Improving Money and Credit Control in Nepal: Controlling the Money Multiplier

JOHN THORNTON*

INTRODUCTION

This paper outlines a scheme that would allow the Nepal Rastra Bank (NRB) to closely control the money supply and at the same time to move to a system of monetary control in which the most important instruments would be its own credit operations and the reserve requirements of commercial banks.[1] This compares to the present situation in which the main instrument of monetary control is a quantitative limit on the credit operations of the banks. The scheme would therefore supplant direct control by indirect control and would allow the banks, unconstrained by direct ceilings on their credit expansion, to react to the price signals of the market.

The scheme would not require any radical change in the current operations of the NRB or of the banks. It is suited to the needs of a central bank facing unpredictable cash demands and lags in data compilation which in Nepal are the product of the topographical nature of the country, the presence of bank branches in remote areas, the underdeveloped transport and communication system, and the fact that in the NRB almost all of the statistical work is done manually. The important requirement of the scheme is that the foreign exchange system in Nepal be managed in such a way that it allowed some degree of monetary independence, either through a flexible exchange rate and/or exchange control. In this regard, in May 1986 the Nepal authorities introduced a new exchange rate system and indicated that exchange rate flexibility would be an important feature. In addition, residents are subject to strict exchange control.

The next section illustrates how precise control of the money supply in Nepal, even under the present direct approach, is greatly hampered by the unpredictable nature of the money multiplier. The proposal itself is outlined in the following Section. It involves stabilising completely the money multiplier k and controlling the cash base B in the money supply function:

$$M = kB \qquad (1)$$

The last Section looks at how the scheme would operate in practice.

THE MONEY MULTIPLIER

In order for control over central bank credit to translate into control over the expansion of banking system credit, a stable or predictable relationship is required between the growth of the monetary base

---

Dr. Thornton is an Economist with the International Monetary Fund. He is currently the IMF Resident Representative in Nepal.

(currency in the hands of the public and the reserves of commercial banks) and the growth of broader monetary aggregates. This relationship can be represented by the money supply multiplier. A simplified version of the multiplier is:

$$k = (1 + cd)/(rd + cd) \qquad (2)$$

where cd is the currency: deposit ratio and rd is the reserve: deposit ratio. The important point to note from (2) is that to stabilize the money multiplier a central bank must be able to eliminate any incentive banks have to hold reserves in excess of legal reserve requirements and sterilize variations in the public's cash demands.

1.   Variations in the Multiplier

One way to grasp the importance of variations in the money multiplier in changes in the money supply in Nepal is to decompose the short run change in money into two components, one part attributable to changes in the multiplier and the other part attributable to changes in the monetary base. More specifically, the change in money ΔM can be written as the sum of three components in an identity:

$$\Delta M = B-1 \ (\Delta k) + k-1 \ (\Delta B) + (\Delta k) \ (\Delta B) \qquad (3)$$

where B-1 and k-1 are respectively, the outstanding stock of monetary base and the value of the multiplier in the preceding period. The first term B-1 (Δk), can be interpreted as the change in money that would occur if the monetary base remained unchanged from its value in the previous period. The second term can be interpreted as the change in money that would result from a change in monetary base given an unchanged multiplier. The third, cross product term is usually small.

If the cross product term is combined with the second term, the identity becomes:

$$\Delta M = B-1 \ (\Delta k) + (\Delta B)k \qquad (4)$$

Table 1 presents the results of calculating identity (4) for 1980 IQ through to 1986 IVQ using the broad definition of money. The figures in column 2 of the table are the changes in money attributable to changes in the monetary base multiplier - i.e., B-1 (k). Comparing these figures to the actual change in money in column 1 reveals that changes in the money stock attributable to variations in the multiplier are frequently a large part of the actual change in money itself and often work to offset the effects on the money stock of changes in the base. The importance of the multiplier is even more clear if the relationship between changes in the bank reserves component of the monetary base and changes in money is examined (i.e. if bank reserves are substituted for B in identities (3) and (4)). This relationship is shown in Table 2. In this case, in 23 out of 28 observations changes attributable to variations in the bank reserves multiplier were larger than the actual change in money itself. In addition, short run changes in the multiplier typically coincided with short

run changes in money in the opposite direction. Monetary control of any precision under these circumstances is difficult.

