An Evaluation of Financial Targets in Six Countries*

Introduction

Central banks in formulating and implementing their monetary policies generally aim at bringing about changes in certain financial variables as a first step in their efforts to influence the ultimate targets of policy. In the first section of this paper we survey the financial targets of six central banks, focusing particularly on the distinction between operating and intermediate targets. The six countries covered in the study are the U.K., Japan, U.S.A., Germany, France and Italy. A second section attempts to present a general framework by which to evaluate the diverse financial targets; a brief final section makes some concluding general comments on the analysis of the paper. An Appendix demonstrates somewhat more rigorously some of the points made in the text while a second Appendix examines the role of indicators of the monetary thrust and attempts to distinguish indicators from targets.

1. Survey of Financial Targets in Six Industrial Countries

Financial targets may be divided into *operating targets* and *intermediate targets*. *Operating targets* are positioned somewhere in the transmission process between policy instruments, directly controlled, and intermediate targets. *Intermediate targets* are positioned somewhere between operating targets and ultimate targets of policy (employment, inflation, balance of payments). Intermediate variables either directly influence expenditure or are very directly and closely related to financial variables that do.

Examples of operating targets are free reserves, base money, short-term interest rates more or less directly influenced by the monetary authorities.

Examples of intermediate targets are bank credit, money supply, some short-term market interest rates, long-term interest rates.

The distinction between an operating target and an intermediate target turns then on the proximity of the financial variable to the policy instrument. (On this definition the point at which the line between the two should be drawn is essentially arbitrary).[1]

A survey of the financial targets on which the six central banks have focussed since 1960 reveals not only some differences between these central banks but also significant shifts in emphasis in individual countries over the period.

Of all the countries the *United States* has not only changed the emphasis in its operating and intermediate financial targets most; it has also developed the theory with the greatest degree of sophistication and there has been an interesting interaction between theoretical-academic opinion and the evolving thinking of the policy-makers at the Federal Reserve. Until 1966 the operating target of policy was most frequently expressed in terms of "money market conditions", while intermediate targets were not explicitly laid down. The Open Market Committee would direct the Desk Manager to "maintain", "ease" or "tighten" money market conditions which tended to be identified in varying degree with (a) member bank borrowings; (b) the net free reserve position of the banks; (c) the Federal Funds rate (and sometimes the Treasury bill rate).

Beginning in 1966 the Committee supplemented its references to "money market conditions" by reference to some intermediate financial variable. This variable was nearly always bank credit. The Board would project the rate of growth of bank credit consistent with desired money market conditions; the FOMC

* This is a chapter in a larger study of the monetary policies of six industrial countries. This article was prepared on the basis of the work the author undertook as a Consultant to the OECD from November, 1972 to May, 1973. It however represents the author's personal view and not that of the OECD.

1 For example where ceilings on bank credit are imposed bank credit may be more appropriately viewed as an operating rather than an intermediate target.

would then direct the Desk to tighten (ease) money market conditions if the actual growth of credit exceeded (fell short of) the projected growth. Although it is now generally agreed that the "proviso clause", introduced after 1966, represented some shift of emphasis towards control over intermediate financial variables expressed in terms of monetary aggregates, it did not make any real impact on the choice of operating targets, which remained very largely oriented towards "money market conditions". A major change in emphasis did, however, occur in early 1970 when directives throughout that year tended to be explicitly expressed in terms of money supply and bank credit as intermediate targets. But during 1971 the FOMC became concerned both with monetary-credit aggregates and interest rates and in 1972 the main operating target had become reserves against private deposits (RPDs).[2]

In *Germany,* the principal operating target of policy has been the ratio of the volume of the banks' free liquidity to deposits.[3] Free liquidity is defined as bank reserves, less required reserves and central bank advances, plus freely available liquid assets (including foreign and domestic and unused rediscount quotas). On the other hand, intermediate targets have not been laid down explicitly. The authorities seem to have taken an eclectic attitude, trying to influence both interest rates and broader monetary aggregates, particularly the volume of bank credit.

In *Italy,* the main intermediate target of policy has been the volume of bank credit but the long term interest rate on government bonds was also a dominant intermediate (as well as operating) target of policy in the years when this interest rate was pegged. In the early half of the 1960's, the operating target was the total reserves of the banking system. Since mid-1960's, the volume of base money in the System[4] has emerged as the operating target.[5] This is defined to include the liabilities of the

2 The literature for che U.S.A. is extensive. See particularly: *Open Market Policies and Operating Procedures,* Staff Studies, Board of Governors of the Federal Reserve System, 1971, and *Controlling Monetary Aggregates II: the Implementation,* Proceedings Conference, September, 1972, Federal Reserve Bank of Boston and literature cited in these two references.

3 See *Monthly Reports* of the Deutsche Bundesbank.

4 At least since about 1965. Prior to that it was excess reserves.

5 A. Fazio, "Monetary Base and the Control of Credit in Italy", in this *Review,* June, 1969. G.F. Caligiuri, A. Fazio and T. Padoa - Schioppa, "Demand and Supply of Bank Credit in Italy", forthcoming, *Journal of Money, Credit and Banking.*

central bank (currency + cash of the banking system — the traditional definition) plus postal deposits in the hands of the public, certain domestic assets easily convertible at the central bank for base money, the undrawn collateral loan line and certain free foreign liquid assets.

