Chapter IV

Monetary Policy In India - Theory, Issues And Evidence

4.1 Introduction

Monetary policy represents one of a number of policies available to the authorities in the pursuit of macroeconomic objectives; the objectives usually considered are Low inflation, high or full employment, balance of payments equilibrium and a satisfactory rate of growth of real income. In a broader context, monetary policy as part of overall economic policy is basically a set of techniques, the users of which are located at the Central bank and not in the government. This suggests fundamentally three major aspects of monetary policy :

a) the degree of autonomy of the Central Bank vis-a-vis the government,

b) the optimum policy mix between monetary policy and fiscal policy

c) the relations between monetary policy and other instruments of economic policy.

It is true that the autonomy of the central bank vis-a-vis the government varies greatly from one country to another. The point at issue in this context is the concrete autonomy in the management of monetary variables; is it the central bank or the government which plays a dominant role as regards monetary

policy decisions? The preference for a high degree of independence for the Central bank is desirable due to the observation that, although economic policy is framed as a whole by the Government, the objective of monetary stability is not given a sufficiently important place in the formulation and implementation of economic policy.[1] The autonomy of Central bank vis-a-vis the government has to be ensured so that an objective deemed to be essential, that of monetary stability, is not unduly related to the background. Needless to say, the history is replete with examples showing the subordination of Central banks to the governments culminating into economic disasters, the classic example of it being German hyperinflation.

The aspect of optimum policy mix between monetary policy and fiscal policy involves what implications the budgetary deficit and the means of financing it have for an economy. One theoretical viewpoint asserts that all public expenditure financed by savings and not by the creation of money leads to a rise in the rates of interest which crowds out an equivalent volume of private expenditure, so that the expansionary effect of the budgetary stimulus is nil. However, Milton Friedman[2] has

1. Paul Coulbois - General Report on the Colloquium "New Approaches in Monetary Policy" - ed. J.E.Wadsworth and L.D.Juvingy, 1979
2. M.Friedman, Capitalism and Freedom, Chicago, 1962, P.83

shown that the effect of public expenditure on income depends on the interest elasticities of investment demand and of money demand. Warren L.Smith[3] stated that the condition for a full efficiency of a Keynesian multiplier was a creation of money sufficient to satisfy, at constant rates of interest, the growing demand for money of an expanding economy, which did not imply that the budget deficit should be financed entirely by an increase of money supply. In this context, the distinction which is often emphasized is the distinction between financing by savings and financing by money.

As already mentioned, monetary policy being a part of whole economic policy, has to keep cohorence with other policies if it has to respect the imperatives of consistency; In cases of the autonomous push of domestic costs and/or the supply shocks, monetary policy might have to play an accomodating role in alignment with other structural policies like industrial policy, employment policy, productivity increase and energy saving campaigns adopted by the state.

4.2 Theoretical foundations of monetary policy

Opinion on the role of monetary policy - what can it contribute? and how should it be conducted to contribute the most? - has fluctuated widely over the years. The relative stability of the 1920s was attributed to the system's capacity

---

3. W.L.Smith - "A Neo-Keynesian View of Monetary Policy", in Controlling Monetary Aggregates, Federal Reserve Bank of Boston, Monetary Conference, June, 1969.

for fine tuning through monetary measures. However, the opinion swung to the other extreme with the advent of the Great Depression. The flavour of professional thought then was in favour of fiscal policy which was believed by all but a few to be the most effective instrument which could stem a depression. Fiscal policy reigned supreme during 1930s till mid 1960s and monetary policy was rendered obsolete. However, the failure of the post-war macroeconomic stabilization policy based on Keynesian analysis to curb inflation led to a revival of belief in the potency of monetary policy. This revival was initially fostered by the theoretical developments attributed to Haberlet and pigou who pointed out that changes in wealth via changes in real quantity of money can affect aggregate demand even if they do not alter interest rates. Also important in this context are the results of empirical studies by Friedman, Meiselman[4] and others which supported the view that there exists a strong and reasonably stable correlation between changes in the money supply and changes in the amount of national income. In the united states during the fifties, studies of both theoretical and empirical nature by Milton friedman[5] revolutionized the thinking towards theory and

4. M.Friedman and D.I.Meiselmann(1963) - "The relative stability of Monetary Velocity and the investment multiplier in USA 1897 - 1958 in Commission on Money and Credit, Prentice-Hall, Eaglewood Cliff.

