IMPACT OF MONETARY POLICY ON MONETARY ASSETS IN PAKISTAN
A Money Multiplier Approach
(1980-81 to 1999-2000)

HAFEEZ UR REHMAN and IMTIAZ AHMED*

Abstract. Monetary policy plays an important role in achieving sustained economic growth. Researchers have tried to examine various issues related to monetary policy in developed countries. Several studied have been carried out to identify the major determinant of stock of money. However, a little research has been conducted to analyze the level of stock of money by using the money multiplier approach. In Pakistan, monetary policy is designed to control total monetary assets keeping in view the projected growth rate of GDP, monetization of the economy and likely surplus or deficit in the country's external account. The objective of this paper is to ascertain the monetary policy in controlling the total monetary assets by analyzing the behaviour of the money multiplier. The findings of this study show that the monetary base remained an important determinant of the monetary stock (M_2) and the monetary policy remained an effective instrument in controlling and regulating monetary assets in Pakistan.

I. INTRODUCTION

Monetary policy is formulated to gain sustained economic growth and to keep inflation within manageable limits. Normally variations in money supply are used as an instrument of monetary policy, in accordance with the requirement of output level and employment on the one hand and price stability on the other. In Pakistan monetary policy is designed to control total monetary assets keeping in view the projected growth rate of GDP,

*The authors are, respectively, Assistant Professor at the Department of Economics, University of the Punjab, Lahore-54590 (Pakistan) and Lecturer in Economics at Government College, Daska (currently Ph.D. student at Pakistan Institute of Development Economics, Islamabad).

monetization of the economy and the likely surplus or deficit in the country's international account. Once the safe limit of total monetary asset is determined it is then realized through various indirect measures, like 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 early 1970s indicated the shortcomings of indirect methods when they failed to cope with the new situation. The open market operation could not be materialized 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 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 rising trends in prices. The credit ceiling with its beneficial effects also has some adverse effects. For example, commercial banks have little incentive in mobilizing deposits and their ability to respond to demand becomes extremely limited. The response of the public and commercial banks to a certain extent depends 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, a little research has been conducted to analyze 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 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 this paper is to ascertain the monetary policy in controlling the total monetary assets through analyzing the behaviour of the money multiplier and high powered money and to see further, whether the results are in consonance with current monetary policy.

The determination of monetary aggregates is presented in section II, section III analyzes different behavioural variables and analysis of the empirical findings is the subject matter of section IV. The last section concludes the discussion.

II. DETERMINATION OF MONETARY AGGREGATES

Theoretically the stock of money in an economy is determined by two variables: 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 the banks. The variation in money stock can further be explained by assuming two different behaviours 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 of multiplier is expressed in the form of equations.

$$M = \overline{m} \, B \qquad \text{Under constant multiplier} \qquad (1)$$

$$M = m \, B \qquad \text{Under variable multiplier} \qquad (2)$$

Where M is stock of money, B refers to high-powered money, $\overline{m}$ refers to 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. However, monetary policy is pursued through controlling M_2. The money multiplier for M_2 is defined as:

$$m = \frac{\dfrac{CC}{D} + 1}{\dfrac{CC}{D} + \dfrac{BR}{D}} \quad \text{or} \quad m = \frac{C_2 + 1}{C_2 + BBR11} \qquad (3)$$

where

$$C_2 \quad = \quad \frac{CC}{D}$$

$$BBR11 \quad = \quad \frac{BR}{D}$$

$$D \quad = \quad DD + TD$$

$$m \quad = \quad \text{money multiplier}$$

CC	=	Currency in circulation
DD	=	Demand deposits
TD	=	Time deposits and
BR	=	Bank reserves

Equation (3) explains that variations in the money multiplier are due to two ratios, the currency to deposit ratio (C_2) 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) consist 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 is held by State Bank of Pakistan as reserve which finally appears as part of high-powered money. The other deposits have been excluded from the total deposits (D) due to their different nature and forming a negligible proportion in total monetary assets.

The currency to deposit ratio and the bank reserve to deposit ratio with high-powered money are the determinants of total monetary assets. The value of the money multiplier m is inversely related to C_2 and $BBR11$. The ratio C_2 states that the public wants to hold a fraction of their balances in the form of currency. The higher is 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 depends upon economic conditions of the country and to a great extent on political stability. The other ratio, $BBR11$, reflects the behaviour of commercial banks. The banks reserves are maintained for two purposes; firstly as a statutory requirement, the limits of which are determined by State Bank of Pakistan and secondly to meet the daily transactions. The variations in the ceiling of the statutory requirement on one hand affect the credit creating capacity of banks and, on the other hand, reflect the tone of the monetary authorities.

III. SOURCES OF DATA

The annual data on the monetary aggregates have been taken from the Government of Pakistan (2000-2001 and previous issues) and Annual Reports of State Bank of Pakistan (2001 and previous issues). The data covers the period from 1980-81 to 1999-2000. The analysis is based on the entire period 1980-81 to 1999-2000 and then further divided into two sub-

periods, *i.e.* 1980-81 to 1989-90 (sub-period I) and 1990-91 to 1999-2000 (sub-period 2). The period of analysis is divided into prescribed sub-samples to consider the effects decade wise.