Table 1

Nepal: Decomposition of Changes in Broad Money — the Monetary Base Multiplier

(NRs millions, end of period)

Date		Change in Broad Money (sum of columns 2 and 3)	Attributable to:	
			Changes in the multiplier	Changes in the monetary base
		(1)	(2)	(3)
1980	I	396	10	386
	II	250	69	181
	III	-49	407	-456
	IV	217	-6	223
1981	I	481	90	391
	II	300	-243	543
	III	-89	175	-264
	IV	362	-162	524
1982	I	489	46	443
	II	311	-119	430
	III	198	180	18
	IV	392	405	-13
1983	I	504	204	300
	II	457	-307	764
	III	68	1125	-1057
	IV	595	-343	938
1984	I	472	-827	1299
	II	332	229	103
	III	-120	447	-567
	IV	564	70	494
1985	I	808	-977	1785
	II	765	376	389
	III	-320	1624	-1944
	IV	919	-887	1806
1986	I	1275	-1105	2380
	II	884	-31	915
	III	-519	681	-1200
	IV	889	-295	1184

Table 2

Nepal: Decomposition of Changes in Broad Money –
the Bank Reserves Multiplier

(NRs millions, end of period)

Date		Change in Broad Money (sum of columns 2 and 3)	Attributable to:	
			Changes in the multiplier	Changes in bank reserves
		(1)	(2)	(3)
1980	I	396	1590	-1192
	II	250	-414	664
	III	-43	-315	266
	IV	217	606	-389
1981	I	481	3624	-3143
	II	300	-2254	2554
	III	-89	-1108	1019
	IV	362	-25	387
1982	I	489	1642	-1153
	II	311	-1577	1888
	III	198	-1525	1723
	IV	392	2494	2102
1983	I	504	2655	-2151
	II	457	-2203	2660
	III	68	2337	-2269
	IV	595	-327	922
1984	I	472	-739	1211
	II	332	1006	-674
	III	-120	453	-573
	IV	564	90	474
1985	I	808	-2289	3097
	II	765	-1014	1779
	III	-320	4898	-5218
	IV	919	-1827	2746
1986	I	1275	-3860	5135
	II	884	727	157
	III	-519	5687	-6207
	IV	889	385	504

THE SCHEME

The scheme has five basic elements. The fact that it would require little change in the present activities of the NRB is due to the admirably uncluttered way in which the present system of reserve requirements operates and to the fact that some of the elements of the scheme are already in place.

The elements are:

(1) Defining reserve assets vault cash and deposits with the NRB. This element has been in operation since 1986. Previously, Treasury bills had been counted as a reserve asset. This provided an implicit subsidy to the budget by ensuring a minimum banking system demand for Treasury bills no matter what their yield and made the budget deficit unnecessarily inflationary. The abolition of this requirement provided a greater separation of monetary and fiscal policy.

(2) Imposing a uniform reserve requirement. The NRB adopted a uniform reserve requirement of 5% against all monetary deposits in 1982. However, commercial banks are additionally required to hold a cash reserve of 4% of total deposits. Under the scheme this requirement is abolished. There is, in any case, a good reason for excluding vault cash from the reserve requirement since it can lead to an unintended deflationary monetary policy. The logic here is as follows When individuals cash checks at a bank there is in the first instance a simple exchange of deposits for currency with no change in the total of currency in circulation plus deposits. However, since vault cash is one of the components of bank reserve balances used for meeting the legal reserve requirement, banks will find that they have a reserve shortage when currency flows out of the banks into general circulation. Unless the currency drain is offset by NRB policy, banks will be forced to contract deposits further. A currency drain out of the banking system tends to depress the money stock. The reserve regulation should be altered so that vault cash in the banks does not count as one of the components of bank reserves for the legal requirements; rather, it should be treated as a deduction from gross deposits in calculating net deposits subject to reserves. In Nepal, this has probably not been a problem to date because of the generally liquid position of the banks.

(3) Creating Special Deposits owned by the commercial banks and held at the NRB. The owners of Special Deposits would receive interest on their holdings commensurate with the return they could have earned by placing their funds in a similar safe, interest bearing financial instrument. A market related return on Special Deposits would ensure that banks would continue to have an incentive to compete for deposits and so ensure an optimal level of financial intermediation.

