5. Monetary Base IV
Part C

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Monetary Targets Conceptual Antecedents document

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MONETARY TARGETS:

CONCEPTUAL ANTECEDENTS

&

RECENT POLICIES IN THE UNITED STATES, THE UNITED KINGDOM AND WEST GERMANY.*

by

A. S. Courakis

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Socrates: Do you find that your monetary system works well ?

Economist: Pretty well, thank you, Socrates, on the whole.

Socrates: That would be, I suppose not because of the rather strange rules of which you have told me, but because it is administered by men of ability and wisdom ?

Economist: It would seem that that must be the reason rather than the rules themselves O Socrates.

Denis Robertson, 'British monetary policy', Lloyds Bank Review, May, 1939.

I INTRODUCTION

Over the last few years increasing attention has been devoted to explicit quantitative targets for growth of monetary aggregates.[1] Early examples of such tendencies can be found in U.S. official statements[2] dating back to 1970. In October 1972 the E.E.C. Commission[3], with characteristic optimism, announced (and in 1973 the Council of Ministers agreed on) the objective that member nations pursue a policy of maintaining an annual rate of increase in their respective 'money supplies' equal to their respective rates of growth of output plus 4 per cent. Two years later the Bundesbank announced its decision to pursue a target rate of increase in a particular monetary aggregate.[4] At the beginning of 1975 the Swiss National Bank took pride in being 'one of the first central banks in the world to make public its target for the desired money supply growth'[5], and since spring of that year the monetary targets of the Federal Reserve have been made public.[6] For the Netherlands, a 'money supply' target was announced[7] in 1976 and in France a quantitative objective pertaining to the rate of increase in wide money was included in the stabilization policy programme presented by the government in September of the same year.[8] In the United Kingdom, in July 1976, the Chancellor of the Exchequer declared a target[9] of 12 per cent for, as it was quoted in the press, 'monetary expansion' in the financial year 1976-77, while The Times ventured into a 'Programme for Economic Stability' that began with the objective that

> Money supply growth be kept to 9 per cent this year, 6 per cent next year, and 4 per cent thereafter, this commitment to be institutionally entrenched beyond doubt and pressure.[10]

The major impetus for such tendencies and recommendations does of course derive from increasing acceptance of the view that control of inflationary pressures requires control of monetary aggregates. It is less clear whether the connection perceived relates to acceleration of the rate of increase in the 'money supply' being seen as the primary cause of price changes, or whether it is felt that non-monetary

../explanations of

explanations of inflation presuppose a particular response on the part of the monetary authorities[11], in the absence of which such pressures will be considerably reduced or disappear entirely. But to some extent these tendencies are also encouraged by a belief that such policies are conducive to greater stability of financial markets by eliminating the uncertainty implicit in a process of policy changes.[12] The latter is also pertinent to the smoother operation of foreign exchange markets, where it is felt that the basic objective of eliminating 'the sense of turbulence, uncertainty, and crisis that have been common in recent years... will be served as the domestic intentions of the monetary authorities become more predictable, and as confidence in the domestic monetary framework grows '.[13]

At any rate the public has come to focus attention on official statements regarding monetary targets, and comparisons of current monetary statistics to the target values is an art to which much effort is now devoted. In short, as one author recently put it, 'the era of monetary policy by monetary targets has arrived'.[14] But what does this mean ? An attempt to answer this question suggests the need to examine a variety of issues.

(1) Are 'targets' to be understood as 'Friedmanian rules' ?

(2) Are they to be understood as statements of acceptance that monetary aggregates comprise the best intermediate variables in determining economic activity ?

(3) Are targets to be understood as indicators of economic activity ?

(4) Are they to be understood as policy indicators ?

(5) What criteria are employed in determining their values ?

(6) In what sense do they imply a change in the behaviour of monetary authorities ?

(7) What is the content of 'publicly announced' targets ? and correspondingly,

(8) What are the commitments involved in such announcements ?

It seems instructive, however, to begin with a preview of the 'targets' that governments have come to set.

II MONETARY 'TARGETS': A BIRD'S EYE VIEW OF EXPERIENCE AND PRACTICES IN THREE ECONOMIES

THE UNITED STATES

Since March 1975, in response to a Joint Concurrent Resolution of the House of Representatives and Senate, the Federal Reserve Chairman is obliged once a quarter to report ranges for growth of monetary aggregates in the coming four quarters. These ranges themselves are defined in terms of upper and lower limits for growth rates in three definitions of the money supply and one of bank credit, as measured from the most recent quarterly average levels to their prospective levels four quarters hence. The three definitions of the money supply are currency plus demand deposits, M_1; the latter plus commercial bank time deposits, M_2; and the latter plus shares at mutual savings banks and savings and loan associations, M_3. The fourth aggregate, termed the adjusted credit proxy[15], is equal to total member bank deposits subject to reserve requirements plus non-deposit sources of funds, such as eurodollar borrowings and the proceeds of commercial paper issued by bank holding companies or other officiates. However, lags in data availability have more recently resulted in the replacement of this fourth aggregate by bank credit which includes total bank loans and investments, measured on a monthly average basis, less interbank loans. Table I presents the annual growth ranges adopted and actual rates of growth of such aggregates realized in the period 1975 to 1978.

