
UNIT 12 EVOLUTION OF MACROECONOMIC THOUGHT - II*

Structure

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12.0 OBJECTIVES

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

- bring out the basic tenets of various schools of macroeconomic thought;
- contrast between the New Classical and the New Keynesian schools;
- explain how the New Classical ideas are rooted in Classical ideas;
- explain how the Keynesian views are reinforced by the New Keynesians; and
- highlight contemporary research areas in macroeconomics.

12.1 INTRODUCTION

In Unit 11 we discussed the Classical and the Keynesian theories in some detail. While classical economic theory suggested minimal government intervention in the economy, the Keynesian theory prescribed government intervention. The Keynesian economic theory laid emphasis on the use of fiscal policy for attaining economic goals. In 1955, Paul A Samuelson provided ‘**neoclassical synthesis**’; an integration of Keynesian with classical/ neoclassical economics. He spoke of a mixed economy, with both the market and the government.

Keynesian ideas had influenced government policy right from the time of Second World War till the 1960s. Battling the effect of the Great Depression, governments took it upon themselves to stimulate spending and aggregate

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demand in the economy. The 1950s and 1960s saw high rates of growth in the developed capitalist countries. By the end of 1960s, however, signals of serious crisis in Keynesian economics started coming up. Simultaneous occurrence of unemployment and inflation became commonplace resulting in ‘stagflation’ throughout the 1970s. The trade-off suggested by Keynesian economics did not work.

Many countries began to feel the pinch of fiscal crisis as a result of high government expenditure. The situation was made worse by the OPEC oil embargo of 1973, popularly known as the ‘oil shock’. Keynesian prescriptions did not seem to be working any more. The situation could not be explained convincingly by Keynesian economics or Samuelson’s neoclassical synthesis. Over time, the solution was sought in re-establishing market freedom and letting go of the state stimulus for enhancing aggregate demand. Also, inflation was sought to be controlled by making wages more flexible so that with a reduced demand for labour, wages fall and consequently cost of production as well as prices fall. This opened the door for spread of the ideas of Milton Friedman, commonly known as **Monetarism**. In some ways, this was a resurgence of classical ideas. By this time, the idea of expectations (price expectations) was introduced explicitly in macroeconomics.

After the 1970s, the world of macroeconomics became bifurcated between two prominent schools of thought: (i) **New Classical**, and (ii) **New Keynesian**. Both these schools based their theories on micro-foundations and intelligent, utility-maximising individuals. The new classical theory (like the original classical theory) argues that government intervention is ineffective in changing the level of output. The 1980s and 1990s saw further development of this School and business cycles were sought to be explained by individuals’ rational responses to technological shocks as in the *Real Business Cycle* model.

As the ideas of the new classical economists were developing, economists following the tradition of Samuelson recognised the importance of imperfections in the economy. Known as new Keynesians, these economists argued that even though rational individuals maximised utility, sub-optimal outcomes can result on account of imperfections in the economy. Hence the new Keynesian models argue in favour of government intervention in the economy (like the original Keynesian theory). More recently, **Dynamic Stochastic General Equilibrium (DSGE) Models** have come up which combine features of both new classical theory and new Keynesian theory.

12.2 NEOCLASSICAL SYNTHESIS

With the coming of Keynesian theory, it seemed that the classical/ neoclassical and Keynesian ideas were irreconcilable. However, in 1955, Paul A. Samuelson integrated Keynesian and Classical ideas in the form of ‘**neoclassical synthesis**’.

Over time, tools such as IS-LM and Phillips Curve were used to show that economy exhibits Keynesian characteristics in the short run but in the long run, classical/ neo-classical results were reached.

Milton Friedman and Edmund Phelps introduced the idea of adaptive expectations about prices. In this framework, expectations did not change in the short run, thus giving rise to an upward sloping Aggregate Supply (SRAS) curve. Labour demand was considered to be a negative function of real wages (W/P); labour supply was a positive function of expected real wages (W/P^e). In a contractual labour market, as long as expected prices remained unchanged, nominal wages demanded by the workers (to keep real wages constant) also remained unchanged.

This gave less than full flexibility of wages. However, in the medium run or the long run (the usage is more a matter of taste), expectations about prices (P^e) get revised, leading to a revision of money wages. This leads to a shift in the SRAS curve so as to give a vertical Aggregate Supply (LRAS) curve in the long run (see Fig. 12.1). In the long run, expected price level is equal to the actual price level.

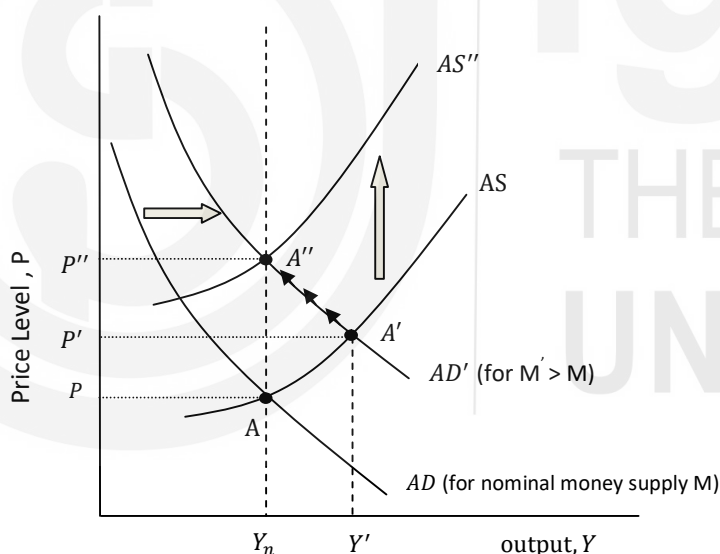


Fig. 12.1: Long-Run Aggregate Supply Curve

In terms of expectations-augmented Phillips Curve; in the short run, due to labour contracts does fail to anticipate further inflation, and therefore, they fail to specify increases in nominal wages needed to keep real wages constant. This leads to a SRPC which shows an inverse relationship between the rate of inflation and unemployment rate. In the long run, the Phillips Curve (LRPC) is vertical at 'natural rate of unemployment' (see Fig. 12.2). The concept of the natural rate of unemployment was first introduced by Milton Friedman and Edmund Phelps in the 1960s.