(4) Announcing a target growth rate, say of x% a month, for the monetary base.

(5)   Imposing a 100% reserve requirement on any bank's deposits which ex-
ceeded the target growth rate for the monetary base set by the NRB.
All reserves not needed for the orinary required reserve ratio would
be held in Special Deposits. If any bank's deposit growth fell below
the target rate of growth set for the monetary base it could withdraw
from Special Deposits an amount equal to the shortfall less required
ordinary reserves. A substantial shortfall in deposits would lead to
a bank having negative Special Deposits. In this case, the NRB would
charge a penal overdraft rate - that is, a rate of interest higher
than the cost of deposit money.

The scheme could be introduced using any base date for which monetary
data were available and the base date could be changed at intervals depend-
ing upon the requirements of monetary policy. Under it the money multi-
plier would be stabilized because commercial banks would have no incentive
to hold excess reserves and because variations in the public's cash demands
would be neutralized. These two features are highlighted in the next sec-
tion.

THE SCHEME IN OPERATION

To Illustrate how the scheme might work two possible situations are
discussed in this section. First, an attempt by the NRB to increase the
money stock by 1% a month. Second, an attempt by the public to change
its holdings of cash relative to deposits. In addition, this section
considers the likely impact of the scheme on financial intermediation
and shows how the operation of the scheme might be reinforced by the NRB
imposing penalties for noncompliance.

An increase in the Money Supply

Under this scheme, to increase the money stock by 1% a month the
NRB must increase the monetary base by the same amount. The NRB would
announce the targeted increase in the monetary base/money stock. At the
same time, it would announce that Special Deposits must be used for de-
posit growth in excess of 1% and that withdrawals from Special Deposits
could be made by banks failing to meet the target rate of increase. The
monetary base would be increased by the NRB by, for example, a net pur-
chase of foreign assets or an increase in its lending through advances
and discounts. The banking system as a whole would then experience an
increase in its holdings of bank reserves and would be able to expand its
loans and advances accordingly. If the public's currency: deposit ratio
remained constant the money supply will grow at the same rate as the mone-
tary base.

A Change in the Public's Demand for Cash

Under this scheme the impact on the money supply of variations in
the public's demand for cash is neutralized. By way of example, suppose
currency in circulation is NRs 5,000 mn, total bank deposits are NRs
11,000 mn and the cash base is NRs 5,550 mn, so that according to equation

(2) the money multiplier is 2.88, and that the ordinary required reserve ratio is a uniform 5%. Suppose that because of an increase in bank deposit interest rates the public decides to hold more of its money in the form of deposits rather than cash - i.e. the currency: deposit ratio falls, say from the initial level of 0.454 (5,000/11,000) to 0.4. At the initial level of deposits the banks would experience an extra deposit inflow of NRs 428 mn (((16,000)/(1+0.4)-(11,000))), all subject to the Special Deposit requirement. Required reserves (ordinary plus Special Deposits) would rise from NRs 550 mn to NRs 978 mn, or from 5% to 8.6%. Because of the requirement for Special Deposits the money multiplier would remain at 2.88 ((1+0.4)/(0.086+0.4)).

If the currency: deposit ratio increases, the money multiplier also remains constant. An increase in the ratio in the above example from 0.454 to 0.5, for example, produces a deposit outflow of NRs 333 mn, a decline in Special Deposits by this amount (in this case a negative level of Special Deposits) and the required reserve ratio falls to 2.03%. Nonetheless, the money multiplier is a constant 2.88.

The scheme effectively separates the money base into two components, one of which is and the other is not high powered money. Under it the two reserve components - ordinary required reserves and Special Deposits - transform themselves into one another in such a way as to ensure constancy in the money multiplier. Special Deposits rise appropriately when the public's cash demand falls and decline by the amount required to keep the money stock constant when the public's cash demand increases.