Despite some important similarities in approach in Italy and Germany, there are, nevertheless, differences worth noting in the way in which the operating target of policy is defined. In Italy base money includes those liquid assets, including cash, which are legally required to be held against deposits whereas in Germany required reserves are excluded. In Italy currency and postal deposits held by the non-bank public are included but in Germany currency is excluded and there is no counterpart to postal deposits. In Germany deductions are made for central bank advances which are considered temporary and represent a commitment on bank reserves, while in Italy advances are not deducted from base money. Both countries, though, include highly liquid domestic and foreign assets (in Italy those not subject to directives) and the unused portions of credit ceilings allowed by the central banks.

The case of the *United Kingdom* is somewhat more difficult to interpret. The position until late 1968-69 could be described as follows. For demand management purposes, the major intermediate target was the volume of bank credit (or, better still, credit extended by a number of financial institutions). Open market policy at the long end of the market, was, however, dominated by considerations of debt management; at the same time there was little inhibition in bringing about sharp variations in interest rates at the short end of the market, frequently to achieve external objectives. Hence until 1968-69 bank credit and interest rate policies served a number of (sometimes conflicting) objectives. Between late 1968 and 1971, broader monetary aggregates gained importance as intermediate targets, in line with the emphasis on the use of open market operations for demand management rather than debt management. During both the financial years 1969-70 and 1970-71, official targets for broader monetary aggregates were expressed in terms of total domestic credit expansion of the banking system as a whole. In the financial year 1971-72, the target shifted from domestic credit expansion to bank credit and the money supply. Bank credit was an operating

target as well as an intermediate target. Since the abolition of credit ceilings in 1971, the monetary authorities seem to have revived their focus on banks' liquid assets and short-term interest rates as operating targets.[6]

In both *Japan* and *France* the intermediate target of monetary policy for demand management has been the volume of bank credit. The problem of choosing operating targets has been less important, to the extent the authorities resorted to direct controls on bank credit. But in *Japan* where credit ceilings were applied to only part of the banking system, the banks' reserve position and call money market rates were important operating targets both in periods of restraint and in expansionary phases.[7] In *France* bank liquidity seems to have been used as an operating target under "normal" circumstances.[8]

By way of summary then it appears that all of the six countries have attached some importance to bank credit as an intermediate target of policy. The money supply, as such, assumed importance as a target beginning in 1970 in the U.S. and beginning 1971 in the U.K. In both these countries, though, there has been some apparent reversal in emphasis in the last year or so. Only the U.K. has experimented with a domestic credit expansion target. In Italy and the U.K. considerable importance is attached to interest rate policy at the long end of the market. Both Italy and Germany have focussed on operating targets (base money and the free liquidity ratio of the banks respectively) as a first step in controlling the volume of bank credit. More recently the U.S. too has focussed on operating targets (reserves against private deposits) as a step in the control of the money supply. During most of the 1960's in both the U.K. and the U.S. interest rate targets were of considerable importance. In some countries (notably the U.K., France and, to a lesser extent, Germany) attempts were made to direct short term interest rates to external objectives while the volume of bank credit was manipulated for demand-management.

6 See "Monetary Management in the U.K.", Bank of England *Quarterly Bulletin*, March, 1971.
"Money Supply and Domestic Credit", *Economic Trends*, May, 1973.
J. Waters, *Money Supply and Credit*, National Westminster Bank, November, 1969.
D. Kern, *The Implications of D.C.E.*, National Westminster Bank, November, 1970.

7 See *Monetary Policy in Japan*, O.E.C.D., December, 1972.

8 See *E.E.C. Study of Monetary Policy Instruments in France*, 1972.

2. General Consideration Governing the Selection of an Operating Target

Since intermediate targets, and particularly the money supply, are in general not directly controllable by the monetary authorities, there is need for an operating target, closer to the policy instruments, which will provide a more direct guide on the effects of policies on the financial sector. Having reviewed the kinds of operating targets which were considered important in the six countries, we now outline a simple general framework, permitting an evaluation of alternative operating targets.

If the monetary authorities, over the relevant planning horizon, had complete knowledge of the structure of the economy and were able accurately to forecast all exogenous developments (such as the demand for exports) there would be a unique constellation of financial variables, including intermediate and operating variables, which would yield exactly the outcome desired. In these conditions, the problem of choice amongst alternative operating targets simply does not arise since by definition they would all yield identical results. In practice, of course, there is only very incomplete knowledge; hence, under uncertainty, it is necessary to select the operational target which is likely to minimise the errors around the expected (targeted) outcome.

We take the desired (expected) outcome to be some level of income (corresponding to some level of employment).[9] We assume that the monetary authorities have a choice of six operating targets which they are able to completely control:[10] these are a short term interest rate, total base money (H), bank reserves (R), unborrowed bank reserves (UR), (bank reserves less central bank borrowings) the free bank liquidity ratio (FR) (where liquidity is taken to include assets saleable to the central bank and unused credit quotas, and domestic credit expansion (DCE) (defined as the difference between the money supply and the net foreign assets of the consolidated banking system). These operating targets

9 Of course, the authorities do not focus on domestic targets alone. They may also want to take account of the effects of error, say, on the volatility of their international reserves. For a discussion of this point see: V. Argy and P. Kouri, "Sterilisation Policies and the Volatility in International Reserves", forthcoming, in R. Aliber (Ed.) *National Monetary Policies and the International Financial System*, University of Chicago Press.

