UNIT 14: BUSINESS CYCLES THEORY

UNIT STRUCTURE

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14.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- describe the multiplier-accelerator theory of business cylces put fowrad by Samuelson
- explain Hick's theory of business cycles.

14.2 INTRODUCTION

We have already discussed business cycle in the previous unit. In this unit, we shall disucss two prominent theories of busines cycles. The first is the Samuelson's Theory of business cycles. In this theory, we shall discuss how Samuelson utilised the accelerator and multiplier interaction to explain the phenomenon of business cycle. The next is the Hick's theory of business cycles.

14.3 MULTIPLIER-ACCELERATOR INTERACTION: SAMUELSON'S THEORY OF BUSINESS CYCLES

In the previous unit, we have pointed out a few factors for the emergence of business cycles. J. M. Keynes also made significant contributions to the understanding of business cycles. He maintained that

business cycles are the results of ups and downs in investment demand. In Chapter 22 entitled 'Notes on the Trade Cycles' of his famous book "The General Theory of Employment, Interest and Money", Keynes argued that the problem of business cycle (Keynes used the term Trade cycle) in the economy was caused 'by a cyclical change in the marginal efficiency of capital, though complicated and often aggravated by associated changes in other significant short-period variables of the economic system.' Thus, according to Keynes, the prime factors of cyclical fluctuations in the economy stems from investment changes generated by the cyclical changes in the marginal efficiency of capital.

In his theory of business cycles, Keynes, with the help of the multiplier theory has shown the effect of increase and decrease in investment on output and employment get magnified when multiplier is working during either the upswing or downswing of a business cycle. However, he did not explain the cyclical and cumulative nature of the fluctuations in economic activity. This is because he did not lay any emphasis on utilising the accelerator in the explanation of business cycles.

Later economists tried to utilise both the multiplier and the interaction principles to explain economic phenomena including business cycles. Samuelson was among the pioneers. He showed that the interaction between the multiplier and accelerator caused cyclical fluctuations in economic activities.

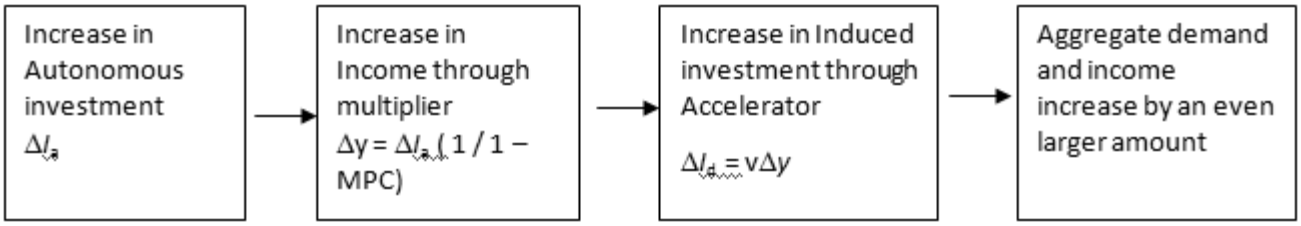
The basic tenet of the Samuelson's model is that multiplier alone cannot adequately explain the cyclical and cumulative nature of the economic fluctuations. An autonomous increase in the level of investment raises income by a magnified amount depending upon the value of the multiplier. This increased income further acts as an inducement to increase investment through the acceleration effect. Thus, the increase in income raises aggregate demand for goods and services. To fulfil the increased demand of more goods, the economy would require more capital goods for which extra investment is needed. In this way, the relationship between investment and income is one of mutual interaction; investment affects

income which in turn affects investment demand and in this process income and employment fluctuate in a cyclical manner.

Samuelson's model rests on the following assumptions:

- Consumption spending in the current period is related to the change in income in the preceding period.
- Investment in the current period is related to the change in income with a lag of one period.
- There is also an additional factor in the form of exogenous (government) spending, which is constant.
- The model does not consider the determinants of this exogenous spending nor the effects of it's changes on the level of income.

