RATIONAL EXPECTATIONS AND MONETARY THEORY: AN INVESTIGATIVE PAPER(1930-1989).

GODWIN CHUKWUDUM NWAOBI
http://myprofile.cos.com/gcnwaobi
gcnwaobi@xuppa.com
gcnwaobi@yahoo.com
234-08035925021

QUANTITATIVE ECONOMIC RESEARCH BUREAU
P.O.BOX 240, GWAGWALADA, ABUJA
NIGERIA, WEST AFRICA

ABSTRACT

Since 1930, expectations have played an important role in economic theory and this is because economics is generally concerned with the implications of current actions for the future. This paper therefore argues that the development of rational expectations theory will make a more significant contribution to economics(and in particular, monetary economics) in the impetus it gives to research on the vital areas of learning and price expectations formation.

Keywords: Rational expectations, monetary theory, augmented Phillips curve, inflation, output, prices

JEL. NO. E10, E50, N10

INTRODUCTION
1.0

The purpose of this term paper is to examine the concept of rational expectations hypothesis in monetary theory. It is hoped that the paper will help us understand their wide applications as well as stimulating further research and thus bringing about a more comprehensive knowledge of expectations in monetary economics.

Since 1930, expectations (anticipation's or views about the future) have played an important role in economic theory. This is because economics is generally concerned with the implications of current actions for the future. Attention has switched from more or less mechanical forms of expectations generation (extrapolative or adaptive) which are essentially adhoc to the theoretically attractive approach of the rational expectations hypothesis. This states that agents use economic theory to form their expectations, and should not make systematic errors in their forecast of the future.

The reason for this switching however, is not hard to find. It derives partly from the sad state in which macroeconomic theory found itself in the early 1970s, with the phenomenon of stagflation confounding earlier Keynesian optimism and with the Philips curve apparently experiencing increasing instability and collapse. It also relate to the fact that the adaptive expectations thesis associated closely with the name Cagan (1956) became increasingly untenable as a model of expectations formation under conditions of accelerating inflation which typified the 1970s.

All these factors combined in suggesting that the rational expectations hypothesis might have be usefully integrated into an economic theoretical framework (and in particular, monetary theory). This integration needs an investigative examination and that in fact is the concern of this paper.

For a systematic approach and in view of restrictions imposed by space, I was limited to four sections. The paper therefore discusses concisely in the introductory part, the expectations survey and methods of expectation formation as presented in section one. The second section looks at Rational Expectations in monetary theory. The third section

focuses on Empirical Literature. Section four concludes the paper.

1.1 EXPECTATIONS SURVEY

The most obvious approach to the understanding of what agents' expectations are, and how they are determined, is to conduct some sort of survey. Thus the information available to the agent at the time the expectations are formed-known as the information set-is of crucial importance. When surveys are made differences between agents may be the result of either different information sets or evaluation of a common information set. One way of avoiding the former is for questionnaires to include details of the most recently available data on the economy. Responses can be recorded quantitatively or qualitatively.

A general method of dealing with qualitative data is to assume that the frequency distribution of responses has the shape of a particular probability distribution. This is the method used by Knobi (1974) and Carlson and Parkin (1975). Calculations using this method require a number of assumptions about the distribution of expectations and so the resulting numbers are, to some extent, subjective.

When quantitative data are collected, many of these problems are avoided, but there still remains the difficulty of how to summarize the individuals' expectations. Usually the arithmetic mean is presented, and occasionally the variance. These in effect give weight to each observation, but do not give any indication of the pattern of variability or skewness of the data.

Whilst these range and variety of surveys of expectations have made important contributions to our understanding of expectations generation processes, analysis and use of them has occurred in parallel with both empirically attractive arbitrary methods and significant theoretical developments. It is to these we turn in the remainder of this chapter.

1.2 EXTRAPOLATIVE AND ADAPTIVE EXPECTATIONS

In modeling expectations of a variable, the simplest assumption is that the expected rate of change of the variable over the next time period will be the same as the change which has occurred over the previous period, so that

$$EtX_{t+1} = Xt \qquad (1.1)$$

Where

X = price

EtX t+1 = expected rate of change of X from period t to t+1.

