Department of Distance Education

Punjabi University, Patiala

Class : M.A. I (Economics) **Semester : 2**
Paper : II (Macro Economic Analysis) **Unit : I**
Medium : English

Lesson No.

1.1	:	Formation of Expectations and Policy Ineffectiveness Theorem
1.2	:	The Phillips Curve and Lucas Island Model
1.3	:	The Taylor and Caplin-Spulber Models
1.4	:	Coordination-Failure Models and Real Non-Walrasian Theories
1.5	:	Theory of Economic Policy-objectives and conflicts
1.6	:	Monetary Policy
1.7	:	Fiscal Policy and Crowding Out

Department website : www.pbidde.org

M. A. (ECONOMICS) PART I **PAPER II**
SEMESTER-II **MACROECONOMIC ANALYSIS**

LESSON NO. 1.1 **AUTHOR: DR. MANISHA**

FORMATION OF EXPECTATIONS AND POLICY INEFFECTIVENESS THEOREM

1.1 Introduction
1.2 Objectives of lesson
1.3 The Formation of Expectations
1.4 The Policy Ineffectiveness Theorem
1.5 Criticism
1.6 Exceptions to the Policy Ineffectiveness Rule
1.7 Conclusion
1.8 Short answer type questions
1.9 Long answer type questions
1.10 Recommended books

1.1 Introduction

The foundations of Lucas's version which has become known as new classical economics lie in the notion of 'rational' expectation. Taking Friedman and the original monetarist analysis first, we find that theoretically it is a partial equilibrium approach in the Marshallian style. The principal feature is the interaction between the supply of and the demand for money and the consequences for monetary policy, considered largely in isolation from the other supply and demand functions in the wider economy. Money is treated analogously to a durable good and the theory builds on the quantity theory relationship, in the form of Friedman's restatement. Throughout Friedman's work, the emphasis is on the effects of monetary policy while his training as a statistician is reflected in the importance placed upon the forecasting ability of the final empirical specification.

Friedman's analysis of inflation and unemployment was a persuasive one, but he had no analysis of fluctuations around the natural rate other than those induced by government policy. However, in doing so, Lucas's model differed crucially in that it relied on a general equilibrium method, and was rooted more firmly in a Walrasian tradition than was Friedman's monetarism. In these models the emphasis is upon consistency between different parts of the model because from the general equilibrium nature of the system. a correctly specified monetary model relies on the other components of the model being correctly identified and modeled. Misspecifications in one part of the model affect all of the other parts and so the Lucas model relies heavily

on a consistent and accurate theoretical model with an abstract, but consistent treatment of the mathematics. In contrast to Friedman's approach, Lucas was far less concerned about practical issues and predictive performance, although he and other 'new classical' have drawn some very strong policy conclusions from the theory including the likely signs and magnitudes of the parameters of the model. The cohesiveness and consistency of the model to acceptable micro-foundations is all important.

1.2 Objectives of lesson

Our first task will be to introduce and define that concept. The chapter will then explore the implications of the rational expectations hypothesis and consider the role of monetary policy in such a world. It will also discuss the propositions of the policy ineffectiveness theorem.

1.3 The Formation of Expectations

The formation of expectations is central to monetary economics since all but the most elementary aspects are dynamic. Dynamics introduces a time dimension by focusing on change from one time period to another. Inevitably, some of the changes will be concerned with the likely future value of some economic variable, such as prices or the money supply, in relation to the present. The question that immediately arises is whether the present can inform us about the future and in particular whether a forecast can be made about a series from information available to us today. This leads us to the process of expectation formation.

There are many ways that expectations can be formed and we will not seek to deal with all of them. Our interest is in explaining how expectations formation can alter the properties of a monetary model, and we illustrate this point with a few simple examples beginning with the simplest, static expectations, where the expected value of some variable pt, given information up to time t - 1, is denoted $E_{t-1}\, p_t$, and is constant i.e.,

$$E_{t-1}\, p_t = p \qquad (1)$$

It can also be said that future expectations will all be equal to p, and so long as the variable does not deviate from p in practice, the expectation will be correct, and there will be no expectational error

$$p_t - E_{t-1}\, p_t = 0 \qquad (2)$$

This is obviously a special case, and most economic series would likely vary from a fixed value. Any variation in p_t when expectations are static will result in expectational errors that are non-zero.

It would be reasonable to consider the possibility of learning in such a context and one way to allow for this is to permit adaptive expectations. The adaptation occurs when expectational errors are observed and the expected value of the variable in the previous period $E_{t-2}\, p_{t-1}$ is updated by the expectational error $p_{t-1} - E_{t-2}\, p_{t-1}$). By adjusting the prior expectation by the previous mistake a new

expectation is formed based on the formula

$$E_{t-1}\, p_t = E_{t-2}\, p_{t-1} + \varphi\, (P_{t-1} - E_{t-2}\, p_{t-1}) \qquad (3)$$

where the term on the left-hand side is the new expectation, the first term on the right-hand side is the expectation from the prior period and the second term is the previous expectational error or mistake, while it is a weight between zero and one. From this formula we can see that

$$E_{t-2}\, p_{t-1} = E_{t-3}\, p_{t-2} + \varphi\, (p_{t-2} - E_{t-3}\, p_{t-2}) \qquad (4)$$

and by substitution of 4 into 3 we can show, by repeated substitution that

$$E_{t-1}\, p_t = \varphi\, p_{t-1} + \varphi(1-\varphi)\, P_{t-2} + \varphi(1-\varphi)^2\, p_{t-3} + - - - + (1-\varphi)^{n+1}\, E_{t-n-2}\, P_{t-n-1} \qquad (5)$$

If n is large, then $(1 - \varphi)^{n+1} \rightarrow 0$ and the expectation is simply a function of the past history of the variable p_t. Each value of p_t in the past has a weight and the weight declines geometrically to ensure that the recent past has more influence than the distant past. By this means, an expectation can be formed, about the future based on past history of the variable itself.

There are three main objections to this schema:

(i) the expectation is entirely backward-looking so it cannot anticipate future events;

(ii) the weighting of the past based on is arbitrary; and

(iii) the procedure is prone to systematic errors.

Consider a surprise event in the evolution of the variable p_t that was not previously anticipated. Given that there has been a surprise, there will be an expectational error, $(p_{t-1} - E_{t-2}\, p_{t-1})$ and this will be used to adjust future expectations according to the weight φ. The unfortunate property of this expectational scheme is that, unless $\varphi = 1$, the adjustment will be partial and not complete. In fact, even if no other shocks or surprises ever occur, the expectation will always differ from the true value because the shock is never fully adjusted for in present expectations.

This result indicates that there will always be a systematic error in expectations following an unexpected shock. The extent of the systematic error will depend on φ; the smaller it is the greater the systematic error since less of the expectational error will be incorporated into the current expectation in each period. The sole exception to this rule is the case where $\varphi = 1$ and this is a situation where

$$E_{t-1}\, p_t = p_{t-1} \qquad (6)$$

which says that the expectation equals the previous value of the variable, and the expectational error is completely eliminated in the fully revised expectation $E_{t-1}\, P_t$. This is the case of rational expectations.

The notion of rational expectations was originally defined by John Muth (1960-1961) in the context of microeconomics and it remained in obscurity until used

by Lucas (1972) to establish the beginnings of new classical macroeconomics. The research that led Muth to the conclusion that expectations should be formed rationally was developed at Carnegie-Mellon University in the late 1950s and early 1960s. While Muth was considering the interaction between the real world and expectations formation, his colleague and co-author, Herbert Simon was also considering the issue. The two came to very different conclusions from their deliberations. Simon considered that optimizing problems were too complex for most economic decision- makers to process fully. He developed a limited optimization scheme based on the principle of satisfying, which seeks acceptable but not necessarily fully optimizing solutions to complex problems. Simon considered that individuals who were 'boundedly rational' would reach satisfactory solutions on the basis of the satisficing principle rather than attempt to solve a complex optimization problem. Muth on the other hand, found it unacceptable that expectations were separable from a theoretical model which accurately represented reality. His view was that expectations that did not consider all relevant information and discarded pertinent data were 'irrationally formed'. For him, individuals were capable of handling real world complexity in expectations formation—their forecasts within the model would be no worse than those made by the economist who has the model. The question we must address is how an individual behaving rationally would form an expectation in order to remove systematic errors. This is a complex problem since many economic series are randomly distributed, and they follow a path in which the next period's value is equal to the previous value plus a random term, ε_{t+1}:

$$p_{t+1} = p_t + \varepsilon_{t+1} \tag{7}$$

The basic philosophy behind rational expectations, derived directly from Muth, is that all available and relevant information is used to make the best possible guess of the future value of a particular economic variable—that is $\varphi = 1$ in our previous example. Errors can still be made but these will be essentially random, with a mean of zero, and display no discernible pattern. The concept of rational expectation does not allow systematic mistakes to be made in expectations formation; moreover, these will be less than those associated with any other forecasting model.

At a practical level, the expectation of the future value of the variable can be found by computing the mathematical expectation of the variable based on all information available up to the time that the expectation is formed. The mathematical representation of the above is

$$E_t(p_{t+1}) = E_t(p_t) + E_t(\varepsilon_{t+1}) \tag{8}$$

The expectation of the previous price is easy to calculate since it can be observed in the information set. The expectation of the random term can be determined from knowledge of its probability distribution, and although the exact value of ε_{t+1} cannot be known, its mean and variance can be inferred from its

distribution. The expectation of the random term can be determined using this information (since $E_t\ \varepsilon_{t+1}$is equal to the mean of the random term) to give our expectation of its future value. From the fact that it is a random, unpredictable shock term we know that the mean will be zero (if it had a non-zero mean we could use that information to help predict its value) but it is defined as the unpredictable part and, therefore, must have a zero mean. From these pieces of information we can say that $E_t\, p_{t+1} = p_t$. That is our best guess of the future value of the economic variable is its past value since the only thing we know about the difference between the current and the future value is that it is unpredictable, but will be zero on average.

The important characteristic of rational expectation is that they do not include systematic errors. This means that the expectational errors, $(p_{t+1} - E_t\ p_{t+1})$ should be uncorrelated with any information, I, that is available at the time of forming expectations. This principle is known as the orthogonality principle and ensures that

$$E_t((p_{t+1} - E_t\ p_{t+1})\ .\ I_t\,|\,I_t) = 0 \qquad (9)$$

If there is information in I_t that can help to remove expectational errors, then it would have been included in the original expectation and, thus, without it, the expectation is not fully rational (some information has remained unused).

Two versions of rational expectations can be distinguished. In the strong form, the individual is assumed to know the correct underlying model which generates the values of this economic series. The definition of information in this case includes all information including economic theory and econometric information which bears on the true data generation process. In weaker forms of rational expectations models, it is acknowledged that information collection is not costless and that orthogonality should hold up to the point that the marginal benefit exceeds the marginal cost of collection. Even under the weak form, if there are sufficient numbers of participants, such errors, that do exist should reasonably be offset in aggregate by the Law of Large Numbers.

The application of the idea of rational expectations is a central feature of the new classical models and it is the basis for many important and interesting results, but it is only in conjunction with the additional assumption that markets clear continuously that it yields the radical classical results that the following sections will elucidate.

1.4 The Policy Ineffectiveness Theorem

The basic policy ineffectiveness proposition draws on the assumption that expectations are rational, making the best use of all available information. Given that departures from the natural rate of output (unemployment) can only occur as a result of surprises to the price generation process, because of unforeseeable and unpredictable events, it is only unanticipated policy that can affect the level of output

in the economy through this mechanism. Any systematic policy can be fully anticipated and neutralized through the price responses. Output cannot be altered by systematic (Keynesian demand management) methods, only by surprising or fooling the general public into making expectational errors. This strong conclusion was first proposed by Sargent and Wallace (1975) in a simple model made up of aggregate supply and aggregate demand equations, a money demand function, and a monetary policy rule. The aggregate supply function is the Lucas 'surprise' function. Aggregate demand depends on the expected real interest rate, that is, the nominal interest rate, R_t, and the expected change in the general price level (inflation) given by ($E_{t-1}\, p_{t+1} - E_{t-1}\, p_t$):

$$y_t^D = (R_t - (E_{t-1}\, p_{t+1} - E_{t-1}\, p_t)) \tag{10}$$

The demand for money depends on income, y_t, prices, p_t, and nominal interest rates, R_t, that affects nominal money balances, M_t^D, according to a fixed parameter, x, and is written as

$$m_t^D = p_t + y_t - \chi R_t \tag{11}$$

Finally, there is a monetary policy rule under which the government adjusts the money supply to the condition of the economy measured by the difference between output last period and its natural rate.

$$m_t^S = \eta(y_{t-1} - y^\bullet) + \varepsilon_t \tag{12}$$

The crucial factor here is the role of the feedback term in the monetary policy rule, η, which is the systematic part of monetary policy.

Solving the system, Sargent and Wallace assume that markets clear, and by equating the money demand and supply, $m_t^D = m_t^S$, the interest rate can be determined as a function of prices and output, since

$$p_t + y_t - \chi R_t = \eta(y_t - y^\bullet) + \varepsilon_t \tag{13}$$

hence

$$R_t = \{\eta(y_t - y^\bullet) + \varepsilon_t - p_t - y_t\}\frac{1}{\chi} \tag{14}$$

Equating the aggregate demand and aggregate supply, $y_t^D = y_t^S$, gives

$$y^\bullet + \alpha(p_t - E_{t-1}\, p_t) = R_t - (E_{t-1}\, p_{t+1} - E_{t-1}\, p_t) \tag{15}$$

and substituting for the interest rate they are able to derive an expression entirely

in terms of prices, the natural rate of output, expectations of prices and coefficients of the model, η, a, and x given as

$$(\chi+1)y^{\bullet}+\alpha(\chi+1)[p_t-E_{t-1}\,p_t]=\varepsilon_t-p_t-\chi[E_{t-1}\,p_{t+1}-E_{t-1}\,p_t]+\alpha\eta[p_{t-1}-E_{t-2}\,p_{t-2}] \tag{16}$$

From this equilibrium expression, the system can be closed by assuming that expectations are formed rationally. Using Muth's method where prices are split into an equilibrium value, $\bar{p}$, and the part due to shocks $\{\varepsilon_t,\varepsilon_{t-1},\varepsilon_{t-2}\ldots\}$ such that

$$p_t=\bar{p}+\phi_0\varepsilon_t+\phi_1\varepsilon_{t-1}+\phi_2\varepsilon_{t-2}+\ldots \tag{17}$$

they show that

$$E_{t-1}p_t=\bar{p}+\phi_1\varepsilon_{t-1}+\phi_2\varepsilon_{t-2}+\ldots \tag{18}$$

and hence that

$$(p_t-E_{t-1}p_t)=\phi_0\varepsilon_t \tag{19}$$

By substituting these terms back into (15), it can be shown that output is unaffected by the operation of systematic monetary policy, since does not enter the final solution for y_t.

This result can be demonstrated by using Muth's method of undetermined coefficients to define prices and expectations in the equilibrium expression, in which case ϕ_0 is not a function of η. Substituting the terms for prices and expectations into the equation and collecting terms in ε_t, ε_{t-1}, ε_{t-2}, we can define the coefficients ϕ_0, ϕ_1 and ϕ_2 in equilibrium. Prices must be equal to $\bar{p}$ in equilibrium, implying that ε_t, ε_{t-1} and ε_{t-2} must drop out and hence their coefficients at that point must take values to ensure that they are eliminated. These can be found by collecting coefficients on those terms, for example, with ε_t:

$$\varepsilon_t:\phi_0+\alpha(\chi+1)\phi_0=1 \tag{20}$$

so if $\phi_0=1/(1+\alpha(\chi+1))$ the ε_t term drops out. Repeating for all coefficient values for ϕ_0, ϕ_1, ϕ_2, etc. ensures that all shocks $\varepsilon_t,\varepsilon_{t-1},\varepsilon_{t-2}\ldots$ drop out.

