms face high demand for their goods and services, they respond by producing more in short run. As the aggregate output continues to increase, firms and economy move closer to their full capacity. It is not likely that the whole economy suddenly reaches the full employment level of output. As the AD increases, the firms' response would be to increase output in the beginning. As AD keeps on increasing further, firms' will start increasing prices. The firms also begin to reach their full capacity constraints; they cannot increase their production capacity in the short run.

As you know from microeconomics, certain inputs such as capital and top management are fixed in the short run. Some firms and industries will reach their maximum production capacity before others; so there will be no kink in the AS curve. Simultaneously, there will be a decline in the unemployment rate as the economy is moving towards the full capacity level. At some level of output (Y*), it is virtually impossible for the firms to expand any further because all factors of production are fully utilized. At that level of output, whatever be the price level, output cannot increase further.

In Fig. 5.5, we depict the upward sloping AS curve. The segment A to B shows the flatter portion (Keynesian zone), while the segment C to D shows the steeper portion (Classical zone) of the AS curve. We notice that all the three time periods (short-run, medium-run and long-run) are summarised in the above figure. The characteristic described in the AS curve are as follows: till about point B, it is the short run. Medium run is from point B to about point C (intermediate zone). Point C onwards, it is the long run (output Y*). During recession the economy is operating on the flat part of the AS curve (Keynesian view). The maximum an economy can produce is Y*, i.e., full employment output (classical view).

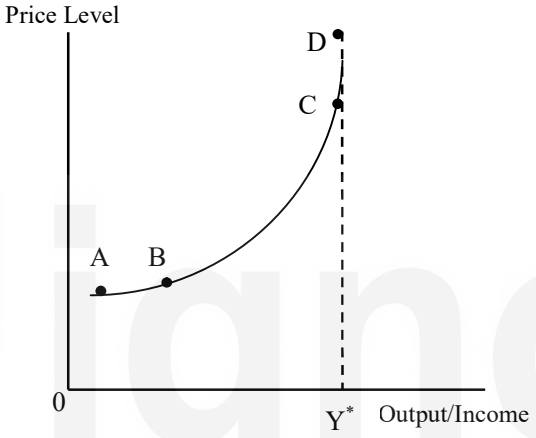


Fig. 5.5: Medium Run Aggregate Supply Curve

The Keynesian position of horizontal AS curve and the classical position of the vertical AS curve are exceptions. In normal circumstances, the AS curve is upward sloping. Therefore, we consider the medium-run AS curve for further analysis.

5.6.1 Slope of the Medium Run Aggregate Supply Curve

Response of input prices to changes in overall price level is the basis of difference between classical and Keynesian views. According to the Classical economists, price changes are fully anticipated. It means the expectations of producers and households are realised. For example, if producers expect that prices will increase by 10 per cent in the coming year, prices actually increase exactly by 10 per cent (neither more than 10 per cent, nor less than 10 per cent).

The Keynesian view, however, holds that an increase in price level is not fully anticipated every time. There is some time lag between the changes in input prices and the changes in output prices. In other words, the wage rate is sticky.

There are several reasons for this: (i) Nominal wages are slow to adjust to changing economic conditions. This could be attributed to 'long term contracts' between workers and firms. Usually wage rate is decided in advance, as part of the contract. (ii) Firms have to incur costs for adjusting prices. Let us take an example of a restaurant. Vegetable prices in the market change so frequently; but restaurants maintain the same prices of food items on the menu card. If

restaurants wish to change prices of food items according to vegetable prices, they have to print menu card so frequently. The printing and distribution cost of menu cards will eat away major part of their profits! A similar situation applies to other firms and they keep their prices unchanged, unless price trend in the economy is clear and significant. Keynesian economists term this reason as 'menu cost'. (iii) Customers are accustomed to certain prices of the goods and services they purchase. They expect prices to be maintained at the same level and resist increase in prices. In order to retain their market share and customer goodwill, firms do not increase prices frequently. Thus, prices change only slowly over time. Hence, the aggregate supply curve slopes upward (See Fig. 5.6).

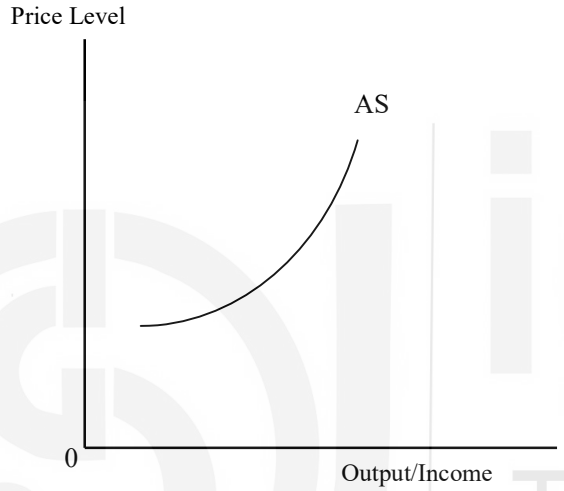


Fig. 5.6: Medium Run Aggregate Supply Curve

5.6.2 Shifts in Medium Run Aggregate Supply Curve

By now, you know that the AS curve describes the relation between output produced in the economy and price level. Thus any change in prices will result in a movement along the AS curve. There are several factors, apart from prices, that influence aggregate output. When we draw an AS curve, we assume these other factors to remain constant. Thus, any change in these factors results in a shift in the AS curve. Let us identify these factors.

