Some Rules for the Conduct of Monetary Policy

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Resolution of the debate over rules versus authority in the conduct of monetary policy appears to hinge on the solution to two separate but related problems. First, there is the problem of determining the most appropriate model to apply to describe the relationship between monetary instruments and economic aggregates. Second, there is the problem of determining the appropriate decision rules to be followed by policymakers when setting their instruments, given their goals and given their model. This paper is primarily concerned with the decision rule problem and not with the question of whose model is best.

For convenience of exposition, the only decisions considered for the conduct of monetary policy will be the determination of desired values of either the interest rate or the stock of money; blends of the two instruments will also be considered. It is assumed that on a quarterly average basis, it is technically possible to set the average desired money stock or the average desired short-term interest rate.

In Section 1, an attempt is made to summarize what is currently known about optimal decision rules for monetary policy. Section 2 describes some experiments in which some simple rules of thumb for the conduct of monetary policy are applied to the structure of the FRB–MIT econometric model.

1. *Decision Rules for Monetary Policy*

a. *Optimal Decisions*

In order to discuss optimal decision rules for monetary policy, it is necessary to use a model which relates policy instruments to the

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*The views expressed in this paper do not necessarily reflect those of the Board of Governors or its staff. I wish to thank H. T. Farr for invaluable help in the preparation of this paper.

relevant goals. For this purpose, it is convenient to use initially the static Hicksian IS-LM curve framework. It is obvious that, for this simple model, in a nonstochastic world, optimal policy decisions can be stated in terms of either the interest rate or the money stock. If the target of policy is, say, full employment nominal income, this target can be achieved either by setting an interest rate which is consistent with the target, given the parameters and other exogenous variables in the system, or by setting a money stock which is consistent with the target. In this model, the choice between the optimal interest rate and the optimal money stock is not an interesting one because one variable implies the other.

The problem becomes interesting when we drop the assumption that values of the endogenous variables are known with certainty. When the demand relations in the economy are subject to stochastic disturbances, there is no hope for always hitting the target. If it is assumed, however, that policymakers seek to minimize the expected loss from failing to hit the full employment target and that they possess a quadratic loss function, some simple results can be obtained.[1] In particular, if the money stock is the policy instrument, the stock which formerly assured full employment now gives the minimum expected loss available for all possible values of the instrument.

Further, if the interest rate is the instrument, the value which previously provided full employment now gives the minimum expected loss possible for use of that instrument.

It has been demonstrated by Poole (1967), however, that in such a stochastic world, the interest rate and the money stock are no longer perfect substitutes as policy instruments. The minimum expected loss under an interest rate policy is not, in general, equal to the minimum expected loss when money stock is the instrument. Which of the two instruments provides a lower expected loss depends upon the particular values of the structural parameters and upon the variances and covariances of the disturbances. In general terms, if most of the source of instability lies in unpredictable shifts in the saving and investment functions, it is better to pursue a money stock than an interest rate policy. In this case variations in the interest rate with a fixed money stock will reduce the impact of these shifts on income relative to what they would be if the interest rate were set at its optimal fixed value. If the primary source of instability is

[1] See Theil (1964) and Holt (1962)

unpredictable shifts in the demand for money, it is preferable to set the interest rate at its optimal value and simply accommodate the shifts in money demand.

Poole goes on to demonstrate the interesting result that it is possible to define a policy which blends interest rates and money stock to provide an expected loss which is as low or lower than that attainable by utilizing interest rates or money stock alone.

There are great difficulties in obtaining analytic solutions for more complex situations. In particular, most policy models assume that the parameters of the model are known with certainty. Brainard (1967) has obtained the optimal policy solution to a simple model in which the structure is not known with certainty. The generalization of Poole's results to include uncertain parameter values raises problems which make it impossible to derive solutions for optimal policy.

Poole has also demonstrated that, for a simple (second order) dynamic system with additive error terms and known parameters, an active counter-cyclical policy, using either the interest rate or the money stock as an instrument, dominates a policy of a constant money stock or a constant interest rate.[2] A similar result has been reported by Lovell and Prescott (1968), comparing fixed and variable money rules using a somewhat different second-order model.