Xt = actual rate of change of the X from t-1 to t

This was used by among others, Turnovsky (1972) A slightly more general model is that provided by regressive or extrapolative expectations hypothesis:

$$EtX_{t+1} = Xt + O(Xt - X_{t-1}) \qquad (1.2)$$

Now if the parameter O is 0, equation (1.1) IS obtained Equation (1.2) can also be rearranged to give.

$$Et\ Xt+I = (I + 0)\ Xt - 0\ Xt-I \qquad (1.3)$$

Where the expectation is a weighted average of the two most recent actual values used. This can be regarded as a particular case of

$$Et\ Xt+I = bo\ Xt + bI\ Xt-1 + b2\ X\ t-2 + - - - \qquad (1.4)$$

Where the expectation is determined by the current and all past actual values. A common restriction for equation (1.4) and which has theoretical attractions, is to assume

$$Bi = (I - l)\, li \quad 0<l < I \qquad (1.5)$$

Which gives the geometric distributed Lag or the Koyck Lag. Substitution of (1.5) into (1.4) and by lagging the resulting equation one period we obtain.

$$Et\ Xt+I - Et-I\ Xt = I - l\ (Xt - Et-I\ Xt) \qquad (1.6)$$

This was used by Cagan (1956), who evaluates the right-hand side for different values of l

In equation (1.6), the current expectation is a weighted average of the previous expectation and the current actual rate of X. Alternatively, (1.6) which is the version commonly known as the adaptive expectations model or the error-learning mechanism expresses the change in the expectation as an adjustment depending on the error between the actual rate of X from t-1 to t and the expectations for that period.

Several variations of the adaptive expectations model have been suggested. Carlson and Parkin (1975) modified equation (1.6) by inclusion of a second error term. Frenkel (1975) suggested a model which combines both regressive and adaptive components. These variations require the appropriate adjustment coefficients to be constant. Several methods of relaxing this assumption has been suggested. One alternative is to use a continuous updating procedure (Khan, 1983) whereby empirically l is re-estimated in each time and so gradual changes in will be detected. A variation on this is the Kalman Filter approach (Chow, 1975) in which the emphasis is on the parameters being stochastic rather than fixed. This method gives the current expectation as the previous expectation adjusted by the previous error.

A criticism which applies to these models is that information other than past actual value of X and past expectations is ignored. But a much wider information set will thus be relevant in determining current expectations. Also, these theoretical models are essential backward-looking, in that the past is extrapolated in some way to predict the future.

1.3 THE EXPECTATIONS - AUGMENTED PHILLIPS CURVE

The Phillips curve relationship between inflation and unemployment has been a key component of macroeconomic models for the past 30 years. Samuelson (1960) named the relationship after A.W. Phillips, the new Zealand economist. Phillips (1958) gave it its best known modern formulation. Since then it has evolved through at least five successive versions as analysis sought to expand it explanatory power, its theoretical content, its policy relevancy, and its ability to fit the facts.

In the earlier 1970s, the original Phillips curve equation gave way to the expectations - augmented version. Some innovations ushered in this change (Humphrey, 1986). The first was the respecification of the excess demand variable, which was redefined as the discrepancy or gap between the natural and actual rates of unemployment (Un-U). The other was the introduction of price anticipations into Phillips curve analysis resulting in the expectation - augmented equation.

$$P = a(Un-U) + Pe \qquad (1.7)$$

Where

P = actual rate of inflation

Pe = price expectations variable representing the anticipated Rate of inflation.

This expectations variable entered the equation with a coefficient of unity, implying the absence of money illusion, that is it implies that people are concerned with the expected real purchasing power of the prices they pay and receive and so take anticipated inflation into account. This unit expectations coefficient also implies the complete absence of a trade-off between inflation and unemployment in the long-run equilibrium when expectations are full realized.

Now equation (1.7) when rearranged to read

$$P - Pe = a (Un - U) \quad (1.8)$$

States that the trade-off between unexpected inflation (P-pe) and unemployment. That is, only surprise price increases could induce deviations of unemployment from its natural rate but Friedman (1968) and Phelp (1967, 1970) pointed to the implausibility of being able to fool the workers all the time. The equations also says that the trade-off disappears when inflation is fully anticipated (i.e., when P-Pe = O), a result guaranteed for any steady rate of inflation. In short, the equation asserts that inflation-unemployment trade-off cannot exist when inflation is fully anticipated.

1.4 RATIONAL EXPECTATIONS HYPOTHESIS

Rational expectations was the invention of John F. Muth. Muth (1961) noted that expectations, since they are informed predictions of future events, are essentially the same as the predictions of relevant economic theory. And at the risk of confusing this purely descriptive hypothesis with a pronouncement as to what firms ought to do, we call such expectations "rational". Thus, rational expectations is the application of the principle of rational maximizing behavior to the acquisition and processing of information for the purpose of forming a view about the future (Pearce, 1983). The basic idea behind rational expectations is that many economic variables should be seen as being determined by processes. If this is done, rational people will form their expectation of that variable in accordance with the process, using all the relevant information available to them (Attfield et al, 1985).

