

An Analysis of Monetary Policy in Controlling the Monetary Assets in Pakistan: A Money Multiplier Approach (1971-72 to 1989-90)

KALBE ABBAS and MUHAMMAD ALI QASIM

I. INTRODUCTION

Besides fiscal policy, monetary policy is designed to attain sustained economic growth and to contain inflation within manageable limits. Usually monetary policy is pursued through variations in money supply in accordance with the requirement of output level and employment on one hand and price stability on the other. In Pakistan monetary policy is formulated to control total monetary assets keeping in view the projected growth rate of GDP, monetisation of the economy and the likely surplus or deficit in the country's international account. Once the safe limit of total monetary assets is determined it is then realised through different indirect measures, namely, the liquidity ratio, reserve requirements and the bank rate. Prior to 1972 credit was controlled by these indirect measures. However, the separation of the Eastern wing and the two oil shocks of the early 1970's indicated the shortcomings of indirect methods when they failed to cope with the new situation. The open market operation could not be materialised due to marginal or nominal demand of government securities. The credit budgeting measure was introduced in 1972, replacing the old one, wherein the principal instrument is the credit ceiling for the commercial banks and they are bound to allocate credit to the priority sectors as determined by the government. Credit budgeting has proved to be an effective instrument of monetary policy both as a means of providing necessary funds for the development process and for curbing the increasing trends in prices. The credit ceiling with its beneficial effects also has some adverse effects for example, commercial banks have little incentive in mobilising deposits, and their ability to respond to demand becomes extremely limited. The response of the public and commercial banks, to a certain extent, depend upon the credit ceilings determined by the monetary authority.

Several studies have been carried out to identify the factors which are important determinants of money stock. However, little research has been done to

Kalbe Abbas and Muhammad Ali Qasim are Research Economist and Staff Economist, respectively, at the Pakistan Institute of Development Economics, Islamabad.

Authors' Note: We would like to thank Dr Sarfraz K. Qureshi, Joint Director, PIDE, for continuous encouragement and guidance during the study. The excellent typing by Syed Zaheer Abbas Shah is also appreciated. However, we are responsible for any errors and omissions.

analyse the level of money stock by using the money multiplier approach. Cagan (1965); Anderson (1968) and Jordon (1969) used the money multiplier approach to determine money supply in the case of the United States of America. Oyejide (1974), has estimated this approach for Nigeria. Hamdani (1976), using three-year quarterly data for M_1 , (from 1972 to 1974), comes to the conclusion that the volume of the monetary base can be determined given the optimal level of money supply. Trivedi (1990) describes the role of monetary policy in controlling the monetary assets in India through the money multiplier approach. The objective of the paper is to ascertain the monetary policy, in controlling the total monetary assets, through analysing the behaviour of the money multiplier and high-powered money and to see further, whether the results are in consonance with current monetary policy.¹

The determination of monetary aggregates is presented in Section 2. Section 3 analyses the different behavioural variables. The analysis of the empirical findings is the subject matter of Section 4. The last section concludes the discussion.

2. THE DETERMINATION OF MONETARY AGGREGATES

Theoretically the stock of money in an economy is determined by two variables viz. money multiplier and monetary base or high-powered money. High-powered money is determined by the central bank of the country and it is used for two purposes namely public holding of currency and bank reserves in the form of vault cash and deposits at the central bank. The money multiplier on the other hand reflects the portfolio behaviour of the public and banks. The variation in money stock can, further, be explained by assuming two different behaviour of the money multiplier. In the first case the money multiplier is assumed to be a constant implying that the entire variation in the money stock is purely due to changes in the monetary base. In the second case it is assumed to be a variable, thus indicating that both the money multiplier and the monetary base are jointly determining the stock of money. The money stock under two different assumptions on multiplier is expressed in the form of equations.

$$M = \bar{m}B \text{ ----- Under constant multiplier} \quad \dots (1)$$

$$M = mB \text{ ----- Under variable multiplier} \quad \dots (2)$$

where M is stock of money, B refers to high-powered money, \bar{m} refers money multiplier when exogenously given and m is the variable multiplier.