The precise ranges of the targets are decided by the Federal Open Market Committee (FOMC) in the light of econometric and qualitative projections of the consequences for the economy of alternative target ranges. From a long-run standpoint the acknowledged strategy is one of gradually reducing growth rates to levels that may prove compatible with price stability. From the 'one-year range' standpoint, however, it is stressed that '...inflation can lead a life of its own quite independent of current or past monetary developments'[16] and hence the growth ranges adopted, take 'the underlying economic conditions' as given. Furthermore, personal judgement as to what comprises 'no more than accommodation' of such underlying economic... and conditions is allowed considerable free reign in view of the fact that the relationships between the four aggregates and GNP are subject to variations that preclude exclusive reliance on past statistical associations.[17]

In pursuing its yearly targets the F.O.M.C. defines, in terms of one or both of the two narrower aggregates, short-run (current and next month) tolerance ranges at levels and spreads deemed consistent with current developments and with the adopted yearly targets. The Committee's instructions to the Manager of the System's Open Market Account accordingly provide for the accommodation of the public's demand for funds in the short-run while at the same time prescribing responses to be made when the growth of M_1 and/or M_2 (i.e. of the aggregate focused upon from a short-run operational standpoint) appears inconsistent with the Committee's longer run objectives.[18]

The latter is the principle at any rate.[19] In practice however, the extent to which tolerance ranges have been observed has been limited. Examining, for example, actual experience during the first year of operation of the 'announced range scheme' one finds that despite variations in the width of the tolerance ranges the actual behaviour of the two aggregates deviated from the specified limits.[20] Nor was this

pattern a manifestation of initial teething problems for such over- or under-shooting has continued in the years since (see pages 000-00). On the yearly ranges, performance has varied as between aggregates. Interestingly there was a greater tendency to 'achieve' all three targets in the earlier part of the period reviewed a feature which corresponds to the pattern of declining growth ranges for M_1 coupled with increasing rates of growth of this aggregate during the period.

THE UNITED KINGDOM

In the British context, publicly announced monetary targets are a more recent phenomenon. In the Budget Statement of April 1976, the Chancellor indicated 'that after two years in which M_3 had increased at a rate less than GDP /he expected/ their growth rates to come more into line in the financial year 1976/77 'though it was still the government's objective that the growth of the money supply should remain moderate'.[21] A few months later, in July 1976, the Chancellor announced that M_3, i.e. the aggregate of currency with the public plus U.K. private and public sector sterling demand and time deposits plus U.K. resident deposits in other currencies, should grow by 12 per cent during the financial year 1976/77. In October this objective was reiterated; and though in December emphasis shifted to a target for domestic credit expansion (DCE) (as the Letter of Intent to the I.M set limits on DCE for the financial years 1976/79), the authorities also announced corresponding objectives for the sterling component of M_3 in the form of a range of 9 to 13 per cent for the financial year 1976/77. This range was furthermore adopted in the Budget speech of 1977 as the joint objective, combined that is with a DCE ceiling of £7.7 billion, set by the I.M.F., for the financial year 1977/78.

Unlike the United States, no precise information regarding short-run operational procedures is available. An address by the Governor of the Bank of England, however, does provide some insight into the modus operandi of pursuit of t M_3 objectives. Commenting on the 'Management of Monetary Aggregates', Mr. Gordon Richardson summarized[22] the Bank of England's 'logic of operating' as seeking

> ....to manage the course of monetary aggregates by bringing about changes in interest rates'. /However, the difficulty of predicting/'..the level and structure of interest rates at which the stock of money that the public wants to hold will be brought into equality with the stock the authorities would like to see being held'/means that/ 'in practice the authorities often try building up a forecast from, as it were, the 'supply' side.' /This involves looking/ '...separately at the main items which statistically speaking are the components of the money supply on a broad definition - such as the public sector borrowing requirement, sales to the public of government debt, the volume of bank lending to the private sector and external flows to the private sector. What we are in effect doing in such an exercise

> is to attempt to predict what the rate of monetary expansion will be if we refrain from trying to change interest rates as a preliminary to considering the need for intervention. The essence of monetary management...is to act to offset divergencies, in these sources of monetary expansion - difficult to predict and control - as soon as it becomes reasonably clear that inaction is likely to undermine achievement of the monetary target'.

Whatever the precise operational context of policy[23], the record so far has not been in accordance with stated objectives. In the first year of operation, 1976/77, neither the original (July 1976, 12 per cent) target for M_3 nor the (December 1976, 9 - 13 per cent) target range for sterling M_3 were attained. The latter grew by 7.5 per cent and the former, as was the case in the previous two years, by 10 per cent only. Part of the reason for such undershooting[24] was that the public sector borrowing requirement was some 25 per cent below the figure predicted even as late as December 1976. Furthermore the demand for gilt edged was higher than anticipated, resulting in higher than forecast sales of securities to domestic investors despite the fact that the authorities refrained from selling gilt edged in the last two months of the financial year.

The performance in the financial year 1977/78 was not in accord with the target rate of increase postulated either. As Table II reveals, in the first three quarters of the financial year sterling M_3 rose at an annual rate of almost 15 per cent. This was so despite continuing strong demand for gilt edged[25] and despite the authorities' eventual move to a more flexible exchange rate policy in late October 1977. Even this rate, however, was to be exceeded in the last quarter of the financial year, so that for the year as a whole the rate of growth of sterling M_3 was more than twice that of 1976/77.

Besides prompting the intriguing (?) comment in the Bank's Quarterly Bulletin that

> with recovery in the real economy still very fragile, the authorities were naturally unwilling to see interest rates go higher than was essential.[26]

this performance must have contributed to the move to six-monthly rolling targets, anticipated in the February 1978 lecture by the Governor of the Bank of England referred to earlier and announced in the Budget speech of April 1978 - a '...minor but useful technical change to our continuing policy of having publicly announced monetary targets'[27] as the Governor saw it, but at any rate one which experience since has not challenged.