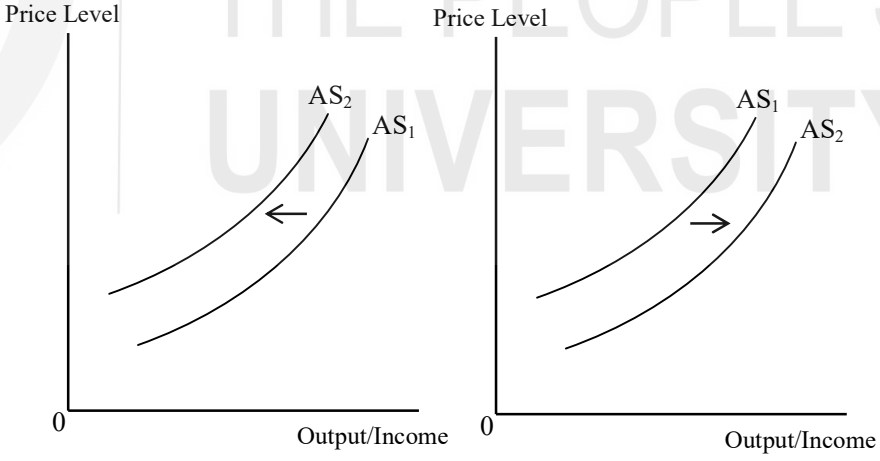
Anything that affects (apart from the price of the good) the individual firm decision can shift the aggregate supply curve in the short run. Thus there are several factors the shift the AS curve: supply shocks, economic growth, stagnation, public policy, and natural disasters. We discuss about these factors below.

(i) Input Prices: If the input prices fall, the cost of production also falls. It means that the firms can produce more in the given budget. Thus there is a shift in the AS curve to the right. Such a shift is depicted in panel

(b) of Fig. 5.7. Similarly, if there is an increase in input prices, production cost will increase. The AS curve will shift to the left, as shown in panel (a) of Fig. 5.7. Fluctuation in input prices is a common phenomenon. You might of observed periodical increases in crude oil prices which severely affects the Indian economy.

(ii) Technological Progress: We have discussed about the impact of technological progress on the AS curve in Section 5.5. Advancement in technology increases productivity of firms. The AS curve shifts to the right (see panel (b) of Fig. 5.7) as a result of technological progress.

(iii) Public Policy: There government provides incentives to firms so that economic growth accelerates. These incentives could be in the form of tax cuts for firms or higher government expenditure on infrastructure creation (such as roads, power supply, communication, etc.). Such incentives reduce the cost of production of firms, as a result of which the AS curve shifts to the right. Conversely, if the government policies are such that it increase the cost of production (such as stricter environmental norms, increase in tax rate, reduction in public expenditure on infrastructure), there is a left-ward shift in the AS curve. You should note that changes in tax rate on household income influences the AD curve, not the AS curve.



Panel (a) **Panel (b)**

Fig. 5.7: Shifts in Medium Run Aggregate Supply Curve

(i) Recession: Business cycles affect the AS curve. During recession there is accumulation of inventories and firms are pessimistic about the future. There is not much demand for goods and services also. In such circumstances, the AS curve shifts to the left (as shown in panel

(a) of Fig. 5.7). Conversely, during the expansion phase of a business cycle, firms are optimistic in their business operations. The AS curve will shift to the right (as shown in panel (b) of Fig. 5.7) during the expansion phase.

(ii) Natural Disasters: An economy is often struck by natural disasters such as flood, drought, earthquake, etc. Such disasters affect production adversely and the AS curve shifts to the left.

Check Your Progress 2

1) As per the Keynesian view, explain why the short run aggregate supply curve is horizontal.

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2) State the reasons for the upward slope of the medium run aggregate supply curve.

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3) Explain the factors that will result in a rightward shift in the aggregate supply curve (use appropriate diagram).

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5.7 LET US SUM UP

The aggregate supply (AS) curve in macroeconomics is different from the supply curve in microeconomics. In this Unit, we discussed about the classical and Keynesian views on aggregate supply, which have strong implications on the price and output levels in an economy. As the time horizon is very important from the Keynesian view, we discussed the different shapes of aggregate supply

curve with respect to short run, long run and medium run. The aggregate supply curve is horizontal in the short run; vertical in the long run; and upward sloping in the medium run. The factors behind the shift of the AS curve are also discussed. We explained that the classical aggregate supply curve and the Keynesian long run aggregate supply curve are both vertical; although for different reasons.