The choice of a suitable money stock variable as an instrument of achieving the desired economic goals has been widely discussed in monetary economics. In Pakistan three money stock variables have been defined namely M_1 , M_2 and M_3 .

¹"The Government of Pakistan (1992) has decided to abolish the credit ceilings and to control and regulate money and credit through indirect market-oriented instruments". (See Detailed Annual Plan 1992-93):

However, monetary policy is pursued through controlling M_2 . The money multiplier for M_2 is defined as:

$$m = [(CC/D) + 1] / [(CC/D) + (BR/D)] \quad \text{or} \\ m = (C2 + 1)/(C2 + BBR11) \quad \dots \quad \dots \quad \dots \quad (3)$$

where

$C2 = CC/D$, $BBR11 = BR/D$, $D = DD + TD$;

m = money multiplier;

CC = currency in circulation;

DD = demand deposits;

TD = time deposits; and

BR = bank reserves.

Equation 3 explains that the variations in the money multiplier are due to two ratios, the currency to deposit ratio ($C2$) and the bank reserves to deposit ratio ($BBR11$). The total monetary assets include three types of deposits namely demand deposits, time deposits and other deposits. In this study the total deposits (D) consists of the demand deposits (DD) and the time deposits (TD) due to the fact that these two types of deposits not only reflect the behaviour of the public preferences to currency or deposits but a certain portion of the deposits are held by the State Bank of Pakistan as reserves which finally appears as part of high-powered money. The other deposits have been excluded from the total deposits (D) due to its different nature and forming a negligible proportion in total monetary assets.

The currency to deposit and the bank reserve to deposit ratio with high-powered money are the determinants of total monetary assets.² The value of the money multiplier m is inversely related to $C2$ and $BBR11$. The ratio $C2$ states that the public wants to hold a fraction of their balances in the form of currency. The higher the ratio, the more the holdings in the form of cash and less in the form of deposits. The behaviour of the public towards the holding of balances in cash or in deposits depends upon factors such as the level of financial development and financial deepening, the rate of return on financial and non-financial assets, economic conditions of the country and to a greater extent political stability. The other ratio, $BBR11$, reflects the behaviour of commercial banks. The banks' reserves are maintained for two main purposes, firstly as a statutory requirement the limits of which are determined by the State Bank of Pakistan and secondly to honour transactions. The variations in the ceiling of the statutory requirement at the one end variate the credit creating capacity of banks and, on the other hand, reflect the tone of the monetary authorities.

²Currency to deposits ratio may also be influenced by interest rate offered on different deposit schemes. The bank reserves to deposits ratio is subjected to variations by the host of factors like market interest, discount rate and required reserve ratio.

The annual data on the monetary aggregates have been taken from the Government of Pakistan (1992a) and annual report of the State Bank of Pakistan (1991). The data covers the period from 1971-72 to 1989-90. The analysis is based on the entire period 1971-72 to 1989-90 and then further divided into two sub-periods i.e. 1971-72 to 1979-80 (sub-period 1) and 1980-81 to 1989-90 (sub-period 2). We have divided the period of analysis into prescribed sub-samples to consider the effects of the devaluation of the currency, nationalisation of banks in the 1970's (sub-period 1) and the effects of the world recession, particularly in the industrialised countries during the 1980's (sub-period 2).

3. ANALYSIS OF DIFFERENT BEHAVIOURAL VARIABLES

The behaviour of the variables for the two sub-periods as well as the entire period, is presented by analysing the compound and annual growth rates, respectively. The growth rates of the selected monetary variables are presented in Table 1.