10 Needless to say, this is not totally realistic.

have been selected because, as the discussion in the previous section showed, they are the ones on which central banks have tended in the main to focus.

For simplicity, we focus on only five types of uncertainties (errors): one arising from misreading the strength (weakness) of private expenditure, a second arising from unanticipated shifts in the demand for money, a third arising from unexpected shifts in the demand for currency to hold, a fourth originating in unexpected changes in the demand for reserves by the banking system [11] and a fifth arising from unexpected changes in the net foreign assets of the consolidated banking system. Unexpected changes in net foreign assets are assumed to originate either in a change in private capital inflow or in a change in exports. These unanticipated developments will produce an outcome in terms of income which will be different from the expected outcome. The problem for the monetary authorities is then to find that operational target which will, in the face of these unanticipated developments, minimise the deviations from the expected outcome.

In analysing this problem we make use of a macro framework which is basically Keynesian, with both private expenditure and the demand for money responding positively to income and negatively to interest rates. Net foreign assets of the consolidated banking system are assumed to be a negative function of income and a positive function of the interest rate. On the money supply side, it is assumed that the demand for currency responds to income, that the reserve deposit and free liquidity ratios are sensitive to interest rates, that borrowings from the central bank respond positively to interest rates.

The full model and the proofs are provided in an Annex.

The attached Table sets out the results for the five types of unexpected disturbances. The Table ranks the five operating targets in order of the degree to which they are stabilising in relation to expected income.[12]

11 This may be due to changes in the distribution of reserves amongst banks with different preferences for liquidity or say due to changes in the economic outlook.

12 A weakness in this analysis is the fact that it tends to disregard lags in the effects of monetary changes. For example a shift in expenditure which is accommodated by an increase in the money supply is assumed to be destabilising, but this need not be the case if the increase in the money supply exerts most of its influence in the planning periods that follow.

Consider first the case of an unexpected change (increase) in expenditure. With income and interest rates rising there will be an increase in the demand for currency and an increased willingness on the part of the banks to operate with a lower level of excess reserves (lower their reserve/deposit ratio). If the authorities maintain the total of base money the increased demand for currency will push in the direction of reducing the money supply (by absorbing more bank reserves) while the lower desired reserve/deposit ratio will push in the direction of increasing the money supply. If the former is dominant (as is quite likely, especially in countries where there are virtually no excess reserves) then it is possible for the money supply to fall in the face of an increase in expenditure (which is stabilising). Where bank reserves (BR) are maintained, any increases in the demand for currency will be neutralised by the injection of additional reserves into the banking system, but so long as excess reserves are sensitive to interest rates there will be some accommodating increase in the money supply. Where unborrowed reserves is the operating target the money supply will be still more accommodating since the maintenance of unborrowed reserves at a fixed level will allow the banks to increase their borrowings from the central bank. In the case of an interest rate target the central bank will need to provide reserves sufficiently to maintain the interest rate at the same level. With a free liquidity ratio the central bank will need to provide free reserves so as to maintain the free liquidity ratio; since the free liquidity ratio is itself a function of market interest rates this would be tantamount to maintaining interest rates. Interest rates and free liquidity ratios are then identical in their effects and, for unexpected changes in expenditure, are also the most destabilising of the operating targets.

In the case of domestic credit expansion, the outcome depends on the degree of sensitivity of the capital account to changes in the domestic interest rate. Where capital movements are not very sensitive increases in expenditure will worsen the foreign account, which in turn will tend to reduce the money supply which is stabilising. (With DCE fixed the money supply moves with the foreign balance); but when capital movements are very sensitive, as in highly integrated economies, the foreign account will improve and the money supply will increase which is destabilising. At one extreme, then, when financial integration is very low, DCE

Unanticipated Change in:	*Rankings Operating Targets* (From most to least stabilising)	
1. Expenditure	DCE	H R UR I, FR
2. The Demand for Deposits	DCE	I, FR UR, H(?) (1) R
3. The Demand for Currency		I, FR, DCE UR R, H(?) (1)
4. Demand for Reserves		I, DCE UR, H(?) (1) R FR
5. Private Capital Inflow		I, FR, UR, H, R, DCE
6. Exports	DCE	H R UR I, FR

(1) Question mark indicates the two in the same row are difficult to compare.

may yield results analogous to and as stabilising as, base money; at the other extreme e.g. when financial integration is perfect the results are as destabilising as the case of interest rates.

Consider now the case of an unexpected change (increase) in the demand for deposits. Financial markets will be under pressure and interest rates will tend to rise. With interest rates and the free liquidity ratio as operating targets reserves will be supplied so as to maintain the original level of interest rates, in this way completely accommodating changes in the demand for money. Hence, these two operating targets will be perfectly stabilising in their effects on income. With the level of unborrowed reserves maintained the money supply will increase, in part because the reserve/deposit ratio will fall but also because borrowings will increase. When total base money is the operating target there will also be some accommodating increase in the money supply, partly again because the reserve deposit ratio falls but also in this case because with income falling the demand for currency will

drop and this will increase the portion of base money held as reserves. Where bank reserves is the operating target the increase in the money supply will be due solely to changes in the reserve/deposit ratio. Hence, bank reserves will be the least stabilising of these operating targets.

The outcome for DCE again depends on the interest sensitivity of capital movements. At one extreme where financial integration is perfect the increase in the demand for money will be fully accommodated by an inflow of funds from overseas. This result is perfectly stabilising and identical to the case where the interest rate is the operating target. When, however, financial integration is very low there will be significant deflationary effects on income.