In terms of Lucas's aggregate supply function we know that only ε_t and ϕ_0 appear in the equation for output:

$$y_t=y^{\bullet}+\alpha(\phi_0\varepsilon_t)=y^{\bullet}+[\alpha/(1+\alpha(\chi+1))]\varepsilon_t \tag{21}$$

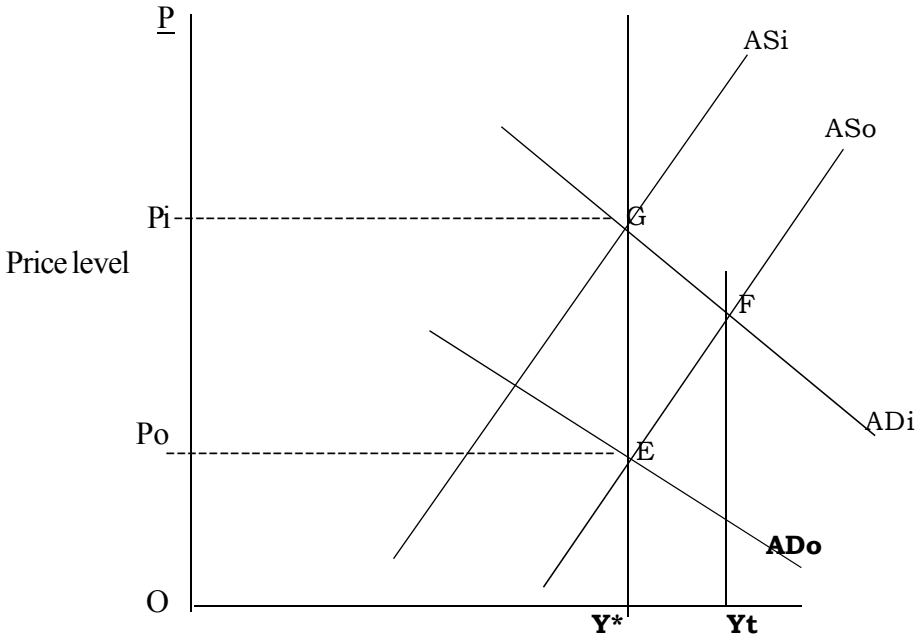
Notably η does not appear. Therefore, systematic monetary policy, operating

through η, cannot affect the level of output. Policy, as described by the monetary feedback rule, gets built into the evolution of the price level and its systematic effect is neutralized by the responses of the general public. The only option left to the government in this case is to adopt a non-systematic or 'surprise' policy, which by its very nature is unable to achieve anything, but a temporary deviation from the natural rate and is completely offset in the following period when expectations are revised. Even if the government were to choose this option, it becomes apparent that its effect in comparison to doing nothing is not beneficial. Consider the variability of output when the government acts randomly to affect the money supply. The variance of output, Var(y_t), is now positively increased by the impact of the variation in the money supply, Var (c,) in the following way:

$$Var(y_t) = \left[\frac{\alpha}{1+\alpha(1+\chi)}\right].Var(\varepsilon_t) \tag{22}$$

Raising the variability of output might be considered to reduce welfare rather than improve it. The conclusion is that it is pointless for a government to attempt systematically to engage in stabilization policy by means of monetary or fiscal feedback rules and deterimental for them to do so in an unsystematic way. The ineffectiveness proposition can be illustrated by means of a diagram in the same way that the expectations augmented Phillips curve. In fact, there are many similarities between the two since the surprise supply function is a rearrangement of the expectations augmented Phillips curve. In Figure 1 the aggregate supply and aggregate demand functions are illustrated, and these are graphical representations of the equations discussed above. In the initial state there is an equilibrium at point E at the natural rate y*. The use of systematic monetary policy will be ineffective and will not result in any movement in the aggregate demand or aggregate supply curves, since the effect is fully anticipated in the expectations term. Only surprises affect aggregate supply and aggregate demand as the figure shows the case of a positive unanticipated monetary shock. The aggregate supply function does not shift initially because the monetary policy was unexpected; and the increase in prices was not anticipated in the expectations term. Aggregate demand does shift out as the effect of the positive monetary shock is to increase the level of demand in the economy. This leads to a new equilibrium at F, where output is higher than the natural rate at y1, but this is only temporary and lasts only one period before the information about the shock is incorporated into the information set upon which expectations are based, and the aggregate supply curve shifts inwards as this happens. The economy returns to the natural rate again at y*, but at a higher price level at point G, as a result of the positive monetary shock. The effect of the unsystematic policy in the form of a monetary surprise is a temporary boost to output, reversed in the subsequent period and resulting only in

a higher price level therafter.



Aggregate Demand and Supply

Figure 1: The effect of expectations on price and output through aggregate supply

1.5 Criticism

The argument has not always gone the way that new classical would have expected, however, two criticisms emerged from within their own camp suggesting that the models are not derived from the optimization behaviour of individuals, and that they are too simple in their treatment of the monetary policy process. In an attempt to address one of these points, Sargent and Wallace (1981) introduced bonds into the analysis to allow for bond-financed government spending. Having done so, monetary policy was tied to the behaviour of the government deficit and the stock of bonds. When stock of money and bonds are related to the deficit, which is a flow, the problem of government finance becomes a dynamic problem of the choice over the financing strategy. Since deficits must be financed by money creation or issues of additional government bonds, monetary policy may be constrained by fiscal policy through the level of outstanding debt. Past decisions over bond issue can have enduring implications for future monetary policy in this sense the problem is dynamic and choices made in the present or the past can be a constraint on the possible paths for policy in the future.

There have been two reactions to the policy ineffectiveness theorem. New classical have embraced the results and advocated the abandonment of demand management employment policy and its replacement by supply side policies to

influence factors in the economy which govern the natural rate itself. One important aspect of that agenda was the development of real business cycle theory, real to signal that the business cycle is caused by factors unrelated to changes in the money supply. Instead business cycles are seen to be the result of changes in total factor productivity, due to new technology, new products, and alterations to workers' skills. An above-average rate of growth of productivity in one period, for example, acts as a spurt to new investment opportunities, so that the impulse persists for some time. Recessions are the result of several quarters of below-average productivity growth.

1.6 Exceptions to the Policy Ineffectiveness Rule

Four sets of conditions may result in the policy ineffectiveness rule not applying in practice, allowing governments a measure of influence over the level of output through monetary and fiscal policy. The first two cases deal with the nature of the information set available to the general public.

Commenting on the strong policy ineffectiveness result of Sargent and Wallace, Robert Barro observed that "The efficacy of public activism then requires an appeal to an information or computational advantage for the government" (1981: 58). Around the same time, Turnovsky (1980), Weiss (1980) and King (1982) showed that the Sargent and Wallace result derives from the assumption that both the public and the private sectors have access to the same information set. This assumption was challenged on the basis that the government collects information on the price level, money supply, output and so on and only a certain amount of it is revealed to the public. The government also has access to information before it is put in the public domain.

Because of this informational and time advantage, it is suggested that the authorities can respond to economic situations before the public becomes aware of them through published data, and can systematically affect output through monetary or fiscal policy without expectations offsetting or reversing the policy action. The public cannot anticipate and counteract actions which are effectively surprises based on the private information.

Turnovsky, Weiss, and King show that it is possible that the information asymmetry may in fact work in the other direction, but nevertheless still leave a role for systematic monetary policy. If the private sector has both the global connections and the resources to access information independently of the public sector, it may have an advantage over the government.

In many areas the private sector is in constant touch with market conditions and can observe first-hand the behaviour of prices. Turnovsky, Weiss, and King start from the premises that present and future behaviour by the private sector will be influenced by their expectations of future conditions and prices. Even though the government has no information advantage, and no means of directly affecting the

variance of output by a systematic policy rule, it can nonetheless alter future output through the impact of present policy on the private sector's expectation of future prices. While the government may be at an informational disadvantage if does have the opportunity to influence output by playing on the expectations and the behaviour of the private sector.

1.7 Conclusion

In terms of its impact upon the economics profession, the rational expectations revolution in macroeconomics and monetary analysis has often been likened to the Keynesian revolution nearly half a century before. But whereas classical economists objected to the rigid pricing, exogenous expectations, and 'animal spirits' of the Keynesian analysis, which underpinned the case for interventionist policies, many object today to the leap of faith in new classical economics.

Stripped to its essentials, the concept of rationality in expectations involves nothing more than the assumption that economic man (or woman) tonus and acts upon expectations of future events in a rational, rather than an arbitrary or adhoc. manner. Since actions based upon incorrect premises of what the future has in store result in unwanted costs, it pays to use available information to improve the accuracy of such forecasts. In most cases that matter, professionals are employed to gather and process information on behalf of the public obvious examples include unions, pension funds and life assurance companies, which act on behalf of the public in specialist roles.

1.8 Short answer type questions

1. What is an important characteristic of rational expectations?
2. What is orthogonality principle?
3. What is the concept of rational expectations?
4. What are expectations?

1.9 Long answer type questions

1. What are expectations? What is the importance of expectations in macroeconomics?
2. Explain adaptive expectations theory of expectation formation.
3. Explain the policy ineffectiveness theorem.

1.10 Recommended books

Advanced Macroeconomics	:	David Romer
Macroeconomics	:	John. H. Makin
Macroeconomics Theories	:	M. J. C. Surrey
Macroeconomics	:	Rudifer Dornbusch and Stanley Fischer

M. A. (ECONOMICS) PART-I **PAPER-II**
SEMESTER-II **MACROECONOMIC ANALYSIS**

LESSON NO. 1.2 **AUTHOR: DR. MANISHA**

THE PHILLIPS CURVE AND LUCAS ISLAND MODEL

2.1 Introduction
2.2 Objectives of lesson
2.3 Explanation of model
2.4 Implications of model
2.5 The Lucas Critique
2.6 Conclusion
2.7 Short answer type questions
2.8 Long answer type questions
2.9 Recommended books

2.1 Introduction

Lucas developed the relationship between wage-price inflation and the level of economic activity known as the Phillips curve, it was in the theory of the labour market that the Phillips curve was most vulnerable. The New Zealand economist A. W. Phillips (1958) had shown that a logarithmic relationship between the unemployment rate and wage inflation in Great Britain from 1861 to 1913 was able to be fitted satisfactorily to data for 1948-57. The relationship was such that high unemployment was associated with low wage growth, while low unemployment was combined with a rapid growth of wages. That was generally interpreted as one between excess demand and those variables. A stimulus to demand (say from government spending) would increase output and reduce unemployment, but the cost of that achievement was higher inflation. Conversely a reduction in demand would reduce inflation, but at the cost of increased unemployment. Those trade-offs were an accepted part of policy formulation in the 1960, as Philips curve had been found to exist in major countries.

During the late 1960 and early l970 the relationship had received renewed attention from economists because the apparently stable negative relationship between inflation and unemployment identified by Phillips and others had come into question as new data appeared to indicate both rising inflation and lower economic activity. Friedman suggested that the reason for the success of the Phillips curve in its original 'misspecified' form over the late 1950s and 1960s was the low level of inflation in that period which meant that nominal changes and real changes to wages did not diverge much over the period. His prediction was soon afterwards shown to

be true as the inflation rate accelerated in the early 1970s, widening the gap between nominal and real changes to wages, and the empirical regularity, which provided the main justification for the Phillips curve break down.

Friedman (1968) and Phelps (1970) put forward the hypothesis that this was because the process by which wages were negotiated, which determined the fate of inflation, involved expectations of future conditions. There contention was that the Phillips curve was failing to account for the impact of expectations on the wage inflation process and as a result of the misspecification was failing to explain the true nature of the relationship between inflation and unemployment. The misspecification of the Phillips curve was revealed by two inconsistencies with neoclassical economics which Friedman corrected by specifying the relationship in real rather than nominal terms and as a relationship between the level, not the change, of the wage and the rate of unemployment. To deal with the first of these issues Friedman expressed the Phillips curve in real terms, and 'augmented' it with price expectations, enabling the model to predict accurately the change to prices over the period for which wages were being negotiated. Without this adjustment money illusion would never be corrected, workers would continue to mistake nominal for real changes to their wages and would never learn from their mistakes. To deal with the second issue, he noted that should the relationship be written in terms of the change to wages and the rate of unemployment then there should be a 'natural rate of unemployment' to which the economy would converge in the absence of disturbances. The natural rate repreents the long-run level of unemployment consistent with any level of nominal wage inflation, given that there is no money illusion and that price expectations correct for nominal changes in wages.

2.2 Objectives of lesson

In this lesson, we will study expectations augmented short-term and long-term Philips curve, Philips curve and Lucas Island model.

2.3 Explanation of model

To understand the model certain assumptions are as follows:

Assumptions of the model

1. There are no *involuntarily* unemployed in the economy.
2. Inhabitants were able to accurately and continuously determine the prices on their own island, but could only infer from these likely contemporaneous prices on other islands.
3. The people are often better informed about their own enterprise and local economy than they are about the economy at large.
4. The restriction on information about prices implied that the inhabitants would need to form expectations about the contemporaneous general price level using the information on the behavior of prices on their own

island.

5. The labour supply is assumed to be elastic and the market is assumed to clear continuously without the hindrance of nominal wage rigidities, firms with which inhabitants negotiated are profit-maximizing.

Friedman suggested that statistical evidence for a negative relationship was due to temporary money illusion and the possibility that in the short-run there could be an exploitable trade-off between inflation and unemployment. In the long-term the true change to the real wage would become apparent as nominal prices and wages were observed; this would mean that expectations would change and the short-run deviation from the natural rate of unemployment would be corrected. In the, expectations augmented version of the Phillips curve, there can be no money illusion in the long-run and the Phillips curve must be vertical at the natural rate of unemployment.

In diagrammatic terms the rational expectations augmented Phillips curve can be illustrated in Figure 1. Drawing the graph with the change in money wages on the vertical axis and unemployment on the horizontal axis, the original Phillips curve is labelled AA and shows a negative relationship between wage inflation and unemployment. Friedman's model concurs with this curve in the short-run when there is money illusion to overturn the neutrality result, so AA is a short-run expectations augmented Phillips curve, but BB represents the long-run Phillips curve which is vertical above the natural rate of unemployment U*. To consider the dynamics of price expectations in this context, suppose that the labour market clears at a real wage consistent with expectations that prices will be equal to some value Po.

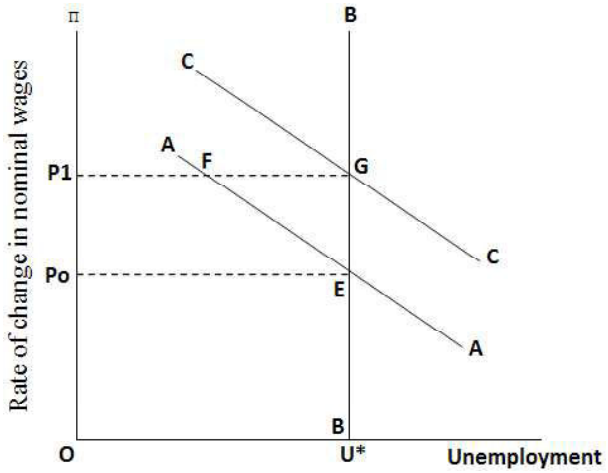


Figure 1: Expectations augmented short-run and long-run Phillip's curves

Suppose that after the settlement of the contracts in the labour market the price level is increased to p_1 so that the real wage falls from w/p_0 to w/p1. So long as money illusion prevails in the short-run the economy will move from point E to point F where the level of unemployment has fallen and the inflation rate is higher. This is only a temporary position which holds until it is perceived that the price level has risen and real wages have fallen. Once this is the case, expectations of prices are revised and the economy returns to the natural rate but at a higher level of inflation than before, on the short-run Phillips curve CC. This serves to illustrate that there are many short-run Phillips curves, each consistent with an expected level of inflation—there is not a unique negative relationship between inflation and unemployment. It was because of the successive shift of short-run Phillips curves outwards as price expectations rose that the apparent strong negative relationship broke down in the early 1970s.

We turn now to Lucas, who was quick to appreciate the wider significance of the informational errors. His contribution was to pick up on the notion that expectations entered the process of inflation generation and, by accurately specifying theoretical micro-foundations, to explain how expectations formation could affect the inflation process. This was a first indication that Friedman's concern for predictive accuracy was not enough for Lucas who wanted to develop a coherent and consistent underlying theory. Friedman had used neoclassical principles to come to his conclusions but had no formal model behind them; it was the development of a formal model which Lucas provided in the form of the 'islands model'.

Lucas's approach was to imagine a theoretical model in which inhabitants lived on a number of islands. Inhabitants were able to accurately and continuously determine the prices on their own island, but could only infer from these likely contemporaneous prices on other islands and hence the general price level p_t, which they could observe only with a lag. These assumptions replicated the idea that people are often better informed about their own enterprise and local economy than they are about the economy at large. The restriction on information about prices implied that the inhabitants would need to form expectations about the contemporaneous general price level using the information on the behavior of prices on their own island.

$$E_z(p_t) = E(p_t | p_t(z), \Omega_{t-1}) \tag{1}$$

where $E_z(p_t)$ is the expectation of sellers in market *z* of the general price level p_t, given information on prices in market *z* at time $t(p_t(z))$ and last period's

information on the general price level and other factors Ω_{t-1} . Suppose the information from the past period expectation of prices in time t is weighted with the information from market z to allow expectations to be formed as

$$E_z(p_t) = \theta\, p_t(z) + (1-\theta) E_{t-1} p_t \tag{2}$$

Then the seller in market *z* faces a signal extraction problem: re is a signal in the data, but it is contaminated by market-specific noise. The solution to such a problem results in:

$$E_z(p_t) = \left(\frac{\theta^2 \operatorname{var}(p_t(z)) + (1-\theta)^2 \operatorname{var}(E_{t-1}\, p_t)}{\theta^2 \operatorname{var}(p_t(z))} \right) \bullet p_t(z) \tag{3}$$

It was assumed that the inhabitants would need to know the general price level in order to be able to conduct negotiations over wages in the labour market. The inhabitants were assumed to be fully rational using all available information to calculate their expectation of the general price level. The labour supply is assumed to be elastic and the market is assumed to clear continuously without the hindrance of nominal wage rigidities, firms with which inhabitants negotiated are profit-maximizing. In such a model Lucas considered the inter-temporal substitution problem faced by the inhabitants who have a choice of taking leisure today or leisure tomorrow a rise in wages entails both an income effect and a substitution effect as greater wages create incentives to reduce working hours, in response to the level of income earned, and to increase hours, in response to the marginal return to the extra hours worked. Lucas suggested that the dominance of the substitution effect over the income effect was responsible for the observed negative correlation between prices and output levels. Through the use of the model it was possible to show that expectations about changes in real wages could alter the labour supply by encouraging or discouraging inter-temporal substitution between leisure today and leisure tomorrow. The correspondence between decisions to work (or not work and hence be unemployed) and the behavior or real wages period to period, which depend heavily on expectations of the general price level, create a Phillips curve trade- off. From this foundation the Phillip's curve could be regarded as a solution to the labour market problem when the price level is imperfectly observed. Labour supply simply responds to the expected real wage from one period to the next on the basis of expectations of the general price level.