5.a) M.Friedman(1956)'The quantity theory of money - a restatement' in Friedman(ed) Studies in the Quantity Theory of Money, University Press,Chicago.

b) M.Friedman(1958)'The supply of money and changes in prices and output' in the Relationship of Prices to Economic stability and Growth.

conduct of monetary policy and in this pursuit, he was ably supported by the studies of Brunner, Meltzer and economists of the Federal Reserve Bank of St.Louis[6]. Initially in monetary literature, this new development was described as the "Chicago-School" but in the course of time the name "monetarism" became accepted.

Monetarism by itself represents a series of propositions each reflecting a major assumption or tenet underlying monetarists' model. This implies contrary to the popular belief that monetarism is a much broader phenomenon than the simple adoption of a money supply rule for monetary policy. Following are the key propositions underlying monetarism:

1. Crucial to the monetary approach is the distinction between monetary magnitudes and real magnitudes. This is a crucial distinction in as much as that failure to recognize it is often the source of confusion and misunderstanding regarding monetarists position. Monetarists seem to be advocating two contradictory propositions at the same time: their theoretical analysis views nominal money stock as a kind of Veil and stresses

---

6. a) K.Brunner and A.H.Meltzer (1972a)'Friedman's Monetary theory' Journal of Political Economy 80, September/October, pp. 837-51.

   b) K.Brunner and A.H.Meltzer(1972 b), 'Money, debt and economic activity' Journal of Political economy, 80, September/October, pp.951-77.

real variables while their historical and applied analysis of stabilization policy suggests that movements in money stock are the key to curbing inflation and economic instability. The first proposition implies that monetary changes will only affect nominal variables. While the second statement implies that monetary policy is, in fact, the key to obtaining the desired values for the important real endogenous variables(i.e. the real wage, employment, real output and rate of economic growth).

This apparent paradox may be resolved by noting first that the nominal money stock may affect nominal variables while exerting very little direct influence on the real variables. Thus, when an increase in nominal money raises money income, the level of money wages and the price level, without affecting any of the real endogenous variables, money is properly viewed as a veil. Second,nominal money stock changes may significantly affect the real endogenous variables, in an economy where output can easily expand and where quantities adjust faster than prices. Third, in an economy where output can no longer expand and where prices adjust rather than quantities, control of the nominal money stock is the key to controlling the rise in prices. Essentially, monetarists distinguish between nominal money - a supply - determined

policy variable - and the real (value of the) money stock - a demand - determined endogenous variable; they treat the quantity of nominal money as a variable determined primarily by the supply condition, postulating a fairly close link between monetary base (or high powered money) supplied by the Central Bank and the quantity of nominal money available to the public. In contrast, the real money stock is an endogenous variable, determined by the interaction of the financial and real sectors, and satisfying the demand function for real balances.

2. Central to the monetarists' analysis is also the demand for money function."..... What ultimately matters to holders of money is the real quantity rather than the nominal quantity they hold and that there is a fairly definite real quantity of money that people wish to hold under any given circumstances"[7]. Monetarists assert that there exists a stable demand function for real money balances and, further, that the determinants of this demand function are relatively few in number; it is assumed that demand for real balances is positively related to the level of real income and negatively related to the money rates of interest. What is most important in this context is the postulate that while the demand for money may vary, it will vary in a predictable and quantifiable manner.

---

7. David I. Fand(1970) - A Monetarist Model of the Monetary Process - The Journal of Finance, May, pp.275-289.

3. Fundamental to the monetarists' analysis is the to note that changes in nominal policy magnitudes have their main impact on nominal variables. The principal impact of a sustained increase in the rate of growth of nominal balances will be a corresponding rise in the rate of inflation rather than in real output (i.e., in nominal income rather than in real income) and a rise in nominal interest rates rather than in real interest rates. Nominal policy variables impact little on real variables such as employment and real output, especially in the longer run. It is asserted that substantial changes in nominal income are almost invariably the result of changes in the nominal supply of money,[8] the monetary authorities, by their actions, can cause major swings in private sector nominal income, which in turn can generate cyclical swings in real income. As a result, monetarists often prescribe relatively constant money supply growth rates as the appropriate central bank policy. Regarding the interest rate, the monetarist theory utilizes the close link between nominal money and prices to rationalize the positive association between monetary growth and the level of market rates. The historical association between interest rates and prices may be interpreted as a mutatis mutandis relation, where the initial liquidity effect of an increase in nominal money is subsequently offset by the induced income and price expectations effect. Following Fisher, the nominal interest rate

8. M.Friedman(1970) - 'A theoretical framework for monetary Analysis' - Journal of Political Economy, 78, March/April, pp. 193 - 238.