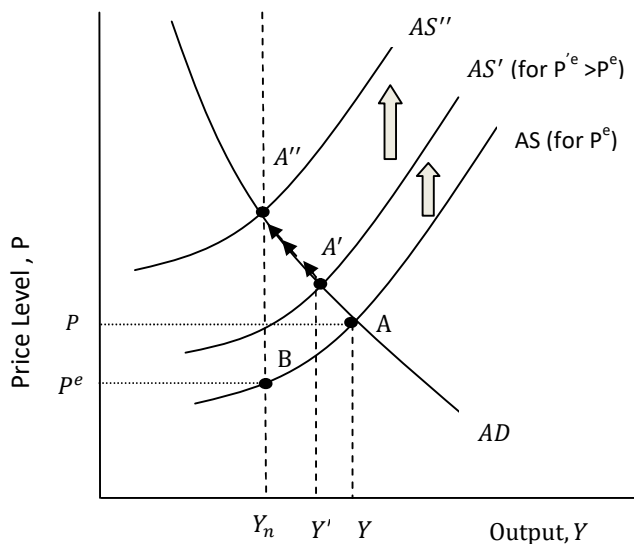


Fig. 12.2: Long-Run Phillips Curve

Thus, any kind of demand shock leads to a Keynesian kind of equilibrium in the short run (when P^e is constant) and equilibrium at the ‘natural rate of output’ in the long run. In the long run, output changes only on account of supply side factors (which change the natural rate of output itself) as in classical theory. Also the inflation –unemployment trade off can only be exploited in the short run. The adjustment of prices and output in the short and the long run can be seen in Fig. 12.1 and Fig. 12.2.

Check Your Progress 1

- 1) Assume that the economy starts in the long run at natural rate of output. By using the AS-AD framework show the impact of a contractionary fiscal policy on output and prices in the short run and in the long run.

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- 2) Assume that the economy is operating at the natural rate of output. Using AS-AD framework, explain the impact of a contractionary fiscal policy on investment in the short run and in the medium run.

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12.3 MONETARISM

Keynesian theory faced the first serious challenge in the mid-1950s on account of the work done by Milton Friedman and his followers. In contrast to Keynes' recommendations, Friedman laid much greater emphasis on monetary policy rather than on fiscal policy. Not surprisingly, Friedman is known as the father of 'monetarism'. In 1956, Friedman reformulated the quantity theory of money and achieved results which were close to the results of the traditional Quantity Theory. Demand for money was found to be stable and hence, changes in money supply were held to be responsible for fluctuations in output.

Monetarists believe that changes in income are predominantly explained by monetary policy. According to them, fiscal policy may be useful but only in the short run and that too for controlling inflation. In fact, monetarists explained the Great Depression in terms of laxity of Federal Reserve Bank. They argued that if the Federal Reserve Bank had intervened with open market operations (by purchasing bonds and securities, so that there is an increase in money supply) the severity of the Great Depression would have been much lesser.

Monetarists also challenge the Keynesian inflation-unemployment trade-off. According to them, Phillips Curve is vertical in the long run (at the natural rate of unemployment) and hence, it is ineffective to try and maintain unemployment below the natural rate. Instead, government should focus on monetary policy to maintain price stability. The policy suggestions made by the Monetarists became the new orthodoxy during the 1970s as the capitalist economies faced a combination of inflation and unemployment which could not be convincingly explained by Keynesian theory.

During the 1980s, macroeconomic theory got bifurcated into two major schools of thought, viz., new classical economics and new Keynesian economics. This bifurcation continues till date. Both the camps are based on rigorous micro foundations for macroeconomics. In other words, the starting point for both the schools of thought is the behaviour of the individual economic agent (such as households and firms).

It is important to understand that both the schools attempt to provide different explanations for the underlying economic reality. While new classical theory attempts to explain business cycles or fluctuations in output through imperfect information or through real shocks (see RBC), new Keynesian theory explains the same phenomena through real and nominal rigidities of wages and prices.

12.4 NEW CLASSICAL ECONOMICS

The new classical theory revived the classical ideas through newer tools of analysis.

12.4.1 Salient Features of New Classical Theory

The important features of new classical economics are as follows:

- (i) **Lucas Critique:** As mentioned in the previous Unit, the decades of 1950s and 1960s were the heyday of Keynesian economics. Policy makers believed that they have mastered the art of policy-making and they have wide range of policy options. Stagflation during the 1970s however shattered such optimism. Robert Lucas criticised Keynesian models on the ground that these models lack micro-foundations. These are highly aggregative models. The parameters of these models change when there is a change in policy. Thus, forecasts based on past data does not hold good for these aggregative models.
- (ii) **Micro-foundations of Macroeconomics:** Lucas suggested that all macroeconomic models should be based on micro-foundations. Utility function of households and production function of firms should be integrated in macroeconomic models. Let us elaborate a bit on this. There are two types of trade-off before households. One, trade-off between consumption and saving; less consumption means more saving. More saving means more of future income. Thus, the choice between consumption and saving today is the same as the choice between present consumption and future consumption in a temporal framework. Households optimise on their consumption and saving over time (i.e., inter-temporal optimisation) given the level of future expected income and the real interest rate. Two, trade-off between work and leisure. Since time in a day is limited, more hours of work means less time for leisure. If more time is devoted to work, more is the stream of income. Similarly, firms optimise their production decisions over time on the basis of production function. Firms take into account expected rate of inflation and output gaps in their production decision.
- (iii) **Continuous Market Clearing:** New classical economists assume that wages are and prices are flexible. Thus there is equality between supply and demand; and markets clear always. New classical economics rules out the possibility of market imperfections.
- (iv) **Rational Expectations:** New classical theory assumes rational expectations on the part of economic agents. Economic agents take into account all available information in formation of expectations about economic variables such as prices, inflation and wages. As a result, there is no systematic error in forecast, and in the long run actual value of a variable is equal to the expected value of the variable.