Very little is known about optimal policy decisions for more complex situations than those considered above. What is appropriate monetary policy for a growing economy with an imperfectly known, probably nonlinear structure which is subject to stochastic shocks, and which probably has long lags? There is no very good answer to this question right now. Further research is clearly in order. Substantial effort is being expended by the Board of Governors' research staff and by academic economists to provide an eventual solution to the problem. Along with efforts to estimate the structures of more detailed models, sensitivity analyses dealing with changing economic structures are currently being conducted. Projects are also underway to obtain dynamic simulations of nonlinear, stochastic systems. The optimal policy choices implied by various utility function specifications will be obtained for these structures.

b. *Rules of Thumb*

A practical short-run approach to policy problems is to propose

[2]The dynamic models are trendless so a constant money stock is analogous to Friedman's money growth rule in a growing economy.

rules of thumb for the conduct of monetary policy which might lead to results which are superior to those obtained from the current conduct of policy. Friedman's proposal of a constant growth rate of the money stock can be interpreted as such a rule of thumb. The rule is not claimed to be optimal in the linear decision rule sense. It is only argued that the lags in response of the economy to variations in monetary policy are so long[3] and so uncertain in length[4], and the ability to forecast future events is so limited, that pursuit of an active counter-cyclical monetary policy may give results which are inferior to the rule.

Friedman's rule may be "nth" best among rules of thumb, however. Ignorance of how to conduct optimal monetary policy does not imply that resort should be made to the simplest rule available. Such ignorance might suggest, however, that the application of relatively simple rules of thumb may give results which dominate those obtained from attempts at more sophisticated policy manipulation.

Because it is often difficult—if not impossible—to identify the sources of unexpected interest rate or money stock variations, setting the value of one instrument subject to maximum variations in the other may give results superior to those obtained when only one instrument is used. Two rules of thumb in the spirit of Poole's analytic results are suggested by this statement.

First, a constant money growth rule could be pursued subject to maximum allowable changes in the interest rate. For example, if the interest rate constraint is violated during any period, the money stock could be changed sufficiently to bring the interest rate back to its allowable range. By varying the severity of the interest rate change constraint, the rule could range all the way from a Friedman rule, where any change in interest rates is tolerated, to a pure interest rate rule, where no interest rate change is tolerated at all. Narrow constraints would be appropriate when it is likely that short-run shifts in the money demand function are an important source of instability.

[3]The issue of lags provides an interesting example of how policy prescriptions need not hinge on a specific model. Friedman bases his prescription on his reading of direct money-income relations. The FRB-MIT econometric model, which is far removed from the quantity theory, gives evidence of a lag for monetary policy which is even longer than that claimed by Friedman.

[4]Friedman's observation that monetary policy lags are variable in length is not necessarily devastating to policy activists. Variable lags are not necessarily unpredictable lags, see Tinsley (1967).

The relationship between money growth and interest rates should be made negative if the source of large interest rate changes is shifts in the saving and investment functions. In this case, the use of a positive relationship between interest rate changes and money growth would be inferior to the Friedman rule. The choice between a negative or positive relation between money and interest rates should rest on empirical evaluation of the circumstances. The choice cannot be changed frequently, however, if the rule is to remain a rule.

Second, an interest rate rule, such as a constant rate of increase in the interest rate, could be pursued subject to a money growth constraint. Thus, the interest rate rule would be pursued single-mindedly provided the growth in the money stock did not fall outside some predetermined range, say, 2-6 percent per annum. By varying the width of the allowable range of growth rates, the rule can range all the way from a pure interest rate policy, in which any money growth rate is allowed to a Friedman rule, in which only one growth rate is allowed, and the interest rate is free to vary. Narrow growth rate ranges would be appropriate when it is likely that shifts in the saving and investment functions are the source of instability.

Before proceeding to apply these rules of thumb to an actual model, it should be stressed that the policy rules studied here are only intended to be suggestive. There are certainly other candidates, and no attempt has been made to exhaust all reasonable alternatives. The purpose of the exercises is to illustrate how rules of thumb might be used—not to suggest the best rule. It should also be stressed that rules of thumb are just that; they are not great principles to which policy makers should slavishly adhere. If economic events clearly indicate the modification or abandonment of a rule, that course clearly should be taken. What the rules do say is that policy-makers should be made aware of economists' ignorance of optimal policy and be given a task which they can conceivably perform.

2. *Some Simulation Experiments*

This section describes several simulation experiments in which the rules of thumb described in the previous section are imposed on a recent version of the FRB-MIT model.[5] For the sake of brevity, simulated values only for nominal GNP are reported.

For purposes of comparison, a control simulation was run to predict values of GNP in which all exogenous variables were fed into

[5] For a description of the model see de Leeuw and Gramlich (1968), and Rasche and Shapiro (1968).

the model at their actual historical values over the 1963-I–1968-I period. Comparisons are made in terms of such control solutions.