The formulation of the Lucas-Rapping labour supply model gave a new micro foundation for the Philips curve relationship, backing up some of Friedman's claims that expectations augmented models in real terms were the correct way to think about the relationship. But in certain respects the model went beyond Friedman

and was more strict in its interpretation of the role of expectations. In the Lucas-Rapping model, the inhabitants of the islands are unemployed because they are unable to negotiate a real wage sufficient to compensate them for forgoing current leisure and, thus, are voluntarily unemployed in the event that the minimum acceptable wage could not be reached the inhabitants would prefer to opt for leisure rather than work in the current period. Thus, in the Lucas as model there are no *involuntarily* unemployed.

The Lucas-Rapping model asserts that it is only the random and unpredictable contemporaneous events for which expectations cannot account that lead to departures from the natural rate of unemployment. Their notion of expectations is a fully rational one in which all information is used to update expectations such that there are no systematic errors. Consequently, departures from the vertical long-run Phillips curve BB figure 1 occur only for one period after which the error is incorporated into the information set and future expectations take account of it. In other words, movements along the short-run Phillips curve occur only as one-period departures from equilibrium, whilst in Friedman's case they can persist so long as money illusion exists, which may be for several periods. The implications of this last point become apparent once the Phillips curve is rearranged into a form resembling an aggregate supply curve. Consider the expectations augmented Phillips curve which can be written as

$$p_t = \left(y_t - y^{\bullet}\right) + E_{t-1}\, p_t + \varepsilon_t \tag{4}$$

In this form the equation is a relationship between the price level and the departures from the natural rate of output (which can be thought of as a scale variable which proxies for unemployment) and the expectations of prices based on the information available in the previous period. Here there is an error term, indicating that random events can affect prices.

By rearrangement, it is possible to write equation (4) in such a way that output deviates from the natural rate when unexpected events cause changes to prices which expectations cannot account for in the current period:

$$y_t = y^{\bullet} + \left(p_t - E_{t-1}\, p_t\right) - \varepsilon_t \tag{5}$$

This has become known as the Lucas supply function or 'surprise' function since only unexpected surprises cause output to deviate from the natural rate, Note that the surprise effect is only influential for one period, after which it becomes part of the information set and is incorporated into the process of expectations formation.

2.5 The Lucas Critique

A key macroeconomic question in the late 1970s was whether the aggregate supply curve was best thought of as new classical formulation or an alternative

type. Sargent and Wallace (1973) used tests of the direction of causality between economic variables to try to validate Lucas's new classical model on econometric grounds, thereby concluding that the new classical approach was not inconsistent with the data. Barro (1977, 1978) attempted to confirm these results by modelling directly the aggregate supply relationship. In order to do this he specified the money supply process and from it derived estimates of the unexpected changes to monetary policy. He then introduced both variables into a model to explain output and found that whilst anticipated monetary policy did not have a statistically significant effect on output as unexpected component did seeming to confirm the new classical approach. Shortly after the publication of these results, however, Sargent (1979) established from theoretical first principles that these econometric approaches could be mis-leading. His reasoning was to become known as the observational equivalence argument by which it is possible to show that a model which seems to show that systematic monetary policy can affect output can be rearranged with some reasonable additional assumptions to show the contrary, i.e., only unanticipated policy can affect output. The problem for the econometric work is that while these models have different assumptions which set them apart in theory, they are observationally equivalent in practice because it is not possible to specify them in such a way that they can be separated on econometric grounds when estimated in reduced form.

This model shows that unsystematic 'surprises' in the money stock affect output, but this has been derived from exactly the same equations as the model which purported to show that systematic monetary policy can affect output. With the additional assumption that the public make rational expectations about monetary policy, the two models can be said to be observationally equivalent. The general implication is that any estimated reduced form equation which an econometrician discovers in the data is compatible with many different structural models with different theoretical priorities and policy implications.

Lucas introduced a rider to this debate which became a turning point in relation to the econometric estimation of economic models involving expectations, known as the Lucas critique. His observation was that many reduced-form models treat the expectational terms in the same way as they treat the structural parameters of the model i.e., as if they are given and unchanging. The obvious objection to this practice is that, unlike structural parameters, expectations are liable to change with the policy process. The models which do not treat them in such a way that this change can be accommodated will generally give misleading results.

2.6 Conclusion

In this lesson we have studied expectations augmented short-term and long-

term Philips curve, Philips curve and Lucas Island model. A. W. Phillips had shown that a logarithmic relationship between the unemployment rate and wage inflation was able to be fitted satisfactorily to data for 1948-57. The relationship was such that high unemployment was associated with low wages growth, while low unemployment was combined with a rapid growth of wages. Lucas was quick to appreciate the wider significance of the informational errors. His contribution was to pick up on the notion that expectations entered the process of inflation generation and, by accurately specifying theoretical micro-foundations, to explain how expectations formation could affect the inflation process.

2.7 Short answer type questions

1. What is Lucas supply function or 'surprise' function?
2. What is the natural rate of unemployment?
3. Write a short note on Philips curve.

2.8 Long answer type questions

1. Critically evaluate Lucas model.
2. The formulation of the Lucas-Rapping labour supply model gave a new micro foundation for the Philips curve relationship, Explain.

2.9 Recommended books

Advanced Macroeconomics	:	David Romer
Macroeconomics	:	John. H. Makin
Macroeconomics Theories	:	M. J. C. Surrey
Macroeconomics	:	Rudifer Dornbusch and Stanley Fischer

M. A. (ECONOMICS) PART-I **PAPER-II**
SEMESTER-II **MACROECONOMIC ANALYSIS**

LESSON NO. 1.3 **AUTHOR: DR. MANISHA**

THE TAYLOR AND CAPLIN-SPULBER MODELS

3.1 Introduction
3.2 Objectives of lesson
3.3 Explanation of Taylor Model
3.4 Explanation of Caplin-Spulber Model
3.5 Conclusion
3.6 Short answer type questions
3.7 Long answer type questions
3.8 Recommended books

3.1 Introduction

The Taylor model assumes that the timing of price changes is determined solely by the passage of time. This is a good approximation for some prices, such as wages set by union contracts, wages that are adjusted annually, and prices in some catalogues. But it is not a good description of others. Many retail stores, for example, can adjust the timing of their price changes fairly freely in response to economic developments. It is, therefore, natural to analyze the consequences of such state-dependent pricing. Our final model of staggered price changes, the Caplin-Spulber model, provides an example of such an analysis.

3.2 Objectives of lesson

In this lesson we will study the following models:

1. Taylor Model
2. Caplin-Spulber Model

3.3 Explanation of Taylor Model

Few economists have questioned the validity of the Friedman-Phelps accelerationist hypothesis that the Philips curve is vertical in the long-run. This new accelerationist consensus, however, has done little to settle the ongoing debate over aggregate demand policy, where the critical issues appear to depend on the short-run Phillips curve and its dynamic properties. The accelerationist theory provided an elegant and concise representation of the inflationary process for the long-run. However, it has proved unspecific as a framework for the development of short-run dynamics.

Two Sources of this Incomplete Specification

i. First is that the accelerationist theory was not specific about the process of

expectation formation. According to the theory, the expected inflation rate Ð* should be added to the right-hand side of the Philips equation. Hence the expectation process determining Π* matters greatly for short-run dynamics. If expectations are formed rationally, the Phillips curve will be vertical in the short-run as well as the long run from the point of view of aggregate demand policy. On the other hand, if expectations are adaptive then the short-run slope might be very flat.

ii. It involves the microeconomic details of wage and price adjustment which are just as much a part of the famous macro "expectation" adjustment, as the expectation formation mechanism itself. Π* represents the persistence of inflation due to the gradual adjustment of outstanding wage and price contracts to new economic information.

The impact of aggregate demand on inflation and employment is critically dependent on whether the contract mechanism or the expectation mechanism dominates the persistence effects commonly represented by Π*.

The purpose is to discuss a model given by John B. Taylor, which focuses on contract and staggered wage setting with rational expectations.

Staggered Wage Setting

A property of wage and price contracts which has not typically been emphasized in microeconomic analysis, but which is important from the viewpoint of macroeconomics, is that contract decisions are staggered: all contract decisions in the economy are not made at the same point in time. While some months are more popular than others for adjusting wage contracts, these adjustment decisions are generally staggered throughout the year.

To make things simple suppose that wage contracts last one year and that decision dates are evenly staggered: half the contracts are set in January and half in July.

This wage setting once done lasts up to a year. If prices are increasing greater than wage increase, then you will have to wait for up to a year. A simple model of contract wage determination is given by the following equation:

$$x_t = bx_{t-1} + d\,\hat{x}_{t+1} + \gamma\left(b\,\hat{y}_t + d\,\hat{y}_{t+1}\right) + E_t \qquad (1)$$

Where, x_t = log values of the variables x or contract wage for period t

b = coefficient

x_{t-1} = wage contract sets in the previous period.

d = coefficient

$\hat{x}_{t+1}$ = period of wage contract set after period t

$\hat{y}_t$ = gap in excess demand or expected excess demand at point t.

$\hat{y}_{t+1}$ = expected excess demand in the coming period.

E_t = Random variable.

The hat is put on the $\hat{x}_{t+1}$ because we expect, with the given available information this, is the expected values

This equation (1) states the assumption that contract wage set in the start of each period depends upon three factors:

i. Contract wage set in the previous period i.e., x_{t-1}.

ii. Contract wage expected to be set in the next period i.e., $\hat{x}_{t+1}$.

iii. Weighted average of expected excess demand during next 2 periods.

X once set, will prevail for the two periods t and t+1.

Coefficients Assumptions

Let us assume that b+d=1, then this is called a homogeneity assumption, i.e., current wage contract assumption is homogeneous.

If we assume further that b = d = ½, this is a symmetry assumption, that means the weight given to the contract wage in two periods i.e., coming period and previous period is equal in their weights i.e., half-half ratio. This is unbiased.

If we want to see the dynamic behaviour in this model, then b and d should differ from 1. And if one time we say b = 0 then b+d=1, bu putting the valus of b 0+d = 1 implies d = 1 and vice-versa.

If b = 0 and d = 1 then contracts are forward looking.

If d = 0 and b = 1 then contracts are completely backward looking.

Wage behaviour is related to the excess demand.

In order to derive a dynamic representation for the behaviour of the contract wage from equation (1), it is necessary to solve for $\hat{y}_t, \hat{y}_{t+1}$ and $\hat{x}_{t+1}$. This involves specifying an aggregate demand relationship and a policy rule. Excess demand variable $\hat{y}_t$ is a percentage of output gap.

The demand for money can be specified with the following equation:

$$m_t^d = y_t + P_t - V_t \qquad (2)$$

Where,

m_t^d = Demand for money in period t

y_t = Percentage of the output gap in period t

P_t = Price in period t

V_t = Random variable or shock variable

If the policy rule for the money supply is in the log linear form,

$$m_t^s = gw_t$$

Where

m_t^s = Money supply

G = Coefficient of growth

w_t = aggregate of contracts wages in 2 periods i.e., x_t and x_{t-1}

Simple aggregate demand equation can be derived as:

$$y_t = -\beta w_t + v_t$$

where,

β = coefficient

The value of β is: $\beta = 1-g$

β is nothing but the degree of aggregate demand to the wage change. If we use the geometric average:

$$w_t = 0.5(x_t + x_{t-1}) \quad (3)$$

Substituting (2) and (3) in (1) or with given information at point of time t-1 we have equation

$$b\hat{x}_{t-1} - c\hat{x}_t + d\hat{x}_{t+1} = 0 \quad (4)$$

Where,

$b\hat{x}_{t-1}$ = backward looking equation with expectation

$d\hat{x}_{t+1}$ = degree of forward looking

$c = (1 + 0.5y\beta)/(1 - 0.5y\beta)$

Further assumptions: Now if we assume, x_t is stable, it yields a solution for x_t of the form:

$$x_t = \alpha x_{t-1} + E_t \quad (5)$$

The value of going to be:

$$\alpha = \frac{c - \left[c^2 - 4\alpha(1-\alpha)\right]^{1/2}}{2d}$$

An equation for average wage wt can be derived from equation (5) using

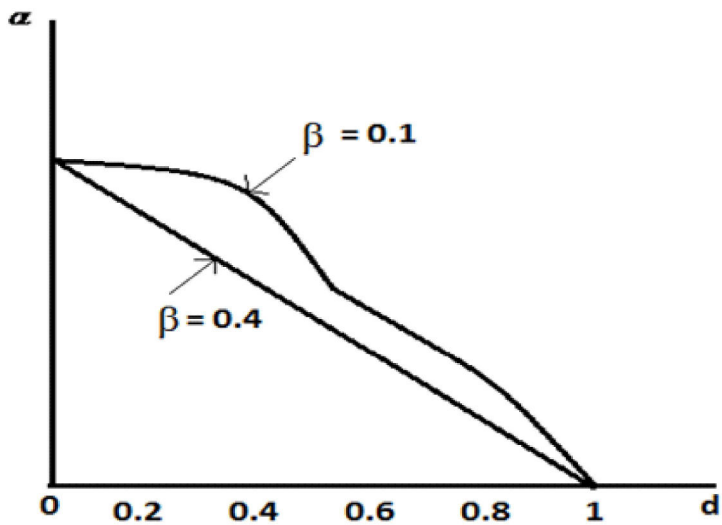
equation (3) and we can find out

$$W_t = \alpha w_{t-1} + 0.5(E_t + E_{t-1}) \quad (6)$$

By using (2) and (6) equations, we will find out final equation.

In the following diagram, there is degree of forward looking (d) on Ox axis and different values of α on Oy axis.

Given the value of β, we can derive relationship of α and d. A hump kind of curve is drawn. A very large value of α shows a very less value of d.



If say for example, as in the diagram, the value of β = 0.1, then the policy is more accommodative.

If the policy is less accommodative the value of β will be high (0.4). There is a persistence of the wage rate when the value of d is very low. Trade off between wages and unemployment will be very low.

Conclusion:

The theme of this, John B. Taylor model is that the inflation dynamics typically associated with the expectations augmented. Phillips curve are significantly influenced by the interaction of staggered contracts as well as by expectations effects. While these ideas are implicit in such accelerationist research, the aim here has been to make them explicit in order that alternative hypothesis concerning the inflation process can be stated more clearly.

3.4 Explanation of Caplin-Spulber Model

The model is set in continuous time. Each individual's optimal price at time t, $P_i^*(t)$, is again $\Phi m(t)+(1-\Phi)p(t)$. Money growth is always positive; as we will see,

this causes P_i^* to always be increasing. The key assumption of the model is that price-setters follow an Ss pricing policy. Specifically, whenever a price-setter adjusts his or her price, he or she sets it so that the difference between the actual price and the optimal price at that time, $P_i - P_i^*$, equals some target level *S*. The individual then keeps the nominal price fixed until money growth has raised P_i^* sufficiently that $P_i - P_i^*$ has fallen to some trigger level, s. He or she then resets $P_i - P_i^*$ to *S*, and the process begins anew.

Such an *Ss* policy is optimal when inflation is steady, aggregate output is constant, and there is a fixed cost of each nominal price change. In addition, as Caplin and Spulber describe, it is also optimal in some cases where inflation or output is not constant. And even when it is not fully optimal, it provides a simple and tractable example of state-dependent pricing.

Assumptions

Two technical assumptions complete the model. First, to keep prices from overshooting *s* and to prevent bunching of the distribution of prices across price-setters, *m* changes continuously. Second, the initial distribution of $P_i - P_i^*$ across price-setters is uniform between *s* and *S*. The remaining assumptions are the same as in the Taylor model.

Under these assumptions, money is completely neutral in the aggregate despite the price stickiness at the level of the individual price-setters. To see this, consider an increase in m of amount $\Delta m < S - s$ over some period of time. We want to find the resulting changes in the price level and output Δp and Δy. Since $(P_i^* = (1 - \phi)p + \phi m,)$ the rise in each price-setter's optimal price is $(1 - \phi)\Delta p + \phi\Delta m$. Price-setters change their prices if $P_i - P_i^*$ falls below s; thus, price-setters with initial values of $P_i - P_i^*$ that are less than $s + [(1 - \phi)\Delta p + \phi\Delta m]$ change their prices. Since the initial values of $P_i - P_i^*$ are distributed uniformly between *s* and S, this means that the fraction of price-setters who change their prices is $[(1-\phi)\Delta p+\phi\Delta m]/(S-s)$. Each price-setter who changes his or her price does so at the moment when his or her value of $P_i - P_i^*$ reaches s; thus, each price increase is of amount $S - s$. Putting all

this together gives us

$$\Delta p = \frac{(1-\Phi)\Delta p + \Phi \Delta m}{S-s}(S-s) = (1-\Phi)\Delta p + \Phi \Delta m \qquad (1)$$

Equation (1) implies that Δp = Δm, and, thus, that Δy = 0. Thus, the change in money has no impact on aggregate output.