5.8 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. The *price output response curve* is a curve that traces out the price decisions and output decisions of all firms in the economy under a given set of circumstances.
2. The classical view holds that resources are fully employed in the economy and hence the firms are working at their full capacity. As per the Keynesian view, the economy observes excess capacity which can be put to use in case of higher demand in order to produce more and achieve a higher output level.
3. As per the classical view, price changes will take place without any change in the output level. From the Keynesian point of view, however, price changes will accompany changes in output level also.

Check Your Progress 2

1. Keynesian aggregate supply curve is horizontal in the short run, indicating that firms will supply whatever amount of goods is demanded at the existing price level. The idea underlying such a curve is that, in the short run, firms have excess capacity. It means that firms have excess capital or labour that is not needed to produce the current level of output.
2. The reasons for upward sloping AS curve are: (i) Nominal wages are slow to adjust to changing economic conditions; (ii) Firms have to incur cost for adjusting prices which are called menu costs; and (iii) Social norms and notions of fairness expect that firms do not change prices frequently.
3. There are several factors that affect aggregate supply and result in a shift in the AS curve. These could be supply shocks, public policy, business cycle, and natural disasters. Identify the situations that will shift the AS curve to the right. Go through Sub-Section 5.6.2 for details.

UNIT 6 EQUILIBRIUM OUTPUT AND PRICES*

Structure

6.0 Objectives

6.1 Introduction

6.2 Short-Run Equilibrium

6.3 Long Run Equilibrium

6.4 Impact of Fiscal and Monetary Policies

6.5 Case Studies

6.5.1 Supply Shock

6.5.2 Demand Shock

6.6 Let Us Sum Up

6.7 Answers/Hints to Check Your Progress Exercises

6.0 OBJECTIVES

After going through this Unit, you should be in a position to

- differentiate between short run and long run equilibrium in an economy;
- differentiate between actual and potential output;
- identify the impact of fiscal and monetary policies on the equilibrium output and prices;
- explain the effect of supply shocks on the economy in terms of inflation; and
- appreciate the implications of the shape of the AS curve on the outcome of an expansionary macroeconomic policy.

6.1 INTRODUCTION

In the previous two units we discussed about the aggregate demand (AD) and the aggregate supply (AS) curves. We are now in a position to explain equilibrium of the economy in a macroeconomics sense. Recall from Unit 4 that aggregate demand shows equilibrium in the goods market and the money market (the AD curve is derived from the IS-LM model). The aggregate supply, on the other hand, is actually a price-output response curve which has a limitation to show the maximum output. When the aggregate demand and aggregate supply of goods and services are equated, we obtain the equilibrium level of output and prices in the economy. Thus the intersection of the AD and AS curves gives us equilibrium output (Y) and price level (P) of the economy. In this unit we also discuss the factors that influence equilibrium output.

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Thus we consider the effects of monetary and fiscal policies on equilibrium output and prices. In addition, we take up certain case-studies that clarify our understanding further.

We learnt in the previous Unit that the AS curve is horizontal in the short-run; upward-sloping in the medium-run; and vertical in the long-run. The horizontal and vertical AS curves are exceptions, however. Economists maintain that the AS curve is not completely flat; there is some increase in the price level whenever the aggregate demand increases. Thus we have two scenarios: (i) in the short-run and medium-run the AS curve is upward-sloping, and (ii) in the long- run the AS curve is vertical. So, in the discussion below we consider two types of AS curves: short-run aggregate supply curve (SRAS) and long-run aggregate supply curve (LRAS).

6.2 SHORT-RUN EQUILIBRIUM

The short-run equilibrium is achieved when the SRAS and AD curves intersect. In Fig. 6.1 (panel (a)) we present the SRAS and AD curves. The curves intersect at point E. The equilibrium output and price level are obtained as Y_1 and P_1 respectively.

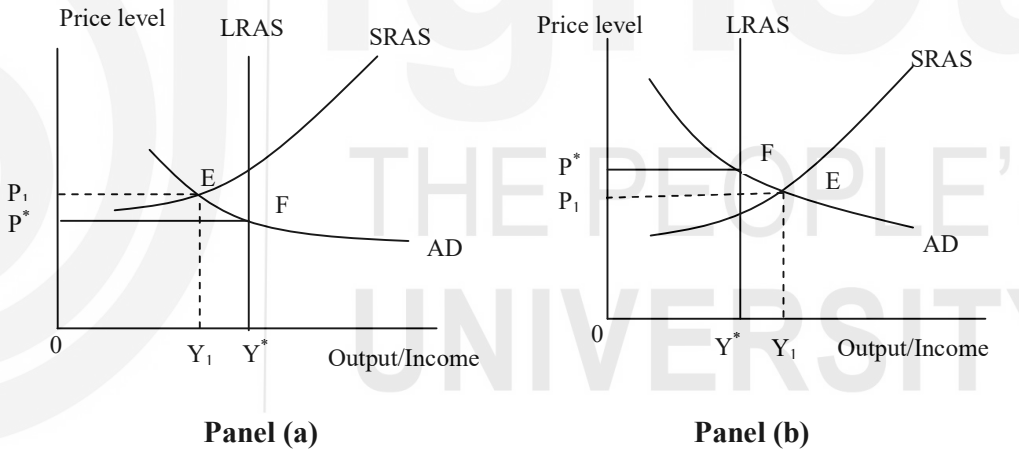

Fig. 6.1: Short Run Equilibrium

We superimpose the LRAS curve along with the SRAS and AD curves in Fig. 6.1(a). We observe that the short run equilibrium output is lower that the full employment equilibrium output (Y^*) in the economy. An implication of the above is that there is excess capacity in the economy. It means the economy will move towards the long run equilibrium output (Y^*) over time. We will discuss the transition process from short run equilibrium to long run equilibrium later in this Unit.