WEST GERMANY

While the movement to publicly announced targets in both the United States and United Kingdom followed a period during which monetary aggregates were accorded greater attention in policy design, the first publicly declared target for monetary aggregates was that of the Deutsche Bundesbank. In December 1974 this monetary authority 'broke new ground' in announcing a decision of the Central Bank Council stating that 'from the present viewpoint' it considered 'a growth rate of about 8 per cent in the Central Bank Money Stock during the year 1975 justifiable in the light of the aims of stabilisation policy'[25].

The monetary aggregate chosen for this purpose is one that has featured in this central bank's policy statements[29] since early 1974. It is equal to currency in circulation plus banks' compulsory reserves against domestic liabilities of the privat sector[30] adjusted for variations (over time) in reserve ratios. The exclusion of excess reserves and absence of offset for borrowed reserves does, of course, imply the this aggregate is conceptually different from what is sometimes defined as the adjuste monetary base[31]; and at least since 1976 the central bank money stock is increasingly presented as a weighted money stock aggregate.[32]

~~In deciding on the precise figure of target rate of growth~~, the Bundesbank

> ...was mainly guided by the following variables: the growth of production potential, the change in the utilization of the production potential, the rate of 'unavoidable' price rises and the change in the 'velocity of circulation'.[33]

Futhermore it was thought that

> 'Of these four variables two - the utilization of the production potential and the velocity of circulation - are equally dependent on cyclical conditions. It can therefore be assumed that the utilization of the production potential and the 'velocity of circulation' both change in the same direction and that there is a relatively great probability of such changes continuing to run fairly parallel in future. Hence two components are particularly important in determining the target: the growth of the production potential and the rate of unavoidable price rises.[34]

Granted such reasoning and projections suggesting an increase in nominal GNP of the order of 9-10 per cent, the target of 8 per cent increase in CBM between December 19[illegible] and December 1975 was reached.

For the first few months of the year policy appeared to keep track of the object[illegible] But by August the rate of increase of CBM was accelerating and, with the annual rate of increase of 13.6 per cent in the second half of the year, the December 1975 CBM was almost 10 per cent higher than a year earlier.

The experience of 1975 was thought to reveal that setting a precise quantitative target for monetary growth to be achieved in the course of precisely one year was too demanding a task for the monetary authorities (see pp.000-000). Thus in defining its objectives for 1976 the Bundesbank set as its target not a figure to be achieved between end-1975 and end-1976, but rather a figure to be achieved on average during this time interval, an average growth target. But the criteria for target setting remained the same. In deciding on the precise figure therefore, the principal, and publicly stated, assumptions were[35]

(1) a 2 per cent of growth of productive potential in 1976
(2) a 2.5 per cent rise in capacity utilization
(3) a virtually unavoidable rise in the price level of 4-5 per cent.

Altogether this amounted to an anticipated growth of nominal GNP of about 9 per cent. But granted the cyclical phase of the economy it was reasoned that this did not require an equal rate of expansion of CBM since

(4) a higher income velocity was to be expected.

Allowing for this last assumption the Bundesbank considered a rise of 8 per cent in CBM, comparing the average for 1976 with the average for 1975, to be appropriate.

While retaining any psychological benefit of continuity of an absolute figure for rate of growth of CBM, the new target, postulated on an average basis, meant of course a considerable reduction in the end-year to end-year growth objective. In the event the new target was also violated. Taking the average of all months the central bank money stock was 9.2 per cent higher in 1976 than in the previous year (though on an end-year to end-year basis the growth rate did decline to 8.4 per cent). Significantly this overshooting was consistent with an actual increase in growth of real output in excess of that embodied in the assumptions on which the 8 per cent target was based, while the increase in prices was smaller than budgeted for. But the overall increase in nominal GNP was as originally projected so that, as the Bundesbank put it 'the crux of the question was why the velocity of circulation did not increase, as had originally been assumed'.[36]

Although no clear answer to the last question was forthcoming (see below) the Bundesbank persisted with its 8 per cent target for the year 1977 also. To preclude any misunderstandings regarding average as opposed to fixed interval growth, the Bundesbank also announced that to meet this target it would strive to achieve a steady expansion in CBM of 6-7 per cent, comparing the average of the fourth quarter of 1977 with the corresponding quarter of 1976. Nominal GNP was, as in 1976, predicted to rise by 9 per cent consistent with a 3 per cent increase in production potential, 2 per cent in capacity utilization and 4 per cent increase in prices. A change in velocity of circulation was expected (contrary to experience in 1976) to make up the difference between 8 per cent and 9 per cent increase in GNP.

At least as revealing as the Bundesbank's persistence to the magical figure of 8 per cent however, was the renewed emphasis, since late 1976, on the behaviour of the banks free liquid reserves as a focus for policy - an issue played down in the preceding three years[37], - and the unwillingness to resolve the dilemma that strong capital inflows posed by allowing the exchange rate to appreciate[38] rather than overshoot the 1976 target in the midst of a merry-go-round of sales of securities to absorb bank liquidity combined with a policy of stabilizing interest rates and total reluctance to raise the cost of Lombard credit in light of record recourse to such credit by commercial banks.[39] Thus, while in December 1977 an 8 per cent growth target for CBM was once again adopted, in the light of predictions regarding the four key variables described above[40], we also find that its unequivocal pursuit was now much qualified. Indeed, experience over the three preceding years culminates in the rationalization, found in the Bank's report for the year 1977, (published in April 1978) that