To understand the intuition for this result, consider the case where ϕ = 1, so that P_i - P_i^* is just P_i - *m*. Now think of arranging the points in the interval (s,S) around the circumference of a circle; this is shown in Figure 1. Initially, price-setters are distributed uniformly around the circle. Now notice that an increase in *m* of Δm moves every price-setter around the circle counter-clockwise by a distance Δm. To see this, consider first a price-setter, such as the one at point A, with an initial value of P_i - P_i^* that is greater than *s* + Δ*m*. Such a price-setter does not raise his or her price when *m* rises by Δm. Since rises by Δm, for this price-setter P_i - P_i^*, therefore, falls

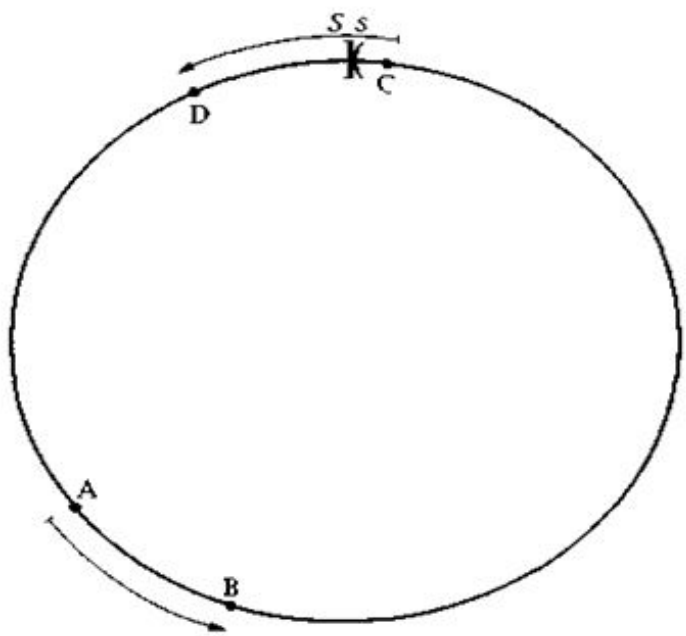


Figure 1: The effects of an increase in the money stock in the Caplin-Spulber model

by Δm. Thus, the price-setter moves counter-clockwise by amount Δm. Now consider a price-setter, such as the one at point C, with an initial value of $P_i - P_i^*$ that is of the form $s + k$, where k is less than Δm. For this price-setter, $P_i - P_i^*$ falls until m has risen by k; thus, he or she is moving counter-clockwise around the circle. At the instant that the increase in m reaches k, jumps by $S - s$, and so $P_i - P_i^*$ jumps from s to S. In terms of the diagram, however, this is just an insignificant move around the circle. As m continues to rise, the price-setter does not change his or her price further, and thus, continues to travel around the circle. Thus, the total distance the price-setter travels is also Δm.

Since the price-setters are initially distributed uniformly around the circle, and since each one moves the same distance, they end up still uniformly distributed. Thus, the distribution of P_i-m is unchanged. Since p is the average of the P_i s, this implies that p - m is also unchanged.

Difference between Taylor and Caplin-Spulber Models

The reason for the sharp difference between the results of this model and those of the Taylor model is the nature of the price adjustment policies. In the Caplin-Spulber model, the number of price-setters changing their prices at any time is larger when the money supply is increasing more rapidly; given the specific assumptions that Caplin and Spulber make, this has the effect that the aggregate price level responds fully to changes in *m.* In the Taylor model, in contrast, the number of price-setters changing their prices at any time is fixed; as a result, the price level does not respond fully to changes in m.

The Taylor model shows that temporary fixity of some prices can have a disproportionate effect on the response of the aggregate price level to aggregate demand disturbances. The Caplin-Spulber model, in contrast, shows that the adjustment of some prices can have a disproportionate effect: a small fraction of price-setters making large price changes can be enough to generate neutrality in the aggregate.

The neutrality of money in the Caplin-Spulber model is not a robust result about settings where fixed costs of changing nominal prices cause the number of price-setters changing prices at any time to be endogenous. If, for example, inflation can be negative as well as positive, or if there are particular shocks that sometimes cause price-setters to lower their nominal prices, then the resulting extensions of *Ss* rules generally cause mon-etary shocks to have real effects. In addition, the values of *S* and s may change in response to changes in aggregate demand. If, for example, high money growth today signals high money growth in the future, price-

setters widen their *Ss* bands when there is a positive monetary shock; as a result, no price-setters adjust their prices in the short-run (since no price-setters are now at the new, lower trigger point s), and so the positive shock raises output.

Importance of Model

Caplin and Spulber's model is not important for its specific results about the effects of aggregate demand shocks. Rather the model is important for two reasons. First, it introduces the idea of state-dependent price changes. Second, it demonstrates another reason that the relation between microeconomic and macroeconomic rigidity is complex.

3.5 Conclusion

Thus together, the Taylor, and Caplin-Spulber models show that any complete treatment of price rigidity requires careful attention both to the nature of price adjustment policies and to how those policies interact to determine the behavior of the aggregate price level. The theme of John B. Taylor model is that the inflation dynamics typically associated with the expectations augmented. Phillips curve are significantly influenced by the interaction of staggered contracts as well as by expectations effects. While these ideas are implicit in such accelerationist research, the aim here has been to make them explicit in order that alternative hypothesis concerning the inflation process can be stated more clearly. Caplin and Spulber's model is not important for its specific results about the effects of aggregate demand shocks. Rather, the model is important for two reasons. First, it introduces the idea of state-dependent price changes. Second, it demonstrates another reason that the relation between microeconomic and macroeconomic rigidity is complex.

3.6 Short answer type questions

1. Give central idea of John B. Taylor model.
2. What are the assumptions of John B. Taylor model?
3. Give central idea of Caplin-Spulber model.
4. What are the assumptions of Caplin-Spulber model?

3.7 Long answer type questions

1. Explain Caplin-Spulber model.
2. Exlpain Taylor model and compare it with Caplin-Spulber model

3.8 Recommended books

Advanced Macroeconomics : David Romer
Macroeconomics : John. H. Makin
Macroeconomics Theories : M. J. C. Surrey
Macroeconomics : Rudifer Dornbusch and Stanley Fischer

M. A. (ECONOMICS) PART-I **PAPER-II**
SEMESTER-II **MACROECONOMIC ANALYSIS**

LESSON NO. 1.4 **AUTHOR: DR. MANISHA**

COORDINATION-FAILURE MODELS AND REAL NON-WALRASIAN THEORIES

4.1 Introduction
4.2 Objectives of lesson
4.3 Coordination-Failure Models
4.4 Empirical Application
4.5 Real Non-Walrasian Theories
4.6 Limitations
4.7 Conclusion
4.8 Short answer type questions
4.9 Long answer type questions
4.10 Recommended books

4.1 Introduction

When prices are flexible, the economy has a unique equilibrium. As in real business-cycle models, fluctuations arise only from changes in the flexible-price equilibrium or from departures of the economy from that equilibrium. If more than one level of output is a flexible-price equilibrium, however, fluctuations can also arise from movements of the economy among different equilibria.

Models with multiple, Pareto-ranked equilibria are known as coordination failure models. The possibility of coordination failure implies that the economy can get stuck in an underemployment equilibrium. That is, output can be inefficiently low just because everyone believes that it will be. In such a situation, there is no force tending to restore output to normal. As a result, there may be scope for government policies that coordinate expectations on a high-output equilibrium; for example, a temporary stimulus might permanently move the economy to a better equilibrium.

4.2 Objectives of lesson

In this lesson we will study coordination-failure models and real non-walrasian theories.

4.3 Coordination-Failure Models

Cooper and John (1988) present a simple framework for analyzing multiple equilibria in aggregate activity. The economy consists of many identical agents. Each agent chooses the value of some variable, which we call output for concreteness, taking others' choices as given. Let $U_i = V(y_i, y)$ be agent i's payoff when he or she chooses output y_i, and all others choose y. Let $y_i^*(y)$ denote the representative agent's optimal choice of y_i given y. Assume that V(•) is sufficiently well behaved that $y_i^*(y)$ is uniquely defined for any y, continuous, and always between 0 and some

upper bound $\bar{y}$. y_i^* (y) is referred to as the reaction function.

Equilibrium occurs when y_i^* (y) = y. In such a situation, if each agent believes that other agents will produce y, each agent in fact chooses to produce y.

Figure 1 shows an economy without multiple equilibria. The figure plots the reaction function, $y_i^*(y)$. Equilibrium occurs when the reaction function crosses the 45-degree line. Since there is only one crossing, the equilibrium is unique.

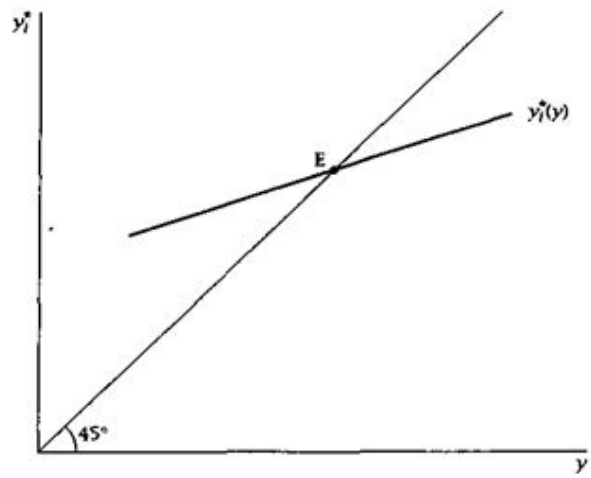


Figure 1: A reaction function that implies a unique equilibrium

Figure 2 shows a case with multiple equilibria. Since y_i^* (y) is bounded between 0 and , it must begin above the 45-degree line and end up below. And since it is continuous, it must cross the 45-degree line an odd number of times (if we ignore the possibility of tangencies). The figure shows a case with three crossings and, thus, three equilibrium levels of output. Under plausible assumptions, the equilibrium at point A is unstable. If, for example, agents expect output to be slightly above the level at A, they produce slightly more than they expect others to produce. With natural assumptions about dynamics, this causes the economy to move away from A. The equilibria at B and C, however, are stable.

With multiple equilibria, fundamentals do not fully determine outcomes. If agents expect the economy to be at C, it ends up there; if they expect it to be at B, it ends up there instead. It is plausible that $V(y_i, y)$ is increasing in y - that is, that a typical individual is better off when aggregate output is higher. Higher aggregate

output shifts the demand curve that the representative firm faces outward, and, thus, increases the real price the firm obtains for a given level of its output.

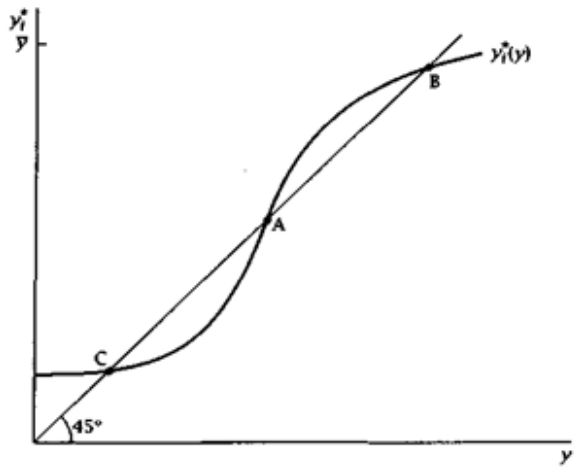


Figure 2: A reaction function that implies multiple equilibria

If $V(y_i, y)$ is increasing in y, equilibria with higher output involve higher welfare. To see this, consider two equilibrium levels of output, y1 and V2, with y2 > y1- Since $V(y_i, y)$ is increasing in y. V(y1,y2) is greater than V(y1,y1). And since y2 is an equilibrium, y_i = y2 maximizes $V(y_i,y)$ given y = y2, and so V(y2,y2) exceeds V(y1,y2). Thus, the representative agent is better off at the higher output equilibrium.

Models with multiple, Pareto-ranked equilibria are known as coordination failure models. The possibility of coordination failure implies that the economy can get stuck in an underemployment equilibrium. That is, output can be inefficiently low just because everyone believes that it will be. In such a situation, there is no force tending to restore output to normal. As a result, there may be scope for government policies that coordinate expectations on a high-output equilibrium; for example, a temporary stimulus might permanently move the economy to a better equilibrium.

There is an important link between multiple equilibria and our earlier discussion of real rigidity. Recall that there is a high degree of real rigidity when, in response to an increase in the price level and the consequent decline in aggregate output, the representative firm wants to reduce its relative price only slightly. In terms of output, this corresponds to a reaction function with a slope slightly less than 1: when aggregate output falls, the representative firm wants its sales to decline

almost as much as others'. The existence of multiple equilibria requires that over some range, declines in aggregate output cause the representative firm to want to raise its price and, thus, reduce its sales relative to others'; that is, what is needed is that the reaction function have a slope greater than 1 over some range. In short, co-ordination failure requires that real rigidity be very strong over some range.

4.4 Empirical Application: Experimental Evidence on Coordination-Failure Games

Traditional game theory predicts that such economies will arrive at one of their equilibria, but does not predict which one. Various theories of equilibrium refinements make predictions about which equilibrium will be reached. For example, a common view is that Pareto-superior equilibria are focal, and that economies where there is the potential for coordination failure, therefore, attain the best possible equilibrium. There are other possibilities as well. For example, it may be that each agent is unsure about what rule others are using to choose among the possible outcomes, and that as a result such economies do not reach any of their equilibria.

One approach to testing theories that has been pursued extensively in recent years, especially in game theory, is the use of experiments. Experiments have the advantage that they allow researchers to control the economic environment precisely. They have the disadvantages, however, that they are often not feasible and that behavior may be different in the laboratory than in similar situations in practice.

Van Huyck, Battalio, and Beil (1990,1991) and Cooper, Dejong, Forsythe, and Ross (1990, 1992) test coordination-failure theories experimentally. Van Huyck, Battalio, and Beil (1990) consider the coordination-failure game proposed by Bryant (1983). In Bryant's game, each of N agents chooses an effort level over the range $[0, \bar{e}]$. The payoff to agent i is

$$U_i = \alpha \min[e_1, e_2, \ldots, e_N] - \beta e_i, \qquad \alpha > \beta > 0 \qquad (1)$$

The best equilibrium is for every agent to choose the maximum effort level, $\bar{e}$; this gives each agent a payoff of $(\alpha - \beta)\ \bar{e}$. But any common effort level in $[0, \bar{e}]$ is also a Nash equilibrium: if every agent other than agent i sets his or her effort to some level ê, i also wants to choose effort of ê. Since each agent's pay off is increasing in the common effort level, Bryant's game is a coordination-failure model with a continuum of equilibria.

Van Huyck, Battalio, and Beil consider a version of Bryant's game with effort restricted to the integers 1 through 7, α = \$0.20, â = \$0.10, and N between 14 and 16. They report several main results. The first concerns the first time a group plays the game; since Bryant's model is not one of repeated play, this situation may correspond most closely to the model. Van Huyck, Battalio, and Beil find that in the first play, the

players do not reach any of the equilibria. The most common levels of effort are 5 and 7, but there is a great deal of dispersion. Thus, no deterministic theory of equilibrium selection successfully describes behavior.

Second, repeated play of the game results in rapid movement toward low effort. Among five of the seven experimental groups, the minimum effort in the first period is more than 1. But in all seven groups, by the fourth play the minimum level of effort reaches 1 and remains there in every subsequent round. Thus there is strong coordination failure.

Third, the game fails to converge to any equilibrium. Each group played the game 10 times, for a total of 70 trials. Yet in none of the 70 trials do all the players choose the same effort. Even in the last several trials, which are preceded in every group by a string of trials where the minimum effort is 1, more than a quarter of players choose effort greater than 1.

Finally, even modifying the payoff function to induce "coordination suc-cesses" does not prevent reversion to inefficient outcomes. After the initial 10 trials, each group played 5 trials with the parameter β in (1) set to 0. With β = 0, there is no cost to higher effort; as a result, most of the groups converge to the Pareto-efficient outcome of e_i=7 for all players. But when β is changed back to \$0.10, there is rapid reversion to the situation where most players choose the minimum effort.

Van Huyck, Battalio, and Beil's results suggest that predictions from deductive theories of behavior should be treated with caution: even though Bryant's game is fairly simple, actual behavior does not correspond well with the predictions of any standard theory. The results also suggest that coordination-failure models can give rise to complicated behavior and dynamics.

4.5 Real Non-Walrasian Theories

Substantial real rigidity, even if it is not strong enough to cause multiple equilibria, can make the equilibrium highly sensitive to disturbances. Consider the case where the reaction function is upward-sloping with a slope slightly less than 1. As shown in Figure 3, this leads to a unique equilibrium. Now let x be some variable that shifts the reaction function; thus, we now write the reaction function as $y_i = y_i^*$ (y, x). The equilibrium level of y for a given x, denoted w(x), is defined by the condition y_i^* (w(x), x) = w(x). Differentiating this condition with respect to x yields.

$$\frac{\partial y_i^*}{\partial y}\hat{y}'(x)+\frac{\partial y_i^*}{\partial x}=\hat{y}'(x), \tag{2}$$

or

$$\hat{y}'(x) = \frac{1}{1-(\partial y_i * / \partial y)} \frac{\partial y_i *}{\partial x} \tag{3}$$

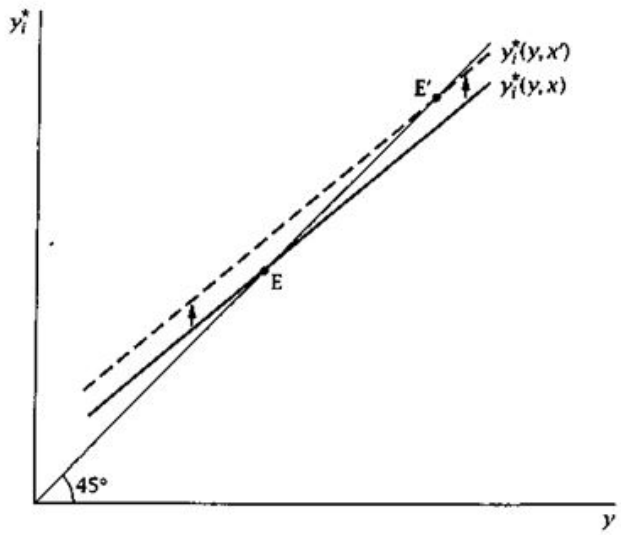


Figure 3: A reaction function that implies a unique but fragile equilibrium

Equation (3) shows that when the reaction function slopes up, there is a "multiplier" that magnifies the effect of the shift of the reaction function at a given level of y, $\partial y_i^* / \partial x$. In terms of the diagram, the impact on the equilibrium level of y is larger than the upward shift of the reaction function. The closer the slope is to 1, the larger the multiplier is.