The case of an unexpected change (increase) in the demand for currency is somewhat more complicated. It is assumed that the increase in the demand for currency is at the expense of deposits so that there is an equivalent drop in the demand for deposits. Where base money is the operating target the initial drop in the demand for deposits is exactly matched by the drop in the supply of deposits; there are, however, secondary effects due to the loss of reserves by the banking system. This will set off a multiple deposit contraction which will be destabilising. As income falls, some of the initial loss of reserves will be returned to the banking system.

When bank reserves are maintained the effect of an increase in the demand for currency will actually be expansionary. The reason is that by maintaining the original level of reserves the level of deposits will tend originally to be maintained; but since the demand for deposits has now dropped there will be an excess supply of deposits, which is expansionary. Much the same happens when unborrowed reserves are maintained except that this case is somewhat more stabilising since some of the expansionary effects will tend to be weakened by the repayments of borrowings (due to falling interest rates). Finally, maintaining the interest rate, the free reserve ratio or domestic credit expansion will be completely stabilising.

In the case of an unexpected increase in the demand for reserves, there is a very significant difference between the interest rate and the free liquidity ratio. Consider the simple case where the desired free liquidity ratio at given interest rates falls.

Then we will observe simultaneously an expansion of deposits, a *fall* in interest rates and a *fall* in the free liquidity ratio. To maintain the *original* interest rate the monetary authorities will have to *reduce* the volume of free liquidity which will be stabilising. But with the free liquidity ratio falling the authorities will *increase* the volume of free liquidity in order to maintain the original liquidity ratio — which is very *destabilising*. Less destabilising than the free liquidity ratio is the policy of maintaining bank reserves. Still less destabilising is a policy of maintaining unborrowed reserves or base money, in the first case because of variations in borrowings, in the second because of variations in the demand for currency. DCE will be as stabilising as the interest rate.

In the case of an unexpected change in the inflow of private *capital,* only domestic credit expansion will generate some instability; the other operating targets will not influence income. Since these unexpected developments are likely to be of very great significance in open economies, use of DCE as an operating target is bound to expose economies to considerable instability in income.[13]

For a change in exports the relative performance of the operating targets will be very similar to the case of a change in domestic expenditure. When DCE is the operating target there will be a direct effect on expenditure and additionally the money supply will be allowed to change by the change in exports, which

13 Recent experience by industrial countries suggests that the Phillips Curve may be quite unstable. It is useful therefore to consider, briefly, the performance of the operating targets for unanticipated shifts in the Phillips Curve. There is in this case a conflict between two domestic targets; the level of employment on the one hand, the rate of inflation on the other. Operating targets which tend to be stabilising (destabilising) to the rate of inflation will be destabilising (stabilising) in relation to the rate of unemployment. In general, given an exogenous disturbance to the domestic price level, the more accommodating is the money supply the more destabilising will be the effect on the rate of inflation but on the other hand, the more stabilising is the effect of the level of employment. Consider for example the case where the interest rate or the free liquidity ratio is the operating target. With prices tending to rise the accompanying increase in the demand for money will tend to push up domestic interest rates. The monetary authorities will respond by accommodating the increased demand for money so as to maintain the original interest rate. This will support the price push, but at the same time prevent any unemployment from developing. Suppose, however, the operating target is bank reserves: in this case the accommodation will be only partial. Here the increase in the interest rate will be allowed and this will have some adverse effect on the level of employment which in turn will attenuate the rise in prices. An operating target then which is a built-in-stabiliser with respect to the rate of inflation is a built-in-destabiliser with respect to the rate of unemployment.

will add to the instability. But it is difficult to compare unambiguously the case of DCE with the other operating targets, since as we have seen there will be some accommodating changes in the money supply when the other operating targets are effective.

Conclusions

Some interesting conclusions emerge from these results. First, a free liquidity ratio would appear, unambiguously, to be an inferior operating target to the interest rate since it performs as well (or as badly) for five types of disturbances and *worse* for the one disturbance (changes in the demand for reserves). Second, DCE would appear to be a poor operating target in open economies exposed to unexpected developments in the inflow of capital. Third, if we treat disturbances 2, 3 and 4 as originating within the monetary sector (on the demand or supply side), it is possible to conclude that the more severe the monetary disturbances in toto in relation to real disturbances, the greater is the advantage of the interest rate as an operating target as against aggregates such as base money, unborrowed reserves or bank reserves. Fourth, where the money supply is the instrument of policy (in other words, it is completely controlled), disturbances originating purely on the supply side (3 and 4) cannot have effects on income. Since the existence of such disturbances favours the use of the interest rate as a target it follows that the *less the control over the money supply, the stronger the apparent case for the use of the interest rate as an operating target.*[14] (Since, however, lack of control is not an 'institutional datum' any improvements in techniques for control over the money supply may shift the margin of advantage in favour of aggregates for operating targets). Fifth, comparisons among the three operating targets B, H,[15] UR are more difficult. Unborrowed reserves would score badly and base money would

14 This is also the conclusion of W. Poole and L. Liberman in *Improving Monetary Control,* Brookings Papers, 1972, Vol. 2, N. 2. The discussion above is a detailed extension and development of some points raised in this paper.