12.4.2 Major Inferences on Policy

- (i) **No Trade-Off between Inflation and Unemployment:** New classical theory rules out the possibility of trade-off between inflation and unemployment, even in the short-run. Economic agents update their expectations on economic variables, and there is no systematic

discrepancy between actual value of a variable and its expected value. For example, workers expect inflation rate correctly and they take into account such inflation rate while entering into contracts with employers. Thus there is no lag between price increase and wage increase. As a result, LRPC is vertical.

- (ii) **Policy Ineffectiveness Proposition:** Based on the assumption of rational expectations, new classical theory predicts that government policy measures become ineffective. Economic agents anticipate the implications of government measures, and their decision-making is influenced by such expectations. According to new classical economists, economic policy is effective only if it is unexpected.
- (iii) **Aggregate Supply Hypothesis:** The AS curve, according to new classical economists is vertical, as in the case of classical theory. The short run AS curve, however, is upward sloping. Workers allocate their time between work and leisure. If the current real wage rate is higher than normal wage rate, they devote more time towards work, cutting down on leisure. On the other hand, when the real wage rate is lower than normal wage rate, there is a disincentive for work; they spend more time on leisure with the hope that they work more in the future. This leads to a decline in production. Thus output is directly proportional to wage rate. Since prices are directly proportional to wage rate, the SRAS is upward-sloping. The LRAS curve, however, is vertical.

12.4.3 Certain New Classical Models

Now let us discuss some of the new classical models, which explain business cycles on the basis of incorrect information. Although workers and firms are acting as desired, they are doing so on the basis of incorrect information. 'Fooling models' given by Friedman, Phelps and Lucas fall in this category. Another set of new classical models, called the *Real Business Cycle Model*, sets utility maximising individuals in a context where demand problems no longer exist. Business cycles are explained by individuals' rational responses to technological shocks and other supply shocks.

i) Friedman and Phelps Models

Although the actions of firms and workers are voluntary and markets clear continuously, business cycles occur when economic agents 'incorrectly' perceive the price level ($P \neq P^e$). Friedman and Phelps (both are Nobel Prize winners), during the 1960s, talked about expectations being 'adaptive'. This implies that expectational errors can happen in the short run, but sooner or later they would be corrected and the economy will reach the natural rate of output. This means that as soon as expectations get revised and $P = P^e$, the economy reaches the natural rate of unemployment. Friedman's model is sometimes called the '*natural rate*'

model. There exists a vertical AS curve and a vertical Phillips Curve at the natural rate of output or unemployment.

Both Friedman and Phelps based their models on *adaptive expectations*, but there is a subtle difference between the two. Friedman’s model is asymmetric in which firms know the actual price level but the workers are ‘fooled’. In Phelps’ model, both workers and firms are equally ‘fooled’ – both sides perceive the rise in aggregate price level as an increase in relative prices for their industry and hence choose to supply more. There are versions of Phelps’ models where the firms are fooled but workers are not; or where workers are isolated from the economy-wide information.

There are certain limitations of these models. First, there is no reason to assume that one set of agents is ‘fooled’ while the other is not. Second, information about wages and prices is known fairly well in the modern world. Third, the entire explanation of business cycles is based on gaps in information, ignorance and fooling.

ii) Lucas Model

Robert E. Lucas, another Nobel Prize winner, introduced *rational expectations* in macroeconomics. This meant that along with maximising utility, economic agents never make consistent mistakes. Thus, these individuals could be ‘fooled’ once, but not twice. Also, the utility maximising decisions pertain to the future as well. Hence people make best forecasts they can, with available information.

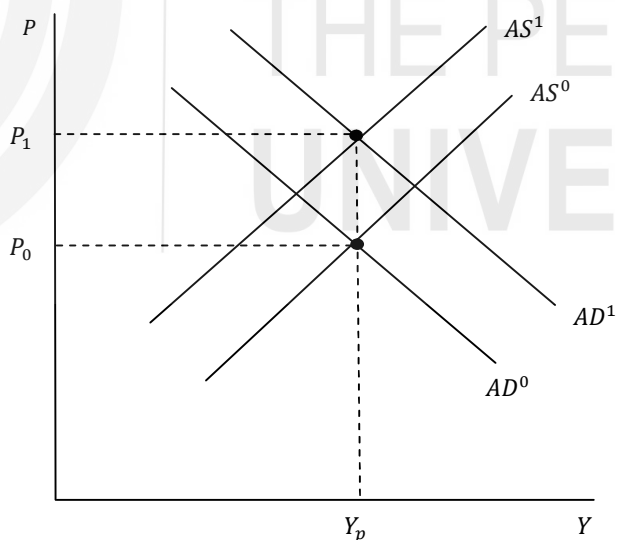


Fig. 12.3: Effect of Anticipated Increase in Money Supply

An implication of rational expectations is that any policy measure taken by the government, whether fiscal or monetary, would be factored in by rational individuals before taking a decision about supply. For example, a monetary expansion meant to stimulate the economy, immediately increases expectations about prices as rational individuals anticipate the impact of policy on wages and

prices. Thus, there is no impact of expansionist monetary policy on employment and real output. This is also known as the *Policy Ineffectiveness Proposition*, as discussed earlier. Anticipated policy is ineffective vis-à-vis output. With a shift in the AD curve from AD^0 to AD^1 , there is an immediate shift in the AS curve (from AS^0 to AS^1), so that the new curves intersect at the natural rate of output or potential output (Y_p) (see Fig. 12.3).