Table 1

Growth Rates of Selected Monetary Variables

	1971-72 to 1989-90	1971-72 to 1979-80	1980-81 to 1989-90
Monetary Assets (M_2)	15.96	19.61	13.12
Currency (CC)	18.81	23.41	14.23
Demand Deposits (DD)	15.59	17.54	13.52
Time Deposits (TD)	14.58	20.26	11.12
Total Deposits (D)	15.16	18.79	12.49
Bank Reserves (BR)	17.83	21.07	16.79
Bank Credit (BC)	16.78	17.80	15.39
Monetary Base (B)	18.46	23.03	14.07
Currency/Deposits (C2)	3.17	3.89	1.54
Bank Reserves/Deposits (BBR11)	2.32	1.92	3.82

During the first sub-period the total deposits grew by 18.79 percent per annum (the TD and the DD at 20.26 percent and 17.54 percent, respectively), whereas currency grew at a rate of 23.41 percent per annum resulting in a larger C2 (3.89 percent) ratio compared to the growth of bank reserves to deposits BBR11 (1.92 percent), leading to a larger multiplier which is also supported by the empirical estimates from Equation 4 in Table 3. The total monetary assets grew by 19.61 percent per annum, which may be due to the relatively large multiplier and the higher growth rate of monetary base (23.03 percent). The high growth rate of the monetary base was due to substantially higher growth rates for both currency

and bank reserves. The high growth of currency may be attributed to the high level of spending in the economy and the high growth of reserves was partly due to a liberal monetary policy or may be the result of slackness in the economy. Thus, the entire period may be termed as a period of liberal monetary policy and it is supported by the fact that, in this period, the growth of bank credit stood at 17.80 percent per annum with the growth rate of real GDP at 5.58 percent. The relatively liberal monetary policy, which allowed greater expansion in currency, bank reserves and bank credit, was an attempt by the government to take out the economy from slackness due to oil shocks in the early Seventies and damage to crops in 1974 and also to overcome the after effects of nationalisation in 1973.

The second sub-period witnessed a decline in almost all the variables. The total deposits declined from 18.79 percent to 12.49 percent per annum (but the decline in TD was comparatively higher than in DD) and the growth in currency also declined from 23.41 percent to 14.23 percent. Thus the ratio of currency to deposits also registered a sharp reduction (1.54 percent).³ The other components of the money multiplier i.e. bank reserves also declined from 21.07 percent to 16.79 percent per annum but the growth in deposits was smaller compared to the growth in bank reserves. Thus the growth in BBR11 was greater than the first sub-period. In fact, the ratio of bank reserves to deposits increased from 1.92 percent to 3.82 percent. With a larger BBR11 compared to a smaller C2 the value of the money multiplier substantially declined for this sub-period and it is supported by a smaller empirically estimated multiplier from Equation 7 in Table 3. The monetary base also declined from 23.03 percent in the first period to 14.07 percent in the second period. The enhanced multiplier along with reduced monetary base caused a substantial contraction in monetary assets (13.12 percent) which is evident from a smaller growth of 15.39 percent per annum in bank credit and a growth rate of 4.84 percent in real gross domestic product. The apparent tight monetary policy during the second sub-period in spite of world recession, seems to be the result of slow growth in currency, demand deposits and time deposits. It reflects considerable disintermediation of the banking system which, in turn, has resulted from attractive rates of return on other non-financial instruments and a decline in the rate of return (in real terms) which in turn was due to a variety of constraints on the activities of the banks.

The similar behaviour of money multiplier components and monetary base can be shown in Table 2. The minimum growth during the first period in the monetary assets is recorded at 7.76 percent in 1974-75 and the growth in currency, bank credit, monetary base and demand deposits also registered their minimum values at 10.38 percent, 12.24 percent, 11.44 percent and 5.20 percent, respectively. The bank reserves and total deposits have grown at the rate of 32.14 percent and 9.14 percent over the previous years respectively. The slow growth in almost all the

³The decline in the growth of TD seems to be the result of the interest rate structure and the slow growth in currency may be due to greater incentives in real assets rather than in monetary assets.