15 If base money were so defined to include some liquid assets held by banks (as in Italy), the destabilising effects of shifts in expenditure would be greater, but on the other hand, the stabilising effects of shifts in the demand for deposits would also be greater.

score very well if real disturbances are dominant. For all monetary disturbances both unborrowed reserves and base money score better than bank reserves. Unborrowed reserves and base money are more difficult to compare for monetary disturbances. A safe conclusion would appear to be that, in general and taking all disturbances into account, base money is probably superior to both unborrowed reserves and bank reserves as an operating target.

The key consideration in determining the optimal choice of an operating target is then the degree of unpredictability in the expenditure, money demand and money supply functions. It follows that two economies may have identical economic structures yet the optimal operating target need not be the same in the two economies if the degree of sophistication in forecasting the behaviour of these functions is different in the two economies. For example, given a particular demand function for money, the more sophisticated the expenditure function used the smaller the error in explaining expenditure; hence, that country with the more sophisticated expenditure function is more likely to opt for an interest rate target.

An important point in this context is the fact that the larger the export sector the greater will tend to be the unpredictability of aggregate expenditure. Hence, those countries with larger export sectors are more likely to be exposed to greater instability on the expenditure side.[16] Of the six countries, the U.K., Germany and Italy would be the most exposed while the U.S. the most sheltered.[17]

Finally and most important, what is the relation between the aggregates UR, H, R as operating targets and the money supply as an intermediate target of policy? For simplicity it is useful to focus on bank reserves and interest rates as alternative operating targets. It needs to be recalled that the original framework is one of planning on the basis of structural relations for a particular target, say income. With perfect knowledge, targeted income, money supply, interest rates, operating instruments will, as we

16 Although this is outside the scope of the paper, it is worth noting ways in which comparisons might be made between the countries in the extent to which they are likely to be exposed to *monetary* disturbances. On the supply side, one could compare the coefficient of variation of the excess reserves/deposit and the currency/income ratios. On the demand side, one could look at the shiftability of the velocity/interest rate schedules.

17 For the six countries the percent of GNP represented by exports (average 1967-71) is: Italy 21.5, France 15.6, U.K. 24.3, U.S. 6.7, Japan 12,7, Germany 21.9.

have seen all be achieved. Now consider which target minimises the fluctuations around the targeted money supply when there is uncertainty. Suppose real disturbances are dominant over monetary disturbances; then bank reserves is the appropriate operating target. It is also the operational target which will minimise the fluctuations in the money supply. Suppose on the other hand, that monetary disturbances are dominant, so the interest rate target is appropriate. If the dominant monetary disturbance is the shift in the demand for deposits the interest target will yield wider fluctuations in the money supply than a bank reserve target (which is in any case inappropriate). If, however, the dominant monetary disturbance originates on the supply side, the interest target will actually minimise the fluctuations in the money supply (indeed for these disturbances eliminate all fluctuations). In this special and interesting case, we have a kind of paradox, that opting for an interest

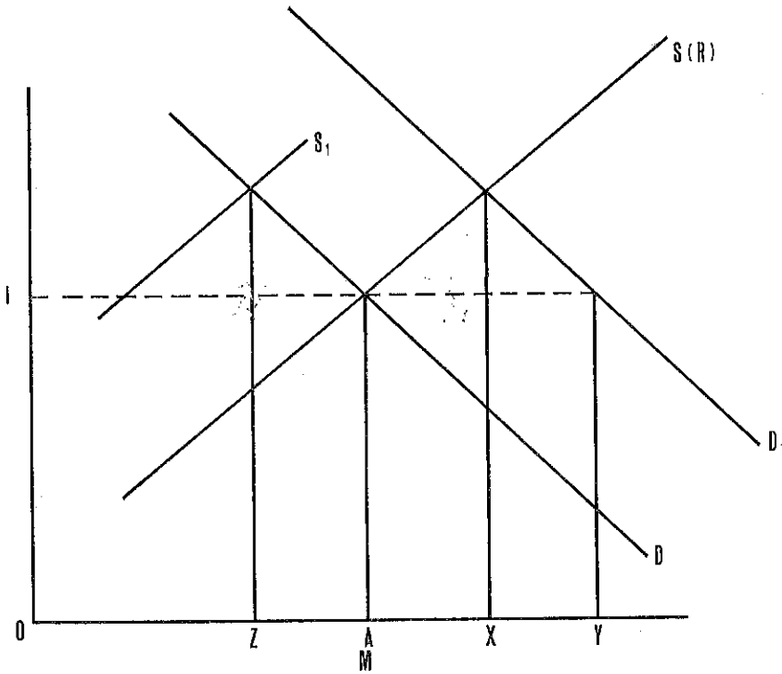

Figure 1.

target is actually more stabilising for the money supply than opting for a bank reserve target.

This particular conclusion is consistent with a recent paper by J. Pierce and T. Thomson.[18] However, it is derived from a more general analysis. The paper compares bank reserves and interest rates as operating targets and focusses only on disturbances originating either in the demand or supply functions for money. Their conclusions may easily be illustrated by reference to a simple supply-demand diagram where bank reserves (R) is a parameter of the supply function and both demand and supply of money are assumed to be sensitive to interest rates. Suppose the demand for money shifts to D_1. With a reserve target the money supply will expand to OX from OA but with an interest rate target the money supply will expand to OY. (It is worth noting that while the error in the money supply target is larger with the interest rate as a target the error is actually welcome since it is stabilising). If, on the other hand, the money supply shifts say to S_1, there will be some fluctuation in the money supply from OA to OZ with a reserve target, but an interest rate target will restore the money supply to its original level. Hence, it is concluded that if the fluctuations in the money supply are more severe than the fluctuations in the money demand function, an interest rate target will actually reduce the fluctuations in the money supply. Our more general conclusion is that if the monetary disturbances are more severe than the real disturbances, so that the interest rate is the appropriate target, the greater the instability on the supply side, the more likely it becomes that fluctuations in the money supply will be minimised.