You may recall the situation of *Ricardian Equivalence* where the government borrows to finance its deficit budget. Such a policy may not lead to higher output as rational economic agents anticipate the implications of government policy. They expect that government will increase taxes in future to repay the debt and increase their saving. As a result, there is no increase in aggregate demand; and therefore output. According to Lucas, only unanticipated policy or a ‘price surprise’ can result in output changes.

Like the other fooling models, Lucas also explains the observed output fluctuations because of information gaps. Business cycles are explained through a set of ‘signal extraction problem’ where the economic agents may perceive the signal of price change incorrectly and therefore change the level of output supplied by them.

The above model can be expressed using the following Lucas supply curve:

$$Y_t = Y_p + \beta(P_t - P_t^e) \quad \dots (12.1)$$

Here, output in period t , (Y_t) differs from potential output (Y_p) only when expected prices (P_t^e) differ from actual prices (P_t).

The problem with the Lucas model is similar to other ‘fooling’ models, i.e., information lags are too short to provide a convincing explanation of business cycles.

12.4.4 Real Business Cycle Model

Prominent economists associated with these models are Nobel Prize winners, Finn E. Kydland and Edward C. Prescott, who put forward these models during the 1980s and 1990s. The real business cycle (RBC) models explain the fluctuations in output in terms of the real shocks to the economy. Economic agents respond to real (supply) shocks rather than monetary (demand) shocks. According to RBC models the fluctuations in output are fluctuations in natural rate of output itself. Prices and wages are fully flexible (as in classical theory) and with a shift in the AS curve, there is a change in the natural rate of output (i.e., potential output). The supply shocks can be of various types: (i) changes in technology, (ii) changes in weather, (iii) new sources of raw materials, and (iv) changes in raw material prices. The supply shocks are assumed to be highly persistent, thus explaining the length of business cycle.

In Fig. 12.4 upper panel we depict production function F_0 which is for normal times. When there is an adverse supply shock (say, drought), there is a downward

shift in the production function to F_1 . In the lower panel of Fig. 12.4 we depict equilibrium in the labour market. The supply curve of labour is N_0^s and the demand curve for labour is N_0^d during normal times. Equilibrium is at point B with employment level N_0 . The corresponding level of equilibrium output is Y_0 (see upper panel of Fig. 12.4).

Now let us assume that there is an adverse supply shock. There is no change in the supply curve of labour, but there is a downward shift in the demand curve for labour from N_0^d to N_1^d . Due to the adverse shock, equilibrium is at point V with equilibrium employment level at N_1 . The corresponding level of output will be Y_1 . Thus, due to the adverse supply shock there is a recession in the economy.

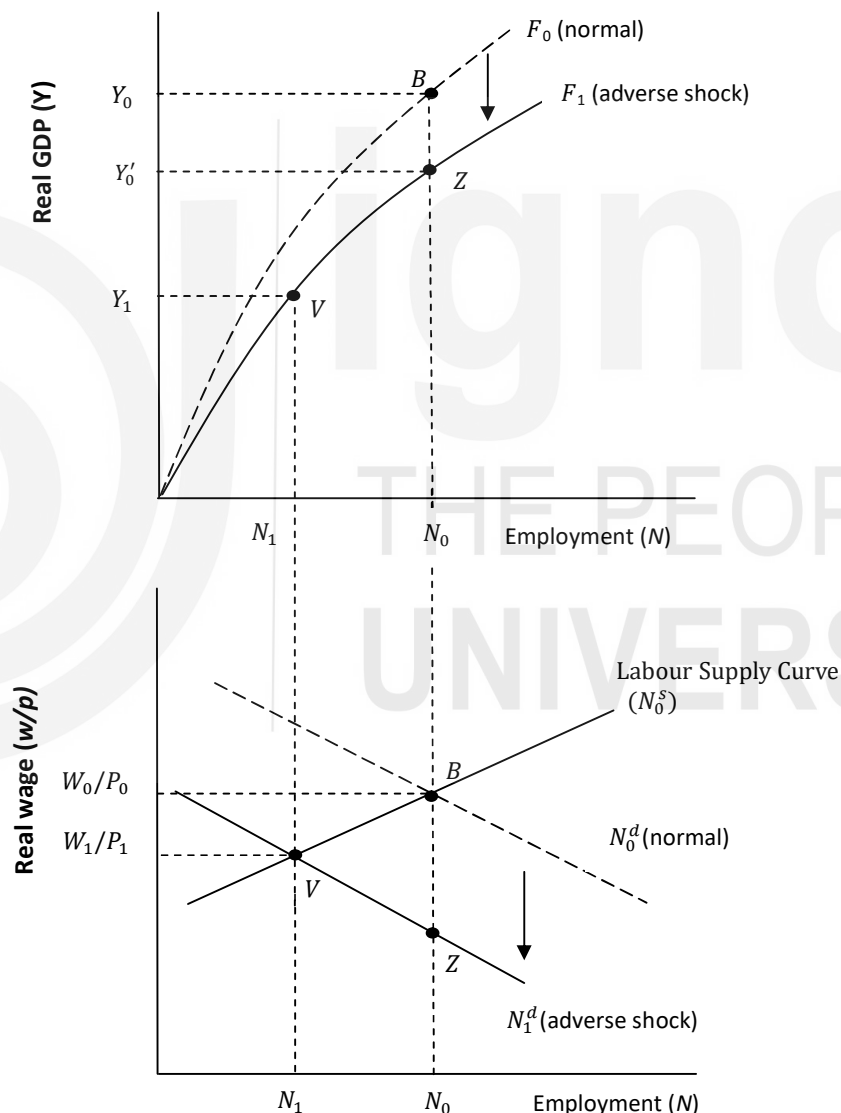


Fig. 12.4: Effect of an Adverse Supply Shock

In Fig. 12.4 we have taken an upward sloping supply curve of labour. Let us assume that the supply curve of labour is vertical at N_0 . Due to the adverse shock

equilibrium is at point Z. There is no decrease in employment (it remains at N_0); adjustment takes place through a decline in real wage. In that case, equilibrium out would be Y'_0 .