Consider an economic variable X, whose value in any period t is actually determined by its own lagged values and lagged values of another variable W in accordance with the following process:

$$Xt = bo + b1\ Xt-1 + b2\ Wt-1 \quad (1.9)$$

This special case assumes that the process determining the variable is deterministic. But most economic processes are stochastic (i.e. including an unpredictable element) represented by Ut and can be incorporated in (1.9) as follows:

$$Xt = bo + b1\ Xt-1 + b2\ Wt-1 + Ut \quad (1.10)$$

Then expectations of Xt will be of the form

$$Et\text{-}1Xt = bo + b1\ Xt-1 + b2W + Et\text{-}1\ Ut \quad (1.11)$$

Where Et-1 Ut is the expectation of Ut formed on the basis of all the information available at the end of the period t-1. the rational expectation of U in period t, is thus

$$Et\text{-}1\ Ut = O \quad (1.12)$$

Hence

$$Et\text{-}1Xt = bo + b1\ Xt\text{-}1 + b2Wt\text{-}1$$

Now, two conditions must be satisfied for such expectations to be considered rational. First, rational expectation must be at least as accurate as the optimal time series predictor (Batchelor, 1982). Secondly, an economic agent is asserted not to make systematic errors. Thus, if the actual value of X is determined in accordance with equation (1.10), it follows that the forecasting or expectational error will be given as

$$Xt - Et\text{-}1\ Xt = Ut \qquad (1.13)$$

According to the rational expectations theory, if expansionary macroeconomic policy is to work in the short-run, a "policy surprise" must occur. The policy surprise may be a "monetary surprise", a "fiscal surprise", or some combination of the two. A monetary surprise occurs when the actual rate of growth of the money supply differs from the expected rate of growth; a fiscal surprise occurs when future levels of government expenditure and taxation differ from expected levels. Since it is not easy to fool the public when the government initiates counter-cyclical policy, the rational expectations school argues that countercyclical policy will not change the levels of employment or income. The only variables that will be affected will be the price level and the interest rate (monetary variables).

Despite its logic, the Rational expectations hypothesis still has many critics. Arrow (1978) has pointed out that rational expectation assumptions require economic agents to be superior statisticians, capable of analyzing the future general equilibrium of the economy "Brimer and Sinai (1981) noted that this is not possible. Further, it is not plausible for the typical individual to be sufficiently sensible to use all the available information about the process determining a variable - due to ignorance. Fellner (1980) and Shiller (1978) point out the inability of economic agents to begin the required information and formulate the correct model of the economy. Again, Pesaran (1982) has argued that research so far carried out by the rational expectations school fails to provide any empirical basis for abandoning the Keynesian explanations of unemployment. As Neary and Stigliz (1983) argue, once the assumption of price flexibility is dropped the conventional Keynesian policy prescription re-emerges.

If the Rational expectations hypothesis were valid then the expectational errors should be randomly distributed overtime. This implies that the level of output (or unemployment) is uncorrelated overtime. Yet it is an eminently established fact in economics that employment and output move about their trends overtime. Finally, the neutrality claim results from the fact that the model is linear and the use of different functional forms to represent the basic model leads to a breakdown of the results (Shiller, 1978).

2.0 RATIONAL EXPECTATION IN MONETARY THEORY

2.1 MONETARY (INFLATIONARY) PROPOSITION

Given the inherent complexity of the current inflation problem and the tendency of individuals to differ in their interpretation of events, it is not surprising that a number of competing theories of inflation exist today. One of these theories is the monetarist view (Laidler, 1973). Hence, any mathematical model that purports to convey the essence of monetarism must embody certain key propositions or postulates that characterize the monetarist position (Humphrey, 1986).

Monetarist hold that inflation is a purely monetary phenomenon that can only be produced by expanding the money supply at a faster rate than the growth of capacity output. Thus at any given time the actual rate of inflation is seen as reflecting current and past rates of monetary expansion. They treat the quantity of money and its rate of growth as variables whose magnitude are fixed outside the system. The exogeneity postulate therefore implies that monetary growth enters the system as a datum to determine the growth rates of spending, prices and nominal income.

Taken together; the money growth, price-adjustment, and expectations-formation equations form a simple three-equation system that embodies a monetarist view of inflationary process. The complete system is written as follows

DM - DP = DX + DYc = DY (2.1)

DP = aX-1 + DPe-1 a > o (2.2)

DPe = bD p + (1-b) Dpe-1 o<b<1 (2.3)

where

DM	=	growth rate of real money stock
DP	=	rate of price inflation
DYc	=	growth rate of capacity output
DY	=	growth rate of actual output
X	=	excess demand
X-1	=	excess demand legged one period
Dpe	=	expected rate of inflation
Dpe-1	=	expected inflation as forecast one year ago.