Generally, short run equilibrium output level is below the full employment level of output (Y*) but at certain occasions it can be to the right of the full employment level as well. In panel (b) of Fig. 6.1 we present such a situation.

Point E is the equilibrium point. Equilibrium output and prices are at Y_1 and P_1 respectively.

Some economists believe that there is a tendency of the economy to oscillate towards Y*. Output can be pushed above *Y** under a variety of circumstances, but when it is operating above full-employment output level, there is an upward pressure on wage rate. As the economy approaches short-run capacity, wage rates tend to rise since firms try to attract more people into the labour force and to induce more workers to work overtime. Rising wages increase the cost of production and shift the SRAS curve to the left thereby driving output back to *Y**.

When the short-run equilibrium exists below *Y**, output tends to rise. It means the wages are likely to *fall* when the economy is operating below full employment with excess capacity and high unemployment. A decline in wages shifts the SRAS curve to the *right*, causing the price level to fall and the level of aggregate output to rise back to *Y**. This automatic adjustment works only if wage rate is flexible; it declines when excess capacity and unemployment exist in the economy.

6.3 LONG-RUN EQUILIBRIUM

We consider the aggregate demand curve and the long run aggregate supply (LRAS) curve to reach at the long run equilibrium. The output at equilibrium remains the same as the supply curve is vertical.

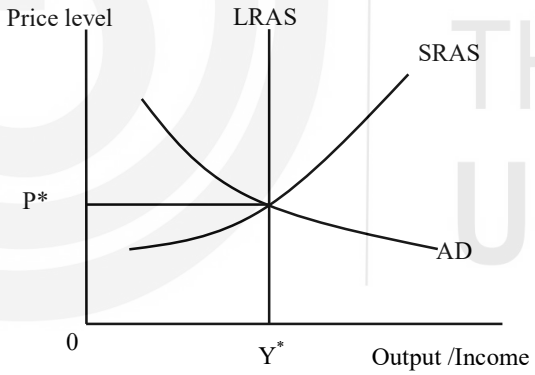

Fig. 6.2: Long Run Equilibrium

In the long run, we notice that the intersection of SRAS and the AD also produce the same output level. It shows that the deviation of the short run output level in Fig 6.1 from Y* does not exist in the long run.

Even the SRAS curve may become vertical at some particular level of output (potential GDP or full employment level). This is because there are physical limits to the amount that an economy can produce in any given time period. At the physical limit, all plants are operating around the clock, many workers are on overtime, and there is no cyclical unemployment.

Let us look at the adjustment process in the economy in Fig 6.3. Let us assume that the economy is operating with $SRAS_1$ and aggregate demand curve AD1. Thus the equilibrium is at A with output and prices given as Y_1 and P1 respectively. Since the LRAS passes through A, the long run equilibrium also is realized (Y_1 represents the full employment level Y*).

Now, suppose there is an increase in aggregate demand demand. As a result, there is a shift in the AD curve from AD_1 to AD_2. Remember that the production capacity of the economy cannot be increased in the short run. Thus the economy will continue to operate with $SRAS_1$; we move along the SRAS curve. In response to the shift in AD, both the price level and aggregate output rise, from P_1, Y_1 to P_2, Y_2. The new equilibrium point is given by point B at which SRAS1 and AD2 intersect (see Fig. 6.3).

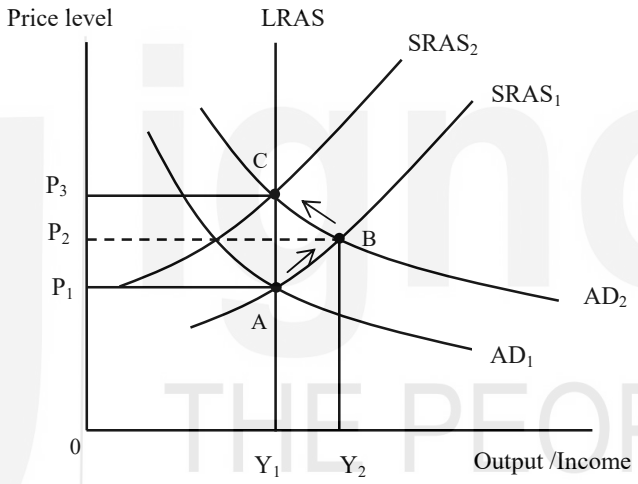

Fig. 6.3: Long Run Aggregate Supply Curve

Notice that there is an increase in price level along with the increase in output. In response to the price rise, workers will demand for a hike in wage rate. The movement along the upward-sloping $SRAS_1$ curve as Y increases from Y_1 to Y_2 assumes that there is a lag between increase in price level and increase in wage rate; increase in wage rate take place later.