(essentially the market interest rate) is assumed to be approximately equal to the real interest rate(the real rate of return to investment) plus the expected rate of inflation. With the help of this relation, Monetarists postulate a sequence of monetary expansion, rising prices, and high interest rates, distinguish between nominal and real rates, and introduce a price expectation variable in order to rationalise a rise in market rates(relative to the real rate) when prices are rising. Thus monetarists reject the liquidity preference interest rate theory because it applies only as long as one can equate an increase in nominal money with a permanent increase in real balances; this also suggests that liquidity preference theory may be useful as a theory of the short run interest rate changes - the liquidity effect - associated with the impact effects of nominal money changes. But once the liquidity effect spends itself, the income and the price level effects would raise interest rates, offsetting the initial decline due to liquidity effect.

4.3 Transmission Mechanism

Analysis of interaction between monetary and real phenomena is the central task of monetary theory. The nature and description of the process through which the monetary impulse will influence ultimately the economic activity is termed transmission mechanism. This is the issue on which there exists substantial disagreement between Keynesians and the monetarists.

The Keynesian tradition, also supported by the conclusions of the Radcliffe report, emphasized the role of interest rates in controlling effective demand and influencing economic activity. Accordingly, money only affects the economy through substitution among financial assets dependent on the interest rate movements generated by the monetary change[9].

The monetarist tradition, on the other hand, in its clearest formulation has stressed the portfolio re-allocation that is to be associated with money imbalances. Excess money balances are alleged to be replaced by all the portfolio assets both financial and real; the process of absorbing a money imbalance calls therefore directly into play the demand prices of real assets and by this route the effective demand and the price level.[10]

More specifically, changes in the stock of money affect the aggregate expenditure through two distinct mechanisms; one is the wealth effect and the other is the substitution effect. At a given price level, an increase in the stock of money implying a net increase in the wealth of the community, by directly shifting the budget constraints of the individuals, shifts the aggregate demand or aggregate expenditure curve and

---

9. R.G.Davis(1969) - 'How much does money matter? a fresh look at some recent evidence' - Federal Reserve Bank of New York Monthly Review, 51, June, pp.119-31.

10. C.A.E.Goodhart and A.D.Crockett(1970)"The importance of Money", Bank of England Quarterly Bulletin, 10, June pp.159-98.

generates in turn an increase in real income, prices and employment[11].

In addition to the wealth effect, changes in money stock also operate through the substitution effect; the portfolios of the individuals consist of money, financial and real assets. The substitution processes concern the mutual substitution between the different assets, between existing assets and newly produced units and finally between the purchase of a physical asset and obtaining the services of the asset concerned. An excess supply of any one asset will be directed to that asset with which it has the best substitution relation. After an initial disturbance has occurred, the equilibrium in the portfolio will be restored only when an adequate adjustment of relative prices and yields has taken place, so that demand and supply of each component are equal. The portfolio decisions of the economic agents give an explanation of the link between the financial and real sector of the economy, because total wealth consists of real as well as financial assets.

It should be noted that Keynes and his followers emphasized substitution only between financial assets and considered bonds as the relevant substitute for money.

---

11. a) A.C.Pigou(1949) The Veil of Money, MacMillan, London.

b) Haberler G.(1952) The Pigou effect once again, Journal of Political Economy, 60, pp.240-6.

Accordingly, given an initial equilibrium in the asset holdings of individuals, an increase in the stock of money, by disturbing the equality of marginal yields (pecuinary as well as non-pecuinary) of different financial assets, initiates a process of readjustments or substitution in favour of bonds and other assets, pushing up the prices of assets and bringing down the nominal rate of interest, which in turn stimulates investment expenditure and aggregate demand.[12]

It is obvious that substitution effect operates through money market (i.e. through shifting the LM curve) and it's effect on aggregate demand, income and prices is indirect. On the other hand, wealth effect operates through the 'IS' curve and its effects on aggregate expenditure, income and prices are direct.