The model implies the following causal chain: Inflation is determined by excess demand and inflationary expectation; inflationary expectations are generated by previous inflationary experience; excess demand is created by excessive monetary growth. Therefore, excessive monetary growth - past and present is the root cause of inflation.

2.2 RATIONAL EXPECTATIONS MONETARISM

In view of the central importance attached to price expectations, it is not surprising that much recent attention has focused on the mechanism by which these expectations are generated and revised.

The first sees price expectations as determined by essentially unexplainable psychological forces. The second is Adaptive Expectation monetarism and it states that inflation is determined by excess aggregate demand and price expectations; that expectations are generated by past price history and hence by previous excess demand; that excess demand results from excessive monetary growth; and therefore that excessive monetary growth, past and present is the root cause of inflation.
According to the rational - expectations hypothesis, individuals will tend to exploit all the pertinent information about the inflationary process when making their price forecasts. If true, this means that forecasting errors ultimately could arise only from random shocks occurring to the economy. For if the public is truly rational, it will quickly learn from these inflationary surprises and incorporate the new information into its forecasting procedures. As incorporated in monetarist models, the rational

expectations will always be correct and the economy will always be at its long-run steady-state equilibrium.

Monetary advocates of the strict rational expectations view argue that it carries some radical implications for stabilization policy. Specifically it implies that systematic policy actions cannot influence real variables even in the short run, since rational agents would already have anticipated and acted upon these policies. To have an impact on output and employment authorities must be able to create a divergence between actual and expected inflation. This follows from the monetarist view that inflation influences real variables only when it is unanticipated. The authorities must be able to alter the actual rate of inflation without simultaneously causing an identical change in the expected future rate. Thus, the only way that monetary policy can have even a short-run influence on real variables is for it to be completely unexpected.

However, this theory is hard to square with such phenomena as stagflation, the apparent intractability of inflation rate, and the short-run non-neutrality of money.

3.0 EMPIRICAL LITERATURE

In using empirical data to test the validity of the rational expectation hypothesis, two difficulties are immediately encountered. Firstly, much of the evidence for rational expectations is sought in macroeconomic models which incorporate other assumptions - particularly price clearing postulates. Negative findings concerning such models do not therefore invalidate rational expectations perse. Secondly, there is the problem of observational Equivalence by which we mean that for any rational expectations model which fits the data there will always be non-rational expectations model which fits the data equally well - it is in recognition of these difficulties, that various approaches has been adopted in carrying out empirical test of this theory (Shaw, 1987).

Lucas (1973) attempted to test the rational expectations model of the natural rate of unemployment by examining the relation between unemployment and the variance of the price changes across countries. He used date from eighteen countries and the regression equation was estimated for each of them using annual data over the period 1952 to 1967. in general, the predictions of the theory are confirmed by Luca's results. A number of other authors Albero (1981) and Kormendi and Meguire (1984) have employed something like the Lucas approach using data from more countries and have generally found much the same result as that reported in Lucas.

Baro (1977) has also tested the rational expectations hypothesis. Barro's studies attempt to show that it is only the unanticipated component of monetary growth that affects employment, real output and the price level. He used annual data for the USA covering the period from 1941 to 1973. In accordance with certain theoretical considerations and after some empirical experimentation, Barro obtained a measure of anticipated monetary growth. He then computes the unanticipated component of monetary growth in each period as the difference between actual monetary growth in the period and the anticipated component of monetary growth in that period. His statistical tests all seemed to support one of the main predictions make by the simple rational expectations model: that it is unpredictable monetary growth that is important in the determination of the level of unemployment and that predictable monetary growth is irrelevant.

In subsequent papers Barro (1978), Barro and Rush (1980) extended his anlysis in two directions. First, he examined the influence of predictable and unpredictable monetary growth on real output rather than unemployment: he found evidence her too that only the unpredictable component of monetary growth affected real output, a positive monetary surprise leading to a rise in output above its natural level. Secondly he introduced a third equation, a price equation - and found that as the rational expectations theory

predicts an anticipated rise in monetary growth, of say X percent leads to an immediate X percent rise in the price level, whereas a similar unpredictable rise in monetary growth leads initially to a less than X percent rise in the price level.