variables was because it was a difficult year for the country's economy due to the deterioration in the terms of trade by 20 percent, damage to the wheat crop, technical problems in the Tarbela dam and delayed rains are some of the main reasons which led to a steep rise in the price level, thus generating inflation. The annual growth rates in monetary assets for most of the years during the first period remained well above twenty percent and during the second period it was below fifteen percent for the most of the years. The currency and the monetary base have a relatively similar growth structure for the entire period and this may be due to a larger share of currency in the monetary base. The demand deposits (DD) has a positive growth rate whereas time deposits (TD) also experienced a positive growth. However, the growth for the last four years was slow (around 5 percent) compared to the remaining period. The slow growth rate in TD coincides with the period when there was a mushroom growth of co-operative societies and companies. The co-operative societies, offering handsome rate of return on deposits compared to different time deposit schemes of the commercial banks, caused a substantial switching of funds (deposits) from commercial banks to the co-operatives and thus, the growth rate of time deposits in 1988-89 remained negative.

Table 2
Annual Growth Rates

	Real GDP (FC)	Monetary Assets (M ₂)	Currency (CC)	Bank Reserves (BR)	Deposits (D)	Bank Credit	Monetary Base (B)	Demand Deposits (DD)	Time Deposits (TD)
1972-73	6.8	22.71	40.85	15.80	22.43	24.103	37.20	16.32	30.21
1973-74	7.5	13.38	27.74	-1.49	6.76	24.101	26.21	11.60	1.24
1974-75	3.9	7.76	10.38	32.14	9.14	12.238	11.44	5.20	14.07
1975-76	3.3	25.93	22.68	30.73	28.34	15.056	23.00	23.38	34.08
1976-77	2.8	24.30	23.17	25.97	24.92	21.862	26.33	31.20	18.25
1977-78	7.7	22.96	17.95	9.19	25.11	10.250	15.69	21.00	29.97
1978-79	5.5	23.49	30.21	47.63	16.11	21.539	30.63	17.27	14.84
1979-80	7.3	17.57	16.71	15.37	19.36	14.172	15.84	16.15	22.96
1980-81	6.4	13.20	24.88	2.72	10.95	21.300	22.96	18.95	2.46
1981-82	7.2	11.36	8.35	12.35	12.92	17.027	8.38	11.59	14.56
1982-83	6.4	25.33	21.56	12.87	27.42	20.947	20.62	17.71	39.06
1983-84	5.1	11.81	13.70	24.58	10.85	15.932	13.36	0.95	20.89
1984-85	9.2	12.64	8.47	15.47	14.65	13.369	10.25	21.84	8.55
1985-86	7.0	14.79	12.10	23.76	15.97	24.507	11.96	14.40	17.47
1986-87	5.7	13.70	18.06	86.90	11.75	14.381	21.73	18.60	5.40
1987-88	5.8	12.22	17.51	-25.85	9.82	7.259	13.32	14.49	4.95
1988-89	5.1	4.56	11.08	15.79	0.36	9.277	10.62	8.26	-8.62
1989-90	4.6	12.63	18.01	11.55	10.47	16.817	17.13	15.22	4.07

4. EMPIRICAL FINDINGS

The regression results are reported in Table 3. Equation 1 explains the relationship between the monetary base (B) and the money stock (M₂) assuming that the money multiplier is stable. In the second equation we relax the assumption of stability and use the ratio of currency to total deposits (C₂) and the ratio of the

Table 3

Summary of the Empirical Findings

Dependent Variable	Coefficients of Policy Variable					R ²	Stat.	D.W. Standard Error as a Percent of Mean of Dependent Variable
	Constant	B	C2	BBR11	BBR22			
Entire Period (1971-72 to 1989-90)								
Equation 1								
M ₂	81737	2.081				0.85	1.72	23.37
T-Stat. Elasticity at Means Standardised Coeff.	(2.06)**	(9.96)*						
0.732								
0.781								
Equation 2								
M ₂	101540	2.3565	-130710	-108150		0.96	1.26	11.63
T-Stat. Elasticity at Means Standardised Coeff.	(2.61)**	(21.65)*	(-4.7)**	(-2.2)**				
0.855		-0.457	-0.833					
0.911		-0.078	-0.011					
Equation 3								
BBR11	-0.040933**			2.8146		0.99	1.58	2.24
T-Stat. Elasticity at Means Standardised Coeff.	(-3.46)			(54.23)*				
3.593								
24.570								