The RBC models have been criticised on various counts. As far as technology is concerned, there is always advancement in technology over time, not a decline in technology. The RBC models have failed to give convincing examples of negative shocks, except for the rise in oil prices. Also RBC models cannot show how the impact of a shock on the output is magnified (as in Keynesian multiplier).

Lastly, if the business cycles occur due to shifts in the aggregate supply, then a fall in output would be accompanied by a rise in prices. However, this is not always the case during recessions and depressions.

Check Your Progress 2

- 1) Let there be a boom in the economy in which output (Y) rises above natural rate of output (Y_p). According to Lucas' model, does this require price surprise? Explain.

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- 2) Bring out the central ideas of real business cycle models.

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12.5 NEW KEYNESIAN ECONOMICS

At the same time, when new classical ideas were spreading, some followers of Samuelson's tradition discarded the conventional IS-LM framework and developed the 'New Keynesian' models. The new Keynesian models are also based on rational, utility-maximising individuals like the new classical models. Thus, new Keynesian economists present the Keynesian ideas by using some of the new classical tools of analysis such as micro-foundations and rational expectations. There is a basic difference between new classical theory and new Keynesian theory, however. New classical economists assume that there is perfect competition in the economy because of which prices and wages are fully flexible. New Keynesian economists believe that there are imperfections and asymmetric information in the economy because of which there are rigidities in

prices and wages (it means that these variables do not adjust to desired levels instantaneously).

With the emphasis on microeconomics of market imperfections, new Keynesian models are able to arrive at the traditional Keynesian results. Even when rational individuals are maximising their utility under these conditions, the macroeconomic results can be sub-optimal. Prices do not adjust rapidly enough to clear the markets (due to rational behaviour of individual economic agents) and therefore these models (along with original Keynesian model) are termed as a *non-market clearing* models.

The imperfect conditions could be on account of several factors: (i) market power of the firms, (ii) nominal or real rigidity of wages and prices, and (iii) asymmetric information. In such a theoretical framework, fluctuations in aggregate demand create fluctuations in output and employment. In terms of AD and SRAS, a demand shock shifts the AD curve, but the SRAS curve is unable to shift due to maximising behaviour of rational individuals. This leads to changes in output and business cycles. The source of price or wage rigidity (due to which SRAS cannot shift quickly or adequately) can be traced to several factors as described below.

(i) Menu Costs: A reason for price rigidity is that it is costly to change prices. You would have noticed that vegetable prices change every day, but the cost of food in a restaurant does not change that frequently. The menu card remains the same – because it costs more to print the menu card again than to bear the loss due to increase in marginal cost. New Keynesian economists generalise the above idea for all firms in an economy. According to new Keynesians, menu costs could be small for a firm, but for the economy as a whole, menu costs could have large effects. In the case of menu costs, in response to a fall in demand by a monopolistic firm, the firm may choose not to cut price if gain in profits from cutting price is less than the menu cost of cutting price.

(ii) Sticky Marginal Cost: Even when menu costs do not exist, sticky marginal cost can result in no change in prices but a change in output. Now fluctuations in output are explained through sticky or rigid marginal costs. In response to a fall in demand faced by a monopolistic firm, the firm experiences a reduction in its marginal revenue. However, its marginal cost may not fall sufficiently for the firm to maintain the same level of output as before the decline in demand. In such a case, the output will fall.

New Keynesian economists offered a variety of reasons for sticky marginal cost or why the firms may rationally expect marginal cost to move differently from marginal revenue. The labour contracts may be fixed for a long time resulting in nominal wage rigidity and sticky marginal cost for the period of the contract. In such cases, nominal wages are fixed in advance and cannot be changed during the contract. Secondly, marginal costs depend on the raw material prices and in case of multiple buyer-supplier relationships, a rational firm may prefer not to

reduce prices until the chain of input suppliers reduce their prices. It is also possible that changes in demand (and therefore marginal revenue) are due to local factors but the costs depend on many other factors. In this case also, a firm may rationally expect marginal revenue to move differently from marginal cost. In all such situations, rational workers and firms take decisions which are privately advantageous for them, but still result in loss of output and employment.

(iii) Staggered Prices: Firms do not set their prices at the same time; it is staggered over a period of time. When there is a change in money supply and aggregate demand some firms may be changing their prices immediately while others wait for some time. This results in a slowing down of changes in price level in the economy.

(iv) Coordination Failure: During the recession phase, many people are willing to work but do not find employment. Inventories of firms keep on increasing as there is a demand deficiency. People go hungry while stock of food is large. Some new Keynesian economists therefore think that business cycle could be due to coordination failure. We have mentioned earlier that prices and wages do not converge to their equilibrium level instantaneously. According to new Keynesian better coordination among firms in decision-making could reduce business fluctuations. Some of the new Keynesian models suggest there are multiple equilibria in an economy. If firms fail to coordinate, the economy may end up with a less efficient (low level) equilibrium.

A major problem with the new Keynesian models is that they suggest too many reasons for stickiness or rigidity in wages and prices. Business cycles are observed even in industries which do not have labour unions and fixed wage contracts.

12.6 DYNAMIC STOCHASTIC GENERAL EQUILIBRIUM (DSGE) MODELS

In recent years, new classicals and new Keynesians have come closer and common models have evolved. New classical economists continue to assume perfect competition with flexible wages and prices. New Keynesian economists include market power and other imperfections resulting in 'sticky' wages and prices.