Sidney V. Argy

18 *Some Issues in Controlling the Stock of Money* (paper presented at 47th Conference of Western Economic Assoc., August, 1972) reprinted in *Controlling Monetary Aggregates II, op. cit.*

APPENDIX I

This Appendix substantiates, by simple algebraic manipulation of a Keynesian type model, the points made in the discussion in the text on the criteria for selection of an operating target.

MODEL

Y = Income
H = Base Money
C = Currency
D = Deposits
BC = Borrowings from the Central Bank
I = Interest Rate
R = Bank Reserves
UR = Unborrowed Reserves
M = Money Supply
DCE = Domestic Credit Expansion
NFA = Net Foreign Assets of Consolidated Banking System
F = Shift in Net Foreign Assets of Consolidated Banking System
A = Expenditure Shift
L = Shift in Demand for Money
X = Shift in Demand for Currency
Z = Shift in Demand for Reserves

(1) $Y = \frac{1}{1-a_1}A - \frac{1}{1-a_1}I$ [Reduced form real sector EQUATION]

(2) $D = cY - dI + L - X$ [Deposit demand function]

(3) $H = C + R$ [Base money identity]

(4) $M = C + D$ [Money supply definition]

(5) $M = DCE + NFA$ [Identity: domestic and external components of money supply]

(6) $UR = R - BC$ [Unborrowed reserves identity]

(7) $C = eY + X$ [Currency demand equation] (1)

(1) The shift variable also appears (with opposite sign) in the deposit demand equation to reflect the fact that the shift into currency is out of deposits.

(8) $R = fD - gI + Z$ [Reserve demand equation]

(9) $BC = hI$ [Borrowing equation]

(10) $NFA = dI - mY + F$ [Net foreign asset equation] (2)

(11) $Ds = \frac{1}{f}H - \frac{e}{f}Y + \frac{g}{f}I - \frac{1}{f}X - \frac{1}{f}Z$ [Deposit supply function for base money] (3)

(12) $Ds = \frac{1}{f}UR + \frac{(g+h)}{f}I - \frac{1}{f}Z$ [Deposit supply function for unborrowed reserves] (4)

(13) $Ds = \frac{1}{f}R + \frac{g}{f}I - \frac{1}{f}Z$ [Deposit supply function for bank reserves] (5)

(14) $Ds = DCE + pI - mY + F - cY - X$ [Deposit supply function for DCE] (6)

SOLUTIONS FOR INCOME

Operating Targets

(15) $$Y = \frac{1}{1-a_1}A - \frac{b}{1-a_1}I \qquad I$$

(16) $$Y = \frac{\frac{g}{f}+d}{(1-a_1)\frac{(g+d)}{f} + b\frac{(c+e)}{f}}A$$

$$- \frac{b}{f\left[(1-a_1)\frac{(g+d)}{f} + b\frac{(c+e)}{f}\right]}(Z-H) - \frac{b}{(1-a_1)\frac{(g+d)}{f} + b\frac{(c+e)}{f}}L$$

(2) Strictly the change in net foreign assets should be related to the change in income but since we are concerned with a «first period» effect the result would be the same.

(3) Derived by substituting (7) and (8) into (3) and rearranging.

(4) Derived by substituting (8) and (9) into (6) and rearranging.

(5) Derived by rearranging (8).

(6) Derived by combining (4), (5), (7) and (10).

Operating Targets

$$\frac{b(1-f)}{f\left[(1-a_1)\frac{(g+d)}{f} + b\frac{(c+e)}{f}\right]}X \qquad H$$

(17) $$Y = \frac{\frac{d+g+h}{f}}{(d+g+h)\frac{(1-a_1)}{f} + bc}A - \frac{b}{(d+g+h)\frac{(1-a_1)}{f} + bc}(L-X)$$

$$\frac{b}{f\left[(d+g+h)\frac{(1-a_1)}{f} + bc\right]}(Z-UR) \qquad UR$$

(18) $$Y = \frac{\frac{g}{f}+d}{(1-a_1)\frac{(g+d)}{f} + bc}A - \frac{b}{f\left[(1-a_1)\frac{(g+d)}{f} + bc\right]}(Z-R)$$

$$\frac{b}{(1-a_1)\frac{(g+d)}{f} + bc}(L-X) \qquad R$$

(19) $$Y = \frac{p+d}{(1-a_1)(p+d) + b(c+m+e)}A$$

$$+ \frac{b}{(1-a_1)(p+d) + b(c+m+e)}(DCE + F - L) \qquad DCE$$

For expenditure shifts (A) we need to compare the coefficients for A in the solutions. For the first four operating targets, it is readily seen that it is highest for I, followed by UR, R and H. DCE is harder to compare with the other operating targets but it is seen that the greater the sensitivity of capital movements to the interest rate (as measured by d) the stronger the impact on income. In the limit where 'd' approaches infinity the coefficient is $\frac{1}{1-a_1}$, which is the same as the coefficient for autonomous expenditures when the interest rate is the operating target.