As wage rate increases, there is an increase in the cost of production. The short-run aggregate supply curve shifts to the left from $SRAS_1$ to $SRAS_2$ (see Fig. 6.3). If the wage rate increases by the same proportion as the price rise, output will be back to Y_1 (point C in Fig. 6.3 at which AD_2 and $SRAS_2$ intersect). So, when wages fully adjust to prices, the equilibrium is at the LRAS curve which provides the full employment level of output. You should note that the equilibrium point moved from point A to point B and finally rested at point C. In the long run, increase in AD has led to an increase in prices only; output has remained the same.

Output Gap

The difference between the actual output and the full employment output is known as the 'output gap'. Thus, Output Gap = $(Y_a - Y^*)$, where Y_a is actual output and Y* is the potential output. Actual output is determined as per the intersection of the AD and SRAS curves. Potential output is given by the intersection of the AD and LRAS curves.

Let us look back at Fig 6.1. In this figure, the difference between Y* and Y_1 is the output gap. Output gap can be either negative or positive. When resources are not utilized efficiently (i.e., they are under-utilised), the actual GDP remains below the potential GDP and a *negative* output gap appears (see Fig. 6.1, panel (a)). On the other hand, output gap is *positive* when actual output is higher than full employment output (see Fig. 6.1, panel (b)).

You should remember that potential output can grow overtime with technological progress and accumulation of resources. Potential output does not depend on the level of aggregate demand. Recall that such a point of view was expressed by the classical economists.

Check Your Progress 1

1) Explain the short run equilibrium of an economy with the help of diagram.

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2) Explain the long run equilibrium of an economy with the help of diagram.

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3) Define output gap and show it through a diagram.

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4) How does the economy adjust itself in the long run, if the actual GDP is to the right of potential GDP in the short run?

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6.4 IMPACT OF FISCAL AND MONETARY POLICIES

In the previous section we saw that the shifts in the AD and AS curves influence the equilibrium levels of output and prices. In the previous two Units we have discussed the factors responsible for such shifts. Let us look back at those factors from macroeconomic policy point of point of view. As you may be aware there two broad categories of macroeconomic policy: (i) Fiscal Policy, and (ii) Monetary Policy. The objective of both the policies is to influence the economy, particularly macroeconomic variables such as economic growth, inflation, employment generation, etc. Fiscal policy refers to the decisions taken by the government regarding public expenditure and taxes. Monetary policy, on the other hand, refers to the decisions taken by the Central Bank of a country (e.g., Reserve Bank of India, in the case of India) with respect to money supply and interest rate.

Basically there are two types of policies that government follows: *expansionary* and *contractionary*. In an economy, the government or its authorised agency uses the instruments of both monetary and fiscal policies realise the desired objectives. You are aware of business cycles, which result in economic fluctuations in an economy. During expansion of phase of a business cycle, growth rate is relatively high and unemployment is relatively low. During this phase, there are chances of high inflation in the economy. On the other hand, during the recession phase of a business cycle, economic growth is relatively slower, unemployment is relatively higher. Since the government's role is to maintain economic stability, it uses fiscal and monetary policies to counter the effects of business cycle. Thus, during expansion phase of business cycle, the government would guard against inflation – it will adopt a contractionary policy.

Fiscal Policy: Recall that the two fiscal policy variables are government purchases (G) and tax rates (t). We have discussed about the impact of these two variables on the AD curve in Section 4.4 of Unit 4. Similarly, we have discussed the impact of the changes in government expenditure and net taxes on the AS curve in Sub-Section 5.6.2 of Unit 5. Expansionary fiscal policy occurs when the government increases government spending and/ or reduces tax rates. When the tax rate is reduced, households are left with more disposable income and their consumption demand goes up.

Thus the AD curve shifts to the right. The government resorts to a contractionary fiscal policy by reducing government expenditure and/ or increasing tax rates.

Monetary Policy: Two important monetary policy variables for regulating the economy are money supply (quantity of money supplied (M_s)) and interest rate. Both these variables are related however. An increase in money supply leads to a decline in interest rate while a decrease in money supply leads to an increase in interest rate. We had a detailed discussion on the importance and instruments of monetary policy in Unit 10 of BECC 133: Principles of Macroeconomics – I. You know that an increase in interest rate has a negative impact on the level of investment demand. On the other hand, a reduction in interest rate leads to a decline in the cost of capital, which in turn leads to an increase in the level of investment in the economy. Many central banks monitor the interest rate in the economy and it has become an important tool of monetary policy. An expansionary monetary policy is carried out by increasing money supply and reducing interest rate. When interest rate is reduced, there is an increase in investment demand and the AD curve shifts to the right. On the other hand, a contractionary monetary policy is carried out by reducing money supply and increasing interest rate.