One criticism of Barro's approach is that he employs a two step estimation procedure and this is not fully efficient in that it does not use all the information contained in the model, in particular it fails to take account of its cross equation restrictions. This led to Attfield, Demery and Duck (1981a) model application to U.K. annual data for the period 1946-1977. They argued that their method of dealing with the relationship between fiscal and monetary policy is simpler than that used by Barro (1977). The use of real value of borrowing requirement avoids the problem of estimating the normal level of government expenditure which, they argued, Barro handles inconsistently since he assumes an adaptive expectations mechanism for this relationship whilst assuming that agents form their expectations rationally elsewhere in the system. They employed full information maximum likelihood method as their estimation technique.

Furthermore, Attfield, Demery and Duck (1981b) estimated a three equation quarterly model of unanticipated monetary growth, output and the price level for the United Kingdom for the period 1963 to 1978. apart from the use of quarterly data the main difference in this study is that the current monetary shock is included in the output equation rather than being relegated to the error term. They reach broadly the same conclusion as in the paper using annual data: that is only unanticipated monetary growth which affects real output and that the cross equation restrictions imposed by the model cannot be rejected. Thus, their results lend support to the findings of Barro.

Again, Leiderman (1980) pointed out that Barro's model embodied tow important but separate hypothesis - rational expectations and structural neutrality - and that it was possible to test for rational expectations separately, and then, given rational expectations test for structural neutrality. The structural neutrality hypothesis in the Barro model is simply the assumption that any growth in the quantity of money which is anticipated, whether those anticipations are formed rationally or not, will not affect the level of real output or unemployment. Leiderman carries out his test using similar data to that used by Barro (1977) on Barro's money growth and unemployment model. He used a full information maximum likelihood technique and concludes that the restrictions implied buy the constituent hypothesis of rational expectations and "structural neutrality', as well as by the joint neutrality hypothesis, are not rejected by the sample information at the usual significance levels of five and one percent.

In a different empirical study, Attfield and Duck (1983) combined locals and Barro approaches. To test the two predictions, they test the restrictions implied in their model. They used annual data for the period 1951 to 1978 from eleven different countries namely the USA, Netherlands, Canada, Denmark, Australia, the UK, Philippines, Columbia, El Salvador, Guatemala and Argentina. The particular countries were selected because an adequate explanation of monetary growth was possible on the basis of a simple and common process. They estimated their model using maximum likelihood techniques and find that unanticipated monetary growth does generally have a positive effect on real output. They also find that the null hypothesis that the anticipated component of monetary growth exerts no influence on real output cannot be rejected for any country at the 1% level. However, their overall conclusion is that there is some support for the propositions that monetary growth affects real output of unpredictable monetary growth declines the more unpredictable monetary growth becomes. In a different paper, Kormedi and Meguire (1984) reach broadly the same conclusion using a similar model but with a much larger sample of forty-seven countries.

Now, the Lucas (1973) model has two limitations: non-testing for structural neutrality and the failure to allow for other influences on changes in aggregate demand. An improvement in the weaknesses is an extension to Lucas test and this was the main feature of an empirical paper by Gordon (1982). He examined the behavior of nominal income growth net of the natural growth of output over the period 1890 to 1980l in the USA. Gordon claims that lagged inflation terms of up to 5 years exerted a significant negative effect on output and that the coefficient on anticipated nominal income growth was

significantly positive in all periods. These findings directly contradict the evidence put forward by Barro (1977) and Attfield, Demery and Duck (1981); for in these studies anticipated money growth was found to have no real output effect in either the United States or United Kingdom. Gordon suggested a reconciliation of these contradictory findings. Since anticipated aggregate demand (measured by anticipated nominal income growth) does influence output but anticipated money does not, it follows that anticipated money growth does not influence aggregate demand. Also, Gordon provide a more powerful test and rejected the main feature of the Lucas (1973) model - that only unanticipated changes in aggregate demand affect output. Similar results were obtained for the UK by Demery (1984).

The main feature of Mishkin's (1982) tests that distinguishes it from others is the length of the Lag on anticipated and unanticipated money growth., in his test, lagged terms in anticipated and unanticipated money growth up to twenty quarters were included in the output equation. Following Leiderman (1980), Mishkin estimated aggregate demand and output equations simultaneously, imposing the relevant cross-equation restrictions. This permitted him to test separately for rational expectations and structural neutrality. He adopted three alternative aggregate demand variables, inflation, nominal income growth and money growth. According to structural neutrality, only unanticipated values of each of these should influence output. His equations were estimated using quarterly US data over the period 1954-1976. when adopting money growth as the aggregate demand variable, his results constitute an emphatic reversal of the Barro result.