The first policy simulation is one which adheres to a strict Friedman rule. The simulation shows what the model predicts would have happened to GNP over the control period if the money stock (demand deposits plus currency) had grown at a constant percentage rate from quarter to quarter. The growth rate chosen was the constant annual rate at which the initial money stock in 1962-IV had to grow to achieve its actual value in 1968-IV. The rate was 4.25 percent per year. The simulation results are presented in Table I. Figure I shows the additional GNP (positive or negative) which would have been forthcoming with a constant actual growth rate of the money stock.

The results suggest that, if the simple rule of thumb of a constant growth rate of the money stock had been adopted during the period,

TABLE 1

CONTROL SIMULATION VS CONSTANT MONEY GROWTH

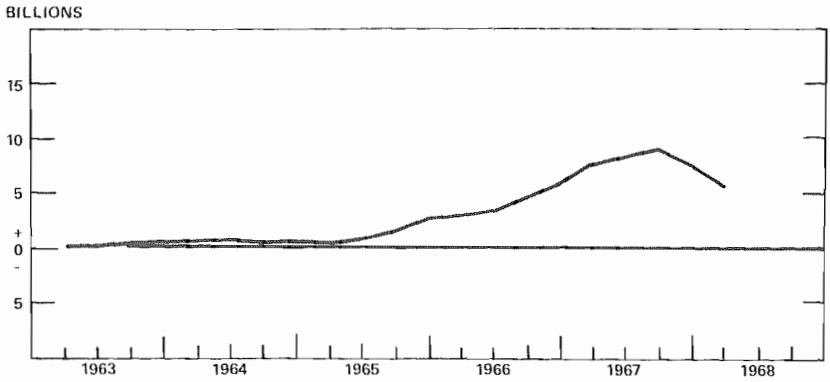
(Billions of dollars)

		Control	4.25% Money Growth	Difference
1963	I	578.421	578.443	.022
	II	587.189	587.228	.039
	III	597.990	598.237	.247
	IV	611.374	611.849	.475
1964	I	624.925	625.534	.609
	II	638.628	639.284	.656
	III	651.630	652.070	.440
	IV	663.689	664.067	.378
1965	I	672.911	673.320	.409
	II	688.092	688.883	.791
	III	703.955	705.466	1.511
	IV	720.770	723.212	2.442
1966	I	735.479	738.468	2.989
	II	750.230	753.512	3.282
	III	761.916	766.253	4.337
	IV	771.731	777.580	5.849
1967	I	786.810	794.473	7.663
	II	801.814	810.035	8.221
	III	820.492	829.448	8.956
	IV	841.208	848.603	7.395
1968	I	859.861	865.367	5.506

FIGURE I

EFFECTS ON GNP OF 4.25% GROWTH IN MONEY

DEVIATIONS FROM CONTROL SIMULATION



the performance of GNP would have been only slightly worse than the actual control simulation. The 1966 boom would have been more aggravated using a money growth rate than was the case using more sophisticated policy decision procedures. It is interesting to note that use of the constant money growth rate would not have appreciably increased the variability of GNP over the period studied. Further, the imposition of the 4.25 percent rule actually produced smaller quarterly changes in the bill rate than those obtained for the control simulation, where bank reserves experienced large quarterly fluctuations. The mean absolute change in the bill rate for the control simulation was 45 basis points; for the money growth rule, it was only 16 basis points.

Figure II shows the differences between the control simulation and two simulations in which the money stock is made to grow at constant annual rates of 4 percent and 3.5 percent, respectively. The results are not surprising: A lower growth rate of the money stock over the period would have produced an improved performance of the economy. Again, use of constant quarterly growth rates in the money stock does not introduce great quarterly variability into the GNP generated by the model.

The next set of experiments concern a money rule which is constrained by a maximum allowable interest rate change. The same 4.25 percent money rule was applied to the model, provided that the Treasury bill rate did not change during the quarter by more than a

specified absolute amount. If the rate change fell outside the range, the money rule was abandoned for the quarter, and bank reserves were changed sufficiently to bring the bill rate change back to its allowable range. Several absolute change values were attempted; results for absolute changes of 30 basis points and of 10 basis points are reported.