Working of the Model: To explain the working of the Samuelson's model, let us first consider the following Figure 14.1 which explains with how income and output will increase by even larger amount when accelerator



In Figure 14.1, I_a = Increase in Autonomous Investment, Y = Increase in Income, 1/ 1 –MPC = Size of Multiplier where MPC = Marginal Propensity to Consume, I_d = Increase in Induced Investment, v = Size of accelerator.

The model of interaction between multiplier and accelerator can be mathematically represented as under:

$$Y_t = C_t + I_t \qquad \ldots(i)$$

$$C_t = C_a + c\,(Y_{t-1}) \qquad \ldots(ii)$$

$$I_t = I_a + v\,(Y_{t-1} - Y_{t-2}) \qquad \ldots.(iii)$$

Here Y_t, C_t and I_t stand for income, consumption and investment respectively for a period t, C_a stands for autonomous consumption, I_a for

autonomous investment, c for marginal pro-pensity to consume and v for the capital-output ratio or accelerator.

From the above three equations and from the assumptions of the model we have already discussed, it can be seen that consumption in a period t is a function of income of the previous period Y_{t-1}. Similarly, induced investment in period t is a function of the change in income in the previous period. This further implies that there is two periods gap for changes in income to determine induced investment (consider the second assumption of the model).

Now, in the equation (iii) above, induced investment equals v ($Y_{t-1} - Y_{t-2}$) or v (ΔY_{t-1}).

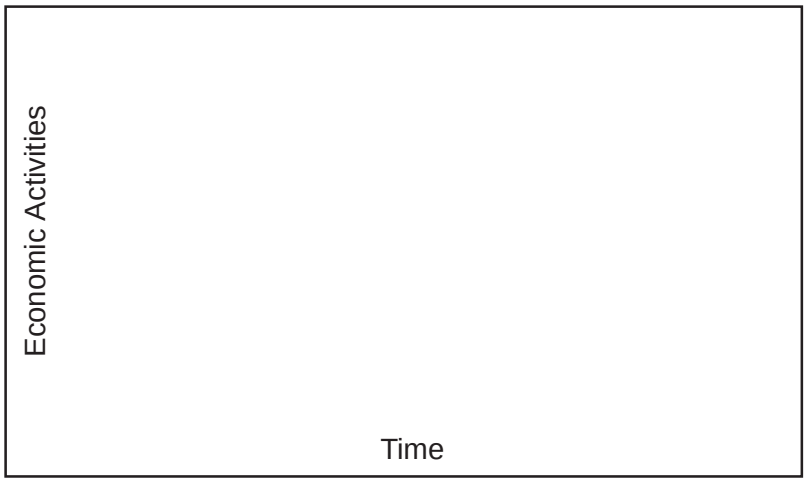
Substituting equations (ii) and (iii) in equation (i) we get the following income equation (iv).

$$Y_t = C_a + c\ (Y_{t-1}) + I_a + v\ (Y_{t-1} - Y_{t-2}) \quad \ldots(iv)$$

Equation (iv) explains how changes in income are dependent on the values of marginal propensity to consume (c) and capital-output ratio v (i.e., accelerator).