Another critique of the Barro model illustrates an important methodological point. Pesaran (1982) argued that the tests conducted by Barro (and others) are inadequate in one important respect. It is quite possible for Barro's model to be quite 'comformable' to the data and yet be rejected when compared with an alternative model which is also conformable to the data. A "proper test" of an hypothesis, argues Pesaran, invariably requires consideration of at least one genuine alternative. He attempted to do this by comparing the Barro model with a 'Keynesian' alternative. He first modified the Barro model and then set up alternative Keynesian models. He used non-nested hypothesis testing procedures and was able to reject the Barro model on the assumption that the Keynesian model is true; however, he was not able to reject the Keynesian model under the assumption that the Barro model was true. By performing what he calls a 'proper' test, Pesaran was able to reject the Barro model in favor of a Keynesian alternative.

In a novel critique, Laidler (1986) also takes issue with the Barro approach on methodological grounds. Barro examined the period 1945-76 in determining the division between anticipated and unanticipated monetary growth but assumed that economic agents respond to anticipated changes with a new classical macro-economic model in mind. However, the dominant orthodoxy throughout most of this period was decidedly Keynesian. Since, in the new classical macroeconomics, agent's knowledge or understanding of the way in which the economic system operates, is itself a determinant of the system then it becomes imperative to model expectations formation accordingly. In particular, Laidler suggested that much econometric modeling may have been fully appropriate at the time.

Casual empiricism with respect to trade cycle behavior also runs counter to the rational expections hypothesis. For example, output changes occur in response to general price changes being perceived as relative price changes. Thus, output and employment fluctuations should be observed to lag behind price level fluctuations but the evidence indicates, on the contrary, that output changes precede price-level changes (Shaw, 1981). Earlier, Fischer (1977) showed that due to the long-term contracting, the neutrality proposition breaks down, which compelled a notable advocate of rational expectations to write that "the potential usefulness of activist policy rules in dampening fluctuations may survive the rational expectation revolution". Thus, Neary and Stigliz (1983) argued that once the assumption of price flexibility is dropped the conventional Keynesian policy prescription re-emerges and in some cases its potency is reinforced because of the assumption of rationality.

In conclusion, Perry (1984) noted that rational expectations hypothesis amounts to a kind of "studied neglect" entailing clear costs and risks. He argues that it is bad science

to build models that are inconsistent with the facts because they fit a particular theory. However, all the above reviewed empirical studies tend to suggest the inconclusiveness of the theory.

4.0 SUMMARY AND CONLCUSION

The essence of rational expectations can be summarized very simply: if economic variables are determined by an identifiable on-going process then sooner or later intelligent economic agents will recognize the process and will then model their expectations in the light of that process together with whatever information they have at their disposal. As stated it seems to be an eminently sensible doctrine superior apriori to any other system of expectations formation, implying as it does, that economic agents enjoy their highest attainable indifference curve.

The basic principle of policy-making suggested by the rational expectations hypothesis is that policies are likely to fail if, to be effective, they require that people do not know or cannot discern the process actually determining a policy variable just as they can understand any other process. This will almost certainly make policy-making more difficult, indeed it may rule out the achievement of some targets of policy altogether because some targets can only be achieved if people make mistakes.

Thus, rational expectations monetarism predicts that, in the absence of unpredictable random disturbances, steady-state equilibrium always prevails. Monetary changes produce no surprises, no disappointed expectations, no transitory impacts on real variables. Trade-offs are impossible even in the short-run.

Indeed, most of the research on rational expectations has exhibited great technical competence, impeccable logic, and considerable ingenuity. This has contributed in no small measure to its apparent success and to the confusion and uncertainty which rational expectations have aroused in the rest of the economics profession. The fundamental simplicity of the ideas involved has become obscured by overly rigorous development.

However, the rational expectations hypothesis, in itself, should not be provocative to economists. It merely brings expectations within the scope of individual maximizing behavior. Expectations used to be handled within models on an ad hoc basis. Rational expectations provides a way of incorporating expectations which is consistent with the orthodox economic theorizing (Muddock, 1982).

In conclusion, the development of rational expectations theory will make a more significant contribution to economics (and in particular, monetary economics) in the impetus it gives to research on the vital areas of learning and price expectations formation. It brings to the fore questions about the availability and use of information. Instead of being the finale of the monetarist's for a revitalized theory of expectations which is integrated in monetary theory and policy.

BIBLIOGRAPHY

1. Alberro, J. (1981) "The Lucas hypothesis on the Phillips Curve: Further International Evidence" Journal of Monetary Economics, Vol. 7, pp. 239-250.

2. Arrow, K. J. (1978) "The future and the present Economic Life" Economic Inquiry, Vol. 16, April, pp. 157-169.

3. Attfield, C.L.F., Demery, D. and N.W. Duck (1981a) "Unanticipated Monetary growth, Output and the price level: UK 1946-1977" European Economic Review, Vol. 16, pp. 367-385.