In a situation like this, any factor that affects the reaction function has a large impact on overall economic activity. In the terminology of Summers (1988), the equilibrium is fragile. Thus, it is possible that there is substantial real rigidity, but that fluctuations are driven by real rather than nominal shocks. When there is substantial real rigidity, technology shocks, credit-market disruptions, changes in government spending and tax rates, shifts in uncertainty about future policies and other real disturbances can all be important sources of output movements. Since, as we have seen, there is unlikely to be substantial real rigidity in a Walrasian model, we refer to theories of fluctuations based on real rigidities and real disturbances as real non-Walrasian theories. Just as there are many candidate real rigidities, there

are many possible theories of this type.

This discussion suggests that whether there are multiple flexible-price equilibria or merely a unique but fragile equilibrium is not crucial to fluctuations. Suppose first that (as we have been assuming throughout this section) there are no barriers to nominal adjustment. If there are multiple equilibria, fluctuations can occur without any disturbances at all as the economy moves among the different equilibria. With a unique but fragile equilibrium, on the other hand, fluctuations can occur in response to small disturbances as the equilibrium is greatly affected by the shocks.

The situation is similar with small barriers to price adjustment. Strong real rigidity (plus appropriate insensitivity of the profit function) causes firms' incentives to adjust their prices in response to a nominal disturbance to be small; whether the real rigidity is strong enough to create multiple equilibria when prices are flexible is not important.

4.6 Limitations

Keynesian theory encompasses a wide range of models, most of which are intended to address specific issues rather than to approximate the behavior of the economy as a whole. In addition, Keynesian accounts of fluctuations usually ascribe important roles to many different kinds of shocks and many different types of market imperfections. These features of the Keynesian approach form the basis for the major criticism that can be made against if Keynesian models are so vague and so flexible that they are almost impossible to refute. Like Ptolemaic astronomers with their epicycles to explain every new observation, Keynesian macroeconomists can modify their theories and postulate unobserved shocks to fit the data in almost any situation.

It is easy to find examples of the flexibility of Keynesian analysis, involving issues ranging from the basic assumptions of the models to the specifics of individual episodes. Shortly after the publication of the General Theory, Dunlop (1938) provided strong evidence against its prediction of a counter-cyclical real wage. Rather than abandoning his theory, Keynes (1939) merely argued that its description of price-setting behavior should be changed. To give another example, the Keynesian response to the breakdown of the output-inflation relationship in the late 1960s and early 1970s was simply to modify the models to include supply shocks and core inflation. Similarly, confronted with clear evidence that the microeconomics of nominal adjustment differ greatly from what one would expect if the only barriers to adjustment are small fixed costs of changing prices, new Keynesians did not discard their theories; instead they argued that the actual barriers to nominal flexibility are a complicated combination of adjustment costs and other factors (D. Romer, 1993), or that menu costs are just a metaphor that is

no more intended to describe reality than is the Walrasian auctioneer of competitive models (Ball and Mankiw, 1994). And so on.

The same flexibility characterizes not just Keynesian models, but Keynesian accounts of specific episodes. The models allow for disturbances in essentially every sector of the economy—money supply, money demand, fiscal policy, consumption, investment, price-setting, wage-setting and international trade and, thus, are consistent with almost any combination of movements in the different variables. For example, conventional Keynesian accounts attribute the 1981-1982 U.S. recession to tight monetary policy. The fact that most measures of money growth did not decline sharply is not viewed as an important problem for this view, but is accounted for by postulating a shift in money demand that was only partly accommodated by the Federal Reserve. Similarly, conventional Keynesian accounts attribute a large part of the 1990-1991 U.S. recession to an unexplained fall in "consumer confidence." And the conjunction of rapid output growth, very low unemployment, and steady or falling inflation in the United States in the second half of the 1990s is attributed to a large extent to favorable supply shocks and declines in the natural rate of unemployment developments that are deduced largely from the behavior of these macroeconomic variables.

It is possible that the economy is complicated, that there are many types of shocks, and that the modifications of Keynesian models reflect gradual progress in our understanding of the economy. But a theory that is so flexible that it cannot be contradicted by any set of observations is devoid of content. Thus, if Keynesian theory is to be useful, there must be some questions about which it delivers clear predictions. One issue on which Keynesian theory appears to provide such predictions is the real effects of nominal disturbances. A central element of all Keynesian models is that nominal prices or wages do not adjust immediately. As a result, the models predict that independent monetary disturbances affect real activity. If this prediction is contradicted by the data, it appears that the models will have to be abandoned rather than modified, and that the study of fluctuations will have to pursue the real business-cycle models.

4.7 Conclusion

In this lesson we have studied coordination-failure models and real non-walrasian theories. When aggregate output falls, the representative firm wants its sales to decline almost as much as others. The existence of multiple equilibria requires that over some range, declines in aggregate output cause the representative firm to want to raise its price and, thus, reduce its sales relative to others; that is, what is needed is that the reaction function have a slope greater than 1 over some range. In short, co-ordination failure requires that real rigidity be very strong over some range.

4.8 Short answer type questions

1. Write a short note on policy of ineffectiveness theorem.
2. What are the limitations of real non-walrasian theories?

4.9 Long answer type questions

1. Explain coordination-failure models.
2. Explain and comment on policy of ineffectiveness theorem.

4.10 Recommended books

Advanced Macroeconomics: David Romer
Macroeconomics : John. H. Makin
Macroeconomics Theories : M. J. C. Surrey
Macroeconomics : Rudifer Dornbusch and Stanley Fischer

Theory of Economic Policy-Objectives and Conflicts

5.1 Introduction
5.2 Objectives of the lesson
5.3 Objectives of Macroeconomic Policy
5.4 Conflicts or Trade-off in Policy Objectives
5.5 Problem of Coordination of Macroeconomic Policy Objectives
5.6 Conclusion
5.7 Short Answer Type Questions
5.8 Long Answer Type Questions
5.9 Recommended Books

5.1 Introduction

Macroeconomic Policy means the monetary and fiscal policy it refers to the instruments by which a government tries to regulate or modify the economic affairs of the country in keeping with certain objectives; In other words, it tries to assess the behaviour of the economy as a whole and to seek ways in which its aggregate performance might be improved. These are achieved through certain instruments and objectives of macroeconomic policy. Its two main instruments are monetary and fiscal policy, and its four major objectives are full employment, price stability, economic growth, and balance of payments equilibrium. The policy targets are the specific values which a government attaches to its various objectives of macroeconomic policies. For instance, the government may have policy objectives like to achieve full employment, to achieve price stability and to attain the targeted growth rate for the economy. Thus, the policy targets of the government are to reduce unemployment rate, control inflation rate and to increase growth rate per year. On 'the other hand, policy instruments are those exogenous variables that can be directly influenced by the government. The government can influence macroeconomic policies by such instruments of monetary policy as bank rate, changes in reserve ratios, open market operations, selective credit controls, etc. Similarly, it can use such fiscal policy instruments as tax rates, budgetary policy, compensatory fiscal policy, etc.

5.2 Objectives of the lesson

In the present lesson we will study the objectives of macroeconomic policy, policy targets and instruments and the problems that arise when these objectives come into conflict with each other.

5.3 Objectives of Macroeconomic Policy

The following are the objectives of macroeconomic policy.

(1) Full Employment

Full employment has been ranked among the foremost objectives of economic policy. But there is no unanimity of views on the meaning of full employment. The classical economists always believed in the existence of full employment in the economy. To them unemployment was a normal situation and any deviation from this was regarded as something abnormal. Full employment existed when everybody at the running rate of wages wishes to be employed. Those who are not prepared to work at the existing wage rate are not unemployed because they are voluntarily unemployed. There is, however, no possibility of involuntary unemployment in the sense that people are prepared to work but they do not find work. However, this classical view on full employment is consistent with some amount of frictional, voluntary, seasonal or structural unemployment.

(2) Price Stability

One of the policy objectives of monetary and fiscal policy is to stabilise the price level. Both economists and laymen favour this policy because fluctuations in prices bring uncertainty and instability to the economy. Rising and falling prices are both bad because they bring unnecessary loss to some and undue advantage to others. Again, they are associated with business cycles. The policy of price stability keeps the value of money stable, eliminates cyclical fluctuations, brings economic stability, helps in reducing inequalities of income and wealth, secures social justice and promotes economic welfare.

(3) Economic Growth

One of the most important objectives of macroeconomic policy in recent years has been the rapid economic growth of an economy. Economic growth is measured by the increase in the amount of goods and services produced in a country. A growing economy produces more goods and services in each successive time period. Thus, growth occurs when an economy's productive capacity increases which, in turn, is used to produce more goods and services. In its wider aspect, economic growth implies raising the standard of living of the people and reducing inequalities of income distribution. All agree that economic growth is a desirable goal for a country.

Monetary and fiscal policies contribute towards growth by helping to maintain stability of prices. By moderating economic fluctuations and avoiding recessions, these policies help in achieving the growth objective. Since rapid and variable rates of inflation discourage investment and adversely affect growth, these policies help in controlling hyper-inflation. And growth can be promoted by a judicious mix of monetary-fiscal policies. So monetary and fiscal policies should be such as to encourage investment, and control economic fluctuations in order to promote growth.

(4) Balance of Payments

Another objective of macroeconomic policy is to maintain equilibrium in the balance of payments. The achievement of this goal has been necessitated by the phenomenal growth in the world trade as against the growth of international liquidity. It is also recognised that deficit in the balance of payments will retard the attainment of other objectives. This is because a deficit in the balance of payments leads to a sizeable outflow of gold. But it is not clear what constitutes a satisfactory balance of payments positions. Clearly a country with a net debt must be at a surplus to repay the debt over a reasonably short period of time. Once any debt has been repaid and an adequate reserve attained, a zero balance maintained over time would meet the policy objective. But how is this satisfactory balance to be achieved on the trading account or on the capital account? The capital account must be looked upon as fulfilling merely a short-term emergency role in times of crisis.

A deficit in the balance of payments of a country can be wiped out with restrictive monetary and fiscal policies, by reducing imports and encouraging exports and by devaluation of the currency.

5.4 Conflicts or Trade-off in Policy Objectives

The four policy objectives discussed above are not complementary to each other. Rather they are conflicting with one another. If a government tries to fulfill one objective, some other objective moves away. It has to sacrifice one objective in order to attain the other. It is, therefore, not possible to fulfill all these policy objectives simultaneously. We discuss below conflicts between different policy objectives.

Full Employment and Economic Growth

The majority of economists hold the view that there is no inherent conflict between full employment and economic growth. Full employment is consistent with 4 per cent unemployment in the economy. So the relationship between full employment and economic growth boils down to a trade-off between unemployment and growth. Periods of high growth are associated with low level of unemployment and periods of low growth with rising unemployment.

In 1961 Aurther Okun established a relationship between real GNP and changes in the unemployment rate. This relationship has come to be known as Okun's Law. This law states that for every three percentage points growth in real GNP, unemployment rate declines by one percentage point every year. This is illustrated in Figure 5.1 where the curve U represents unemployment and curve G the real growth of an economy for a few years.

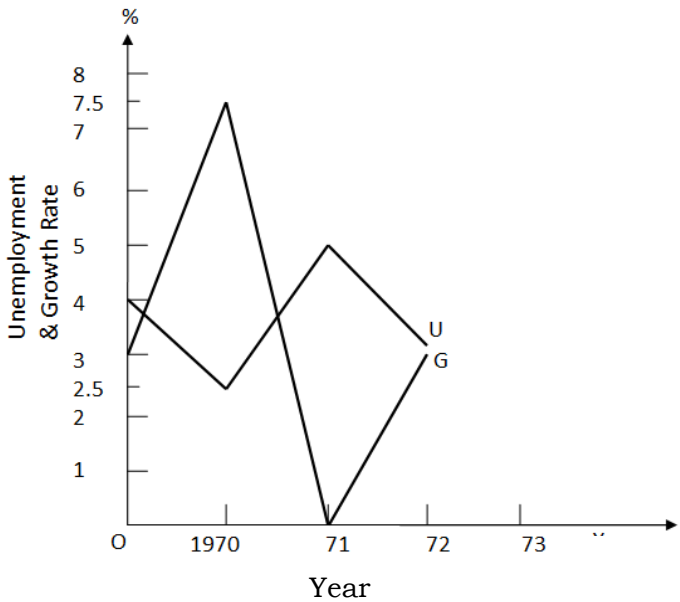


Figure 5.1

To begin with, the economy is growing at 3 per cent with an unemployment rate of 4 per cent. During the year 1970, when the real GNP increases by 4.5 per cent (from 3 per cent to 7.5 per cent), the unemployment rate feel by 1.5 per cent (from 4 per cent to 2.5 per cent). In the next year 1971, the growth rate of the economy falls to zero arid the unemployment rate rises to 5 per cent. In the subsequent year 1972, the real growth rate increases to 3 per cent and the unemployment rate declines to 4 per cent.

However, certain economists argue that the unemployment rate increases as the growth rate rises. Economic growth leads to reallocation of resources in the economy whereby there is change in the type and quantity of labour demanded. There is shift in the demand for labour from one sector of the economy to the other. As workers are trained for specific jobs, they are displaced when the demand for the products of particular industries falls. This creates unemployment. This is particularly so when growth is the result of technological innovations which are labour-saving and require more qualified and skilled workers. Thus, unskilled workers are the worst sufferers because they are thrown out of jobs with automation. Employment can, however, increase with growth if demand expands faster than the productivity of labour. If demand is increasing at 3 per cent per annum and the productivity is increasing at 4 per cent per year, the output will expand but employment will decline. Under the circumstances, the government should adopt such monetary and fiscal policy which should increase the overall demand in the economy.

Economic Growth and Price Stability

There is conflict between the goals of economic growth and price stability. The

rise in prices is inherent in the growth process. The demand for goods and services rises as a result of stepping up of investments on a large scale and consequent increase in incomes. This leads to inflationary rise in prices, especially when the level of full employment is reached. In the long-term, when new resources are developed and growth leads to the production of more commodities, the inflationary rise in prices will be checked. But the rise in prices will be there with the growth of the economy and it will be moderate and gradual.

Full Employment and Price Stability

One of the objectives of macroeconomic policy is to have full employment with price stability. But the studies of Philips, Samuelson-Solow and others in the 1960s established a conflict between the two objectives.

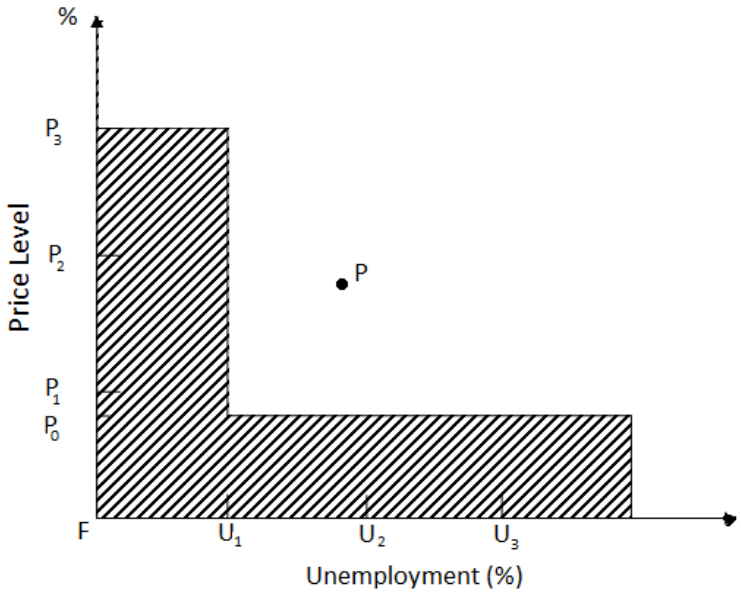


Figure 5.2

These findings are explained in terms of the Philips curve. They suggest that full employment can be attained by having more inflation and that price stability can be achieved by having unemployment to the extent of 5 to 6 per cent. Economists do not find any conflict between unemployment and price stability. They hold that so long as there are unemployed resources, there will be price stability. Prices start rising only when there is full employment of resources. This is illustrated in Figure 5.2 where the percentage of resources unutilized (or unemployed) are taken on the horizontal axis and the percentage change in price level is taken on the vertical axis. Thus, each point indicates the percentage of resources unemployed along with the price level. According to this theory, so long resources U1, U2 and U3 are unemployed the price level remains constant at P0. It is only when the economy reaches the full employment level F, prices 'rise from P0 to P1 to P2 to P3 with successive increases in demand. Thus,

there is no conflict between unemployment and stable prices as shown by the shaded area of the figure. However, the macro policy implications of such a relationship are that there can be no conflict between full employment and price stability so long as the economy is in the shaded area. This is because when there is full employment, resources are not in excess supply and if the government controls the excess demand through appropriate monetary and fiscal policy, there will be stability of the price level. But if the economy happens to be at point P, which may be taken to be a point on the Phillips curve, there will be conflict between the objectives of full employment and price stability.