We saw earlier in this Unit that an expansionary policy shifts the AD curve to the right and that a contractionary policy shifts the AD curve to the left. We consider the case of right-ward shift in the AD curve below. You should examine the effect of a decrease in aggregate demand (left-ward shift in the AD curve) yourself.

When considering the effect of a policy change, we must be careful to note the position and slope of the SRAS curve. In fact, the extent to which output and prices will change due to a change in aggregate demand depend, to a large extent, on the shape of the AS curve. In Fig. 6.4 we depict the AS curve which is relatively flatter at lower levels of output; upward sloping in the middle segment; and relatively vertical when level of output is high.

In Fig. 6.4 the initial demand and supply curves are AD_1 and AS_1 respectively. These curves intersect at E_1. The equilibrium levels of output and prices are given by Y_1 and P_1 respectively. In Panel (a) we depict a situation where the intersection between AD and AS curves is at a lower level of output. The slope of the AS curve is relatively less in this segment. In Panel (b), on the other hand, we depict a situation where the intersection between AD and AS curves takes place at a higher level of output. The slope of the AS curve is relatively high in this segment.

Suppose the government pursues an expansionary policy, as a result of which the AD curve shifts to the right, from AD_1 to AD_2. The outcomes of the shift in the AD curve are different in panel (a) and panel (b).

If the economy is initially on the relatively flatter portion of the AS curve, as shown by panel (a) of Fig. 6.4, an expansionary policy will result in a smaller

increase in prices but increase in output will be substantial. The increase in equilibrium Y (from Y_0 to Y_1) is much greater than the increase in equilibrium P (from P_0 to P_1). This is the case in which an expansionary policy works well. There is an increase in output with little increase in the price level.

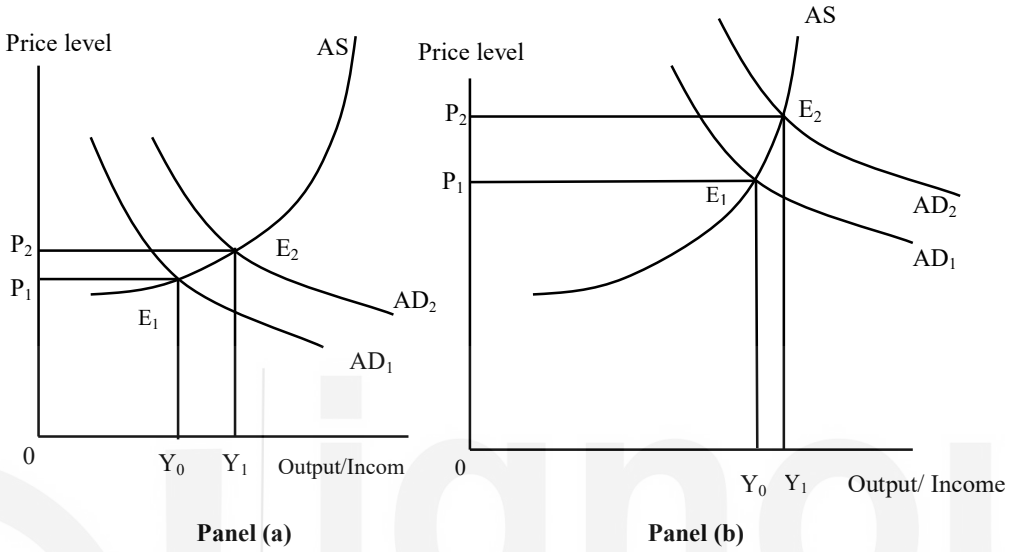

Fig. 6.4: Effect of Expansionary Policy on Equilibrium Output and Prices

If the initial equilibrium is on the steeper section of the AS curve, as shown by panel (b) of Fig. 6.4, an expansionary policy will result in a small increase in equilibrium output (from Y_0 to Y_1) but a large increase in the equilibrium price level (from P_0 to P_1). An expansionary policy does not work well under such situations. While economic growth is less, inflation is much higher. We will attempt to explain the reason behind such a situation. When an increase in government expenditure takes place, there is an unanticipated demand for goods and services as a result of which there is a decline in the inventories of the firms. The firms try to hire more labour and purchase more raw materials so as to increase their production. Consequently, the wage rate and the prices of raw materials increase, which lead to an increase in price level in the economy. The increase in the price level results in an increase in the demand for money, which (with a fixed money supply) leads to an increase in the interest rate, thereby decreasing planned investment. We elaborate on this point below.

As you know, the resources (viz., capital, labour, raw materials) available in an economy are limited. During recession, there are unutilised resources in the economy. Thus there are adequate inputs available for the firms to invest. When the economy is operating nearer to full employment level, situation is different. When government expenditure increases under such circumstances, the government competes with the private sector for the limited resources available in the market. There is an increase in interest rate, wage rate and prices. The private sector finds it unviable to make further investment. Often we term it as **crowding out effect**.