4.4 Relevance of Mainstream Models for a Mixed Economy

It is no denying the fact that Macroeconomic debate over the last four decades has produced some consensus among the major factions of macroeconomists regarding the factors that affect the demand for money and the routes through which changes in money supply impinge on the real part of the system. The IS-LM model signifying the neo-classical synthesis is widely used and

---

12. J.M.Keynes (1936) - The General Theory of Employment, Interest and Money, MacMillan, London.

deployed for the purpose of indicating the links highlighted in the post-Keynesian mainstream literature between monetary and real factors. The same model may also serve as a point of departure for suggesting alternative approaches to monetary theory, especially for mixed economies where fiscal and monetary policies are (or need to be) formulated in the context of investment and production plans in the public and the private sectors. A careful reading of the mainstream literature suggests that the major differences between the contending schools of macroeconomics relate not so much to the formal structure within which the monetary and real factors interact, but more to the underlying assumptions regarding the degree of wage-price flexibility, the formation of expectations, the length of time required for revision of old contracts and for adjustment to equilibrium and the access to information of different types of economic units.[13] These factors become important as they are qualitatively different in developing economies as compared to developed countries. Since the rai'son d'etre of a mixed economy in general and development planning in particular lies in the failure of the market mechanism in some important areas, the neo-monetarist model, may a priori be regarded as unsuitable for the developing economies. However, as is already noted there is a broad area of consensus among the major schools of mainstream economics regarding the basic analytical framework, and the contending theories may be said to differ primarily in respect of the quantitative significance of some crucial response functions and parameters. Hence the first step towards

13. J.C.Poindexter (1981) Macroeconomics, Holt-Saunders International editions.

the construction of an appropriate model for developing countries it can plausibly be argued, would be to have reliable estimates and information regarding the degree of flexibility of money wages and prices, the formation of expectations, the income and interest elasticities of consumption, investment and the demand for money and the structure of different kinds of lags etc. There various estimates, when plugged into the mainstream macroeconomic structure, may then be expected to yield reasonably correct theoretical and policy. Conclusions regarding the role of monetary and other factors. It should be noted that the mainstream models developed in the context of advanced capitalist Countries necessarily abstract from some major institutional and structural features of less developed countries and hence do not pose quite a few relevant questions and issues for theoretical and empirical investigations. Our present knowledge appears to suggest that in adapting these mainstream models for developing countries, account should generally be taken of (i) the operation of the government in respect of production and investment; (ii) the close connection between fiscal and monetary factors, especially that between the modes of financing government expenditure and the supply of money; (iii) differences between the behaviour of the agricultural and the industrial sectors; and (iv) the role of monetization or sectoral composition of output in determining the demand for money.

The preceding analysis suggests that the task of constructing a macro-model in developing countries involves

(i) a classification of the main markets on the basis of flexibility of quantity and prices; (ii) an examination of the interaction among different markets(including money market); (iii) an identification of the effective constraints operating on the various sectors; (iv) an analysis of the sensitivity of these constraints to behavioural factors and policy measures and (v) an estimation of the values of crucial behavioural parameters, e.g. the production responses in various sectors income and interest elasticities of money demand, investment and consumption function etc. In short, this is not to suggest and contend that the models of the received macroeconomic theory are entirely irrelevant for developing economies but extreme care should be taken in developing and formulating macroeconomic models and also that estimated parameters of underlying function should be properly interpreted and assessed in view of the specific structural features of an economy. Though this study does not attempt to build up a comprehensive macroeconomic model for Indian economy, appropriate care is taken for the specification and estimation of equations.

4.5 Significance of Monetary Policy

Monetary policy, as mentioned earlier, refers to the changes in the stock of money. It is contended that there is a strong causal relationship between the prices and growth in money supply and also that loss of control over the stock of nominal money and its rate of growth leads to high rates of

inflation and high variability in the rate. This happens especially when the government indiscriminately resorts to the monetary system to obtain resources to bridge budget deficits and banks are allowed to succumb to the increase in the demand for credit without due regard to the overall liquidity position in the economy. A highly variable and unpredictable rate of price change encourages definancialization and leads to misallocation of resources because it does not permit the public to adjust their portfolios for the imminent price rise. It is also argued that the inflation tax imposed by deficit financing is more indiscrimate and less equitable than direct taxes on income and indirect taxes because its incidence is heavier on the poor than the rich[14]. It follows that maintaining a low and predictable rate of inflation will necessitate a more effective use of instruments of monetary policy. From this, it seems the relationship between inflation rates and variability needs a closer study. Is it true that higher rates of inflation are associated with higher variability? If money is found to affect nominal income, then what is the price quantity composition of this over time? What trends in inflation and real growth one visualizes over a period of time? What qualitative observations from a descriptive analysis of monetary policy, inflation and real growth one can make ?