> 'The Bundesbank had to assume from the outset /since targets were first announced that is/ that there may be periods in which the pursuit of an 'intermediate target variable' as reflected in the announced rate of CBM cannot be given priority; it is then necessary to consider whether to tolerate the non-attainment of the original target or to revise the target. In 1977 as in 1976 the Bundesbank decided not to change the target but to explain the reasons for the divergence'.[41]

Whether such pronouncements suggest a shift in the Bundesbank's position will be discussed later. But from the standpoint of providing a broad record of events (as I have aimed to do in this section) we may note that the reasons given for the divergence in 1977 were that rises in interest rates such as would have been required to contain the growth of CBM would, on the one hand, have 'increased the risk of cyclical setback' and, on the other, 'would have been at variance with external requirements', placing that is more pressure on the Deutschemark to rise further. And since higher monetary growth in the short-run was thought not to endanger price stability, the Bundesbank chose not only 'not to counteract accelerating monetary expansion' but indeed to initiate 'further monetary relaxations'.

III. CONCEPTUAL ANTECEDENTS AND THE INTERPRETATION OF POLICY

FRIEDMANIAN RULES ?

There is much in the above that can be said to carry a Friedmanian tinge.[43] A yearning for a more stable economic environment after the vagaries of the first half of the 1970s is easily understood; and equally, when much else has failed, Friedman's vision may not tantalize all, but promises deliverance with seductive (apparent) simplicity. As he concluded in 1968:

> by adopting publicly the policy of achieving a steady rate of growth in a specified monetary total... the monetary authority could make a major contribution to promoting economic stability... Other forces would still affect the economy, require change and adjustment and disturb the even tenor of our ways. But a steady monetary growth would provide a monetary climate favourable to the effective operation of those basic forces of enterprise, ingenuity, invention, hard work and thrift that are the springs of economic growth. That is the most that we can ask from monetary policy at our present stage of knowledge. But that much — and it is a great deal — is clearly within our reach.[44]

This prescription, which appears to elevate the pursuit of a stable rate of growth of some monetary aggregate[45], to the status of a sole objective for monetary policy, derives we may remember from three premises, namely that

(1) the behaviour of the private sector is basically very stable;

(2) our ignorance of structural relationships precludes the use of monetary policy for fine tuning (so that the pursuit of such policy by the authorities is likely to result in instability in the sense of increasing the amplitude of the adjustment path that the private sector will generate in response to any given disturbance in the absence of policy);

(3) monetary policy, though it has important effects on real magnitudes, cannot peg real magnitudes at predetermined levels.

In principle these seem to be positive issues on which empirical investigation may be expected to adjudicate. In practice disagreement at the normative level, stemming from differences of opinion[46] regarding social order and time perspectives, has sustained, and will continue to sustain, some of the heat of the debate on 'rules versus discretion' in monetary or other policy. At the positive level. Friedman's rule comprises one of the alternatives open to the policy-maker. At the normative level, it reflects his preference for limited government and, where government is essential, his preference for limiting government so far as possible by clearly specified rules rather than granting wide discretion to government officials[47]. To be sure, experience does affect normative judgements also. The performance of various countries in the last few years has induced considerable reflection on the extent to which governments can be expected to deliver such objectives as the market may (or does) fail to deliver. Furthermore the experience of the last few years has emphasized the trade-offs between short-run benefits and long-run losses.[48] Yet though the targets adopted do reveal increasing acceptance of the position that monetary acrobatics do not confer long-run benefits[49], and may indeed confer losses[50] while imperfect knowledge of the relevant parameters and lags in 'recognition', 'implementation' and 'effects' limits their short-run potential[51], it is also clear that the targets I have described in section 2 above, do not appear to qualify for the title of Friedmanian Rules.[52] The American ones are too frequently reviewed (and one perceives that they are revised to conform to what can be achieved when due regard is paid to other economic variables) to be consistent with Friedman's grand design and desire to deprive the monetary authority of discretion. The British ones have not been with us long; but as the move to 'rolling targets' a l'americaine <u>also</u> indicates in this respect they have much in common with those of the United States. And the Germans ? They at least can claim to have kept to the same absolute yearly figure; though, as we have seen, granted revisions in measurement this has not really been the same all the time. More importantly, in Germany too the process whereby target values are derived <u>is not one that abstracts from current conditions</u>, resting on belief in the inherent stability of the economy[53], despite exhortations to the affect that in 'assessing the expansion of central bank money in the manner compatible with stability it is ... above all necessary to be guided by the somewhat <u>longer-term</u> possibilities of economic growth'.[54]

THE NATURE AND CONDUCT OF ECONOMIC POLICY

Granted that the policies currently pursued cannot be accorded the status of Friedmanian rules, monetary targets should be seen in the context of resolutions to what, following Brunner and Meltzer, may be termed 'the policy problem'.[55] The latter[56] pertains to the conduct, and interpretation of the posture, of policy in an environment characterized by incomplete knowledge of the structural relationships intercalating instruments of policy and ultimate goal variables, and by imperfect information regarding current and even past values of the endogenous and exogenous variables in the sytem.

In Brunner's analysis[57], policy in such an environment is seen as comprising '... three major groups of problems: (i) <u>the information problem</u>; (ii) <u>the interpretation problem</u>; and (iii) <u>the determination problem</u>'.[58] The first of these relates to the assessment of the general movement of the economy, the pace of economic activity, the pressure on the price level and the trend in the balance of payments; in short to the identification of the current movement of the goal variables, whatever the cause of such movements may be. By contrast, <u>the interpretation problem</u> relates to the acquisition of 'information about the monetary thrust transmitted to economic activity'.