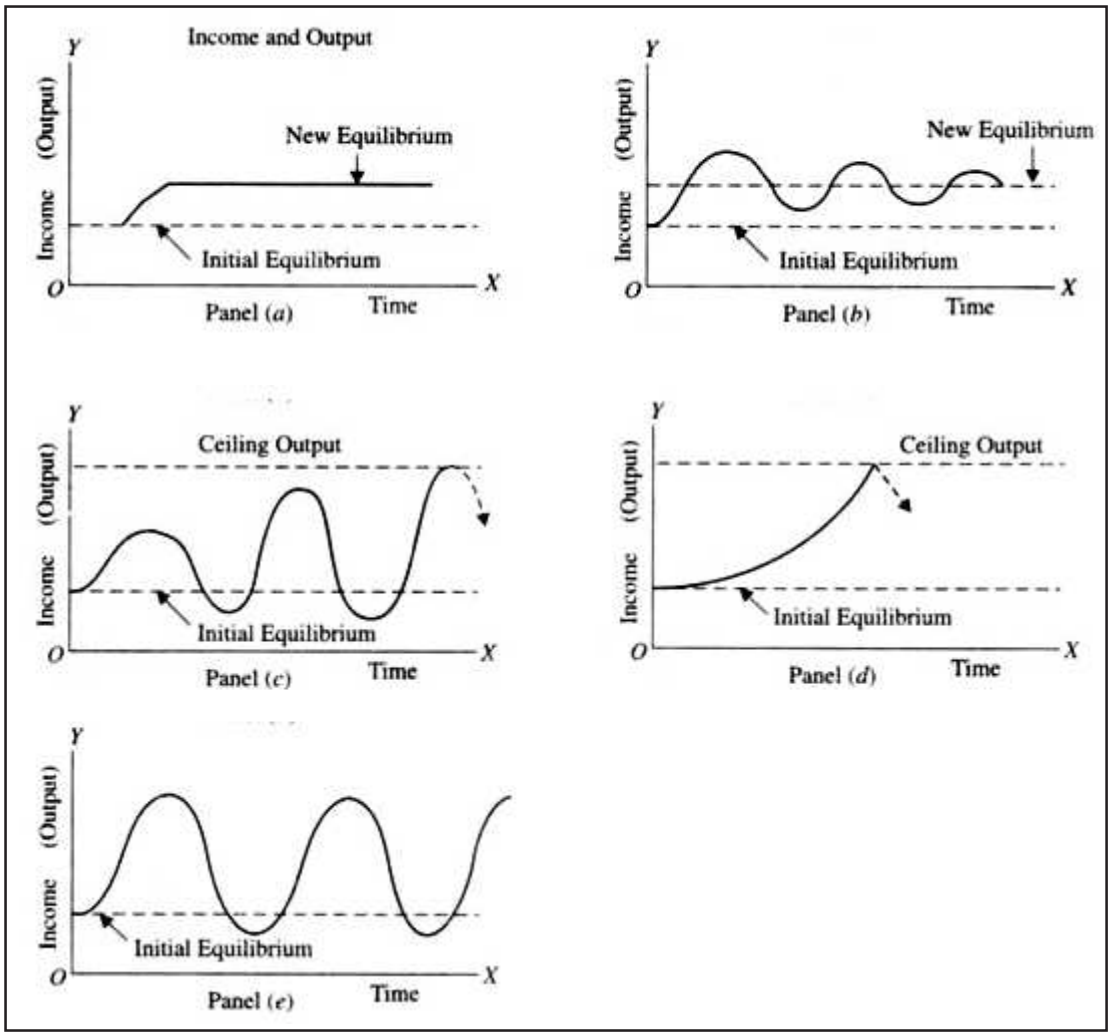
With the help of different combinations of the values of marginal propensity to consume (c) and capital-output ratio (v), Samuelson explained different paths which the economy will follow. The various combinations of the values of marginal propensity to consume and capital-output ratio (which respectively determine the magnitudes of multiplier and accelerator) have been shown with the help of Figure 14.2.

Figure 14.2: Combination of Multiplier and Accelerator



The above figure 14.2 though seem simple, is yet actually a combination of five distinct patters, marked by A to E. These paths or patterns of movements which the economic activity (as measured by gross national product or income) can have depending upon various combinations of the values of marginal propensity to consume (c) and capital-output ratio (v) have been explained with the help of Figure 14.3.