The results indicate that placing sufficiently narrow bounds on the allowable change in the bill rate can have a large impact on simulated GNP. Figure III shows the differences between the simulated GNP values for the straight (4.25 percent) money rule and those subject to maximum absolute changes of 30 and 10 basis points, respectively. In both cases, because interest rates could not rise rapidly in the later periods, there was a definite tendency to add to the excess demand conditions. The results suggest that, for the period of simulation, a simple money rule dominates one which seeks to limit quarter-to-

FIGURE II

EFFECTS ON GNP OF 4.00% and 3.50% GROWTH RATES IN MONEY:
DEVIATIONS FROM CONTROL SIMULATION

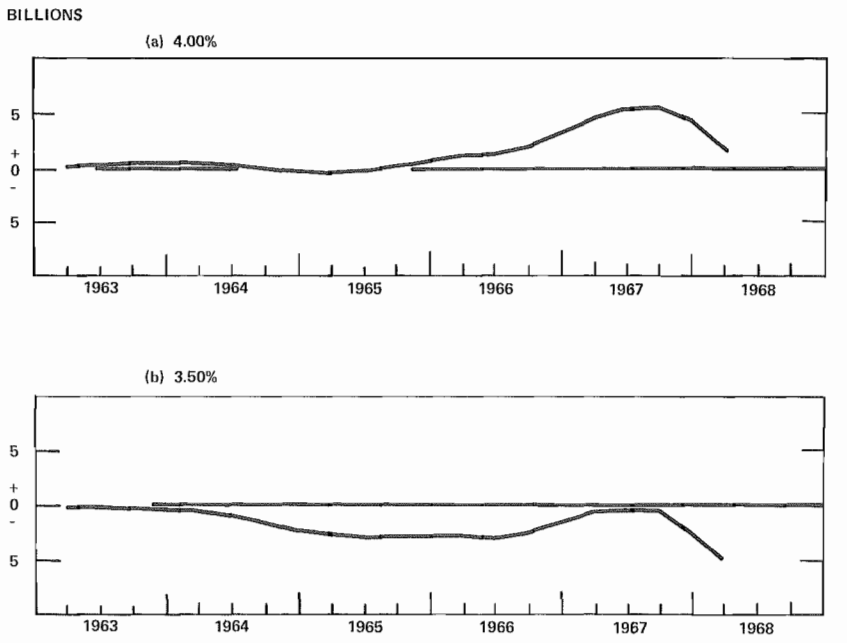
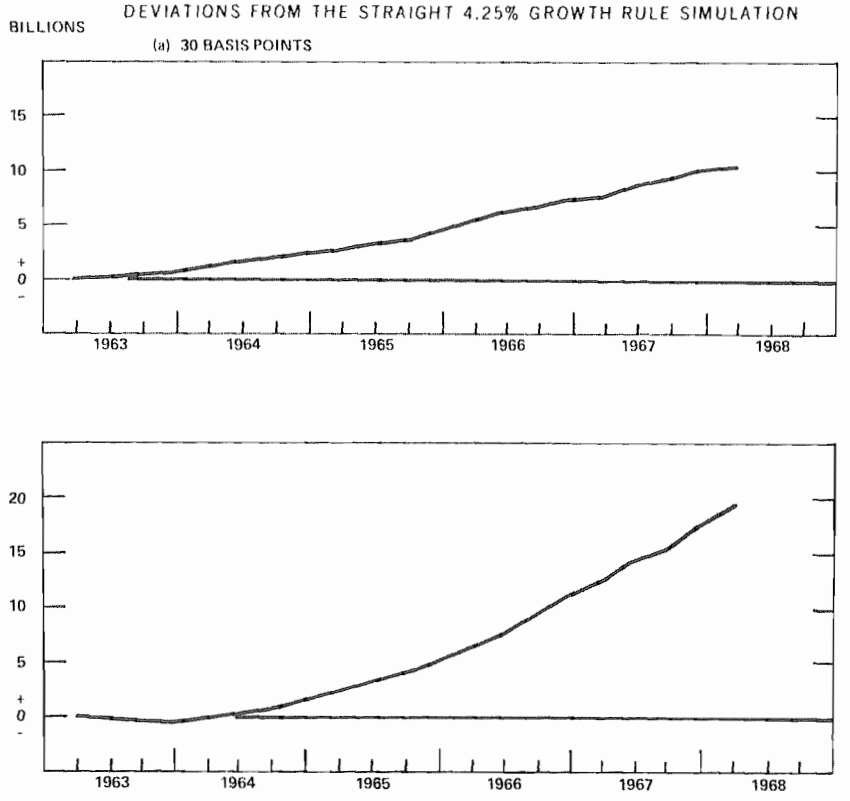


FIGURE III

EFFECTS ON GNP OF 4.25% GROWTH IN MONEY SUBJECT TO A MAXIMUM ABSOLUTE CHANGE IN THE BILL RATE: DEVIATIONS FROM THE STRAIGHT 4.25% GROWTH RULE SIMULATION