Full Employment and Balance of **Payments**

There is a major policy conflict between full employment and balance of payments. Full employment is always related to balance of payments deficit. In fact, the problem is one of maintaining either internal balance or external balance, if there is a balance of payments deficit, then a policy of reducing expenditure will reduce imports but it will lead to increase in unemployment in the country. If the government raises aggregate expenditure in order to increase employment, it will increase the demand for imports thereby creating disequilibrium in the balance of payments. It is only when the government adopts expenditure-switching policies such as devaluation that this conflict can be avoided, but that too temporarily.

Price Stability and Balance of Payments

There appears to be no conflict between the objectives of price stability and balance of payments in a country. Fiscal and monetary policies aim at controlling inflation to discourage imports and encourage exports and, thus, they help in attaining balance of payments equilibrium. However, if the government tries to remove unemployment and allows some inflation within the economy, there appears a conflict between these two objectives. For a rise in the price level will discourage exports and encourage imports, thereby leading to disequilibrium in the balance of payments. But this may not happen if prices also rise by the same rate in other countries of the world.

5.5 Problem of Coordination of Macroeconomic Policy Objectives

We have seen above that there are four policy goals which are often in conflict with each other. The problem is one of achieving them simultaneously. Full employment, economic growth and price stability are the major objectives of economic policy. They are essential for the internal balance of the economy. But balance of payments equilibrium is also an essential policy objective because a disturbance in the balance of payments has serious effects on growth, employment and prices. This objective, therefore, requires external balance. The theory of economic policy has centred around two problems. First, the relation between the number of policy objectives and the number of policy instruments; and second, the assignment of policy instruments to the realisation of the objectives. In order to achieve given objectives

with the same number of policy instruments, the second problem of the assignment of instruments to targets arises. The formulation of the assignment problem will eventually lead to equilibrium values of the objectives, despite lack of coordination between them.

Policies for Internal and External Balance

A deficit in the balance of payments implies an excess of expenditure over income. To correct it, expenditure and income should be brought into equality. Expenditure-reducing policies aim at reducing aggregate demand through higher taxes and interest rates thereby reducing expenditure and output. The reduction in expenditure and output, in turn, reduces the domestic price level. This gives rise to switching of expenditure from foreign to domestic goods. Consequently, the country's imports are reduced. Expenditure-switching policies aim at increasing the demand for domestic goods and to change expenditure from imported goods to domestic goods. Such expenditure-switching increases domestic output. So long as the marginal propensity to spend is less than unity, it will improve the country's balance of payments.

To achieve both objectives of internal and external balance simultaneously a judicious combination of expenditure-reducing and expenditure-switching instruments is needed. For instance, if the economy is already at the full employment level, a policy of devaluation may cause inflation within the economy. So expenditure-switching policy of devaluation must be accompanied by expenditure-reducing policies of tighter fiscal and monetary controls to maintain full employment and balance of payments equilibrium.

In order to explain this type of policy measures which may be required to achieve internal and external balance simultaneously, we take eight possible cases of disequilibrium in Figure 5.3. These cases require different combinations of policy measures. A country at point A has equilibrium in the balance of payments and unemployment (or recession). Such a situation requires expansion of the domestic economy through increase in domestic expenditure: This will reduce net exports. In order to counteract this tendency, devaluation should be combined with increase in domestic expenditure. If unemployment and a deficit in the balance of payment exit simultaneously, as at point K in zone ill, there should be increase in domestic expenditure. A policy that raises internal demand through expansionary measures also increases domestic employment-But this policy widens the deficit in the balance of payments. This is described as the "dilemma zone", because instead of an expansionary policy, devaluation is the preferable policy.

If the economy combines full employment with a deficit in the balance of payments, as at point D, devaluation is the remedy. This will create a large export surplus and excess foreign demand will lead to inflation in the domestic economy. To

counteract these tendencies, a smaller devaluation will have to be combined with a cut in domestic expenditure. Take point tf in Zone IV where domestic inflation is combined with a deficit in the balance of payments. Inflation should be combated with reduction in domestic expenditure which would also reduce the deficit in the balance of payments and ultimately move the economy towards the equilibrium position ***E.*** If the country has balance of payments equilibrium and inflation as at point f; it should appreciate its exchange rate and reduce domestic expenditure.

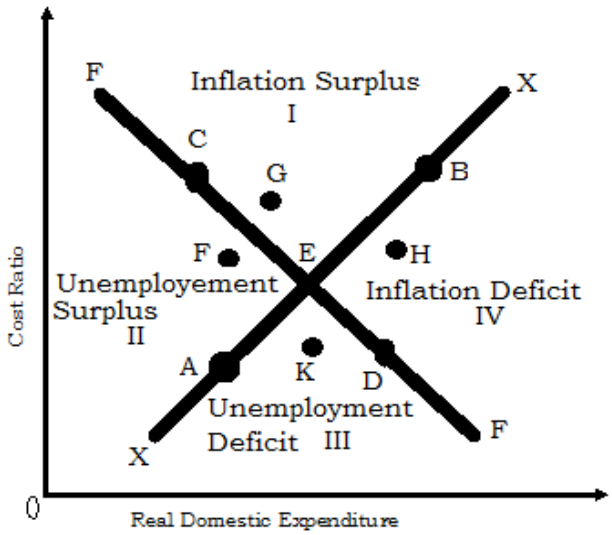


Figure 5.3

Take point G in Zone I where a surplus in the balance of payments is combined with inflation. In this situation, the exchange rate should be appreciated to correct the surplus and expenditure be reduced to combat inflation. But reduction in expenditure would increase the surplus. This again represents the "dilemma zone".

If the country has full employment and a surplus in the balance of payments, as at point C, it should appreciate its exchange rate. But appreciation would create unemployment. To avoid it, it should increase domestic expenditure.

Finally, move to point F in Zone n where a surplus in the balance of payments is combined with unemployment. Here the increase in domestic expenditure would be appropriate for both internal and external balances. Such a policy will raise employment and also induce an increase in imports to reduce the size of the surplus. The above discussion reveals that if the economy is on neither the FF (internal balance) curve nor the XX (external balance) curve, it is in one of the four zones. When the economy follows only one policy or both expenditure-switching and domestic expenditure policies simultaneously to achieve one target (say, internal balance), it moves away from the other target (say, external balance). This problem arises not only

in the "dilemma zones" I and HI, but also in the "simple zones" II and IV. For instance, if we take point F in Zone H where a surplus in the balance of payments is combined with unemployment an expansionary policy will reduce unemployment and reduce the surplus. But to move the economy to full equilibrium point F, appreciation or depreciation of the exchange rate will have to be adopted which will move the economy away from one target or the other.

Mundell discusses the case of relationship between two tools and two objectives. The two instruments are monetary policy represented by interest rate and fiscal policy represented by government expenditure. The two objectives are full employment (internal balance) and balance of payments equilibrium (external balance).

5.6 Conclusion

Full employment, economic growth, balance of payments and price stability are the major objectives of economic policy. The four policy objectives discussed above are not complementary to each other. Rather they are in conflict with one another. If a government tries to fulfill one objective, some other objective moves away. It has to sacrifice one objective in order to attain the other. It is, therefore, not possible to fulfill all these policy objectives simultaneously. There can be possibility of internal and external imbalance. To achieve both objectives of internal and external balance simultaneously a judicious combination of expenditure-reducing and expenditure-switching instruments is needed.

5.7 Short answer type questions

1. Discuss the principal objectives of macroeconomic policy.
2. Is there any conflict between the objectives of full employment and price stability?
3. Discuss some of the problems of economic policy.
4. Explain particularly the trade-off in policy objectives.
5. What is internal and external balance?

5.8 Long answer type questions

1. What policy instruments would you suggest for maintaining both internal and external equilibrium?
2. Fiscal policy should always be directed toward the achievement of internal balance. This is most obviously true when a policy 'conflict' arises." Discuss.

5.9 Recommended books

G.K. Shaw : An Introduction to the Theory of Macroeconomic Policy
N.F. Kaiser : Readings in Macroeconomics
Edward Shapiro : Macroeconomic analysis
T.F. Dernberg and D.M. Dougall : Macroconomics

MONETARY POLICY

Nature of Monetary Policy

Monetary policy is as old monetary system as money itself. There are evidences which suggest that even in ancient period monetary management was known in Greece. The prince who minted the first coin was a monetary reformer and the princes who debased their coins to finance deficit were also monetary reformers. Managed currency was not entirely unknown to the ancient Egyptians, Greeks and Chinese who shifted to and from the shrines of their temples in order to counteract movements in the price level. But, before 1914, the whole thinking about monetary policy was based upon the idea of automatic gold exchange system.

During the Ist World War (1914-1919), this notion was almost shattered and monetary policy assumed new dimensions. In the modern sense, monetary policy aims at systematic regulation of the volume of money (currency as well as credit) with definite objective in view. Monetary policy should be able to work both ways - forward, irrespective of the objective of monetary policy, it has attained a definite dimension, in which it works, the objectives of monetary policy generally revolve around expansion or contraction of credit. It implies a positive endeavour to regulate, the volume and value of currency and credit, a way that is considered to be in accordance with the interests of increase of the welfare of the community independently of the technical international considerations which has been in the past, regarded as being of the paramount importance.

The genesis of monetary policy took place after the World War I when the gold exchange standard showed a breakdown. Inflation in Germany and two conferences in 1920 in Burssels and in 1922 in Geneva compelled the statesmen in the world to think about a new monetary system which was bound to effect the monetary policy in every country. Before that, as has already been stated, automaticity of gold exchange system was cherished because of which the idea of central banking was nebulous. In due course, the return of Great Britian to the gold standard was hailed as giving a lead in the great work of monetary reconstruction. But this was only the beginning of a herculean task. At the time, scarcely any one considered that price level could or ought to be the care and pre-occupation, for less a main objective of

policy of a central bank. *Increasing unemployment was a reminder to the world that the monetary problem, that of providing and working through satisfactory currency and credit machine,cannot be solved easily and finally before a distant future.* The depression of the thirties provided further stimulus to the thinking of reforms in the field of monetary management.

In the recent past, the horizones of monetary policy have further been widened greatly. The central bank of a country has to decide whether to maintain or to change the terms on which it is prepared to grant credit : exchange control authorities have to take action day by day and hour by hour; banking leaders and treasury officials have to be in constant touch with others to consider the questions that arise daily.

To define monetary policy in specific terms, it is control of availability, cost and the use of money and credit. The traditional agent of monetary policy is the central bank which works through the monetary system. More or less, it deals with the monetary system of a country. It may have been defined in different words by different monetary economists, all of them testify its concern with the measures and decisions of a monetary nature.

Monetary policy can be defined from another point of view also. All monetary decisions and measures irrespective of whether their aims are monetary or non-monetary, and all non-monetary decisions and measures that aim at effecting the monetary system, constitute monetary policy. In this category will be included the steps taken to influence the value and volume of money and the monetary measures which pursue non-monetary, economic, social or political aims. Monetary measures like debasements, inflation, deflation, devaluation etc. and non-monetary measures like price and wage controls, physical controls, budgetary device, export drives, import cuts, quota system etc., will all come under monetary policy because these aim to influence the monetary situation in a country.

Objectives of Monetary Policy

Monetary policy of a country is an important aspect of its overall economic policy. It helps a healthy growth of the economy of the country, by adjusting money supply to the needs of growth, by directing the flow of funds in the required channels and by providing institutional facilities for credit in some specific fields of the economy.

Monetary policy consists of the measures taken by the central bank to regulate credit. It operates through five inter-related factors; the availability of credit, the volume of money, the cost of borrowing, the prices of capital assets and the liquidity of the economy. The primary task of the monetary policy is the mobilisation of resources to the proper channels.

The identification of the objectives of monetary policy becomes our first task if we want to analyse the appropriate monetary policy. The objectives of monetary policy

differ with the economic conditions of the country, still there is a spectrum of objectives that a country can adopt. Since monetary policy is a means to an end in itself, it is expected to achieve certain objectives determined by the monetary authority and/or the State. Its objectives must be regarded as being part of overall economic objectives to the extent that monetary policy is concerned with subsidiary objectives of its own, however, these latter must assist in attaining the basic objectives of economic policy.

The objectives of monetary policy have been changing from time to time. The instruments available to the central banks also differ from country to country. Even within the same country, the objectives differ at different times. Monetary policy in the narrow sense has signified one thing at one time and the other at another time. Its objectives change with the changes in the conditions of the economy. Empirically also this type of generalisation can be tested. Still monetary policy has been directed to achieve a few traditional and set objectives.

Under gold standard, maintenance of exchange stability was the most important objective of monetary policy. Because the monetary system was an automatic system, the central bank was practically passive. The supply of money was regulated by the automatic inflow and outflow of gold. At that time, scarcely anyone considered that price level would ought to be the care and pre-occupation, far less a main objective of policy of a central bank.

After the end of Ist World War, with the decline of gold standard, central bank was expected to exercise a discretionary influence on monetary system. The international monetary instability, the growth of nationalistic feelings, the rigidities in economic structure and the appearance of a huge volume of 'hot money' sounded the knell of the gold standard. In the words of Sayers, the inter-wax period can, perhaps be called the hey-day of central banking. There was deal of discussion about the objectives of monetary policy in the changed circumstances. Mac Millan Committee (1929-31) spoke of the central bank as being called upon to look after the maintenance of the parity of the foreign exchange with unnecessary disturbance to domestic business, the avoidance of the credit cycle and the stability of price level. In the changed circumstances, the regulatory functions of a central banking were emphasised.

With the emergence of Keynesian revolution, maintenance of full employment became of objective of monetary policy. With the advent of Great Depression in 1929, resulting in mouthing unemployment, the role of monetary policy to stimulate total demand and thereby help maintenance of a high level of income was emphasised.

This was sought to be achieved by making available enough credit at a low cost. Thus, cheap money was adopted. But experience and the lesson of, 'General Theory', made the people believe that monetary policy was completely ineffective. It is easy to discourage investment by raising interest rate, but we are not sure that lowering the interest rate would increase investment. Moreover, cheap money policy was indispensable to loan financed compensatory spending. The scope of effective anti-depression monetary policy is clear from the fact that even if credit policy is incapable by itself in turning the tide of depression, it can increase overall liquidity via open market operations and other conventional methods, thereby creating the monetary atmosphere necessary for the successful operation of more effective measures of fiscal and other policies.

After the IInd World War, the inflationary trends in the world again revived the interest in monetary policy, specially in the interest-rate mechanism. Dear money policy as a measure of controlling inflation caught the attention of the policy framers. The political feasibility of effective fiscal policy in the form of tax increases and reduction in expenditure was doubtful. Central bank credit control measures seem to be more effective in controlling expansion. An additional reason was the relative freedom of the central bank to operate unpopular anti-inflationary monetary measures. The following extract from Radcliffe Committee Report amply bears this out:

"The most serious handicap of measures, as a method of operating on the level of demand, is that individual tax changes, as distinct from the budget total, have to overcome opposition on varied grounds having nothing to do with the general economic situation. Their timing, too, is handicapped by dependence on the parliamentary time-table; and there are real administrative difficulties in making frequent changes in many tax rates. The more flexible the fiscal weapons can be made, the less will it be necessary to rely on monetary measures. On the other hand, if the authorities are unable to manipulate taxation with sufficient flexibility, there will have to be more reliance on monetary measures." (P. 185)

The latest of the objectives of the monetary policy attains a different shape as compared to the conditions explained above. Redcliffe Committee, which examined the working of the monetary policy, makes a list of a new set of objectives to be followed by the monetary authorities. These include the attainment of full employment, stability in the internal value of money, steady economic growth, some contribution to the economic development of other countries and strengthening international reserves.

In this constellation of objectives, there are possibilities of conflict among these five objectives. Stability of internal value of money remains the major objective. The government independent of the economic situation in the country cannot decide at its

own, which objective is the foremost. It depends upon the importance of each of these objectives.

To choose any one of these objectives is not a problem, but it is very difficult to bring out coordination and consistency among different objectives. In addition to traditional objectives, economic growth has become an important objective of monetary policy. In a developing country, economic development with an equitable distribution of income becomes a central objective of monetary policy. In the administration of development objective a number of difficulties may arise. Economic development is a moving target; it is indefinite. It is possible to predict the projected rate of growth, but to find out the ideal rate of growth is a problem.

Instruments or Tools of Monetary Policy

Having set out the general framework for the operation of monetary policy, we can examine the instruments of monetary policy. In fact, the effectiveness of monetary policy depends upon the instruments of credit control. The technique of monetary control have to be conditioned by the pattern of banking and financial institutions. The extent of success of the policy depends upon the instruments employed.

The techniques available to monetary authorities to maintain internal stability consists of (a) regulating quantity to the money and to some extent of the near money with the purpose of directing and influencing the volume of expenditure (b) manipulating the level of interest rates or the relationship between short-run and long-run rates and (c) regulation quality of credit according to purpose of use of it. The powers of the monetary authorities to regulate creation of money and near money depends largely on their power to control by direct or indirect means, the credit and instruments policies of the money creating institutions.