... ../Finally.

Finally, the determination problem 'relates to the optimal strategy guiding the monetary authorities' behaviour in the context of prevailing institutional arrangements' as well as to the way in which alternative institutional arrangements impinge on the optimal strategy.[59]

Although these problems are distinct in some respects, and in the work of Brunner and Meltzer, and others[60] considerable effort has been expended in separate discussions of the target and indicator problems, in recent years attention has focused primarily on the optimal choice of a short-run/target governing the continuous adjustments of the policymakers control variables. In particular under conditions of incomplete knowledge about the structure and information lags policymakers have typically chosen to direct their policies to the attainment of specific values of endogenous variables that are observable with a lag shorter than that pertaining to the goal variables themselves and which, provided that they can be said to relate to the goal variables in a determinate fashion, serve as the 'proximate' or 'intermediate' targets for policy. Interest rates, monetary and credit aggregates are obvious candidates for this role and in this context the emphasis on 'monetary targets' may be interpreted to denote convergence of opinion to the view that (for the particular time interval to which policy choices relate) monetary aggregates comprise the 'best' intermediate variables in securing the attainment of desired values of the goal variables. While the latter may be true, we should note from the outset that both the theoretical models pertaining to this issue and the interpretations of current policies that claim (formally or informally) to depart from such models rest on a much more limited view of the problem than that explicit in Brunner's missionary discourses or indeed in descriptions of the deliberations of policymakers.

INTERMEDIATE TARGETS AND INFORMATION VARIABLES: THE VARIANCE APPROACH

At the expense of considerable simplification one may distinguish three aspects of incomplete knowledge, namely

(1) lags in information pertaining to the goal variables and other variables in the system;

(2) lack of knowledge of the structure, that is to say of the values of the parameters characterizing responses of economic actors in a particular economy at a particular interval of time;
and

(3) random disturbances.

Recent analysis has focused entirely on the first and third of these aspects of experience[61] in notable disregard of the fact that, in view of the absence of precise information (consensus) regarding the structure and the increasing evidence that the desirability of particular strategies is intimately related to the precise nature of this structure, the questions pursued in such treatises bear a rather casual (or even

remote) resemblance to those confronting the policymaker. Nevertheless one is impressed by the extent to which the authorities' behaviour in some countries can be said (or has been interpreted) to conform to the mould of the 'variance approach'.

In the context of this approach it is assumed that the policymaker in pursuing his goals seeks to minimize the expected value of the quadratic loss function[62] over a particular horizon. Besides the weights attaching to the goal variables in terms of preferences, the choice of strategy depends on the mean values of the parameters and stochastic properties of the model purporting to characterize the policymaker's perception of his environment, and also the flow of information about the exogenous and endogenous variables in the system.

Following Theil[63], the more popular variant of the approach, aptly described as 'certainty equivalence', assumes that the decision-taker perceives a linear structure and knows with certainty the constants and coefficients of this structure, so that stochastic variability is confined to additive disturbances.[64] The policy choice then reduces to a deterministic Tinbergen (instruments-goals) problem.[65] In particular, within the confines of the traditional Hicksian IS-LM structure (usually employed to illustrate the variance approach), the superiority of an interest rate policy over a money stock policy[65], measured by comparing the expected squared deviation of the goal variable (typically income) from its 'desired' value, depends on the variance-covariance structure of the additive disturbances attaching to the expenditure and monetary sectors and on the values of the parameters describing the response of expenditures to changes in the interest rate and of the demand for money to changes in the interest rate and income.[67] In such a model, furthermore, it can be easily deduced that if, as monetarists have often claimed, the demand for money is both more stable than the expenditure function and rather unresponsive to interest rate movements, a money stock policy is superior to an interest rate policy. Monetary growth targets therefore (it is inferred) can be interpreted to imply tacit acceptance of monetarist antecedents, reflecting, that is, prior information (or beliefs) that the underlying structure is such as for the variance in the goal variable under a money stock policy to be smaller than under an interest rate policy.

Whether the latter is an appropriate characterization of policymakers' current perception of their respective environments is an issue to which I will come in due course. For the moment let us delve further into what is to be understood by a money stock policy in such a frame. In an environment in which the money stock and the interest rate can be regarded as alternative instruments of policy[68] (in the sense that the authorities can set the value of either at the level consistent with minimizing the variance in the goal variable) and where decisions relate to an interval of time during which the authorities receive information neither about the value of the goal variable nor any other variable except that which they choose to control, the money stock policy relates to the choice of a single value of an instrument of policy to be maintained at the interval between policy reviews. Although therefore the setting of the money stock (in the hypothetical case in which M is an instrument) at the particular level consistent with minimizing the variance in the goal variable implies that the interest rate respondsto movements in the demand for money and in the expenditure function, or correspondingly the setting of the interest rate — in a situation in which this alternative is deemed to minimize the variance in the goal variable between policy reviews — implies that the money stock varies, this variation is not (or cannot be) utilized by the authorities to effect revisions in their instrument that will reduce the variance in the goal variable further. On the other hand, if the authorities receive information, on the behaviour of the variable whose value is not set as an instrument, with a regular frequency greater than that pertaining to the goal variable, they may choose to respond to such information by adjusting their instrument of policy.[69]

In the latter case two kinds of response may be distinguished. The first is for the authorities to seek to infer, in the light of their prior knowledge about the structure and its stochastic characteristics, the likelihood that this deviation of the money stock (or interest rate) from its expected (and other things equal consistent with minimizing the variance in the goal variable) value is due to an IS disturbance and adjust their instruments of policy in accordance with the expectation of such a disturbance being reflected in the movement of the money stock or interest rate. The second is for the authorities to seek to adjust their instruments in such a way as to minimize the variance in the money stock[70], treating, that is, the money stock as the proximate policy objective — as the intermediate target. (A simple graphical representation of these alternatives is given in Appendix A below.)