4. Attfield, C.L.F., Demery, D. and N.W. Duck (1981b) "A Quarterly model of Unanticipated Monetary growth, Output and the price level in the UK 1963-1978" Journal of Monetary Economics, 8, pp. 331-50.

5. Attfield, C.L.F., and N.W. Duck (1983) "The influence of unanticipated Monetary growth, and Real Output Some Cross Country Estimates" Journal of Money, Credit and Banking, Vol. 15 pp. 442-454.

6. Attfield, C.L.F., Demery, D. and N.W. Duck (1981) Rational Expectations in Macroeconomics: An Introduction to Theory and Evidence, Oxford: Basil Blackwall Limited.

7. Barro, R. J. (1976) "Rational Expectations and the Rate of Monetary Policy" Journal of Monetary Economics, Vol. 2(1), pp. 1-33.

8. Barro, R. J. (1977) "Unanticipated Money Growth, and Unemployment in the United States" American Economic Review, Vol. 67(2), March, pp. 101-115.

9. Barro, R. J. (1978) "Unanticipated Money, Output, and the Price level in the United States" Journal of Political Economy, Vol. 86(4) pp. 549-80.

10. Barro, R. J. and Rush M. (1980) "Unanticipated Money and Economic Activity" in S. Fisher, (ed) Rational Expectations and Economic Policy, Chicago: University of Chicago Press.

11. Brimmer, A. F. and Sinai A. (1981) "Rational Expectations and the Conduct of Monetary Policy" American Economic Review, Papers and Proceedings, Vol. 71(2), May, pp. 259-267.

12. Cagan, P. (1956) "The monetary dynamics of hyperinflation" in M. Friedman, (ed) Studies in the Quantity Theory of Money, Chicago: University of Chicago Press.

13. Carison, J. A. and J. M. Parkin (1975) "Inflation expectations" Economics, Vol. 42, pp. 123-138.

14. Chow, G. C. (1975) Analysis and Control of Dynamic Economic Systems, New York: John Wiley and Sons.

15. Danes, M. (1975) "The measurement and explanation of inflationary expectations in Australia" Australians Economic Papers, Vol. 14, pp. 15-87.

16. Defris, L. V. and R. A. Williams (1979) "Quantitative Versus Qualitative measures of price expectations" Economic Letters, Vol. 2, pp. 169-173.

17. Demery, D. (1984) "Aggregate demand, rational expectations and real output. Some new evidence for the UK, 1963.2 - 1982.2" Economic Journal.

18. Edwards, S. (1983) "The Short - Run Relation Between Growth and Inflation in Latin America: Comment" American Economic Review, Vol. 73, June, pp. 477-482.

19. Fellner,W (1980,) "The Valid Core of Rationality Hypothesis in the Theory of Expectations" Journal of Money, Credit and Banking, Vol. XII (4), November, pp. 763-787.

20. Fisher, S. (1977) "Long Term Contracting, Rational Expectations and the Optimal Money Supply Rule" Journal of Political Economy, Vol. 85, pp.191-206.

21. Fratianni, M. (1978) "Inflation and Unanticipated Changes in Output in Italy" in K.
Brunner and A.H. Meltzer, (eds) Carnegie-Rochester Conference Series in Public Policy, Journal of Monetary Economics Supplement, Vol. 8, pp. 141-180.

22. Frenkel, J. A. (1975) "Inflation and the Formation of Expectations" Journal of Monetary Economics, Vol. 1, pp. 403-421

23. Frenkel, J. A. (1977) "The Forward Exchange Rate Expectations and the Demand for Money: The German Hyperinflation" American Economic Review, Sept. 67(4) pp. 653-670.

24. Friedman, B. M. (1980) "Survey Evidence on the Rationality of Interest Rate Expectations" Journal of Monetary Economics, Vol 6, pp. 456-465.

25. Friedman, B. M. (1968) "The Role of Monetary Policy" American Economic Review, Vol 58(1), March, pp. 1-17.

26. Grossman, J. (1979) "Nominal Demand Policy and Short -Run Fluctuations in Unemployment and Prices in the United States" Journal of Political Economy, Vol. 87(5), October, pp. 1063-1085.

27. Hanson, J. (1980) "The Short-Run Relation between Growth and Inflation in Latin America: A Quasi-Rational or Consistent Expectations Approach" American Economic Review, Vol. 70, December, pp. 972-989.