---

14. C. Rangarajan, "Price behaviour in India: An explanation through a model of supply and demand for money", Paper presented at the Indian econometric conference, 1974.

R.J.Modi, A critique of Monetary Policy in India: 1947-67, Minnesota University, 1967.

4.6 Monetary Policy, Inflation and Real Growth - India and Some Asian Countries.:

It is true that there exists wide agreement about the goals or objectives that the stabilisation policies should pursue and it is equally true that diversity of opinion abounds regarding the role that should be assigned to the different instruments of economic policy. In India, more specifically, price stability as an objective of economic policy is being assiduously pursued and attended to by the policy makers and one often hears such assertions that economic policies must have a strong systematic bias in favour of minimising inflationary pressures. However legitimate doubts immediately present themselves about the original contributing factors for price increases[15] and this often posses dilemma to the policy makers in adopting prompt and appropriate measures. It would be extremely difficult to devise an anti-inflation stabilisation package which mitigates all pervasive influence of the major factors in their totality. Hence to render the problem of inflation and its solution analytically tractable, it would be pertinent to take a more electric view of inflation and of the adequately of the pursuit of appropriate measures.

---

15. Major factors are money supply increases, international factors, dislocation of infrastructural facilities such as power, transport and port facilities, continued budget deficits, accertion of foreign exchange reserves, expectations of a poor agricultural season, administered prices as well as difficulties in regard to efficient and prompt supply management.

It is no gain saying the fact that disequilibrium between aggregate demand and supply does manifest itself in the rising prices. This is attributable, a la monetarists, to an unwarranted expansion of money supply and credit which, in effect, arises in order to avoid the temporary depressive effects of non-accommodation. Such accommodating policy is apt to accentuate inflationary price expectations and cost trends making it imperative for the authorities to anchore these trends to a consistent course of demand policy. Table: 1 explains the mechanics of price inflation in India and shows the trend of price inflation over the period 1951-52 to 1982-83.

The computed price index in column(4) of table:1 is obtained by dividing column (2) by column (3) x 100 and is based on the assumption that the index of money supply is a good indicator of aggregate demand and the index of real national income a good indicator of aggregate supply. As can be seen from the table, the computed price index tracks the official price index reasonably well and does confirm the assumption that the index of money supply and real national income are good approximations to the actual demand and supply in the Indian economy. In table:1 it can also be observed that the computed price index over predicts the actual price level in the initial years. This is obvious because during the first two decades, Indian economy had been experiencing relatively moderate excess demand pressures as reflected in lower inflation rates. It was only after 1970s that price increases started getting some momentum and got