Presented thus it is immediately obvious that such an intermediate target strategy, unless it can be maintained that the demand for money depends on income only[71], is inferior to '...the optimal policy... of first determining how much of the money surprise is likely to be due to a spending disturbance (thereby warranting an offsetting action) and then allowing for the LM curve slope in gauging the optimal policy'.[72] The optimal policy therefore requires that the money stock be treated as an 'information variable'[73] rather than a target. And even in this capacity there is no reason for exclusive attention on its path. For since the path of any other observable endogenous or exogenous variable also contains information that (in this scheme of things) can be interpreted through the structure, it will in general[74] be inefficient to abstain from exploiting fully[75] the information contained in observations of variables other than the money stock (or interest rate).[76]

Such an uncompromising verdict on the desirability of using any particular intermediate variable as a focus for policy (be it as an 'information variable' or an 'intermediate target') however cannot fail to raise the question of whether the particular characterization of the policy problem, encapsulated in what was termed the 'certainty equivalence' approach, bears any resemblance to that which confronts macroeconomic decision-takers and hence whether, in appraising current policy procedures, we are entitled to confine ourselves to such a mould. After all, if we accept '...at face value the proposition that central bankers are men and women of normal competence...who take decisionsaccording to the advancement of the public weal...'[77] it seems hard, in the light of the above, to explain their alleged recurrent recourse to intermediate targets, unless of course by 'normal competence' we are to understand a level of intelligence below that required to comprehend that it is inefficient to disregard costlessly provided and interpretable information that is known to be relevant to the pursuit of ultimate objectives.

Steeped in the variance mould it is tempting to seek an explanation in the nature of the disturbances.[78] For though policy simulations do in practice invariably rely on deterministic structures, the particular econometric model comprising the background to such simulations (the foundation of the prior beliefs) does, by definition, exhibit multiplicative disturbances and is thus 'at variance' with the popular 'certainty equivalence' variant of the variance approach. However, while multiplicative disturbances[79] result in optimal policies that imply a more conservative response on the part of policymakers to changes in the exogenous and/or endogenous variables in the system, and further still detract from the Tinbergen instrument-goal solution in that the policymaker will generally deploy as many instruments as are available irrespective of the number of goal variables he pursues (since such a course of action tends to reduce the risks associated with multiplicative disturbances), such a move towards reality — except perhaps in the, for our purposes, irrelevant case of infinite planning horizons — does not detract from the above conclusion that there exists an optimal policy, in the sense of a feedback rule that is superior to an intermediate target strategy.

All this however, it cannot be stressed enough, is on the assumption that the decision-taker holds a particular prior belief about his environment, about the structure

INTERMEDIATE TARGETS UNDER 'UNCERTAINTY'

In contrast to the variance approach, the policy problem pursued in the Brunner Meltzer writings comprises (like Friedman) as an essential ingredient:

> ...ignorance — or relatively incomplete information about the structure of the economy.[80]

Ignorance of the structure relates to

> ...absence of quantitative estimates of the parameters of a general equilibrium macro-model, of the speeds of adjustment of many of the variables, and of the distribution of the effects of monetary policy through time.[81]

A proper understanding (and appraisal) of policy and of intermediate targets (and indicators) (see pages) cannot therefore depart from the assumption (critized by Brunner and Meltzer) that 'A particular hypothesis relating monetary policy to [the goal variables] is well established', so that different policies (with or without feedback from information variables) can be uniquely ordered in terms of this hypothesis, but from recognition of the fact that

> ...the policymaker has many different competing hypotheses of the structure available to him.[82]

That the conduct of policy in such an environment is a task distinct from that implied in the Poole -Kareken et al. -B. Friedman writings is blatantly obvious when we reflect on how sensitive the policy recommendations (the optimal policy that is) derived from any specific model are to the exact specification of the model[84], a fact which as Turnovsky has demonstrated 'is even more true when crucial parameters are subject to stochastic disturbances'.[85]

Consider therefore a world, much as the real one, in which the decision-taker is confronted with an array of alternative theoretical structures and econometric estimates pertaining to various aspects of such structures. In principle, of course, all such structures can be explicitly defined and a systematic comparison be undertaken that yields some ordinal ranking and may render one or other of these structures as, statistically, the most acceptable characterization of the economy for a particular interval of time. Even if this were feasible in practice however (and if the will for such an undertaking existed, which is doubtful, in the face of current practice of '...econometric models mutating and multiplying at amazing speed..'[86], such a comparison would, at best, resolve the ambiguities regarding the correct specification of the structure in the period to which our data sample pertains. Although, therefore, it may strengthen the decision-taker's confidence in a particular paradigm, his awareness of: (a) the precariousness of the assumptions required to enable him to undertake the statistical comparison; (b) the protean nature of the economic system; (c) memories of how often other prior beliefs were shaken in the past; (d) the fact that any such verdict for the period as a whole need not imply the same verdict for all subperiods; as well as, possibly, (e) his unease with the performance of at least some of the equations of the model, will almost certainly prevent the convergence of his prior beliefs to a single paradigm.[87]