Figure 14.3 (panel a to e): Interaction between multiplier and accelerator (Different patterns of income (output) movements for various values of c and v,



Explanation of different panels of Figures 14.2 and 14.3: When the combinations of the value of marginal propensity to consume (c) and capital-output ratio (v) lie within the region marked A (in Figure 14.2), with a change in autonomous investment, the gross national product or income

moves upward or downward at a decreasing rate and finally reaches a new equilibrium as is shown in panel (a) of Figure 14.3.

Now, if the values of c and v are such that they lie in region B (in Figure 14.2), the change in autonomous investment or autonomous consumption will generate fluctuations in income which follow the pattern of a series of damped cycles whose amplitudes go on declining until the cycles disappear as is shown in panel (b) of Figure 14.3.

Similarly, region C in Figure 14.2 represents the combinations of c and v which are relatively high as compared to the region B and determine such values of multiplier and accelerator that bring about explosive cycles, that is, the fluctuations of income with successively greater explosive growth. This situation has been shown in panel (c) of Figure 14.3. In the figure it has been seen that the system tends to explode and diverges greatly from the equilibrium level.

The region D in Figure 14.2 provides the combinations of c and v which cause income to move upward or downward at an increasing rate which has somehow to be restrained if the cyclical movements are to occur. This has been explained in subsequent panel (d) of Figure 14.3. Like the values of multiplier and accelerator of region C, their values in region D cause the system to explode and diverge from the equilibrium state by an increasing amount.

In a special case when values of c and v (and therefore the magnitudes of multiplier and accelerator) lie in region E in Figure 14.2 , they produce fluctuations in income of constant amplitude as is shown in panel (e) of Figure 14.3.

Thus, we have seen the interaction of multiplier and accelerator in case of various values of marginal propensity to consume (c) and capital-output ratio (v). On the basis of the interaction of the multiplier and accelerator the two categories of business cycle theories have been put forward.

One category of these business cycle theories assumes the values of multiplier and accelerator which generate explosive cycles. For example, Hicks' theory of business cycles falls in this category. On the other hand,

Hansen has propounded a business cycle theory based on the interaction of multiplier with a weak accelerator which produces only damped oscillations. In the next section, we shall discuss Hicks' theory of business cycles.



CHECK YOUR PROGRESS

Q 1: State whether the follwing statements are True (T) or False (F).

(a) Keynes utilised the multiplier-accelerator interaction technique to explain trade cycles. (T/F).

(b) Samuelson assumed consumption to be a factor of income of the preceding period (T/F)

Q 2: Mention the assumptions of the Samuelson's theory of business cycles. (Answer in about 50 words).

14.4 HICK'S THEORY OF BUSINESS CYCLES

Hicks presented his theory of business cycles in his book 'A Contribution to the Theory of Trade Cycle' published in the year 1950. Even after more than 50 years of publication, his theory continues to remain prominent in the discussion of the theory of trade cycles. Hicks' theory of trade cycles is based on three important concepts, viz., J M Keynes' multiplier analysis, J M Clark's acceleration analysis and Harrod's growth analysis.

Assumptions of the Theory: Before discussing Hicks' theory of business cycles in detail, let us consider the assumptions on which the theory rests. These assumptions are:

- Hicks has assumed that the economy is in equilibrium initially.
- The economy is progressive in the sense that autonomous investment increases at a constant rate such that the economy over the period of

time does not remain static at one point. This means the economy faces the situation of dynamic equilibrium (please recall/review the discussion in the previous unit).

- Consumption in the current period is a function of income of the previous period. Symbolically, it can be represented by $C_t = f Y_{t-1}$; where C means consumption, Y means income and t represents time. This is different from Keynes analysis where he assumed consumption to be a function of current income.
- Induced investment in the current period is a function of change in output of the previous period. Symbolically, it can be represented by $I_t = f(Y_{t-1} - Y_{t-2})$; where I means investment, Y means income and t represents time.
- Values of multiplier and accelerator remain fixed.
- There exists a limit to upward limit of growth (Hicks used the term 'ceiling') of the economy. It cannot grow beyond the full employment level of output.
- There is no such direct constraint in the downward (i.e., contraction) movement of the economy. However, there exists indirect constraints. This is due to the fact that ***disinvestment*** can not exceed depreciation cost (termed as transformation of the accelerator) acts as the indirect constraint. Again, gross investment can not fall below zero. Thus, it means that just like as the upward limit, there also exists a downward limit (Hicks used the term 'floor') to fluctuations.