Continued -

Table 3 (Continued)

Dependent Variable	Coefficients of Policy Variable				R ²	Stat.	D.W. Standard Error as a Percent of Mean of Dependent Variable
	Constant	B	C2	BBR11			
Period 1 (1971-72 to 1979-80)							
Equation 4							
M ₁	2664.2	2.7926			0.99	1.50	3.85
T-Stat.	(1.89)***	(36.78)*					
Elasticity at Means Standardised Coeff.		0.946					
		1.000					
Equation 5							
M ₂	18368	2.9764	-40244	-117200	0.99	2.26	0.78
T-Stat.	(7.85)*	(85.40)*	(-6.8)*	(-2.6)**			
Elasticity at Means Standardised Coeff.		1.008	-0.346	-0.035			
		1.063	-0.346	-0.035			
Equation 6							
BBR11	-0.052698*			2.6968	0.99	2.33	3.14
T-Stat.	(-29.27)			(38.52)*			
Elasticity at Means Standardised Coeff.				4.405			
				0.962			
Period 2 (1980-81 to 1989-90)							
Equation 7							
M ₂	91259	1.8314			0.90	2.52	8.95

Continued -

Table 3 (Continued)

Dependent Variable	Coefficients of Policy Variable					R ²	Stat.	D.W. Standard Error as a Percent of Mean of Dependent Variable
	Constant	B	C2	BBR11	BBR22			
T-Stat. Elasticity at Means Standardised Coeff.	(3.47)**	(8.63)*						
		0.685						
		0.765						
Equation 8								
M ₂ T-Stat. Elasticity at Means Standardised Coeff.	140420 (5.25)**	2.7006 (15.16)*	-282230 (-13.0)*	-88657 (-1.74)**		0.99	2.15	1.09
		0.994	-0.667	-0.009				
		1.110	-0.169	-0.027				
Equation 9								
BBR11 T-Stat. Elasticity at Means Standardised Coeff.	-0.048681 (-11.23)*				2.4849 (18.16)*	0.97	1.50	10.67
					2.729			
					0.988			

Note: *Indicates 1 percent level of significance.
 **Indicates 5 percent level of significance.
 ***Indicates 10 percent level of significance.

reserves of the schedule banks to total deposits (BBR11) as a determinant of the money multiplier along with the monetary base on the right-hand side of the equation. Further, the impact of the reserve of the scheduled banks with the State Bank of Pakistan on the Bank reserves is presented in the third equation. Equations 4 through 6 and 7 through 9 explain the same phenomenon for the first and the second sub-periods respectively.

The empirical findings of the theoretical framework is presented in Table 3. Changes in the monetary base positively and significantly affect the stock of money which is evident from Equations 1, 4 and 7. The money multiplier ranges approximately between 2 to 3. The elasticity for period 2 is about unity which explains that the money multiplier (m) is found to be comparatively stable in this period. Now we include the approximate components of the money multiplier i.e. C2 and BBR11. Equations 2, 5 and 8 explain that the B, C2 and BBR11 are statistically significant with the right signs. The elasticities and the standardised beta coefficients of C2 and BBR11 in all the three periods are very low compared to the first assumption of stable m . But the standard error as a percent of the mean of the dependent variable is relatively small with the inclusion of C2 and BBR11 for the entire period and the sub-periods. It can also be noted that the money multiplier remained important both in the case of stable and unstable assumptions. Movements in bank reserves are largely affected by the movements in the reserves with the State Bank of Pakistan (BBR22) as is evident from the Equations 3, 6 and 9.