Let us suppose that the above considerations result in the policymaker retaining a number of econometric models. In addition he may entertain a variety of beliefs regarding the path of the exogenous variables in the system that cannot be described by a mean value and some measure of dispersion. His policy problem then requires that he examines how alternative policies perform under the assumptions/characteristics of the different models defined by the competing hypotheses about the structure and paths of the exogenous variables. If, for example, we retain the assumption that his goal is a particular value of income, we may envisage a process of policy selection analogous to a pay-off matrix with different columns corresponding to different stochastic models and different rows corresponding to different policies to be examined, each element of the matrix (if we retain the quadratic loss function — 'for simplicity') being the expected squared deviation of the goal variable from its desired value associated with a particular combination of model and policy.[88] The choice of policy could be determined '...by a Bayesian procedure...'[89], i.e. by attaching probabilities to the various models and proceeding to choose that strategy which minimizes the value of the (on these prior probabilities calculable) weighted sum of the elements as between rows.[90] More likely than not, however, the same considerations that contribute to the policymaker's reluctance to converge on a particular model will direct him to a maxi-min decision whereby '...the optimal strategy minimizes the worst variabilities over time attributable to...partial ignorance' of the structure and of the path of the exogenous variables in the system.[91]

Notice that such a procedure suggests that the policy adopted will not in general be 'optimal' when examined in the context of any of the competing models. Like an intermediate target strategy (we may without commitment record) compared to the 'optimal policy' prescribed by a particular prior belief, the policy adopted on the maxi-min criterion will almost certainly be inferior when appraised in terms of any one of the alternative models; but it will, nonetheless, be a correct policy granted uncertainty over model selection. This does not of course establish that the intermedia target strategy is the same as the best max-min strategy. But it does reveal that, even if it could be shown that an intermediate target strategy is inferior to the 'optimal policy' embedded in each conceivable prior perception of our economic environment, we will not have secured a sufficient condition for dismissing intermediate targets as 'inefficient'.

This conclusion contrasts sharply with the dicta of the variance approach. **Can it be also argued however that intermediate targets are, in a context of uncertainty over model selection, in some sense 'efficient' ?**

Tapping on the findings of the models that recognize multiplicative disturbances, we may conjecture that uncertainty over model selection (in addition to the presence of multiplicative disturbances for any given model) will in general provoke conservative adjustments in all instruments of policy. But this does not in itself constitute proof that the policy to be adopted is different from an intermediate target strategy since we are not operating in the instrument ——>(target) ——>goal-setting of the certainty equivalence mould. At the same time, since the maxi-min criterion for policy selection does not in itself provide any indication as to the kind or number of strategies (the number of rows of the pay-off matrix that is) which should be considered, there exists at the present state of our knowledge (and for both macro-economic and microeconomic questions alike) no absolute criterion by which to establish whether the intermediate target strategy would be in some sense efficient. More precisely, in examining alternative policies, the policymaker will, of course, consider the maxi-min implications of the optimal policies pertinent to each of the alternative models that he deems 'relevant'. But beyond this there is, in principle, an infinite number of other policies, of strategies 'governing the continuous adjustments of the policymaker's control variables'[92], of relations between changes in policy and conditions in the environment'[93], which are open to him. There does remain, therefore, the 'technical' (?) problem of: by what reasoning is the policymaker to select the alternative strategies to be compared ?

In the latter context we can do no other but suppose that the search procedure will involve some 'rule of thumb', some judgement. Intuition may suggest a procedure that treats the optimal policies defined by each of the specific models as the limits of a range within which to search for superior maxi-min strategies. Yet this procedure, tempting though it is to the econometrician/statician[94], does not appear simple (clear in its purpose) once we recognize that the 'optimal strategies' implied by each of the 'relevant' models involve different instruments and almost certainly more than one instrument in each case.[95] Similar feelings of compromise may encourage the identification of optimal policies implied in the (by definition) irrelevant states of prior beliefs that assignment of equal or unequal probabilities to the relevant models will render, and the subsequent appraisal on a maxi-min basis of these policies in the context of the relevant models. Compromise may also suggest that we identify the strategy that derives from the union of the relevant alternatives, moving that is to a position of total ignorance of the behavioural characteristics of those aspects of our economy to which competing hypotheses of behaviour apply. The optimal strategy derived from a model that treats the values of magnitudes outside the union as given can then be examined in terms of its maxi-min implications within our relevant alternatives.

No doubt other such suggestions can be tendered. Formally the search procedure is ad hoc, though we ought at least to concede that the alternatives that spring to mind in the manner of those listed above stem from some process of reasoning, from some perception of 'order', from experience, that suggest 'compromise' as a reasonable 'rule of thumb'. On reflection, however, we may also remember that besides ignorance of the structure there are also data lags. But then would it be unreasonable to adopt a 'search procedure' in which we examine the maxi-min performance of strategies that minimize, for one or other of the relevant alternative models, the variance of one or other of the endogenous variables that are observable with a regular frequency greater than that pertaining to the goal variable — of strategies that is which relate to intermediate/proximate targets ?