IV. ANALYSIS OF DIFFERENT BEHAVIOURAL VARIABLES

The behaviour of variables for the two sub-periods as well as the entire period is observed by analyzing 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

	1981-82 to 1999-2000	1981-82 to 1989-90	1990-91 to 1999-2000
Monetary Assets ($M2$)	14.78	15.17	14.43
Currency in Circulation (CC)	13.14	14.32	12.09
Demand Deposits (DD)	13.71	14.00	13.46
Time Deposits (TD)	16.69	14.53	18.63
Total Deposits (D)	14.82	14.07	15.49
Bank Reserves (BR)	11.62	8.22	14.68
Monetary Base (B)	13.00	13.90	12.19
Currency/Deposits (C_2)	−1.09	0.37	−2.42
Bank Reserves/Deposits ($BBR11$)	−2.22	−4.12	−0.52

During the first sub-period, the total deposits grew by 14.07% per annum (TD and DD at 14.53% and 14.00%, respectively), whereas currency grew at a rate of 14.32% per annum resulting in a larger C_2 (0.37%) ratio compared to the growth of bank reserves to deposits $BBR11$ (−4.12%), leading to larger multiplier which is also supported by the empirical estimates from Equation (4) in Table 3. The total monetary assets grew by 15.17% per annum, which may be due to the relatively larger multiplier and the higher growth rate of the monetary base (13.90%). The high growth rates of the monetary base were 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 may be the result of slackness in the economy.

In the second sub-period, the total deposits increased from 14.07% to 15.49% per annum, but the increase in time deposits is from 14.53% to 18.63% which is comparatively higher than all others. Demand deposits declined from 14.0% to 13.46% and the growth in currency also declined from 14.32% to 12.09%. Thus, the ratio of currency to deposits also registered a sharp reduction (–2.42%). The other component of money multiplier, *i.e.* bank reserves increased from 8.22% to 14.68% per annum but the growth in deposits was small compared to the growth in bank reserves. Thus, the growth in $BBR11$ was greater in the first sub-period. In fact, the ratio of bank reserves to deposits increased from –4.12% to –0.52% with a larger $BBR11$. Compared to a smaller C_2, the value of the money multiplier substantially declined for this sub-period and is supported by a smaller empirically estimated multiplier from equation (7) in Table 3. The monetary base also declined from 13.90% to 12.19% in second sub-period, which caused a contraction in monetary asset (14.43%). 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 and demand deposits. This whole sub-period was full of political instability, due to which there was a greater variation and contraction in monetary assets took place.

The similar behaviour of money multiplier components and monetary base is shown in Table 2. The minimum growth during the second sub-period in monetary assets was recorded at 10.65% in 1996-97 and the growth in currency, monetary base, bank reserves and demand deposits also registered their minimum values at 4.28%, 3.42%, –6.82% and –7.16%, respectively. The main reason of the slow growth in almost all the variables was a difficult year for the country's economy because of high deterioration in law and order and severe political instability in the country. The annual growth rates in monetary assets for most of the years during the first period remained well above 15% and during the second period it was below 15% for the most of the years.

The currency and the monetary base had 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*) had a positive growth rate whereas time deposits (*TD*) also experienced a positive growth. However, the growth for the three years, 1986-87 to 1988-89, was slow compared to the remaining period. The slow growth rate in *TD* coincided with the period when there was a mushroom growth of co-operative societies and companies. The co-operative societies, offering handsome rate of returns on deposits compared to different time deposits schemes of the commercial banks, caused a substantial switching of funds (deposits) from commercial

banks to 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 M2	Currency (CC)	Bank Reserves (BR)	Deposits (D)	Monetary base (B)	Demand Deposits (DD)	Time Deposits (TD)
1981-82	7.6	12.66	8.35	4.94	12.92	8.08	11.59	14.56
1982-83	6.8	17.88	21.56	3.32	27.42	20.20	17.71	39.06
1983-84	4.0	14.93	13.70	8.31	10.85	13.36	0.95	20.89
1984-85	8.7	13.34	8.47	27.96	14.65	9.67	21.84	8.55
1985-86	6.4	14.14	12.10	4.04	15.97	11.52	14.40	17.47
1986-87	5.8	16.92	18.06	16.78	11.75	17.97	18.60	5.40
1987-88	6.4	16.42	17.51	6.88	9.92	16.81	14.62	5.02
1988-89	4.8	13.69	11.08	1.38	5.15	10.49	10.04	−0.40
1989-90	4.5	16.51	18.01	0.35	18.00	17.03	16.23	20.21
1990-91	5.6	17.77	19.03	38.24	12.10	19.95	1.77	24.65
1991-92	7.7	14.09	10.84	20.95	22.44	11.40	18.16	26.70
1992-93	2.3	13.85	09.91	25.54	18.01	10.84	5.92	29.21
1993-94	4.5	14.02	10.69	19.00	16.06	11.25	7.70	22.40
1994-95	5.2	16.43	16.71	18.44	18.52	16.83	20.14	17.44
1995-96	6.8	13.12	08.60	16.39	10.58	9.17	2.27	16.25
1996-97	1.9	10.65	4.28	−6.82	4.94	3.42	−7.16	12.21
1997-98	2.0	14.21	11.79	10.26	11.98	11.68	4.54	15.68
1998-99	4.2	11.42	5.42	2.38	33.51	5.21	7.69	15.46
1999-00	3.9	18.73	23.62	2.37	6.79	22.19	7.53	6.30