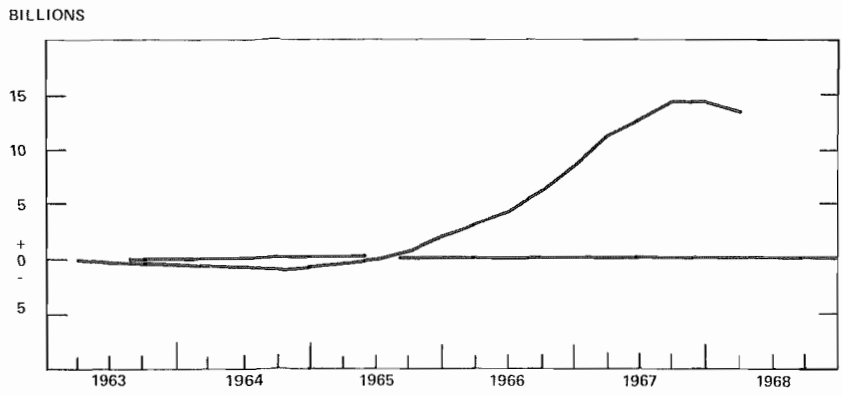
quarter changes in the bill rate. During the period, an inverse rule between money and interest rates was apparently called for.

Another set of simulations deals with imposing an interest rate rule on the economy. Here the initial simulation was one in which the interest rate was made to rise at a constant annual rate (11.7 percent) from a base period of 1963-I to achieve its actual value in 1968-I. In this simulation the money stock is endogenous.

The simulation results from applying the interest rate rule, taken as deviations from the control simulation, are reported in Figure IV. The results are quite similar, but somewhat larger in magnitude, than those obtained for the money growth rate rule. Preventing interest

FIGURE IV

EFFECT ON GNP OF CONSTANT BILL RATE GROWTH:
DEVIATIONS FROM CONTROL SIMULATIONS



rates from rising rapidly in 1966 and 1967 would have added to the excess demand in the economy.

The remaining simulation experiments examine the influence on the simulated performance of the economy of an interest rate rule which is constrained by a maximum range of money growth rates. Several ranges of money growth were attempted; a 2-6 percent range had virtually no impact on simulated GNP. Figure V shows the difference between the simulated GNP values for the straight interest rate rule and those for maximum ranges of 3-5 percent and 3.5-4.5 percent in the annual growth rate of money. The constraints were effective in 5 and 7 quarters, respectively.

The results suggest that this combination rule would have been beneficial over the period of simulation. Not only is the expansion of GNP retarded during the later quarters of simulation but also the economy pursues a more steady path of expansion.

3. *Conclusions*

The results of the simulation experiments suggest that rules of thumb may be a useful guide to policy. While rules are not infallible—as the money growth with maximum interest rate change rule indicates—they appear to be capable of providing stability to the economy. In particular, a combination interest rate-money stock rule

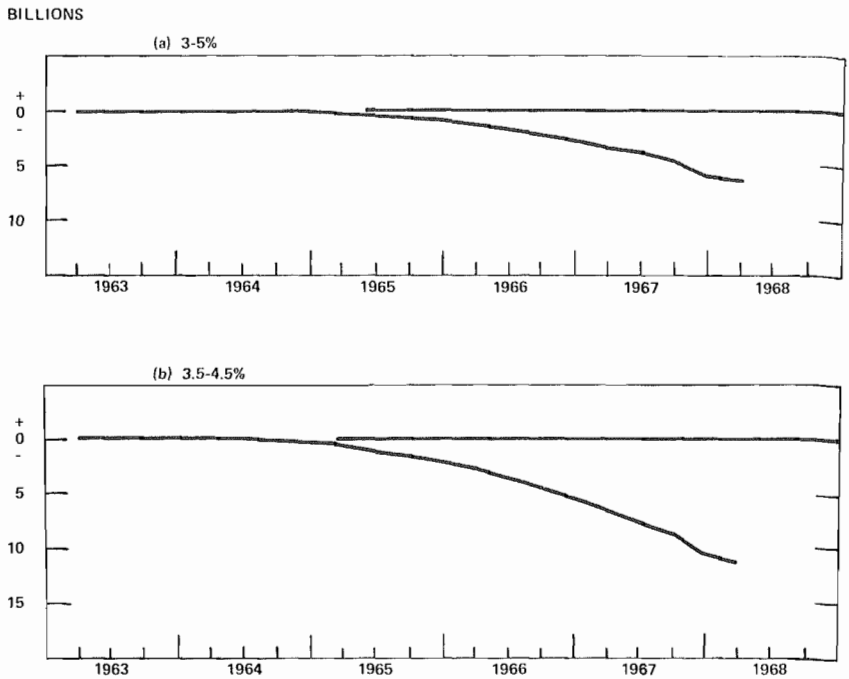
which limits the range of growth of the money stock appears to be a particularly promising rule of thumb.