From this perspective the selection of a proximate target constitutes a choice from among the strategies that a particular search procedure renders. As such it need not be superior in a maxi-min sense to all other feasible strategies, but it cannot a priori be said to be no better than the superior strategy that emerges from comparison of the optimal strategies pertaining to each member of the group of models deemed by the decision-taker as relevant. Furthermore, it should be stressed that the choice of strategy is not (as indeed is true of the optimal strategy in the context of a particular prior belief) independent of the state/flow of information regarding the paths of other variables in the system since, even for strategies that derive from the particular search procedure of minimizing the variance of one or other of the 'irrelevant' endogenous variables, the policy vector is conditional on any information about the time path of the predetermined variables that is available.[96]

INTERMEDIATE TARGETS AND POLICY INDICATORS

In the above I have interpreted ignorance of the structure to denote a situation in which the decision-taker is confronted with a number of alternatives each of which is 'equally likely'. In contradistinction to the rationale, to the apparatus of though on which the variance approach is based, I do not by this expression mean that the alternative hypotheses are 'equally probable' in the sense that 'equal numerical probabilities' can be attached to them, since with regard to the problem identified, as Shackle would put it

> ... it does not appear that numerical probability can express [the decision taker's] state of mind when [he is] confronted with a number of alternative predicates between which [he] know[s] of no reason to discriminate.[97]

This, I believe, is in the spirit of Brunner's analysis, though I should acknowledge that in what appears the most explicit of his statements of the problem, the role of numerical probabilities is quite ambiguous as we are told that '...the optimal strateg can be decided upon either by a Bayesian procedure in the case of incomplete stochastic information pertaining to the class of [alternative] hypotheses [about the structure an

/the path

the path of the exogenous variables in the system] or in the absence of such knowledge by a suitable maxi-min decision'.[98]

There are a number of reasons why 'numerical probabilities' and consequently the Bayesian procedure are, as I have already suggested, inappropriate. The first is that given a particular set of n alternative states of nature perceived by the decision-taker, the mean average of these states yields an irrelevant prior belief since in general it will not relate to a state of nature deemed by the decision-taker as equally likely as the alternatives initially perceived, or if by chance it averages out to being identical to one of these alternatives it must by definition be regarded as no more likely than the others. Secondly, if n is large the placement of a numerical probability equal to $\frac{1}{n}$ is a '...procedure which implies that we regard each of [the models and their outcomes] as highly improbable. But to say that each of them is highly improbable is to say more than we really mean when that we wish to express is 'I have little relevant knowledge and so far as I am concerned any of the mutually exclusive contingencies A, B...N could happen without seeming incongruous with what I do know of the circumstances. No one of these contingencies seems to me 'improbable' in the sense that it calls for any stretch of the imagination to conceive it coming true'.[99] In the same vein consider the case in which we do attach equal probabilities to the alternative states. The mean average we have reasoned cannot be considered more likely than the original states. At best it may be regarded as equally likely, as it would be if we come to regard it as another possible state of nature. But 'The fundamental question which we are then led to ask is this: Does an increase in the number of hypotheses (rivals to a given hypothesis), which we cannot reject as impossible, really reduce the degree of acceptance we accord to a given hypothesis ? Plainly...it does not. The mere recognition of a wider ignorance about what may happen does not alter or reduce the right of a given hypothesis to its place amongst those which our knowledge does not enable us to reject'.[100]

In this scheme of things a maxi-min comparison of alternative strategies seems to me to comprise an approach consistent with the nature of the problem. This may, as Wallich has noted, '...seem to adopt a rather pessimistic slant'[101]; but the 'alternative procedures' suggested by him, namely '...to examine models for robustness of their policy advice under varying assumptions, or perhaps to look for a policy that is robust with respect to switches among models'[102] are (as I understand them) the same maxi-min decision.

From a taxonomic (classificatory) standpoint one may trace some overlaps between the two approaches. Thus in a sense the maxi-min approach to the 'determination (strategy, target) problem' comprises a general case within which the variants of the variance approach must in any given circumstance be nested. At the trivial level,

for example, any particular prior belief about the structure and the path of the exogenous variables comprises one of the models, a limiting case, in the Brunner-Meltzer perspective. No less revealingly, Poole's analysis, it has been argued by Brunner, relates to '...an optimization procedure [which] minimizes the contemporaneous variance of the time path. The resolution of this problem assures us that the variability expected at any time point due to our incomplete information has been minimized by a suitable choice of policy adjustments. But we obtain no assurance from this procedure about the variability or instability of the process over time. Whatever the variability of the process over the time profile, variability due to stochastic structure has been minimized in the cross-section of time. The variance approach [in its Poole variant] provides thus only a very partial answer and applies probably to the pragmatically least important question'.[103] In contrast the approach emphasized here, though it permits the possibility that strategies focusing on intermediate targets are superior to the optimal strategies embedded in the alternative competing hypotheses, stresses the continuous adjustment elements of the problem, and will in general involve a feedback rule.

That this is so is clear once we recognize that an intermediate target strategy (unlike the framework defined by Poole) does not imply a particular set of values of the vector of instruments of policy (that is to say the intermediate target is an endogenous rather than a control variable) so that the pursuit of any particular value or path of the target variable is (as I have already noted) itself conditional on the information confronting the policymaker. But to recognize the need for feedback is to raise the question of on what the required adjustment in the vector of instruments of policy is to be based. In the framework of a particular prior belief about the structure and the path of the exogenous variables there is no such problem , since in that context the known structure renders a unique change in the vector of instruments of policy consistent with securing any particular outcome. But when competing hypotheses about the structre are acknowledged, a given change in instruments of policy is consistent with a number of responses of the endogenous variable that may serve as the target.

It is, of course, perfectly consistent with the maxi-min approach for the policy-maker to adjust his instruments of policy in accordance with the parameter responses prescribed by one or other of the competing models comprising his prior beliefs, and hence to act *as if* all deviations of the target variable from its expected value defined by this model are due to exogenous factors calling for adjustment in the vector of instruments. Equally, however, the strategy adopted may, in conjunction with the endogenous variable selected as the target, rest on an *index* of the effect of policy changes that so far as possible is independent of the diversity of characteristics which the alternative hypotheses exhibit. In our discussion these comprise alternative