The Impact on Financial Intermediation

There are at least three respects in which the scheme would encourage financial intermediation. First, banks would have no incentive to hold excess reserves. No interest would be paid on excess reserves. In addition, Special Deposits and reserves held under the ordinary reserve requirement would automatically meet 100% of any deposit withdrawal. A reserve shortfall would not occur as a result of a deposit withdrawal since this would be covered by the transfer from Special Deposits to ordinary reserves held at the NRB. The transfer would increase ordinary reserves by exactly the amount needed to maintain the minimum required ratio after a deposit withdrawal. If this characteristic of the scheme and the fact that no interest was paid by the NRB on excess reserves turned out not to be a strong enough disincentive to the holding of excess reserves, then a rate of interest charge on excess holdings could always be introduced.

Second, the payment of interest on Special Deposits would encourage the banks to compete for deposits. Above average deposit growth in one bank would lead to an increase in Special Deposits and below average growth in another would lead to a decline in Special Deposits. The inefficient bank would have to contract loans and investments since it would face a cash deficiency. The efficient bank would gain deposits at the expense of the inefficient bank. This contrasts with the current system of credit ceilings which, given that they are uniform across banks, penalizes efficiency in deposit taking. Under the scheme money stock

control would be achieved without any interference with changes in the distribution of deposits between banks arising from changes in the relative efficiency of banks.

Third, efficiency in bank lending need not be impaired because banks could compete for the fixed supply of loanable funds through an inter-bank market. The NRB could give an important lead in the development of such a market by a reduction in its own accommodative mechanisms through which the banks obtain funds from the NRB at their own initiative. The growth of an inter-bank market would have the additional advantage of providing an indicator of money market conditions in Nepal.

Reinforcing the Operation of the Scheme

A system of penalties could be designed and introduced by the NRB to ensure that each commercial bank recognises that a violation of the reserve constraint conflicts with its objective of profit maximization, thereby ensuring that violations of the reserve constraint were quickly eliminated.

One possible scheme would be a called by the NRB for Penal Deposits whenever a bank's holdings of required reserves (ordinary and Special Deposits) fell below the prescribed level. Calls for these deposits could be made on a sliding scale from 0-000%, increasing, for example, by x% for each working day the bank was deficient. The maximum quantity that could be called would be equal to the actual level of the bank's deposit liabilities minus the level backed up by reserve requirements. These levies could be made and repaid automatically by debits or credits to the bank's deposit account at the NRB. To make sure the penalty is effective Penal Deposits would be subject to a penal rate of interest, payments for which could be deducted daily from the reserve deficient bank's account at the NRB. The penal interest rate coupled with the sliding scale would make uncovered deposit holdings very unprofitable and banks would have a strong incentive to reduce their loans and investments to comply with the requirements of monetary policy.

SUMMARY AND CONCLUSION

The proposal outlined above would fix the relationship between the monetary base and the money stock by stabilizing the money multiplier. It would allow the NRB to control the money stock precisely and would identify clearly the NRB as being responsible for the behaviour of the money stock. The scheme is flexible in that it could be introduced using any base date for which monetary data are available and the base date could be changed at intervals, depending upon objectives and circumstances. The scheme would encourage financial intermediation since it discourages the holding of excess reserves and gives banks an incentive to bid for deposits. This is an important advantage over the current system of credit ceilings. In addition, the development of an inter-bank market, which could be promoted by the NRB, would promote efficiency in bank lending. Against this, tighter monetary control in Nepal might increase the variability of the exchange rate, short-term interest rates and credit avail-

ability. These potential costs would have to be weighed against the expected benefits of closer monetary control.

FOOTNOTES

1. A Scheme of this type was recommended for Portugal by Fry (1979) which in turn was an amended version of a scheme devised by Duck and Sheppard (1978) in the context of the United Kingdom.

SELECTED REFERENCES

Aschheim, J. (1961): Techniques of Monetary Control (Baltimore: Johns Hopkins University Press).

Burger, A.E. (1971): Money Supply Process (Belmont, Calif.: Wadsworth Publishing Co.).

Duck, N.W. and Sheppard, D.K. (1978): "A Proposal for the Control of the U.K. Money Supply." Economic Journal, Vol. 88, 1 (March), pp. 1-17.

Fry, M.J. (1979): "Monetary Control When Demand for Cash is Unpredictable." Economic Journal, Vol. 89, (September), pp. 636-641.

Poole, W. and Lieberman, C. (1972): "Improving Monetary Control," Brookings Papers on Economic Activity, (2): pp. 293-335.