TABLE : 1 : MECHANICS OF TRENDS IN PRICE INFLATION IN INDIA, 1951-52 to 1987-88

Year	Index of money supply	Index of Real income	Computed Price, index (4= 2+ 3)	Official price index (WPI)
1.	2.	3.	4.	5.
1951-52	26.1	49.9	52.4	43.8
1962-53	25.5	51.6	49.3	44.8
1953-54	26.5	55.0	48.1	45.3
1954-55	28.3	56.4	50.1	40.1
1955-56	32.1	58.2	55.2	44.4
1956-57	33.7	61.4	54.9	47.0
1957-58	34.8	60.1	57.9	47.5
1958-59	36.7	65.2	56.3	50.2
1959-60	39.5	66.2	59.7	53.1
1960-61	42.0	70.8	59.3	57.1
1961-62	44.5	73.1	66.8	55.0
1962-63	48.3	74.2	65.1	57.7
1963-64	54.2	78.1	69.4	62.3
1964-65	58.5	84.1	69.5	67.3
1965-66	64.7	79.1	81.7	75.7
1966-67	70.1	79.7	87.9	87.5
1967-68	75.0	86.7	86.4	88.2
1968-69	81.7	89.1	91.7	91.0
1969-70	89.7	94.6	94.8	96.5
1070-71	100.0	100.0	100.0	100.0
1971-72	112.3	104.4	110.7	105.6
1972-73	129.3	99.8	129.5	116.2
1973-74	149.5	105.0	142.3	139.7
1974-75	157.0	106.6	147.2	175.0
1975-76	170.2	117.0	145.4	173.0
1976-77	202.6	117.6	172.3	176.7
1977-78	237.2	128.3	184.8	185.8
1978-79	281.5	135.4	207.8	185.8
1979-80	325.9	128.2	252.6	217.6
1980-81	379.3	138.7	273.4	257.3
1981-82	405.1	145.7	278.0	280.6
1982-83	466.3	147.4	316.2	295.5
1983-84	451.6	149.8	301.4	317.3
1984-85	541.5	154.4	350.6	335.4
1985-86	595.5	161.7	368.2	353.2
1986-87	699.0	169.7	412.0	380.0
1987-88	787.0	178.2	441.6	410.4

Source : RBIBulletin, Various issues.

Note : Column(3) refers to measured real income and is arrived at by deflating Nominal income by an appropriate deflator and to that extent, Column(3) and (5) are not independent.

entrenched with expectations further exacerbating price increases. The preceding analysis substantiates the policy makers concern regarding price stability and emphasizes that monetary management as a part of the aggregate demand management to subsequve well defined social objectives should be given due consideration. such management of the aggregate demand by regulating certain macro-aggregates (be it credit restraing, money supply targets and/or gradual reduction in Govt. expenditure) is considered essential in view of the fact that higher rates of inflation are accompanied by greater variability in inflation rates and the discrepancy between actual and anticipated rate of inflation entails considerable welfare costs. Before we examine the issue of variability of inflations, it is instructive to examine the long run relation between money stock and inflation.

4.7 Money Supply and Inflation :

It is widely agreed that in the long run, the rate of increase in money demand will be dependent solely on the growth of potential output. This implies that in the long run the inflation rate (π) is determined by rates of money supply growth (m) and real full employment output growth (y_f) or $\pi = m - Cy_f$ ..(1) Where C is the income elasticity of demand for money. Because the growth of full employment income is largely determined by fundamental factors other than the growth

of the money supply. equation (1) implies that to control the long-run('steady state') inflation rate it is necessary and sufficient to reduce the growth rate of the money supply. However, it is argued by many that monetary policy can account for very little of the inflation of the recent years; This view stresses the supply side effects (food and other price shocks) and suggests that non-monetary factors should be awarded much greater significance and that higher inflation was not of monetary origin and therefore that the prescription of monetary restraint is not necessary.

Table: 2 provides the results of an admittedly crude attempt to examine the relationship between long-run money supply growth and inflation rates. Drawing on data on average inflation and money supply growth for the 1960s and 1970s, and on the rate of growth of aggregate output, it presents rough estimates of the income elasticities of the demand for money, using both M_1 and M_3 definitions. The implied elasticities differ in the two periods for which they are calculated, 1960-70 and 1970-80 but accord well with prior expectations.[16] The elasticities are then used to extrapolate the 'underlying' inflation rates of the 1980s. If money supply growth had been maintained at the 1980-88 rate throughout the decade and if(long run) growth in

16. In surveying international evidence on the demand for money, Laidler(1977: 148-149) concludes that narrowly-defined elasticities are generally less than broadly defined ones, with the former often significantly less than unity. Indian studies generally have found similar results; see, for example Trivedi, M.S.(1980).
Laidler D.E.W.(1977) The demand for money, Dun-Donnelly, New York.
Trivedi, M.S.(1980), "Inflationary expectations and Demand for money in India(1951-75)" Indian Economic Journal, Vol.28, No.1, July-Sept, pp.62.76.

TABLE:2: THE RELATIONSHIP BETWEEN LONG-RUN MONEY SUPPLY GROWTH AND INFLATION RATES[1].