If the LRAS curve is vertical then a policy action such as increasing government spending, simply end up increasing the price level. Because the firms are producing at capacity, prices and interest rates will continue to rise until the increase in government spending is completely matched by a decrease in planned investment and there is complete crowding out.

In case of contractionary fiscal or monetary policy, the shift in the AD curve is leftwards. This leads to downward movement in the equilibrium level of price and output. Again, it is important to note where the economy is operating: at the flatter portion of the AS curve or at the steeper portion of the AS curve. In the long run, a contractionary policy will only decrease the price level and the output level will remain at the full employment level.

6.5 CASE STUDIES

You should be able to relate theoretical understanding with practical situations or global issues which affect the economy. An important economic role of the government, as you know, is to maintain stability in economic growth, price level and employment. Let us look into how the fiscal and monetary policies are put to work.

6.5.1 Supply Shock

In the past forty years, global markets have seen abrupt rise in crude oil prices, often termed as 'oil crises'. Since crude oil is an essential input for many products, there has been a sharp rise in the cost production of these products during the oil crises. Further, many counties are dependent on imports of crude oil. During oil crises, the balance of payments position of these countries has been severely upset. The supply shock due oil crises or similar circumstances has been difficult to manage for policy makers.

Let us assume that the economy operates with AS_1 and AD_1 curves. Equilibrium is at E_1 with equilibrium output and prices of Y_1 and P_1 respectively. Let us assume that a supply shock is encountered by the economy. It will shift the AS curve from AS_0 to AS_1 (see Fig. 6.5), as a result of which the equilibrium will shift from E_1 to E_1'. This leaves the economy with a lower output of Y_1' and higher price level of P_1'. There are many kinds of inflation which we will discuss in Unit 7 of this course. In the case of supply shock, we look at inflation as cost-push or supply-side inflation. If we assume that the government does not react to this shift in AS by changing the fiscal or monetary policy, the AD curve will not shift.

As pointed out earlier, the government would take monetary policy measures (such as increase in money supply and decrease in interest rate) and fiscal policy measures (such as increase in government expenditure and decrease in tax rate). Consequently, the AD curve will shift to the right. In Fig. 6.5 we assume that the AD curve shifts from AD_1 to AD_2. As a result, the equilibrium will shift from E_1'

to E_2. Thus the government would try to bring back the economy on the track. Output will increase as a result of government policy measures. The problem with such policy, however, is that the intersection of the AS_2 and AD_2 curves would take place at a higher price level. As you can see from Fig. 6.5, equilibrium output is Y_1, but equilibrium price is P_2.

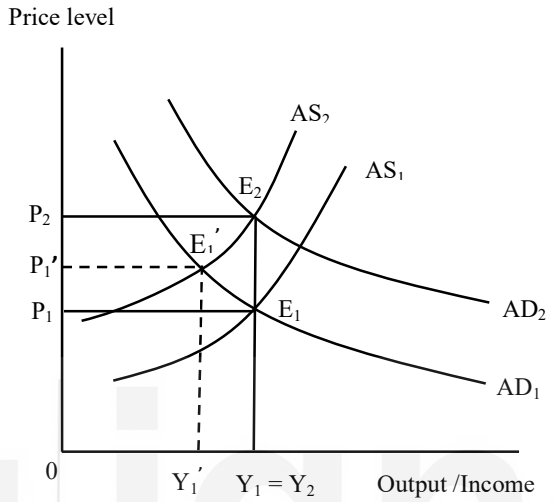

Fig. 6.5: Cost Shock and Policy Impact

The outcome is a situation of 'stagflation' (this term refers to a combination of stagnation in output and inflation) in the economy. The economy would be experiencing both stagnation in output and inflation. During the 1970s the problem of stagflation was visualised for the first time. Subsequently, quite a few instances of stagflation is witnessed in many countries.

Thus, we can say that the supply shocks are bad news for policy makers. If the government does not react, there would be decline in output. If the government attempts to counter it by expansionary policies, price rise (implies inflation) would be much higher.

6.5.2 Demand Shock

Demand shock could be either positive or negative. Examples of positive demand shocks are tax cuts, interest rate cuts, government stimulus package, etc. Examples of negative demand shocks are natural disasters, stock market crash, etc. While a positive demand shock shifts the AD curve upward to the right, a negative demand shock shifts the AD curve downward to the left. Depending upon the shape of the AS curve, increase in AD results in an increase in both output and prices. Let us consider a case of positive demand shock.

In the previous section we pointed out that the segment of the AS curve in which the economy operates is very important. In case the economy is operating at the flatter portion of the AS curve and there is an unexpected increase in aggregate demand, the impact will be more on output and less on prices. In contrast, if the economy is operating at the vertical portion of the AS curve, the impact of an

increase in aggregate demand will be more in terms of higher prices and the output may not increase at all (Refer to Section 6.4).

In Fig. 6.6 the economy is operating with AS and AD_0 curves. The equilibrium output and prices are Y_0 and P_0 respectively. Due to a positive demand shock, suppose the AD curve shifts from AD_0 to AD_1. Consequently, equilibrium output and prices change to Y_1 and P_1 respectively.