5. CONCLUDING REMARKS

In this study it is observed that:

1. The monetary base remained an important determinant of the monetary stock (M_2) for the post-1972 period.
2. The proxy variables of the money multiplier along with the money base also proved to be an important determinant of the money stock.
3. The variations in the volume of bank reserves were largely determined by the level of bank reserves with the State Bank of Pakistan.
4. Although monetary policy remained an effective instrument, however, its weakness came into light in the late Eighties when commercial banks, under tight regulatory control, became ineffective both administratively and in attracting deposits. Under these circumstances our study supports the current monetary policy adopted from July, 1992.

REFERENCES

- Anderson, Leonall C. (1968) Three Approaches to Money Stock Determination. *Review of Federal Reserve Bank of St. Louis*. August.
- Cagan, Philip (1965) Determinants and Effects of Changes in the Stock of Money, 1975-1980. Princeton: Princeton University Press.

- Hamdani, S. M., Mazahir Husnain (1976) Money Multiplier as a Determinant of Money Supply: The Case of Pakistan. *The Pakistan Development Review* 15:2.
- Jordon, Jerry L. (1969) Elements of Money Stock Determination. *Review of Federal Reserve Bank of St. Louis*. October.
- Oyejide, T. A. (1974) Controlling Money Supply in Less Developed Countries: The Case of Nigeria. *The Bangladesh Development Studies*. July.
- Pakistan, Government of (1992) *Detailed Annual Plan*. Islamabad: Planning Commission.
- Pakistan, Government of (1992a) *Pakistan Economic Survey*. Islamabad: Finance Division, Economic Adviser's Wing.
- State Bank of Pakistan (1991) *Annual Report 1990-91*. Karachi.
- Trivedi, Pushpa (1990) The Role of Monetary Policy in Controlling Money Stock in India (1960-61 to 1988-89). *Indian Economic Journal* 38: 1

Comments on

"An Analysis of Monetary Policy in Controlling the Monetary Assets in Pakistan: A Money Multiplier Approach (1971-72 to 1989-90)"

The title of the paper under discussion is: "An Analysis of Monetary Policy in Controlling the Monetary Assets in Pakistan: A Money Multiplier Approach". However, the subject matter of the paper reveals that it deals almost exclusively with the determinants of money supply at a very basic level. Given the fact that effective formulation of monetary policy depends on understanding the determinants of money supply, the need for empirical investigation in this area cannot be understated.

The authors claim that relatively few studies have analysed the money stock determination process using the money multiplier approach. However, the studies that they have listed do not include Brunner and Meltzer's (1964) work on estimation of money supply functions which is a continuation of Brunner's (1961) seminal paper on the supply theory of money. Brunner and Meltzer have formulated both linear as well as non-linear money supply hypotheses. They have represented their non-linear hypothesis in the form of money multiplier equations. ($M_1 = mB$, where B is the monetary base and the multiplier term M is comprised of all major behavioural parameters of commercial banks and the non-bank public i.e. public's currency ratio ' k ', time deposit ratio ' t ', banks excess reserve ratio ' e ' and banks reserve deposit ratio ' r '. This formulation is based on the recently added dimension to the theory of money supply, according to which the money stock is jointly determined by the central bank, the commercial banks and the non-bank public.

Mangla and Ladenson (1978) applied Brunner and Meltzer's model to Pakistani data for 1961-71 and found that the monetary base, currency deposit ratio, time deposit ratio and reserve deposit ratio are important determinants of the money stock in Pakistan. Baig (1978) updated Mangla and Ladenson's work using quarterly data from 1971: I to 1977: II and Haq (1990) updated it using quarterly data from 1972: I to 1988: IV. Both studies confirm and support Mangla and Ladenson's results for Pakistan. It is suggested that the authors incorporate this empirical evidence in their paper since their results regarding the monetary base, the currency deposit ratio and the reserve deposit ratio present additional evidence in favour of the earlier hypothesised relationships between the stock of money and its determinants.

The result regarding the strong relationship between the volume of bank reserves and reserves with the State Bank of Pakistan should be explained in the light of theoretical reasoning.

The results do not clearly reflect the conclusion regarding the efficacy and role of monetary policy.

Aliya H. Khan

Assistant Professor,
Quaid-i-Azam University,
Islamabad.