The techniques of monetary policy in a contemporary world are undergoing a rapid transformation. Formerly, exclusive instrument which most of the central banks in the world were the variation in the rates of interest at which the central banks in the world were using, was willing to discount bills. During the depression of the 1930's, however, monetary orthodoxy was gradually abandoned.

In recent years, central banks have become concerned, not only with the control of the volume of credit, but also with the flow of credit into specific sectors of the economy.

In India, this changed role of central banking has been the guideline since the Ist Five Year Plan. The First Plan states thus:

"Central banking in a planned economy can hardly be confined to the regulation of the overall supply of credit or to somewhat negative regulation of the flow of bank credit. It would have to take on a direct and active role, firstly in creating or helping to

create the machinery needed for financial developmental activities all over the country and, secondly, in ensuring that the finance available flows in the directions needed" (Page 38)

With this objective in view and depending upon the time to time requirements of the economy, the Central Bank of a country applies constantly changing combinations of various instruments. Those instruments can be quantitative or qualitative in nature. Quantitative techniques are applied through variation in the interest rate (bank rate), reserve requirements and open market operations.

Qualitative techniques are of recent origin. These measures consist of credit regulation for a specific/sector (selective credit control) and moral suation.

Of these, the most important and widely used instruments are bank rate. open market operation and selective credit controls. The policy implication of these instruments of monetary policy have been analysed below:

Bank Rate

The bank rate, or the discount rate as it is called in the United States, is the officially announced rate charged by the central bank for discounting of advances to member banks. In other words, it can be called as the cost of borrowing by the banking institution from the central bank. By changing bank rate, the central bank affects the cost of borrowing and thereby influences the volume of credit.

In the monetary market, if it is an organised one, there is a close relationship between the bank rates and the short-term money. The presence of an organised money market is very essential for the effective use of this technique because it is only in an organised money market, that the central bank can come to know that the current flow to bank credit and money is or is not in commensurate with the needs of the economy. Consequently, a change in the bank rate is commonly viewed as an amber light, an important index of the direction of the official policy.

Ostensibly, the official policy is successfully implemented through a responsive banking system, but technically the effectiveness of a change in the bank rate should take into account its influence on the following :

1. Effect on enterpreneur's expectations as to the profitability of new investments and the resulting effect on their demand schedule for credit.
2. Effect on credit rationing policies by financial institutions.
3. Effect on the increasing government bond rates, on the willingness of investors to take the capital loss resulting from the sale of securities to make private loans.

4. Effect of rising yields on government securities on the eagerness of lending institution to earn higher incomes on private obligation.
5. Effect of declining capital value on the propensity to consume.
6. Multiplier effect of any initial decline of spending resulting from the above changes.

The above mentioned factors go to prove that banking system must view a change in the official rates as a 'caution light'. The demand for credit must also be sensitive to cost. While as Hawtrey suggests "there is nothing to prevent for Central Bank from pushing the rate up to the required" level, it is only to small increases, the bank rate owes its real effectiveness.

In recent years, a great deal of controversy has entered around the question of efficacy of the bank rate. Even monetary commissions of international repute, like The Radcliffe Committee, have expressed their mixed feeling regarding the potentiality of this instrument. The final word has not been said, but it is definite that most economists regard it of some importance.

But another aspect of bank rate, relatively unknown, assumes special importance. In developing nations, like that of ours, with planned economies, where the public sector accounts for the larger part of the nation's investment and where the governments are equipped with a set of more direct and powerful instruments, the bank rate looses much of its significance, because bank rate will affect only a small number of enterprises. Furthermore, a well organised and responsive money market, which is a sine-qua-non for the effective functioning of the bank rate, is also absent in most instances, the number of negotiable and credit instruments to be rediscounted is very small. These factors help to suggest the limited efficacy of the bank rate in developing countries. This is the reason why this instrument is not used in such economies as frequently as is used in some advanced countries like the U.K. and U.S.A. etc.

Open Market Operations

In the broad sense, open market operations refer to the purchase or sale of the securities in the market by the central bank. The objective is to influence the reserve position of banks which indirectly would bring about relative changes in money rates and credit conditions. The end result is to effect desired adjustment in domestic prices, cost of credit conditions and production. A notable feature of open market operations is that regardless of the parties involved : these operations have a direct and positive impact on the volume of bank reserves. It can be applied in desired magnitudes, and be quickly reversed. These operations are, therefore, an active reflection of the prevailing monetary philosophy of country.

The efficacy of open market operations depends upon a variety of factors, chief among them being the existence of an active and broad money market. This is imperative if the central bank wishes to buy or sell securities in appropriate amounts in order to exert the desired effect of bank's reserves. Of course, it hardly needs to be mentioned that the central banks should have in its portfolio sufficient volume of securities of various maturity periods for an effective use of this instrument.

A relatively restricted use of open market operations is to take recourse too, in developing countries. In these countries, money markets are not fully developed. Consequenly, open market operations are often used to broaden the securities markets so as to create an institutional set-up for a more effective use of this instrument. Many of these nations also make the traditional use of this, depending upon the character of their financial institutions.

Variable Reserve Requirements

A change in the variable reserve ratio does not change the total reserve position of the commercial banks. It only affects the amount of excess on secondary reserves. The logical reason for this is that the power of the banks to create credit mainly depends upon the excess reserves. Hence a change in the reserve requirement affects the credit creating capacity of the banks and, in turn, their power to effect supply.

A change in the reserve requirements has two-fold effects :

1. Assuming that there is an increase in the reserve requirement, there is an immediate decline in the excess reserve of commercial banks. They find additional funds to meet the large reserve on the basis of which credit is created.
2. An increase in requirement would reduce the rate of multiple expansion of deposits for the entire banking system.

The instrument of variable reserve requirements is generally considered to be *blunt* and *clumsy,* the reason being that it has technical and psychological limitations. For one thing, it is difficult to use this instrument in moderate doses; even a very small change in the rate results in a substantial change in the liquidity position of commercial bank. For another, the instrument does not take into account the relative strength of the banks and, therefore, affects the smaller banks more severely. Furthermore, there is a difficulty in managing it too.

Since the change becomes effective on a specific date, a sudden and quick adjustment in the liquidity positions of the banks become essential. This process of adjustment is likely to have undesirable disturbances in the market. For these and other reasons, central banks generally use this weapon with moderation and discretion, and that too under special and pressing circumstances.

Selective and Direct Regulations

Overall quantitative controls operate by affecting overall bank reserves and overall credit. Selective controls, by contrast are applied to influence specific sectors of the economy which are most vulnerable. Under this type of regulations, no attempt is made to restrict the general flow of credit, rather restrictions are imposed upon the use of credit into specific sectors regardless of the quantum of credit available for such purposes.

The rationale of selective control is that, consistent with the general credit situation appropriate to a healthy economic system, credit may be so easy to obtain for some purpose that demand expands unduly in particular directions, or speculative activities are over-activated, endangering the stability of the whole economy.

A further need of selective credit control relates to its use as a supplement to general control. When the latter cannot be expected to act in a specific sector either quick or effectively to deal with the partial or sectoral inflationary situation. While there is nothing to prevent a central bank from using selective controls independently. The experience of various countries show that their effectiveness is considerably enhanced if used along with general credit controls.

Direct Action : In one form or another, many central banks also make use of direct regulations either as an alternative to the qualitative and quantitative controls or in conjunction with them. Direct action can be very important in countries which have considerable Central planning and supervision by government business.

These controls also assumed to have special importance in situations where the banking system is either non-responsive to central bank's appeals or consist of a few large banks which could be easily directed to follow the central bank's general policy.

Direct action may take several forms. The central bank may refuse rediscounting facilities to those banks whose credit policy is inconsistent with the bank's policy. The bank may issue directives to bank generally concerning their lending or investment operations. Direct action can also be taken as a coercive measure against an offending bank. Whatever the form, direction always carry punitive threats from non-compliance and are used primarily to buttered general and selective credit policies.

Moral Suation

In the wider sense of the term, moral suation may be treated as one of milder forms of selective credit control with the important difference that this instrument is not accompanied by statutory compulsion or threats or punitive action.

Moral suation carries with it the advantage of creating a less unfavorable psychological reaction and a greater response to the appeal of the central bank. It is,

therefore, for the central bank to secure the willing and active co-operation of the commercial banks in the spirit as well as in the letter.

Another advantage of moral suation is that this informal method of control can be adopted by the central bank for exerting an appropriate influence on non-scheduled banks and also on other kinds of credit and financial institutions generally considered to be outside the scope of the central bank regulation.

Moral suation can be *affectuated* in many forms. The central bank may call in the leading bankers for heart to heart talks. An appeal to their nationalistic spirit may be made. A displeasure may be expressed over their non-compliance with law. Vague threats concerning future availability of credit may be made, or banks, may be warned of direct and punitive actions.

Monetary Policy & Growth

Sustained economic growth has been widely accepted as a very important objective of monetary policy. The primary function of an economy is to provide the people means to satisfy their wants. Money is perhaps, the best mean to satisfy one's wants. But mere providing of money without providing real resources does not lead the economy anywhere, economic growth does not mean higher money income without being accompanied by higher real income. In short, growth means providing real output, satisfaction of consumer's wants and economic freedom. Things should be produced according to the wants of the consumer. These things can be achieved only if the following conditions are fulfilled :

1. The production capacity of the economy should increase.
2. The demand for the things should increase.

Failure of one will cause imbalance in the economy. For example, if things are being produced in abundance but the demand for these things is lagging behind, there will be idle capacity, recession and unemployment. On the contrary, if the demand for things is there, but production is not taking place at the acquired pace, inflation will creep in. Both these imbalances act as barrier to sustained economic growth.

Monetary policy can ensure the maintenance of both conditions. It can ensure necessary production capacity as well as required demand for the goods. Monetary policy promotes sustained economic development by maintaining equilibrium between the total money demand and economy's production capacity. When the production is more than the demand for the goods, monetary policy applies its-brakes of the flow of credit to the production sector. On the other hand, to-check increased demand for the goods, the monetary policy restricts its advances to the consumer sector and tries to give a boost to the production sector.

In short, monetary policy tries to maintain a balance between the demand and supply and provide necessary environment for the economy.

Monetary Policy for a Developing Country

The handling of the instrument of monetary policy is mainly governed by the economic environment and the general objectives of monetary control in the wider national context. In a developing country, like India, monetary policy is concerned with the monetary regulation with a view to promote economic development with reasonable price stability. Monetary policy has to, therefore, both promotional and regulatory. The scope for effective application of monetary and credit policies in developing economy, while it is modest should not be under-estimated. Since the scope is modest every effort should be made to have the best possible results.

In an underdeveloped economy experiencing inflation, additional investment for development must be financed by genuine savings or external resources. Owing to imperfections at market mechanism in such economies, the state has to direct the resources, physical and financial, through state participation to achieve the maximum rate of growth over a period of time. There will have to be a secular expansion of credit and public expenditure. The growth of public sector in most of the developing countries reflects partly, this way of thinking.

The implications of structural and sectoral imbalances in a developing economy should be born in mind while formulating appropriate monetary policy. Monetary authorities have to regulate the rate and pattern of saving and investment to achieve a balance by the instrument of monetary policy.

In a developing economy, monetary policy should assist the process of monetarisation of the economy by the creation of money so as to guide the flow of funds for investment and production. In an expanding economy, the creation of money may activise unemployed labour and other resources to create new savings and productive activity. This would lead to higher national product. So long as the monetary expansion is matching the rise in real income, there will be no rise in prices. Within reasonable limits such a policy helps economic development.

Conclusion

The first and most important lesson that history teaches about what monetary policy can do is a lesson of the most importance that monetary policy can prevent money itself from being a major source of economic disturbance. It has got potential of using money only as catalytic agent. It can set the monetary machinery on right track without affecting anything else. It is an important and positive task for the monetary authority to suggest improvements in the mechanism that will abolish or reduce the chances that it will get out of order, and to use its own powers so as to keep the mechanism in good working order.

The second thing which monetary policy can do is to provide a stable background for the economy. It can keep the monetary machine well oiled. The economic system will work best when producers, consumers and employers can proceed with the full confidence that average level of prices will behave in a predictable way in future. The monetary authority could act as an alternative to gold standard, which had an element of automaticity in the behaviour prices.

Finally monetary policy can contribute to offset major disturbances in economic system arising from other sources.

SUGGESTED READINGS

1. Paul Einzing : A Textbook on Monetary Policy.
2. P.D. Hazela : The Problem of Monetary Policy in Developing Country.
3. Desai. V. R.M. & Chonargik, B.D.: Monetary Policy and Central Banking in India.

SHORT ANSWER TYPE QUESTIONS

1. What do you mean by economic stability ?
2. What do you understand by a monetary action ?

LONG ANSWER TYPE QUESTIONS

1. Explain the main tools of monetary policy.
2. Explain in detail the objectives of monetary policy in a developing country like India.

Fiscal Policy and Crowding Out

7.1 Introduction
7.2 Objectives of lesson
7.3 Instruments of Fiscal Policy
7.4 Crowding out and Fiscal Policy
7.5 Conclusion
7.6 Short answer type questions
7.7 Long answer type questions
7.8 Recommended books

7.1 Introduction

Fiscal policy through variations in government expenditure and taxation profoundly affects national income, employment, output and prices. An increase in public expenditure during depression adds to the aggregate demand for goods and services and leads to. a large increase in income via the multiplier process; while a reduction in taxes has the effect of raising disposable income thereby increasing consumption and investment expenditures of the people. On the other hand, a reduction of public expenditure during inflation reduces aggregate demand, national income, employment, output and prices; while an increase in taxes tends to reduce disposable income and thereby reduces consumption and investment expenditures. Thus, the government can control deflationary and inflationary pressures in the economy by a judicious combination of expenditure and taxation programmes.

7.2 Objectives of lesson

In this lesson we will study instruments of fiscal policy and how fiscal policy is helpful at the time of fiscal deficit

7.3 Instruments of Fiscal Policy

1. Budgetary Policy

Budgetary Policy is also called Contracyclical Fiscal Policy. The budget is the principal instrument of fiscal policy. Budgetary policy exercises control over size and relationship of government receipts and expenditures. Lets see how this policy works in budget deficit and surplus budget.

(1) *Budget Deficit—Fiscal Policy during Depression.* **Deficit budgeting is** an important method of overcoming depression. When government expenditures exceed receipts,

larger amounts are put into the stream of national income than they are withdrawn. The deficit represents the net expenditure of the government which increases national income by the multiplier times the increase in net expenditure. If the MPC is 1/2, the multiplier will be 2; and if' the net increase in government expenditure is Rs 100 crores it will increase national income to Rs 200 crores (= 100 x 2). Thus, the budget deficit has an expansionary effect on aggregate demand whether the fiscal process leaves marginal propensities unchanged or whether a redistribution of disposable receipts occurs. The expansionary effect of a budget deficit is shown diagrammatically in Figure 7.1.

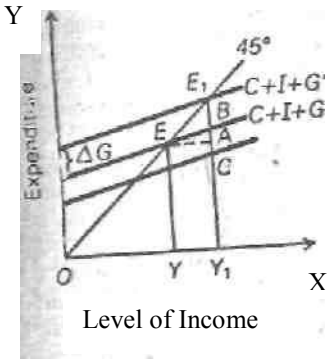


Figure 7.1

C is the consumption function. C+I+G represents consumption, investment and government expenditure (the total spendings function) before that budget is introduced. Suppose government expenditure of AG is injected into the economy. As a result, the total spendings function shifts upward to *C+I+G'*. Income increases from *OY* to OY_1 when the equilibrium position moves from *E* to E_1. The increase in income YY_1 (= EA= E_1A) is greater than the increase in government expenditure $E_1 B$ (= ΔG). *BA* ($E_1A - E_1B$) represents increase in consumption. Thus, the budget deficit is always expansionary, the rise in national income being (YY_1) greater than the actual amount of government spending (ΔG = E_1B). In this method of budget deficit taxes are kept intact.

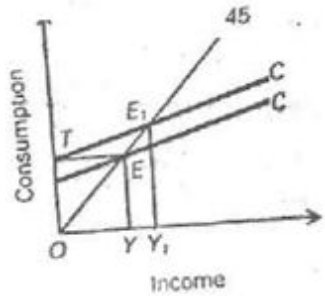


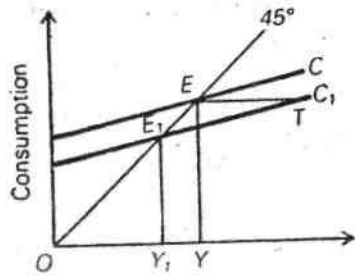
Figure 7.2

Budget deficit may also be secured by reduction in taxes and without government spending. Reduction in taxes tends to leave larger disposable income in the hands of the people and, thus, stimulates increased consumption expenditure. This, in turn, would lead to increase in aggregate demand output, income and employment. This is illustrated in Figure 7.2, where C is the original consumption function. Suppose tax is reduced by *ET,* it will shift-the consumption upward to *C.* Income will increase from OY to OY_1.

However, reduction in taxes is not so expansionary via increased consumption expenditure because the tax relief may be saved and not spent on consumption. Businessmen may not also invest more if the business expectations are low. Therefore, to safeguard against such eventualities the government should follow the policy of reduction in taxes with increased government spending and its multiplier effect will be much higher in case we also assume that some consumption and investment expenditures increase due to tax relief.