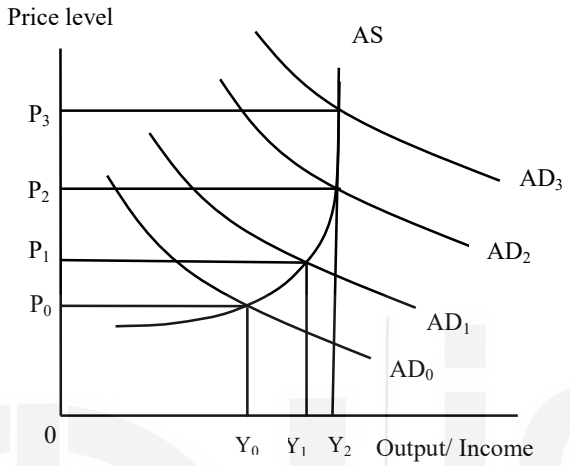

Fig. 6.6: Demand Shock and Sustained Inflation

If aggregate demand keeps on increasing (say due to increase in exports or government stimulus packages) the AD curve shifts from AD1 to AD2 and then from AD2 to AD3. Increase in output cannot be sustained beyond Y2, which is the full employment output level. Subsequently, increase in aggregate demand results in price rise, and the economy may pass through a phase of demand-pull inflation. You should note that inflation initiated by an increase in aggregate demand is called demand-pull inflation.

When aggregate output increases the government must increase money supply; otherwise there will be an increase in interest rate (see Section 9.5 of Unit 9 in BECC 133: Principles of Macroeconomics – I). Economists generally agree that for a sustained inflation to occur, the central bank must accommodate it. In this sense, a sustained inflation can be thought of as a purely monetary phenomenon. Suppose the central bank decides to expand the supply of money to keep the interest rate constant. As the higher price level (P_1) pushes up the demand for money, the central bank expands the supply of money. The objective could be the elimination of the 'crowding-out effect' of a higher interest rate. When the supply of money is expanded, the AD curve shifts to the right again, from AD_1 to AD_2 (refer to Fig. 6.6). This shift of the AD curve, brought about by the increased money supply, pushes prices up even further. Higher prices, in turn, increase the demand for money further, which requires a further increase in the money supply and so on. This leads to sustained inflation without much rise in the equilibrium level of output.

The role of fiscal and monetary policies is to limit the increases in aggregate demand through policy instruments when the economy is operating near the full employment output level. The government has to resort to a contractionary fiscal and monetary policy. Reduction in government expenditure, increase in tax rate and increase in interest rate could be the tools for reducing aggregate demand. When the economy is operating at a lower level of output, however, the government has to boost aggregate demand by enhancing public expenditure. In recent times, during 2020, when the world was passing through the Covid-19 pandemic, government in many countries came up stimulus packages. The objective was to increase aggregate demand.

Check Your Progress 2

1) Explain the impact of expansionary fiscal policy on the equilibrium price and output level.

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2) Explain how the shape of the AS curve affect the outcome of fiscal and monetary policies?

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3) Describe how it is difficult to handle the economy during oil crisis.

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4) Describe the process of stagflation through a diagram.

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6.6 LET US SUM UP

In this unit, we explained how an economy reaches equilibrium levels of output and prices in the short run and the long run. We explained the concept of output gap and its relationship with the equilibrium level of output. We discussed the transition process from short run equilibrium to the long run equilibrium, if there is an output gap in the economy. The impact of fiscal and monetary policies on the equilibrium levels of output and prices was explained with the help of diagrams. In order to relate the theoretical knowledge with real world problems, we discussed two case studies in terms of policy actions.

6.7 ANSWERS/ HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. Short-run equilibrium is given by the intersection of the AD curve and the short-run AS curve (upward sloping). The output so received is called the actual GDP or actual level of output.
2. Long-run equilibrium is given by the intersection of the AD curve and the long-run AS curve (vertical). The output so received is known as the potential GDP or full employment level of output.
3. Output gap is the difference between the potential level of output and the actual level of output.
4. The actual output level is on the right of the potential level of output. Wages will increase and the short-run AS curve will shift to the left. When wages fully adjust, the AS curve will shift in a manner such that the output will be back to the potential level, over a period of time. So, when wages fully adjust to prices, the equilibrium is at the long run aggregate supply curve which describes the full employment level of output.

Check Your Progress 2

1. Expansionary fiscal policy shifts the AD curve to the right. If the economy is operating below full employment level output, particularly at the flatter segment of the AS curve then price rise is smaller while increase in output is large. But if the economy is operating at near capacity level (full employment level), and at the steeper segment of the AS curve then the price rise is much larger while output growth small.

2. Yes, the shape of the AS curve affects the outcome as mentioned in the answer to question 1 above.
3. Oil crisis is a classic case of supply shock. Government can attempt for an expansionary policy but the adverse side effect will be higher inflation. So, the supply shocks are bad news for policymakers.
4. Stagflation occurs when the economy is experiencing both stagnation and inflation simultaneously. The oil crisis as a supply shock precisely produces stagflation.