Historical Experience

	Monetary growth[2] (%)		Inflation[3] (%)	Implied growth in Real money demand (%)		Output growth (%)	Implied income elasticities of money demand	
	M_1	M_3	II	$C_1y=(M_1-II)$	$C_2y=(M_3-II)$	y	C_1	C_2
1960-70	8.91	9.17	6.11	2.8	3.06	3.53	0.8	0.86
1970-80	13.88	16.91	8.17	5.71	8.74	3.50	1.63	2.50

Extrapolated 1980s experience (Period 1980-88)

	Actual Monetary growth[4] (%)		Assumed growth in real money demand[5] (%)		Implied long-run inflation rate[6]. (%)	
	M_1	M_3	C_1y	C_2y	II_1	II_2
	14.00	16.6	2.8-5.71	3.1-8.74	8.3-11.2	7.9-13.5

1. All calculations are based upon the long-run equation $II = m - Cy$ and in Log terms.
2. M_1 is the annual compound growth rate of RBI's narrowly defined money supply = currency + demand deposits + Other deposits. M_3 is the compound growth rate of M_1 + time deposits.
3. The rate of change of whole sale prices.
4. Actual annual compound money supply growth rate 1980-88. It is assumed that they are maintained throughout the decade.
5. Assuming the growth in real money demand was equal to the average of the two previous periods.
6. Prediction II_1 is $(M_1 - C_1y)$; Prediction II_2 is $(M_3 - C_2y)$.

real money demand duplicated the average historical experience of the 1960s and 1970s, then the implied long run inflation rate is 8-11 per cent. This estimated range is reasonably close to the actual inflation rates of the recent years and it seems there doesnot remain a major portion of 1980-88 inflation which can be attributed to price shocks. However, keeping in view the fact that recently, Indian economy has not hit very high levels of inflation, it seems monetary authorities have conducted monetary policy in an appropriate manner. The essential point is that monetary factors alone seem to have led to an inflation rate of around 8 to 11 per cent per year in the 1980s and before Indian economy enters high level, some monetary brakes seem to be desirable. This apart, the exercise seems to have furnished the evidence which supports the long run proportionality between money and price level.

4.8 The variability of Inflation in Asian Countries

The introduction of distinction between anticipated and unanticipated inflation has significantly remoulded the thinking of researchers as well as policy makers towards the choice of an appropriate macro economic policy. One of the major implications of this theoretical distinction by M.Friedman[17] has been the notion that only the unanticipated inflation

17. Friedman, M(1968),"The role of Monetary Policy" American Economic Review, March, Vol.58(1), pp.1-17

produces real effects and once inflation is fully anticipated, these real effects are found to be only temporary. Explicit in this analysis is the belief that economic agents correct their errors of forecasting inflation step by step and inflationary expectations gradually adjust to the actual rate of inflation. This error learning process could be affected adversely by prevalance of higher rates of inflation. This is because higher rates of inflation are accompanied by greater variability in inflation rates. The increased variability would augment the average forecasting error in predicting inflation and this would further widen the time span in which expectations adjust to reality.

It is only recently that the systematic relationship between average rates of inflation and their variability has been emphasized. If a higher rate of inflation is expected to yield a higher degree of variability of inflation, then the discrepancy between actual and anticipated rate of inflation may entail considerable welfare costs. Edward Foster[18] and D.E.Logue and T.D.Willet[19] have provided empirical evidence on the relationship between the rate and variability of inflation by examining the past experience of a larger number of countries. A similar exercise is attempted for seven asian

18. Foster(1978), "The Variability of Inflation "Review of Economics and Statistics, Vol.IX, August, No.3, pp.346-350

19. Logue, D.E. and Willet, T.D.(1976), "A note onthe relation between the rate and variability of inflation" Economics, May,43, pp.151-158.

countries. For all seven asian countries the mean rate of inflation and its standard deviation are computed for five time periods, 1957-86, 1957-76, 1957-68, 1969-76 and 1977-86. The relevant statistics are given in table:3 and table:4; inflation is measured by the annual percentage increase (or decrease) in consumer price index (table;3) as well as in GDP deflator (table:4).

A careful perusal of table:3 and table:4 does confirm our a priori expectation that the variability (unpredictability) of inflation becomes more pronounced with higher rates of inflation. Across each country as well as each period, the relationship between average inflation rates and variability of inflation is found to be positive. More significant is the result that the positive association between average annual inflation and standard deviation remains stable over different time periods. This suggests that choosing an inflationary policy might carry the cost of a more variable inflation. At the policy level coexistence of higher rates of inflation and greater variability makes it imperative for the policy-makers to give utmost priority to the objective of price stability. The disadvantages associated with induced uncertainty on account of higher rates and variability of inflation would also compel policymakers to conduct monetary as well as fiscal policy in the most appropriate manner so that they are not destabilizing. This is needed in order to imitiagate all pervasive adverse effect that the inflationary policies might carry with them.