(2) *Surplus Budget—Fiscal policy during Boom:* Surplus in the budget occurs when the government revenues exceed expenditures. The policy of surplus budget is followed to control inflationary pressures within the economy. It may be through *increase in taxation or reduction in government expenditure or both.* This will tend to reduce income and aggregate demand by the multiplier times the reduction in government or/and private consumption expenditure (as a result of increased taxes). This is explained with the aid of Figure 1, where the economy is at the initial equilibrium position E_1. Suppose the government expenditure is reduced by ΔG so that the total spending function C+I+G' shifts downward to *C+I+G.* Now *E* is the new equilibrium position which shows that the income has declined to OY from OY_1 as a result of reduction in government expenditure by E_1B. The fall in income Y_1Y *(=AE)* > E_1B the reduction in expenditure because consumption has also been reduced by *BA.*

There may be budget surplus without government spending when taxes are s raised. Enhanced taxes reduce the disposable income with the people and encourage reduction in consumption expenditure. The result is fall in aggregate demand, output, income and employment. This is illustrated in Figure 7.3. C is the consumption function before the imposition of the tax. Suppose a tax equal to *ET* is introduced. The consumption function shifts downward to C_1. The new equilibrium position is E_1. As a result, income falls from 0Y to $0Y_1$.



Level of Income

Figure 7.3

2. Compensatory Fiscal Policy

The compensatory fiscal policy aims at continuously compensating the economy against chronic tendencies towards inflation and deflation by manipulating public expenditures and taxes. It, therefore, necessitates the adoption of fiscal measures over the long-run rather than once-for-all measures at a point of time. When there are deflationary tendencies in the economy, the government should increase its expenditures through deficit budgeting and reduction in taxes. This is essential to compensate for the lack in private investment and to raise effective demand, employment, output and income within the economy. On the other hand, when there are inflationary tendencies, the government should reduce its expenditures by having a surplus budget and raising taxes in order to stabilise the economy at the full employment level. The compensatory fiscal policy has two approaches:

(1) Built-in stabilisers

(2) Discretionary fiscal policy

(1) *Built-in Stabilisers:* The technique of built-in-flexibility or stabilisers involves the automatic adjustment of the expenditures and taxes in relation to cyclical upswings and downswings within the economy without deliberate action on the part of the government. Under this system, changes hubs budget are automatic and hence this technique is also known as one of automatic stabilisation. The various automatic stabilisers are corporate profits tax, income tax, excise taxes, old age, survivors and unemployment insurance and unemployment relief payments. As instruments of automatic stabilisation, taxes and expenditures are related to. national income. Given an unchanged structure of tax rates, tax yields vary *directly* with movements in national income, while government expenditures vary *inversely* with variations in national income. In the downward phase of the business cycle when national income is declining, taxes which are based on a percentage of national income automatically

decline, thereby reducing *the* tax yield. At the same time, government expenditures on unemployment relief and social security benefits automatically increase. Thus, there would be automatic budget deficit which would counteract deflationary tendencies. On the other hand, in the upward phase of the business cycle when national income is rising rapidly, the tax yield would automatically increase with the rise in tax rates. Simultaneously, government expenditures on unemployment relief and social security benefits automatically decline. These two forces would automatically create a budget surplus and are, thus, inflationary.

Built-in stabilisers have certain *advantages* as a fiscal device.

(i) *built*-in stabilisers serve as a cushion for private purchasing power when it falls and lessen the hardships on the people during deflationary period.

(ii) they prevent national income and consumption spending from falling at a low level.

(iii) there are automatic budgetary changes in this device and the delay in taking administrative decisions is avoided

(iv) automatic stabilisers minimise the errors of wrong forecasting and timing of fiscal measures.

(v) they integrate short-run and long-run fiscal policy.

Limitations

The effectiveness of built-in stabilisers as an automatic compensatory device depends on the elasticity of tax receipt, the level of taxes and flexibility of public expenditures. The greater the elasticity of tax receipts the greater will be the effectiveness of automatic stabilisers in controlling inflationary and deflationary tendencies. But the elasticity of tax receipts is not so high as to act as an automatic stabilizer.

Second, with low level of taxes even a high elasticity of tax receipts would not be very significant as an automatic stabiliser during a downswing.

Third, the built-in stabilisers do not consider the secondary effects of stabilisers on after-tax business incomes and of consumption spending on business-expectations.

Fourth, this device keeps silent about the stabilising influence of local bodies, state governments and of the private sector economy.

Fifth, they cannot eliminate the business cycle. At the most, they can reduce its severity.

Sixth, their effects during recovery from recession are unfavourable.

(2) *Discretionary Fiscal Policy :* Discretionary fiscal policy requires deliberate changes in the budget by such actions as changing tax rates or government expenditures or both. It may generally take three forms:

(i) changing taxes with government expenditure constant,
(ii) changing government expenditure with taxes constant, and
(iii) variations in both expenditures and taxes simultaneously.

First, when taxes are reduced, while keeping government expenditure unchanged, they increase the disposable income of households and businesses. This increases private spending. But the amount of increase will depend on whose taxes are cut, to what extent, and on whether the taxpayers regard the cut temporary or permanent. If the beneficiaries of tax cut are in the higher middle income group, the aggregate demand will increase much. If they belong to the lower income group, aggregate demand will not increase much. If they are businessmen with little incentive to invest, tax reductions will not induce them to invest. Lastly, if the taxpayers regard tax reductions as temporary, this policy will again be less effective. So this policy is more effective in controlling inflation by raising taxes because high rates of taxation will reduce disposable income of individuals and businesses thereby curtailing aggregate demand.

The *second* method is more useful in controlling deflationary tendencies. When the government increases its expenditure on goods and services, keeping taxes constant, aggregate demand goes up by the full amount of the increase in government spending. On the other hand, reducing government expenditure during inflation is not so effective because of high business expectations in the economy which are not likely to reduce aggregate demand.

The *third* method is more effective and superior to the other two methods in controlling inflationary and deflationary tendencies. To control inflation, taxes may be increased and government expenditure reduced. On the other hand, taxes may be increased and government expenditure be raised to fight depression.

Limitations

The discretionary fiscal policy depends *upon proper timing* and *accurate forecasting. First,* accurate forecasting is essential to judge the stage of cycle through which the economy is passing. It is only then that appropriate fiscal action can be taken. Wrong forecasting may accentuate rather than moderate the cyclical swings. Economics is not an exact science in correct forecasting. As a result, fiscal action always follows after the turning points in the business cycles. *Second,* there are delays in proper timing of public spending. In fact, discretionary fiscal policy is subject to two time lags. First, there is the "decision lag," the time required in studying the problem and taking the decision. The lag involved in this process may be too long. Second, once the decision is taken, there is an "execution lag." It involves expenditure which is to be allocated for the execution of the programme. In a country like USA it may take two years and less than a year in the UK. *Third,* certain public works projects are so

cumbersome that it is not possible to accelerate or slow them down for the purpose of raising or reducing public spending on them.

7.4 Crowding Out and Fiscal Policy

The term *crowding out* refers to the reduction in private expenditure caused by an increase in government expenditure through deficit budget via a tax cut or increased money supply or bond issue. An increase in government expenditure raises aggregate demand, national income and interest rates thereby reducing private investment. This is called the *crowding effect* of fiscal policy.

The Keynesians and monetarists differ on the effects of budget deficit on the crowding out effect. The main difference between the two arises from the fact that the Keynesians emphasise on "first-round" (short-run) effect which show "once-for-all shift" of the *IS* curve, whereas the monetarists emphasise the "ultimate (long-run) effects.

The Keynesian crowding out theory states that when the government resorts to deficit financing by issuing new bonds, its spending increases. National income rises. If the money supply is held constant people will need more money for business which will raise the rate of interest. *A* higher rate of interest will crowd out (reduce) private investment spending. These are the first-round effects which are explained in Figure 7.4 where E_1 is the initial equilibrium position.

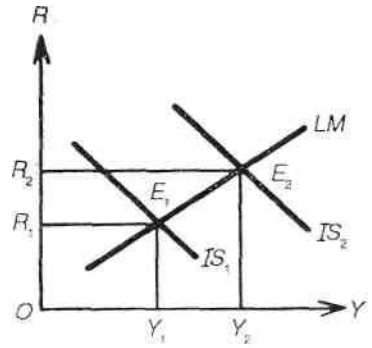


Figure 7.4

The rise in government expenditure financed by issuing bonds shifts the IS_1 curve rightward to IS_2 on a "once-for-all" basis and it cuts the *LM* curve at point *E2.* Since the money supply is constant, E_2 is the new equilibrium level of the economy. The multiplier process raises the income level from Y_1 to Y_2 and the interest rate from *R1* to *R2.* Higher interest rate crowds out a certain amount of private investment. The Keynesians hold that a deficit financed by printing notes (money creation) is more expansionary than bond-financed. But they do not believe that the reduction in private expenditure caused by a higher interest will completely offset the increased government expenditure. In other words, the crowding out of private investment will not be full. The

reason for this is that a high interest rate has dual effects. First, it reduces private spending. Second, a high interest rate leads people to economise on cash balances. They, therefore, divert idle cash holdings for transactions purposes. That is why crowding out of private investment is only partial. On the other emphasizes hand, Friedman the *ultimate effects* of a budget deficit(whether bond-financed or money financed) by taking account of the *wealth effect.* When the government increases its expenditure by selling bonds in the market, their buyers feel themselves wealthier than before. The reason is that they expect to have more resources available for consumption and other purposes in the future. As a result, they tend to increase the demand for money which shifts the *LM* curve *leftward.* This analysis assumes that bonds issued by the government are considered on wealth. Further, both the demand for money and expenditure on consumption are positively related to wealth.

Suppose the government increases its expenditure with bond-financed budget deficit. As a result the public expenditure on buying bonds also increases.

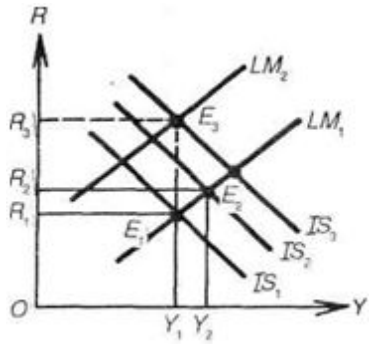


Figure 7.5

The rise in public expenditure shifts the IS_1 curve rightward to IS_2. In Figure 7.5 first-round effect raises the level of national income from Y_1 to Y_2 given the *LM* schedule. The increase in national income, in turn, raises the demand for money and the purchase of government bonds by the public further raise the demand for money due to the wealth effect. As the LM_1 curve shifts leftward to LM_2 and the IS_2 curve shifts rightward to IS_3, so that the ultimate equilibrium is established at the initial level of income Y1. According to Friedman, the rise in interest rate to *R* reduces private investment so that bond-financed government expenditure crowds out private investment. But the total expenditure remains unchanged and fiscal policy has no expansionary effect on national income.

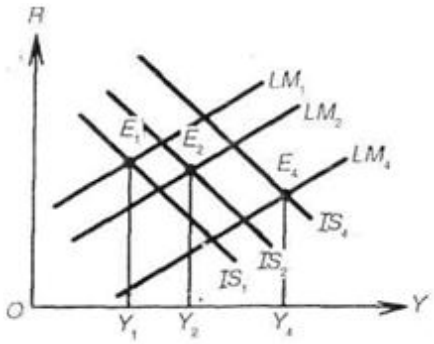


Figure 7.6

If the budget deficit is *money-financed,* it will have an expansionary effect. This is because the increase-in-money supply is greater than the wealth effect on the demand for money. In this case, the LM_1 curve shifts rightward to LM_2 as shown in Figure 7.6. The increase in government expenditure shifts the IS_1 curve rightward to IS_2. The first-round effect raises the level of income from Y_1 to Y_2 . According to Friedman, in a money financed deficit, the money stock continues to grow and the *LM* curve continues to shift to the right causing falling interest rates. In this case, the *LM* schedule exerts a dominance influence on subsequent changes in income than the *IS* schedule. The ultimate (long-run) equilibrium is shown with the shifting of the IS_2 curve rightward to IS_4 and also of the LM_2, curve rightward to LM_4 so that Y_4 equilibrium income level is established. The rate of interest has fallen from Y_2 E_2 to Y_4 E_4. Thus, money-financed deficit is expansionary and it does not crowd out private investment.

Blinder and Solow have criticised Friedman's crowding out model of debt-financed deficit for ignoring interest payments on outstanding debt. They point out that the government has not only to finance the budget deficit, but also interest payments on outstanding debt. They have shown that if private expenditure and demand for money are subject to wealth effects, then the IS and LM curves will be shifting from period to period and the short-run equilibrium will differ from the long-run equilibrium depending upon whether the budget is bond-financed or money-financed.

The short-run and long-run equilibrium situations in the case of **bond-**financed budget deficit are shown in Figure 7.7(A). The rise in government expenditure as a result of bond-financed deficit shifts the IS_1 curve *rightward* to IS_2. This shift is due to both the increase in government expenditure and rise in private expenditure following the wealth effect of bonds. LM_1 curve shifts leftward to LM_2 as a result of wealth effect which increases the demand for money. This raises the short-run equilibrium level of income from Y_1 to Y_2.

If the budget deficit is financed by money creation, the increase in government expenditure is once-for-all increase in the short-run so that the IS'_1 curve shifts rightward to IS'_2 by the same extent, in Panel (B) of **the figure.** But the increase in the supply of money being greater than the **wealth-induced** increase in the demand for money, the LM'_1 curve shifts rightward to LM'_2 in Panel (B). This raises the short-run equilibrium level of income from Y'_1 to Y'_2. A comparison of the bond-financed and money-financed situations shows that money-financed income level Y'_2 is greater than the bond-financed level Y_2. This is because the increase in money supply lowers the interest rate from Y'_1 E_1 to Y'_2 E_2 in Panel (B). Hence money-financed deficit is more expansionary and it does not crowd out private investment. On the other hand, the bond-financed deficit raises the interest rate from Y_1 E_1 to Y_2 E_2 when the national income rises to Y_2, in Panel (A), it is also expansionar, but it crowds out a part of private investment.

In the long-run, bond-financing is more expansionary than money-financing. This is because when "deficits are bond-financed, income must rise sufficiently to produce tax receipts (at given tax rates) that not only match the increased government expenditure on goods and services, but also cover the interest payments on the increased government debt. If deficits are, on the other hand, financed by the creation of money, long-run equilibrium is established when income has merely risen sufficiently to produce tax revenues that each match the increased expenditure on goods and services." Figure 7.7(A) shows the bond-financed situation. When in the long-run the IS_2 curve shifts to IS_6 and the LM_2, curve to LM_6, the new equilibrium level of income is set at Y_6. The money-financed situation is shown in Panel (B) where in the long-run the IS'_2 curve shifts to IS'_6 and LM'_2 curve to LM'_6 and the new equilibrium is established at Y'_6 income level. As is clear from the two figures, Y_6 income level is greater than Y'_6 level.

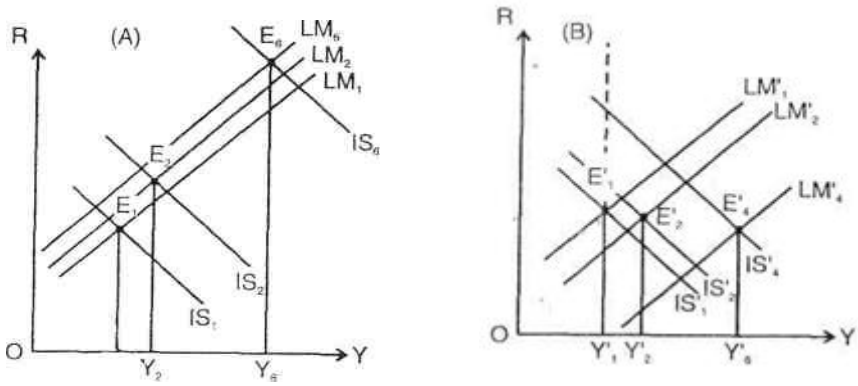


Figure 7.7 (A and B)

The above analysis shows that the long-run effect of increased bond-financed government deficit is more expansionary' but it crowds out private investment because the rate of interest rises sufficiently high. But the money-financed deficit though less expansionary than the former, it does not crowd out private investment through wealth effects.

7.5 Conclusion

Budget deficit may also be secured by reduction in taxes and without government spending. Reduction in taxes tends to leave larger disposable income in the hands of the people and, thus, stimulates increased consumption expenditure. If the budget deficit is *money-financed,* it will have an expansionary effect. Despite the higher multiplier effect of government spending as against changes in tax rates, the latter can be operated more promptly than the former. Emphasis has, thus, shifted to taxation as the best fiscal device for controlling cyclical fluctuations. Thus, when the turning point of a business cycle is already underway, discretionary fiscal action tends to strengthen the built-in-stabilizers. The term *crowding out* refers to the reduction in private expenditure caused by an increase in government expenditure through deficit budget via a tax cut or increased money supply or bond issue. An increase in government expenditure raises aggregate demand, national income and interest rates thereby reducing private investment. This is called the *crowding effect* of fiscal policy

7.6 Short answer type questions

1. What is budget deficit?
2. What are the instruments of fiscal policy?
3. What is crowding out effect?
4. What do you mean by built- in-stabilisers?

7.7 Long answer type questions

1. Explain budgetary and compensatory policies.
2. How can fiscal policy be helpful in solving problem of budget deficit?

7.8 Recommended books

G.K. Shaw: An Introduction to the Theory of Macroeconomic Policy
N.F. Kaiser: Readings in Macroeconomics
Edward Shapiro : Macroeconomic Analysis
T.F. Dernberg and D.M. Dougall: Macroconomics