V. EMPIRICAL FINDINGS

The regression results are reported in Table 3, Equation (1) explains the relationship between the monetary base (B) and the money stock (M_2) 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 (C_2) and the ratio of the reserves of the schedule banks to total deposits ($BBR11$) as a determinant of the money multiplier along with the monetary base on the right side of the equation. Furthermore, 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 R^2 values in equations (1), (4) and (7) are close to 1 which indicate that very high degree of variations in M_2 are explained by the independent variables included in the regressions. Equations (2), (5) and (8) also have the same R^2 values which indicate that very high degree of variations in dependent variable (M_2) are explained by the independent variables included in the regressions. However, the low R^2 values of equations (3), (6) and (9) are 0.14, 0.15 and 0.28 indicate that very low degree of variations are explained by the independent variables included in the regressions.

TABLE 3

Summary of the Empirical Findings

Dependent Variables	Constant	B	C_2	BBR11	BBR22	R^2
Equation (1)	Entire Period (1980-81 to 1999-2000)					
M_2	−96928.79	4.13				0.98
T-Stat	(−3.92)	(30.93)				
Equation (2)						
M_2	410019.3	3.79	−1184595	2891845		0.99
T-Stat	(2.74)	(29.86)	(−4.56)	(1.16)		
Equation (3)						
BBR11	0.03				0.33	0.14
T-Stat	(13.39)				(0.44)	
Equation (4)	Period 1 (1980-81 to 1989-90)					
M_2	20656.56	2.58				0.98
T-Stat	(2.02)	(19.04)				
Equation (5)						
M_2	174021.6	2.81	−384878.5	475456.6		0.99
T-Stat	(4.36)	(18.54)	(−4.73)	(0.47)		
Equation (6)						
BBR11	0.03				1.36	0.15
T-Stat	(8.31)				(1.59)	
Equation (7)	Period 2 (1990-91 to 1999-2000)					
M_2	−226374.0	4.63				0.96
T-Stat	(−3.07)	(15.76)				
Equation (8)						
M_2	358573.2	3.96	−1117750	2141948		0.97
T-Stat	(0.78)	(7.01)	(−1.72)	(0.39)		
Equation (9)						
BBR11	0.04				−4.70	0.28
T-Stat	(8.97)				(−2.11)	

The empirical findings of the theoretical framework show that changes in the monetary base affect the stock of money positively and significantly which is evident from equations (1), (4) and (7). The money multiplier ranges approximately between 2.5 to 4.6. When the approximate components of the money multiplier are included, *i.e.* C_2 and $BBR11$, equations (2), (5) and (8) explain that B, C_2 and $BBR11$ significantly affect the stock of money. 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).

VI. CONCLUDING REMARKS

In this study it is observed that monetary base remained an important determinant of the monetary stock (M_2). The proxy variables of the money multiplier along with the money base also found to be an important determinant of the money stock. The variations in the volume of bank reserves were largely determined by the level of bank reserves with the State Bank of Pakistan. Monetary policy remained an effective instrument in controlling and regulating monetary assets.

REFERENCES

Abbas, Kalbe and Qasim Ali Muhammed (1993), "An analysis of monetary policy in controlling the monetary assets in Pakistan: A money multiplier approach (1971-72 to 1989-90)". *The Pakistan Development Review*, Volume 32, No. 4 (Part II), pp. 1043-1054.

Anderson, Leanall C. (1968), "Three Approaches to Money Stock Determination". *Review of Federal Reserve Bank of St. Louis*, August.

Cagon, Philip (1965), *Determinants and Effects of Changes in the Stock of Money* (1975-1980). Princeton: Princeton University Press.

Government of Pakistan (2001), *Pakistan Economic Survey*, various issues. Islamabad: Finance Division, Economic Adviser's Wing.

Hamdani, S. M. and Mazahir Hussain (1976), "Money multiplier as a determinant of money supply: The case of Pakistan. *The Pakistan Development Review*, Volume 15, No. 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.

State Bank of Pakistan (2000-01), *Annual Report*, various issues. Karachi: State Bank of Pakistan.

Trivedi, Pushpa (1990), "The role of monetary policy in controlling money stock in India (1960-61 to 1988-89)". *Indian Economic Journal*, Volume 38, No. 1.