Disinvestment: Typically, disinvestment refers to no maintaining the existing stock fo capital, i.e., not compensating for depreciation. Disinvestment also refers to selling of capital assets. For example, public sector disinvestment is selling of shares of Public sector undertakings in the market.

'Leverage Effects' *: cause the economy to grow at cumulative rates.*

Distinctive Features of the Theory: Though Hicks' theory is based on three earlier concepts, his theory possesses certain distinctive features. Before explaining the theory, it will therefore be better to consider these distinctive features in brief.

- **Ceiling and floor limits to growth:** Hicks propagates that there exists a ceiling (i.e. upper limit) to growth. Thus, according to him, interaction between the accelerator and multiplier (termed as ***'leverage effects'***) cause the economy to grow at cumulative rates. Such growth continues till it reaches the level of full employment. In a dynamic economy however, due to rising ceiling, and hence it may take longer time (compared to a static economy) to reach the ceiling.

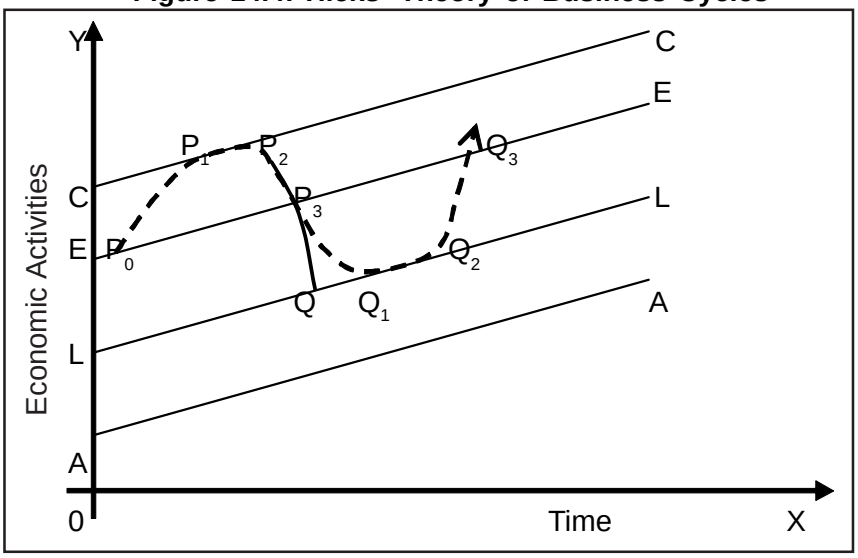
The economy starts to take downward swing after it reaches the ceiling. The downward turn however depends on the availability of resources viz., population, technology, capital stock etc. The economy in fact may not be able to reach the ceiling and take downward turn if the leverage effect (interaction between multiplier and accelerator) is not strong enough. In fact, the economy may sustain at ceiling and creep along this level for sometime (we shall discuss about this while explaining the theory).

It is to be remembered that according to Hicks, while both multiplier and accelerator tend to push up the economy toward ceiling, but its downturn depends only on the multiplier (as accelerator remains inoperative most of the times). This in fact, reduces the rate of decline in growth less as it could have been if both the multiplier and accelerator were in action. Again, according to Hicks, though there is no direct constraint in the downward movement of the economy, there exists indirect constraints as we stated earlier. These constraints are: *first,* gross investment can not fall below zero. *Secondly,* even at this lower level, some basic investment (or, disinvestment) takes place for replacing inventories and equipment. Again, autonomous investment starts increasing and is higher than the amount of disinvestment. Thus, increase in net investment causes an upturn of aggregate income and pushes the economy towards expansion phase.