For demand for deposit shifts (L) we need to compare the coefficients for L. It is of course zero for I (since A is fixed and I is by definition unchanged), highest for R with UR, H in between. DCE is again more difficult to compare. Again the impact depends on the sensitivity of capital movements to the interest rate. Where there is perfect capital mobility ($d \to \infty$) there is no effect on income and the solution is again the same as that for the interest rate.

For shifts in the demand for currency we need to compare the coefficients for X. X does not appear in the solutions for I and DCE implying that in these two cases shifts in the demand for currency have no effects on income. The impact on income is weaker for unborrowed reserves than for other bank reserves or total base money.

For shifts in the demand for reserves we need to compare the coefficients for Z. Again Z does not appear in the solutions for either I or DCE. In this case UR and H are both more stabilising than R.

For shifts in net foreign assets we compare coefficients for F. F only appears in the solutions for DCE implying that only DCE generates some instability in income for this disturbance. Where the shift in foreign assets is due to unanticipated developments in the export sector the total impact is the sum of the effects of A and F.

The free liquidity ratio is identical to the interest rate except in the case of an exogenous shift in the demand for reserves, which is discussed in the text.

APPENDIX II

The Distinction between Financial Targets and Indicators of the Monetary Stance

In looking for indicators of the monetary stance it is useful to make a distinction between an indicator of *policy intent*, reflecting the direction of policy intended by the monetary authorities and the *actual monetary thrust*, reflecting the contribution of monetary conditions to the generation

of aggregate demand (which is not the same as the thrust of policy since it may not reflect policies by the monetary authorities).

If policy intentions are revealed (e.g. in policy acts, in central bank reviews or, in the case of the U.S., in FOMC meetings) some indicator of policy *intent* may be available. It will, however, generally be difficult to say something definite on this basis about changes in the strength of policy as intended by the authorities.

An alternative is to fall back on the movement in operating or intermediate targets (to the extent they are the same as operating targets), as revelations of policy intent. The assumption here is that the authorities have very definite financial targets and that these variables are under their direct or immediate control so that at any point in time they «reflect» the intentions of the authorities.

A good indicator of the *actual monetary thrust* is one which provides a guide to the current influence of the monetary sector in the generation of demand. Hence, the criterion of a good indicator is that it should be a good predictor of the future course of the real economy.

The chief contenders here are rates of change in the money supply or bank credit and the rate of interest. Nominal interest rates may be poor indicators for a number of reasons. An increase in aggregate demand may raise interest rates, creating a misleading impression that the monetary thrust is restrictive. An acceleration in the rate of growth of money may, in due course,[1] actually raise interest rates, again creating a false impression of restrictiveness. There is a whole range of nominal interest rates whose structure changes, so it is not always easy to know which rates to focus on.[2] In economies which rely heavily on rationing there may not be market rates which will truly reflect the thrust of the monetary sector. Beyond this, a more fundamental point would be that real interest rates may be more relevant than nominal interest rates as indicators of the monetary thrust.[3]

There are, on the other hand, circumstances where interest rates may efficiently represent the monetary thrust. For example, if the public's liquidity preference increases (decreases) and the monetary authorities

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1 Some argue that an acceleration in the rate of growth of money *itself* generates an expectation of higher rates of inflation. See A. WALTERS, *Money in Boom and Slump*, Hobart Papers, page 54.

2 For example the public may switch out of long securities into short securities (an increase in liquidity preference, although not for money) lowering short rates and raising long rates. This will probably be restrictive and focussing on short rates will create a misleading impression that the monetary thrust is expansionary. Many of these difficulties are of course avoidable by making calculations of a weighted cost of capital, including the cost of equity issues.

3 But real interest rates are not easy to calculate.

increase (decrease) the money supply to accommodate these changes, the unchanged interest rate (but not the money supply) will better represent the monetary thrust.[4] Or again, where variations in administratively determined interest rates on deposits have effects on market rates, independently of changes either in the demand for money (due to movements in income) or in the supply of money.[5]

Bank credit clearly will have certain advantages over both money supply and interest rates if availability effects are strong and capital markets are relatively underdeveloped. But on the other hand, in conditions where domestic money markets are highly integrated with foreign markets (as in *Germany*) and domestic bank credit may readily be replaced by foreign credit, domestic bank credit may be a particularly misleading indicator.

Both bank credit and the money supply may be poor indicators in circumstances where the public have access to near perfect substitutes. For example in the *U.S.* in 1969 when Regulation Q was effective the large banks lost CD's on a massive scale, forcing the banks to restrict their credit; but the public switched out of CD's into commercial bills, in this way supplying short term credit denied by the banks. In *France* in late 1969 « face à face » credit operations (the bringing together of lenders and borrowers by banks which provide a guarantee) tended to frustrate credit restrictions and rendered the movement in credit misleading as an indicator.

If the existence of several interest rates renders interest rates suspect as an indicator, much the same kind of objection may be raised against the use of the money supply. Some very difficult questions arise in judging which definition of the money supply is most appropriate in a particular country. Narrow money for example will tend to be a particularly bad indicator in circumstances where the public readily shifts from demand to time deposits. The seriousness of this difficulty in reality is an empirical question which turns on the degree of consistency on the one hand between the different definitions of money and, on the other, between the different interest rates.