In recent years a new set of models, called dynamic stochastic general equilibrium models, have come up in recent years. As the name suggests, these are 'general equilibrium models' in the sense that it pertains to the whole economy. The word 'dynamic' reflects the idea that these are inter-temporal models and economic agents optimise on their decision-variables over time. Thus it involves the issue of dynamic optimisation. As you know, the economy receives various types of shocks, viz., demand shocks, supply shocks and policy

shocks, which are exogenous. These shocks are assumed to be random in nature; thus these models are stochastic.

In simple DSGE models there three inter-related blocks (set of equations), viz., (i) a demand block, (ii) a supply block, and (iii) a monetary policy equation (recall policy rules discussed in Unit 10). The equations included in these blocks are derived from micro-foundations.

In DGSE models, passage of time is explicitly considered (dynamic), random variables are included (stochastic), and they provide an explanation for the entire economy and not merely a part of the economy (general equilibrium). Simple versions of DSGE models are based on equations representing i) rational expectations theory of consumption (IS curve of DSGE model), ii) a version of the Phillips Curve in which expectations about inflation are formed rationally but actual inflation depends on expected future inflation and output gap (Stabilisation Policy (SP) curve), and iii) a version of the Taylor Rule which indicates monetary policy. Both demand and supply shocks are allowed to create business cycles.

The DSGE models have been quite useful in policy analysis. Several issues can be analysed through DSGE models. Macroeconomic policies have several implications, as you can imagine. A particular policy measure can be beneficial in certain aspects while being adverse in some other directions. We cite a couple of examples; you can think of many others. First, the impact of currency depreciation in economy – when currency depreciation takes place, exports become cheaper so that demand for domestic goods increases. In case the external debt is high, the country will end up repaying higher amount and servicing the debt. Further, if imports are inelastic (crude oil imports by India, for example), depreciation may lead to balance of payments problem. Second, the impact of an increase in nominal interest rate on inflation – higher interest rate implies tightening of monetary policy, thereby reducing aggregate demand, output and inflation. Higher interest rate however would mean higher cost of borrowing, higher cost of production and higher prices. Which one will be stronger? The DGSE model can help us in deciding the net impact.

Check Your Progress 3

- 1) Give a brief account of the sources of business cycles according to new Keynesian economics.

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- 2) Bring out the salient features of dynamic stochastic general equilibrium models.

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12.7 LET US SUM UP

In this Unit we have discussed the development of macroeconomic thought after the Keynesian theory. Neoclassical synthesis tried to combine classical and Keynesian ideas in the framework of IS-LM equations. Monetarism provided the first serious challenge to Keynesian theory. The economic crisis faced by many countries during the 1970s could not be explained by Keynesian theory. This prompted economists to explore newer macroeconomic models. Introduction of the role of expectations changed the subject matter of macroeconomics completely. New classical theory revived the classical ideas and offered policy prescriptions totally opposite to Keynesian theory. During the 1980s, a new school of thought called new Keynesian theory attempted to revive Keynesian ideas.

Both new classical models and new Keynesian models are based on maximising microeconomic behaviour of rational individuals in an inter-temporal framework. Differences in assumptions about the market imperfection, however, give us quite contrasting results. By assuming perfect competition the new classical economists could come out with that are close to original classical theory. The new Keynesian economists challenge the assumption of perfect competition. By assuming market imperfection they could revive some of the Keynesian ideas. In the end, we gave some preliminary ideas on contemporary DSGE models.

12.8 ANSWERS/ HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) A contractionary fiscal policy shifts the AD curve to the left. The short run result (given by the intersection of new AD and original SRAS) is output lower than natural rate of output and prices lower than expected prices ($Y < Y_n$ and $P < P^e$). In the long run, on account of adaptive expectations, expectations about prices get revised downward and SRAS shifts down. Once again, $Y < Y_n$ and $P < P^e$ (the equilibrium given by new SRAS and new AD) but the gap between Y and Y_n is reduced. With continuous downward revision of expected prices, SAS keeps shifting

down, till SAS intersects new AD at Y_n and P equals P^e . This is the long run equilibrium.

- 2) Contractionary fiscal policy implies reduction in government investment. In the short run, this leads to fall in Y and P . In the long run, Y is back at Y_n but P falls. However, composition of output changes in the long run and investment rises as Government expenditure falls (a reduction in P , increases real money supply, reduces interest rate and thus increases investment).

Check Your Progress 2

- 1) Yes it does. See the policy ineffective proposition in Sub-Section 12.4.3(ii).
- 2) The real business cycle models argue that business cycles are due to supply shocks to an economy. These shocks could be changes in several factors such as productivity, weather, input prices, etc. Real business cycle models are rooted in new classical theory. However, they are often placed under a distinct category as they emphasise on real factors. New classical models, generally, emphasise on monetary shocks or demand shocks to the economy.

Check Your Progress 3

- 1) The new Keynesian theory ascribes various reasons for the occurrence of business cycles in an economy, viz., menu costs, sticky marginal cost, staggered prices and coordination failure. Go through Section 12.5 for details.
- 2) Go through Section 12.6 and answer.

GLOSSARY

- Accelerator** : The accelerator effect in economics is a positive effect on private fixed investment of the growth of the market economy (change in GDP).
- Asymmetric Information** : It refers to a concept where one party in a transaction has more information than the other. For example, when an old car is being sold, the seller has more information about the car than the buyer.
- Adaptive Expectations** : Adaptive expectations is a theoretical concept that deals with formulation of expectations for future on the basis of experiences and events in the recent past. According to adaptive expectations hypothesis, the following equation will be true: $Y_t^e - Y_{t-1}^e = \alpha(Y_{t-1} - Y_{t-1}^e)$, where Y_t^e is the value of expected income in time period t, Y_{t-1} is the actual income in time period t-1, and α is a coefficient and its value is positive but less than one.
- Balanced Growth Path** : A situation where each variable of the model- output per worker and capital per worker, all grows at the rate of technological progress.
- Bonds** : A bond is a fixed income instrument. Bonds traditionally accrue a fixed interest rate (coupon) to the bond holder. Bonds with variable or floating interest rates are also common.
- Brokerage** : It is a fee charged by a broker to execute transactions or provide specialized services.
- Bank Rate** : It refers to the rate at which the central bank lends funds to commercial banks.
- Consumption Goods** : It refers to goods which are produced for the express purpose of satisfying human wants and preferences.
- Capital Goods** : It refers to goods which we may think of as commodities that are produced for the purpose of producing other commodities.
- Constant Returns to Scale** : When the output increases exactly in proportion to an increase in all the inputs or factors of production, it is called constant returns to scale. In the Cobb Douglas Production Function, $Q = AL^\alpha K^\beta$, if $\alpha + \beta = 1$ there will be constant returns to scale.
- Cross-Sectional Budget Studies** : In cross-sectional budget studies, certain sample households are taken and data pertaining to a particular point of time on their income, consumption expenditure, saving, etc. are studied.