- **Rising trend of cycle:** Another distinctive feature of Hicks theory of business cycles has been the rising trend of the cycles. Hicks has assumed that even the economy move through a growth path even when it faces the different phases of trade cycles (please recall/review the discussion of the previous unit). This assumption is quite realistic and matches the real working of an economy.

Explanation of the Theory: We shall explain Hicks theory in terms of the four phases of trade cycles we have discussed already. The theory can be explained with the help of the figure 14.4.

Figure 14.4: Hicks' Theory of Business Cycles



In figure 14.4, the line AA shows autonomous investment, which is assumed to be growing at a constant rate 'g'.

- EE shows the equilibrium path of output which depends upon the level of autonomous investment (AA). This equilibrium path is affected by the interaction of multiplier and accelerator.
- LL represents the lower equilibrium path of output.
- FF represents the highest level of full employment (i.e, the ceiling point). In general, it is above the equilibrium path EE and is assumed to grow at the same rate at which AA is growing.

The four phases of the trade cycle as have been shown with the help of the above figure are as follows.

- **Prosperity:** As we have stated earlier, P_0 is the initial equilibrium point. Now, as autonomous investment is increased at the rate 'g' and the interaction of the multiplier and accelerator pushes the economy upward toward the ceiling path CC. CC represents the path of full employment equilibrium. Thus, the economy reaches the point of P_1. Now as we have discussed already, we are concerned with a dynamic economy which exhibits dynamic equilibrium. Hence, endowed with sufficient manpower, technology and other resources and the ***lagged relationship*** of induced investments actually tends to creep the economy to a higher level even after attainment of the level of full employment ceiling at point

Lagged relationship: It means the relationship between two sets of variables in which the current value of the dependent variable is related to the previous values of the one or more independent variables.

P_1. Thus, the economy creeps from point P_1 to P_2. It is important to note that according to Hicks, full employment ceiling is independent of the path of output. Thus, employment does not depend on output; rather it depends upon the factors like population growth, technological factors etc. Again, these factors have been assumed to grow at the same rate of growth of autonomous investment.

- **Downturn:** Now, the economy can not sustain at ceiling for all the time. It has to make a downturn. As we have discussed already, according to Hicks, the downward movement of the economy may start even before reaching the path of full employment equilibrium, i.e., before touching point P_1. It is interesting to note that while the economy is pushed by the combined forces of multiplier and accelerator, in its downturn the accelerator remains inoperative. As a result its rate of fall becomes less as it could have been if both the forces were to operate (in figure the line P_2P_3Q represents this path). However, as the multiplier is alone operative in the downturn of the economy and due to the indirect constraints we have already mentioned, the economy actually moves towards the path $P_2P_3Q_1$ and not along the path P_2P_3Q.
- **Depression:** You will notice from the figure that as the economy make downturn, it passes the initial equilibrium path EE at point P_3. So, will the economy be stable at this level and be in equilibrium again? The answer is negative. The reverse multiplier effects however pull the economy below EE. The lower limit however is determined by the indirect constraints discussed already. In our case, the line LL depicts that floor limit. The economy thus, reaches the floor limit Q_1.
- **Recovery:** After the economy reaches the floor limit at Q_1, it will not immediately move upward; but it creeps along and reaches a slightly higher floor limit at point Q_2. This movement from Q_1 to Q_2 is basically due to the existence of excess capacity in the economy. Such movement from Q_1 to Q_2 generates some growth in national income. Again, as autonomous investment is continuously being increased at the rate 'g', the interaction of multiplier and accelerator will once again move the economy upward towards the growth path Q_2Q_3.

Critical Evaluation: Hicksian theory of trade cycles possesses the following merits.