Some words of caution about the results are clearly in order. First, the appeal of rules may be dependent on the model used for simulation. Second, experimentation indicates that the short-run response of the economy to a particular rule is dependent on the initial conditions from which the simulation is begun. This suggests that, if rules are to be applied, they should be established gradually. To be successful, the application of a rule has to get off on the right foot. Attempts to override unfavorable initial conditions with a rule may seriously disrupt the economy for several quarters, if not permanently.

The experiments reported in this paper have only scratched the surface of the rules versus authority issue. They do indicate that the

FIGURE V

EFFECT ON GNP OF CONSTANT BILL RATE GROWTH
SUBJECT TO MAXIMUM MONEY GROWTH RATES:
DEVIATIONS FROM THE STRAIGHT BILL RATE GROWTH SIMULATION



subject is worth pursuing in more detail. The results indicate that simulations with complex models may support the use of simple rules of thumb for monetary policy. The application of the rules to competing models may provide further useful information. Equally important is the need of analyses to determine the sensitivity of the results to the particular parameter estimates used. Stochastic simulations might also provide important insights into the problem.

While the derivation of optimal policy decision rules for known structures is an important undertaking, it appears, however, that there may be a substantial immediate payoff to designing suboptimal operating rules for policy.

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DISCUSSION

DAVID MEISELMAN

I regret that I have had little time to examine the simulation results reported in Jim Pierce's excellent paper. I suspect that, even if I had had much more time, I still would have had difficulty going through the model's complex interactions and lags because of the model's immense detail. I shall therefore take the liberty of devoting most of my comments to related questions of the interpretation of these results and to some of their theoretical foundations. In that sense, some of my comments are also relevant to some of the other analyses used at this conference, as well as to several of the central issues raised in the interesting paper Kareken presented yesterday afternoon.

In addition, I wish to note that I attended another famous lunch today at which Jim Duesenberry made a very apt comment that I shall quote later. Also, I have some additional details about that famous breakfast yesterday morning which Henry Wallich discussed in his comments at the opening session of the conference.

Pierce wisely distinguishes between the two separate but related problems of, one, the most appropriate model to apply to best describe or analyze the relationship between monetary instruments and indicators on the one hand, and economic aggregates on the other hand; and, two, the determination of the appropriate decision rules to be followed by policymakers in setting their instruments, given their goals and given their models. Jim then goes on to discuss the decision rule problem, not the question of which model is best. I have little quarrel with this exercise, provided we keep in mind that it is an exercise whose results depend crucially on the model used.

Jim Pierce discusses two models. The first is the Hicks IS-LM apparatus as used by Bill Poole, my former colleague at Johns Hopkins. Poole's analysis is derived from the comparative status of the Hicks model, and analyzes the consequences of each schedule being subject to stochastic disturbances in a world in which the source of change in aggregate income can be readily identified—which in this context is whether it is the IS or the LM curve which shifts to initiate a change in income and interest rates.

I agree with many of Poole's formal conclusions that, in principle, in a world of perfect knowledge, using two instruments—(1)changing the stock of money and (2) fixing interest rates—results in a lower expected loss; and that, if most of the instability lies in the IS curve because of unpredictable shifts in either saving or investment, it is best to pursue a money stock rather than an interest rate target; and that, if instability lies in the LM curve because of unpredictable shifts in the demand for money, then an interest rate target is best. For, with a fixed stock of money and given the demand for money, if there is an unanticipated shift in either investment or saving, (or government expenditures and/or tax rates), interest rates will change to moderate the change in income stemming from these disturbances.

For a given stock of money, how much of the initial disturbance will be offset depends on the interest elasticity of the demand for money. At one extreme, if the demand for money is zero interest elastic, making income velocity a constant in this context, nominal aggregate income remains the same. At the other extreme, if the demand for money is infinitely elastic with respect to interest rates, we are confronted with the specter of the liquidity trap. Interest rates remain the same, and there are no offsetting forces at work. Regarding evidence for the liquidity trap, I note that study after study shows that the demand for money has a very low, but not zero interest elasticity—not the very high interest elasticity required to approach the liquidity trap situation. In addition, the substantial variability in interest rates, as well as their rising trend in recent years, hardly squares with the constant and very low rates required for the liquidity trap.