- Consumption Smoothing** : Individuals avoid volatility in their consumption level during their life time. Thus they transfer their income from periods of high income to periods of low income. In other words, they smoothen their consumption over time.
- Capital Gain** : Profit made by selling capital assets (stocks, bonds, real estate, etc.) at higher price than its purchase price.
- Cyclical Movement** : It refers to the periodical movement of macroeconomic variables through four discrete phases expansionary, boom, down swing and trough.
- Cash Reserve Ratio (CRR)** : This is the fraction of total deposits which the banks are required to hold with the RBI. It is a certain fraction of their demand and time liabilities in the form of cash balances.
- Crowding Out Effect** : Due to a tax cut, there is an increase in disposable income of households. Private saving will increase as a result of higher disposable income. Such increase in private saving, however, will be lower than the decrease in public saving. Therefore, there is a decrease in the desired aggregate saving of the economy. As aggregate saving falls short of aggregate investment, there is an increase in the real interest rate. This higher interest rate would *crowd out* the domestic private investment.
- Debt Financing** : The debt is a stock variable, which is measured at a specific point of time and it is the accumulation of all prior deficits. Public debt is financed by selling government bonds and treasury bills. Banks, Pension Funds and individuals buy those sovereign bonds in return for an interest rate on bonds. In some circumstances public debt can be financed by the Central Bank buying those bonds and printing more money to pay it to the government.
- Distributive Lag Models** : In a regression model, we include explanatory variables to explain the variation in the explained or dependent variable. In distributive lag models, we include lagged values of the explanatory variables also in addition to current values of the explanatory variables.
- Dividend** : It refers to the returns on the shares or equities. It is a distribution of profits by a public limited company to its shareholders.
- Depreciation** : It refers to the loss of value due to wear and tear of fixed capital assets.

- Demand Shock** : A demand shock is a surprise event that shifts the aggregate demand curve. A negative demand shock could be a global pandemic. A positive demand shock could be a stimulus package by the government or an increase in money supply.
- Debt Stabilization** : It means changing the taxes or spending so that the debt remains constant from then on.
- Economic Agents** : These are groups of transactors, which indulge in economic activities like production/ income generation/ addition to capital stock. Economic agents can be classified into producers, households, capital sector, rest of the world, and government.
- Equity** : In the context of stock market investments, equity refers to the shares in a company's ownership. In simpler terms, it is the total amount of money that a shareholder is eligible to receive if all of a company's debts are paid off and its assets liquidated. When an individual invests in a company's equities, (s)he becomes its partial owner.
- Full Employment Output** : It is the capacity output or potential output that an economy can produce, when there is full employment of resources.
- Flexibility in Wages and Prices** : It is one of the basic assumptions of classical economics. According to this assumption, there are instantaneous changes in wage rate and price level as results of changes in supply and demand conditions in the economy.
- Fiscal Deficit** : It is defined as the difference between total expenditure (both revenue and capital) and the revenue receipts.
$$\text{Fiscal Deficit} = \text{Revenue Receipts} - \text{Total Expenditure}$$
- Fiscal Sustainability** : It refers to the ability of a government to sustain its current spending, tax and other policies in the long run without threatening government solvency or defaulting on some of its liabilities or promised expenditures.
- Goods Market Equilibrium** : When AD and AS interact with each other. All points on the IS curve reflects equilibrium in the goods market.
- High-powered Money** : M0 is known as monetary base or central bank money or high-powered money.
- Incremental Capital-Output Ratio** : ICOR indicates the additional unit of capital or investment needed to produce an additional unit of output.

- Inter-temporal Choice** : It is a process of choice in which the decision maker makes decision about what to and how much to do over various periods of time. Today's choice has a direct impact on future's opportunity.
- IS-LM Model** : In Keynesian macroeconomic model the equilibrium in the economy is achieved at the output level and interest rate, where IS and LM curves intersect. The IS curve shows the equilibrium in the real sector while the LM curve shows the equilibrium in the monetary sector of the economy.
- Knife-Edge Equilibrium** : A state in which a slight deviation of actual growth rate from warranted growth rate leads the economy drift farther away from the steady state growth path.
- Lagrangian** : The *Lagrangian function* combines the function being optimized with the functions describing the constraints into a single equation. Solving the Lagrangian function allows us to optimize the variable we choose, subject to the constraints we cannot change.
- Liquidity** : Liquidity refers to the ease with which an asset, or security, can be converted into ready cash without affecting its market price. Cash is the most liquid form of assets.
- Mercantilism** : It is school of thought that prescribed tariffs and subsidies in such a manner that the country's economic power improves. It led to imperialism. It was prevalent mostly in Europe during the 16th to 18th century.
- Mortgage Rate** : It refers to the interest rate charged on home loan.
- Monetary Transmission Mechanism** : It is the link between monetary policy and aggregate demand. This process suggests how monetary policy affect asset prices and general economic conditions (which influence the aggregate demand, interest rates, and amounts of money and credit) in order to influence overall economic performance in a desired direction.
- Monetization of Deficit** : It is a two-step process where the government issues government bonds to cover its spending and the central bank purchases the bonds. The central bank holds the bonds until it matures. This process leaves the system with an increased supply of money.
- Narrow Money** : M1 is also known as 'narrow money'.
- Net Indirect Taxes** : It is the difference between indirect taxes and subsidies.