4 A striking illustration of this occurred in the U.S. in the first half of 1971 when there was a fairly dramatic increase in the demand for money. Federal Reserve projections at the time indicated that the economy was relatively sluggish and correctly attributed the upsurge in the demand for money to the monetary sector. An accommodating policy, which was in fact followed, was the right one in the conditions. The very substantial acceleration in the growth of the money supply during this period could not be taken as an indicator of a more expansive monetary thrust.

5 An illustration of this is to be found in econometric work on the determination of interest rates in the U.K. See for example, R.J. Ball (Manchester School, 1965) who finds that the long rate may be explained by income, the money supply and additionally by the bank rate.

To sum up, then, it is clear that no single indicator will be perfect in representing the thrust of the monetary sector.[6] Ideally, account would need to be taken of changes in bank credit, other sources of changes in the money supply, possible shifts in the demand for money and the possible independent effects of changes in administratively determined interest rates on deposits. In practice, of course, the information necessary to take account of these elements together (each appropriately weighted by its effects on the real economy) is not available. So it is necessary to fall back on single more readily accessible indicators. In countries with developed financial systems such as the *U.S.* and the *U.K.*, the money supply will have some advantage over bank credit whilst in countries where availability effects are strong (e.g. *Japan*) bank credit might have an advantage over the money supply. In countries where shifts in the demand for money are very important, or administrative variations in interest rates on deposits have significant independent effects on the real sector interest rates may have an advantage over either bank credit or the money supply as an indicator.[7]

There are many instances when rates of growth of money and interest rates flashed conflicting signals e.g. in the U.K. in 1967/68, in the U.S. in the early and again middle 1960's.[8] In Italy during the first months of 1971 some contraction in the stock of money (narrow and broad) occurred simultaneously with a reduction in the level of interest rates.

Selection of a poor indicator may lead to bad policy. There are several instances when this is thought to have occurred in the U.S.[9] During

6 Most econometric work in this area (mainly for the U.S.) has concentrated on testing first the relative roles of « supply » and « demand » elements as influences on various indicators and second the power of certain indicators to « explain » movements in income. The more efficient indicator is the one which is freer of demand elements and « explains » income best. Volume variables (money supply and bank credit) tend to perform better than interest rates. See G. Kaufman, *National Banking Review*, June, 1967. M. Hamburger, *American Economic Review*, May 1969. M. Keran, *Federal Reserve Bank of St. Louis Review*, September, 1970.

7 Since a major objection to the use of the interest rate as an indicator is that it is in part influenced by movements in income and expected rates of inflation, an interest rate, purified of fluctuations in both income and inflationary expectations, may have certain advantages over either the money supply or the unadjusted interest rate as an indicator. It will have an advantage over the money supply in that it will take account of some fluctuations in the demand for money and other interest rate changes originating directly in the monetary sector; it will have an advantage over the unadjusted interest rate in that it will be purified of income fluctuations and changes in expected rates of inflation. An adjusted interest rate is proposed as an indicator by D. Starleaf and J. Stephenson. "A Suggested Solution to the Monetary-Policy Indicator Problem: The Monetary Full Employment Interest Rate", *Journal of Finance*, September, 1969. Since, however, adjusted interest rates are difficult to calculate, they may not be a feasible alternative.

8 See: P. Cagan, *Recent Monetary Policy and the Inflation*, American Enterprise Institute, 1971. A.J. Meigs, *Money Matters*, Harper Row, 1972. L. Anderson, *Federal Reserve Bank of St. Louis Review*, September, 1971 for illustrations in the U.S.

9 See Cagan, Meigs, *op. cit.*

recessions, for example, when both interest rates and the rate of increase in the money stock fell the monetary authorities, by focussing on interest rates, were led to believe that policies were expansionary. When on the other hand, economic activity was high, an accelerating rate of growth of money tended to accompany rising interest rates, leading the authorities to believe that their policies were actually restrictive. In the U.K. too, concentration on interest rates has encouraged accommodating policies which in themselves may have been destabilising. In Germany in 1966 during the recession the monetary authorities pointed to the rise in the free liquidity ratio as evidence that policy was expansionary when the rise in the free liquidity ratio had itself been induced (as in the case of interest rates) by the drop in activity.[10]

The distinction between « policy intent » and « actual monetary thrust » enables us to contrast the intent of policy with the influence of the monetary sector. For example if the monetary authorities focus on interest rates one can contrast policy intent, as reflected in short-term interest rates, with the possible real influence of the monetary sector as reflected say in the rate of growth of the money supply or bank credit. These contrasts are particularly revealing in countries such as the U.S. and the U.K. where interest rates have been important as financial targets. In general, any differences between policy intent and the monetary thrust could be attributable either to a lack of control over the financial variable or to a financial target which is different from the indicator.

The criteria for the selection of an optimal target are not the same as the criteria for the selection of an optimal indicator. To begin with, the question of control is irrelevant in determining the optimal indicator but as we have seen, it may be relevant in determining the optimal target. It is conceivable that lack of control over the money supply is such as to shift the balance of advantage to interest rates as a target but this will not weaken the use of the money supply as an indicator. In determining an optimal target the relevant considerations are the degree of *predictability* in the macro-economic functions, in particular the money demand, money supply and expenditure functions. In determining the optimal indicator we need to know the strength of impulses originating in the monetary sector which are being transmitted to the real sector.

V.A.

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10 M. Neumann, *Indicators of German Monetary Policy.*