Note one simple rule for central bank action. Change the stock of money to accommodate changes in the quantity of money demanded. Another way of putting it is that M be changed to offset any shift in V. In the absence of growth, if the IS curve is given, this is accomplished by a fixed interest rate target achieved by appropriate monetary change, holding aside all of the problems of lags as well as considerations regarding how to identify the source of any disturbance to interest rates or to income, or how the change in the money stock takes place.

Objections to the Poole Analysis

There are many things that bother me about the Poole analysis. I shall take up three of them. The first is the presumption that the IS

curve and the LM curve are independent. This is a very crucial assumption that tends to be made repeatedly when the Hicks apparatus is used in technical discussions, as well as in related discussions which implicitly depend on the apparatus.

Second, Poole assumes a negatively sloped IS curve. My own judgment is that, under a wide range of circumstances, the IS curve is best taken to have a positive slope. This is one of the reasons it becomes very difficult indeed to identify the source of the disturbance that leads to a change in either interest rates or aggregate nominal income. With a positively sloped IS curve as well as a positively sloped LM curve, income and interest rates will tend to move in the same direction whether the initial disturbance is "real", in the sense that it is initiated by a shift in the IS curve, or "monetary", in the sense that it is initiated by a shift of the LM curve.

Third, the price level is essentially excluded from the analysis. Among other things, we have no way of knowing whether interest rates are nominal or real—although in one sense, because no price level effects are taken into account, especially regarding expected prices, real and nominal rates are the same. On the other hand, it is clear that the LM curve depends on the nominal rate of interest—the cost of holding money—but the IS curve incorporates the real rate of interest because saving and investment depend on real magnitudes.

If the IS curve and the LM curve are independent, which is the usual textbook case as well as the case implicit in most discussions of macro phenomena, this essentially comes down to a presentation of much of the old Keynesian presumption of fact regarding the sequence of events following a change in either the supply of or demand for cash balances. As you know, the sequence is from money to bonds (or interest rates), to goods. Money buys only bonds, a convenient short-hand expression for all debt instruments; money never buys goods or equities. Money affects the aggregate demand for goods only insofar as the change in bond prices and nominal interest rates caused by shifts in the stock of money (or the demand for money) alter desired saving or desired investment.

In other words, money is to lend, never to spend. Thus, if there is a shift of the LM curve and the LM curve is understood to move along the given and fixed IS curve, this is another way of asserting that the disturbance initially affects only the bond market. People with more or less money in their portfolios than they prefer to hold under existing alternatives attempt to adjust to their preferred cash

position only in the bond market, selling bonds to acquire more cash, or buying bonds with the redundant money, thereby affecting bond prices and interest rates. As interest rates change there is the related question of the response of either saving or investment to the new interest rates. In effect, any direct shift between money and goods is ruled out.

Note that, if people attempt to move between money and goods in order to eliminate a disequilibrium on money account, we essentially have a shift of the LM curve which causes a corresponding shift in the IS curve without, in the first instance, any intervening change in the interest rates! If we follow Poole's rule with respect to offsetting changes in the demand for money which happen to adjust, as above, at the money-goods margin rather than at the money-bonds margin, we will tend to cause the economy to explode.

To illustrate the point, let us spell out what would happen if, in fact, disequilibrium on money account directly affected the demand for goods. Consider a reduction in the demand for cash as people wish to shift out of cash and into goods. It makes little difference whether the goods are consumer goods or capital goods. In the first instance, aggregate expenditures rise but interest rates remain the same. Later, interest rates will tend to rise in response to the higher level of aggregate demand because of (1) the resulting change in the quantity of money demanded to match the new higher level of spending—an increase in the transactions demand for money if you wish, (2) an increase in the productivity of capital, or (3) an increase in prices leading to an upward revision of the expected rate of change of prices.

In the face of these adjustments, if we tried to pursue a policy of fixing nominal interest rates, income would rise faster as interest rates were prevented from rising by an increase in the stock of money, and the equilibrium rate of interest would rise still more. If the policy of supplying still more money to moderate or stop the rise in equilibrium interest rates stemming from this disturbance continued long enough, the system would explode. Alternatively, if we consider an increase in the demand for cash, where people wish to shift out of goods into cash, we get just the opposite result. In the first instance, nominal income would fall, but interest rates would remain the same, later to be pulled down as a consequence of the fall in aggregate demand. A policy of maintaining the level of interest rates in the face of downward pressure on interest rates would cause the economy to implode.