- Net National Disposable Income (NNDP)** : It is the total income at the disposal of a country by way of factor income as well as transfer incomes from the rest of the world. It is identical to NNP at market price plus net current transfers from abroad.
- Non-departmental Enterprises** : These are the government enterprises for which autonomous corporations are set up. The goods or services produced by these enterprises are sold for a price. They are the profit making enterprises set up in the public sector.
- Output-Technology Ratio** : It refers to the ratio of output per worker to technology. It is given by $\bar{y} = \frac{y}{A} = \frac{Y}{AL}$.
- Open Market Operations** : It refers to sale/purchase of government securities by the central bank to/from the general public and banks.
- Price Rigidity** : It indicates the Keynesian view that prices are not flexible; they are sticky. It challenges the classical view that prices change to the equilibrium level instantaneously.
- Portfolio** : It refers to a collection of investments such as stocks, bonds, commodities, cash and cash equivalents.
- Precautionary Motive** : It refers to the desire of an individual to hold cash in order to be able to deal effectively with unexpected events that require cash outlay.
- Permanent Income** : It refers to the long-term average expected income which remains steady throughout life of the consumer.
- Price Rigidity** : Keynes countered the classical economists on the assumption of flexible prices. According to Keynesian economics, there are many factors that lead to rigidity in prices. Menu cost is one such example.
- Phillips Curve** : It describes the relationship between inflation and unemployment. In the short run it is found to be downward sloping. In the long-run it is vertical.
- Public Good** : Two criteria distinguish public goods from private goods, non-rivalry and non-excludability. Consumption of public good (for example, oxygen in the atmosphere) is non-rival. Your consumption of the public good does not reduce the availability of the good for others. Further, no one can be excluded from consumption of the public good.

- Primary Deficit** : It is obtained by subtracting interest payments from fiscal deficit. $\text{Primary Deficit} = \text{Fiscal Deficit} - \text{Interest Payments}$
- Quantity Theory of Money** : The quantity theory of money states that there is a direct relationship between the quantity of money in an economy and the level of prices of goods and services sold.
- Ricardian Equivalence** : It is a proposition that government spending whether by current taxes or by future taxes will have the same impact. According to this proposition deficit financing through borrowing may not lead to increases in output, as people are forward looking and rational.
- Reverse Repo Rate** : Rate at which the commercial banks can deposit their excess liquidity with the central bank, by purchasing securities.
- Steady Growth Rate** : It is consistent with the concept of equilibrium growth. In steady state growth all variables, such as output, population, capital stock, saving, investment, and technological progress, either grow at constant exponential rate, or are constant.
- Steady State** : A steady state is a situation in which the economy's output per worker, y , consumption per worker c and capital stock per worker k are constant.
- Stochastic Variable** : It indicates a randomly determined process; having a random probability distribution. A stochastic variable can assume both positive and negative values, but its average value would be zero.
- Stock Market** : It is also called stock exchange. It refers to the aggregation of buyers and sellers of stocks, which represent ownership claims on businesses.
- Shares** : A share is an indivisible unit of capital, expressing the ownership relationship between the company and the shareholder.
- Speculation** : Speculation involves trading a financial instrument involving high risk, in expectation of significant returns.
- Statutory Liquidity Ratio (SLR)** : Is the fraction of total deposits which the banks are required to hold with them. It is a certain fraction of their demand and time liabilities in the form of government securities.

- Signal Extraction Problem** : Robert Lucas argues that producers face a signal extraction problem in their decision-making. They increase supply in response to an increase in the price of their product. They do not perceive that it is a general increase in prices, not an increase in relative prices.
- Supply Shock** : A supply shock is a surprise event that shifts the aggregate supply curve. It could be either negative or positive. Examples of supply shock are changes in weather, technology, input prices, etc.
- Transaction Motive** : It refers to the desire of an economic agent to hold adequate cash in hand, or in bank account (demand deposit), to meet the financial obligation of daily needs.
- Total Factor Productivity** : Total factor productivity (TFP) is a measure of productivity calculated by dividing economy-wide total production by the weighted average of inputs, i.e., labor and capital.
- Taylor Rule** : The rule describes how, for each one-percent increase in inflation, the central bank tends to raise the nominal interest rate by more than one percentage point.
- Velocity of Money** : It is a measure of the number of times an average unit of currency is used to purchase goods and services within stipulated time period. It is usually measured as the ratio of GDP and country's M1 or M2 money aggregate.
- Risk** : It is defined in financial terms as the probability that an outcome or investment's actual gains will differ from an expected outcome or return.
- Rational Expectations** : Rational expectations hypothesis is an improvement over the adaptive expectations hypothesis. It argues that people will use all available information related to the determination of the expected value of any variable. It also says that people use their human rationality, available information and their experience to predict the future value of any economic variable.
- Ricardian Equivalence Proposition** : The new classical economists question the effectiveness of Keynesian fiscal measures on the ground of Ricardian equivalence. Ricardo had argued that financing of government expenditure by taxes or by issuing bonds would have no impact upon aggregate demand if people were forward looking. According to Barro if expectations formation is according to rational expectations, fiscal policy would be ineffective.

- Warranted Growth Rate** : It refers to that growth rate of the economy when it is working at full capacity. It is also known as Full-capacity growth rate.
- Wage Rigidity** : It refers to rigidity or stickiness in wage rate. According to Keynes wage rate do not reach equilibrium level instantaneously due to several reasons including employment contracts.

SOME USEFUL BOOKS

Abel Andrew B, Ben Bernanke, and Dean Croushore, 2017, *Macroeconomics*, Ninth Edition, Pearson Education

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