28. Hahn, F. (1973) Money and Inflation, Mitsui Lectures in Economics, Oxford: Basil Blackwell.

29. Humphrey, T. M. (1986) Essays on Inflation, Richmond: Federal Reverse Bank of Richmond.

30. Khan, M. S. (1983) "Estimating models of expectations" Economic Letters, Vol. 12, pp. 175-180.

31. Knobl, A. (1974) "price expectations and actual price behaviour in Germany" International Monetary Fund Staff Papers, Vol. 21, pp. 83-100.

32. Kormendi, R. C. (1983) "Government Debt, Government Spending and Private Sector Behavior" American Economic Review, Vol. 735, December, pp. 954-1010.

33. Kormendi, R. C. and P. G. Meguire (1984) "The real output effects of Monetary Shocks: Cross Country tests of Rational Expectations Propositions" Journal of Political Economy.

34. Laidler, D. (1986) "The New-Classical Contribution to Macroeconomics" Banca Nazionale Del Lavoro, Quarterly Review, March, pp. 21-55.

35. Leiderman, L. (1980) "Macroeconometric testing of the rational expectations and structural neutrality hypothesis for the United States" Journal of Monetary Economics, Vol. (6), pp. 69-82.

36. Lucas, R. E. Jr. (1972) "Expectations and the Neutrality of Money" Journal of Economic Theory, Vol. 4, April, pp. 103-124.

37 Lucas, R. E. Jr. (1972) "Some International Evidence on Output - Inflation Trade-Offs" American Economic Review, Vol. 63 (3) June, pp. 326-334.

38. Mishkin, F. (1982) "Does Anticipated Monetary Policy Matter? Econometric Investigation" Journal of Political Economy, Vol. 90 pp. 22-50.

39. Muth, J. F. (1961) "Rational Expectations and the Theory of Price Movements" Econometrica, Vol. 29(3), pp. 315-335.

40. Neary, J. P. and J. E. Stigliz (1983) "Towards a Reconstruction of Keynesian Economics: Expectations and Constrained Equilibria "Quarterly Journal of Economics, Supplement, Vol. 98.

41. Pearce, D. W. (ed) (1983) The Dictionary of Modern Economics, London: Macmillan Press.

42. Perry, G. L. (1984) "Reflections on Macroeconomics" American Economic Review, Papers and Proceedings Vol. 74(2), May, pp. 401-407.

43. Pesaran, M. H. (1982) "A Critique of the Proposed Tests of the Natural Rate-Rational Expectations hypothesis", The Economic Journal, Vol. 92, pp. 529-554.

44. Phelps, E. S. (1967) "Phillips Curves, Expectations of Inflation and Optimal Unemployment Overtime" Economics, Vol. 34(135), pp. 254-287.

45. Phelps, E. S. (1970) Microeconomic Foundation of Employment and Inflation Theory, New York: Nortor.

46. Phillips, A. W. (1958) "The Relation between Unemployment and the Rate of Change of Money wage rates in the United Kingdom, 1861-1957". Economical 25, November, pp. 283-299.

47. Prescott, E. C. (1977) "Should Control Theory be used for Economic Stabilization?" in M. Brumer and H. H. Meltzer, (eds) Optimal Policies, Control Theory and Technological Exports, Carnegie Rochester Conference

Series on Public Policy, Journal of Monetary Economics Supplement,
Vol. 7, pp. 13-38.

48. Samuelson, P. A. and M. S. Robert (1960) "Analytical Aspects of Anti-inflation Policy" American Economic Review, Vol. 50, May.

49.. Sargent, T. J. and H. Wallace (1975) "Rational Expectations, the Optimal Monetary Instrument and the Optimal Money Supply Rule" Journal of Political Economy, Vol. 83, pp. 241- 255

50 Sargent, T. J. and H. Wallace (1976) Rational Expectations and the Theory of Economic Policy" Journal of Monetary Economics, Vol. 2, April, pp. 169-184.

51. Shaw, G. K. (1987) "Rational Expectations" Bulletin of Economic Research, Vol. 39, No 3, July pp. 187-209

52. Sheehey, E. J. (1984) "Money and Output in Latin America: Some tests of a Rational Expectations Approach" Journal of Development Economics, Vol. 14, pp. 203-218.

53 Shiller, R. J. (1978) "Rational Expectations and the Dynamic Structure of Macroeconomic Models: A critical Review" Journal of Monetary economics, Vol. 4(1) pp. 1-44.

54 Turnovsky, S. J. (1972) "The expectations hypothesis and the aggregate wage equation: Some empirical evidence for Canada" Economica, vol. 39, pp. 1-17.

55. Theil, H. (1965) Economic Forecasts and Policy, Amsterdam: North-Holland.

1