- Hicks has made distinct departure from earlier theories of trade cycles with the argument that the economy actually declines at a slower rate. His analysis that the accelerator remains inoperative during downturn of the economy is quite significant.
- The creeping movements both in case of ceiling and floor limits are also quite remarkable. Hicks has shown that the creeping effect at the ceiling point is caused by multiplier-accelerator interaction and the lagged response of investment. Again, the creeping effect at the floor point is caused by absorption of excess capacity. Both these are very sound arguments.
- Linking economic growth with trade cycles is another important milestone.

However, in spite of the above merits, Hicks theory has been criticised on the following grounds:

- The theory has been criticised for being too rigid. The acceleration principle has been utilized in too rigid form.
- Hicks has assumed fixed values for the multiplier and the accelerator. This is quite unrealistic.
- Hicks theory though does not neglect the role of autonomous investment in the economy, but it has been attached a passive role. The increase in autonomous at a constant rate has also been criticised.
- Hicks' argument that the full employment is independent of the path of output has also been criticised.

Despite the above criticisms Hicks theory of trade cycles is considered to be a major contribution in the field. Many critics acknowledge its merit. It is also worth mentioning that even after 50 years of its existence, the theory till today is considered as an important theory in the discussion of trade cycles.



CHECK YOUR PROGRESS

Q 3: State whether True (T) or False (F).

a) Hicks has assumed a static economy in his analysis. (T/F)

b) Hicks has assumed that the economy is initially in equilibrium. (T/F)

Q 4: How according to Hicks does the economy recover after it faces the situation of depression? (Answer in about 60 words)

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14.5 LET US SUM UP

- Samuelson was among the pioneers to use multiplier-accelarator interaction to explaion the phenomenon of business cycle. He showed that the interaction between the multiplier and accelerator caused cyclical fluctuations in economic activities.
- The basic tenet of the Samuelson's model is that multiplier alone cannot adequately explain the cyclical and cumulative nature of the economic fluctuations.
- Hicks theory of trade cycles is considered as a significant contribution in the field.



14.6 FURTHER READING

1) Ajuja, H.L. (2007). *Macroeconomics: Theory and Policy*. New Delhi: S.Chand & Co..Gupta, R.D., &

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3) Rana, K.C. & Verma, K.N. (2009). *Macroeconomic Analysis*, Jalandhar: Vishal Publications.

4) Shapiro, E. (2013). *Macroeconomic Analysis*. New Delhi: Galgotia Publications Pvt. Ltd..

14.7 ANSWERS TO CHECK YOUR PROGRESS

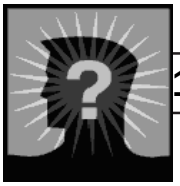
Ans to Q No 1: (a) False (b) True

Ans to Q No 2: Samuelson's model rests on the following assumptions:

- Consumption spending in the current period is related to the change in income in the preceding period.
- Investment in the current period is related to the change in income with a lag of one period.
- There is also an additional factor in the form of exogenous (government) spending, which is constant.
- The model does not consider the determinants of this exogenous spending nor the effects of its changes on the level of income.

Ans to Q No 3: a) False b) True

Ans to Q No 4: According to Hicks, the economy will not automatically recover from the floor limit of trade cycles. Rather it tends to creep along this floor limit and reaches a slightly higher point than this. This movement is basically due to the existence of excess capacity in the economy and it generates some growth in national income. Again, as autonomous investment is continuously being increased at a constant rate and the interaction of multiplier and accelerator will once again move the economy towards the growth path.



14.8 MODEL QUESTIONS

A. Answer the following question (in about 150 words.)

Q 1: Discuss major features of Hicks' theory of business cycles.

Q 2: Briefly discuss the the different phases of a business cycle in line with the Hicks' theory of business cycles..

B. Answer the following question (in about 300-500 words.)

Q 1: Discuss critically Hicks' theory of business cycles.

Q 2: Discuss the Samuelson's multiplier-accelerator interaction theory of business cycles.

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