Of course, the speed of adjustment toward full chaos would increase if, as income rose or fell, there was a corresponding change in prices leading to a change in price expectations and, thereby, to a change in nominal interest rates. These considerations present a serious problem, perhaps an insuperable one, when alternative policies are available—the use of each depending on which of the two schedules is understood to have shifted.

The traditional IS-LM analysis is deficient in dealing with concurrent or expected prices. In that respect, the analysis shares some of the problems we all have in coping with price level phenomena and in separating changes in nominal aggregate demand into changes in prices and changes in real output. (The Federal Reserve Board-MIT model has its own special difficulties here; its price equations leave much to be desired.)

In view of these considerations, it seems to me that there is much danger in following any interest rate target to offset changes in the demand for money—the only formal case which has been made for an interest rate target at this conference. These dangers can largely, but not completely, be avoided by following a money supply target or a money supply indicator in the context of a monetary rule for stable monetary growth, especially since there is much accumulated evidence that the demand for money is highly stable.

At the famous lunch I attended this noon I happened to mention this point to Jim Duesenberry, who commented that a money supply target has automatic stabilization properties but an interest rate target has open-door properties. I quite agree.

The third point I wish to make regarding use of the Hicksian apparatus is that, if, in fact, the IS curve has a positive slope, then we cannot, by examining interest rate and income data, identify the source of the change in either interest rates or income as being either "monetary", that is, a shift of the LM curve resulting from a change in either the supply or demand for money, or "real", that is, a shift of the IS curve resulting from a change in saving or investment. Income and interest rates will tend to move in the same direction whichever class of phenomena initiate the macro disturbance; we can readily increase the instability of both aggregate demand and interest rates by trying to fix the rate of interest at the wrong time, as indeed has been the sad case so frequently in the past. This holds even under the most generous interpretation of assumptions questioned above that adjustments to a change in the demand for money or to a change in the stock of money take place exclusively at the money-bonds

margin. Identifying the sources of change are still more difficult once we acknowledge that we do not start with the world in static equilibrium and that we must consider lags and rigidities, expectational and speculative factors, and practical questions regarding which interest rates to consider for policy purposes.

Regarding the Federal Reserve Board-MIT model, of course, the specific results of this experiment flow from the structure of the model itself and the model may leave much to be desired as an accurate representation of the real world. In that connection, it is important to note that changes in the stock of money work with very long lags in the Federal Reserve Board-MIT model. The lags of the model seem to be among the longest recent investigators have reported. For example, I believe the Federal Reserve Board-MIT lag is almost double the one Milton Friedman has reported. I merely wish to point out that the long lags Friedman found in his research have been a crucial factor in his case against discretionary monetary policy and for a monetary rule, and that the Federal Reserve Board-MIT findings of still longer lags may be strengthening Friedman's case excessively!

Extension of the Surtax

I shall close my comments with some additional details about the famous breakfast that Henry Wallich mentioned in his remarks at the opening session of the conference. In discussing the current problem of the extension of the surtax Henry summarized my position on the surtax as "So what?" Henry was correct in stating that I did not believe the temporary extension of the temporary tax would be a very effective or crucial element in the anti-inflation program, but I think it would be useful if I briefly elaborated several of the points in the breakfast discussion because I believe there were some interesting elements in it. What I did say was that I thought that, in terms of the *direction* of effect, extending the surtax would be helpful in stemming inflation and perhaps in moderating some of the pressure on interest rates, but that I believed these effects would be quite small, which would be consistent with the effects the surtax had when it was enacted a year ago. The case for its limited effectiveness would seem to be especially strengthened because the current proposal is that the surtax be extended temporarily, cut in half after six months, and that it be fully eliminated in a year. On the basis of virtually everybody's sophisticated theory of either consumer outlays or outlays for capital goods, the temporary nature of the tax plus its

relatively low rates means that its total effect on private demand is likely to be very small indeed, holding aside the independent effects of monetary policy. With private spending little effected, the measure can have only trivial effects on interest rates. The tax would largely fall on private saving, which will tend to offset the tendency that a smaller Federal Government deficit would lower interest rates.

Before we had an opportunity to discuss some of these details, Frank Morris had cited an article in the *New York Times* of the day before which had raised doubts that Congress would approve any extension of the surtax. Frank said, "I shudder to think what would happen if the surtax were not extended." I hope Frank found some calm in my analysis.