TABLE : 3 : INFLATION TRENDS (Average growth rate and its variability)

Country	1957-68		1969-76		1957-76		1977-88		1957-88	
	$\bar{X}$	$\sigma_{\bar{X}}$	$\bar{X}$	$\sigma_{\bar{X}}$	$\bar{X}$	$\sigma_{\bar{X}}$	$\bar{X}$	$\sigma_{\bar{X}}$	$\bar{X}$	$\sigma_{\bar{X}}$
India	6.28	4.52	7.33	10.11	6.72	7.42	8.73	3.17	7.32	6.53
Korea	11.01	8.14	15.22	6.63	12.78	7.83	13.22	8.60	12.91	8.07
Malaysia	0.46	1.81	5.16	5.49	2.44	4.47	5.39	1.91	3.31	4.11
Pakistan	3.0	3.97	12.37	9.01	6.94	8.05	8.79	2.17	7.49	6.90
Phillipine	4.03	2.54	12.85	8.85	7.74	7.46	15.95	12.24	10.48	10.43
Srilanka	1.55	1.92	7.08	2.70	3.63	3.57	13.71	6.67	6.62	6.58
Thiland	3.03	4.06	7.25	7.77	4.21	6.22	8.50	5.45	5.46	6.31

($\bar{X}$ is the average mean growth rate of consumer prices for the years and $\sigma_{\bar{X}}$ is standard deviation of growth rates for the years in consideration).

Source : Various issues of International Finacial Statistics and National Accounts Statistics.

TABLE : 4 : INFLATION TRENDS (Average growth rate and its variability)

Country	1957-68		1969-76		1957-76		1977-78		1957-68	
	$\bar{X}$	$\sigma\bar{X}$	$\bar{X}$	$\sigma\bar{X}$	$\bar{X}$	$\sigma\bar{X}$	$\bar{X}$	$\sigma\bar{X}$	$\bar{X}$	$\sigma\bar{X}$
India	6.98	4.00	8.75	6.71	7.51	5.46	8.45	3.46	7.79	4.95
Korea	20.54	15.70	17.85	5.66	19.60	13.18	14.13	7.98	18.2	12.30
Malaysia										
Pakistan	3.68	5.06	13.37	22.43	7.31	14.87	8.95	1.62	7.68	13.12
Philippines	2.42	3.36	13.02	7.96	5.45	7.01	15.95	13.03	7.78	9.75
Srilanka	1.65	4.55	7.66	5.61	3.5	5.63	14.21	6.11	6.02	7.33
Thiland	2.96	3.97	7.16	7.57	4.25	5.68	7.30	4.11	4.97	5.51

($\bar{X}$ is the average mean growth rate of GDP deflators for the years and $\sigma\bar{X}$ is the standard deviation of growth rate for the year in consideration).

Source : Same as for Table : 3

4.9 Real growth and Inflation since the 1950s in Asian Countries

It is believed that nominal income can be controlled by traditional macro-economic policy instruments. The control of the money supply is believed to be a major instrument to control the nominal income. It is widely believed that the most empirically reliable and stable impact of the aggregate demand policies is in nominal magnitudes. To the extent that they affect nominal aggregate demand, monetary and fiscal policies represent a single macro-economic instrument even though they may have different effects on resource allocation.

On the other hand, much less agreement exists on how a given change in nominal income growth will be divided between changes in inflation and changes in real output growth, and hence on the effectiveness, in terms of reducing inflation, and the cost, in terms of foregone output, of a sustained and determined programme of reducing the growth of nominal income via monetary disinflation. This section attempts to provide a descriptive analysis on the price-quantity composition of nominal demand. Data for the price-quantity composition of the growth of nominal GDP for asian countries since the early 1950s are presented in figures 1 and 2; Real growth is measured as the vertical distance from the abscissa to the dashed line and inflation is the vertical distance between the dashed and solid lines. Tables 3,4,5 and 6 give the means and standard deviations for inflation and real and nominal

OUTPUT AND INFLATION TRENDS

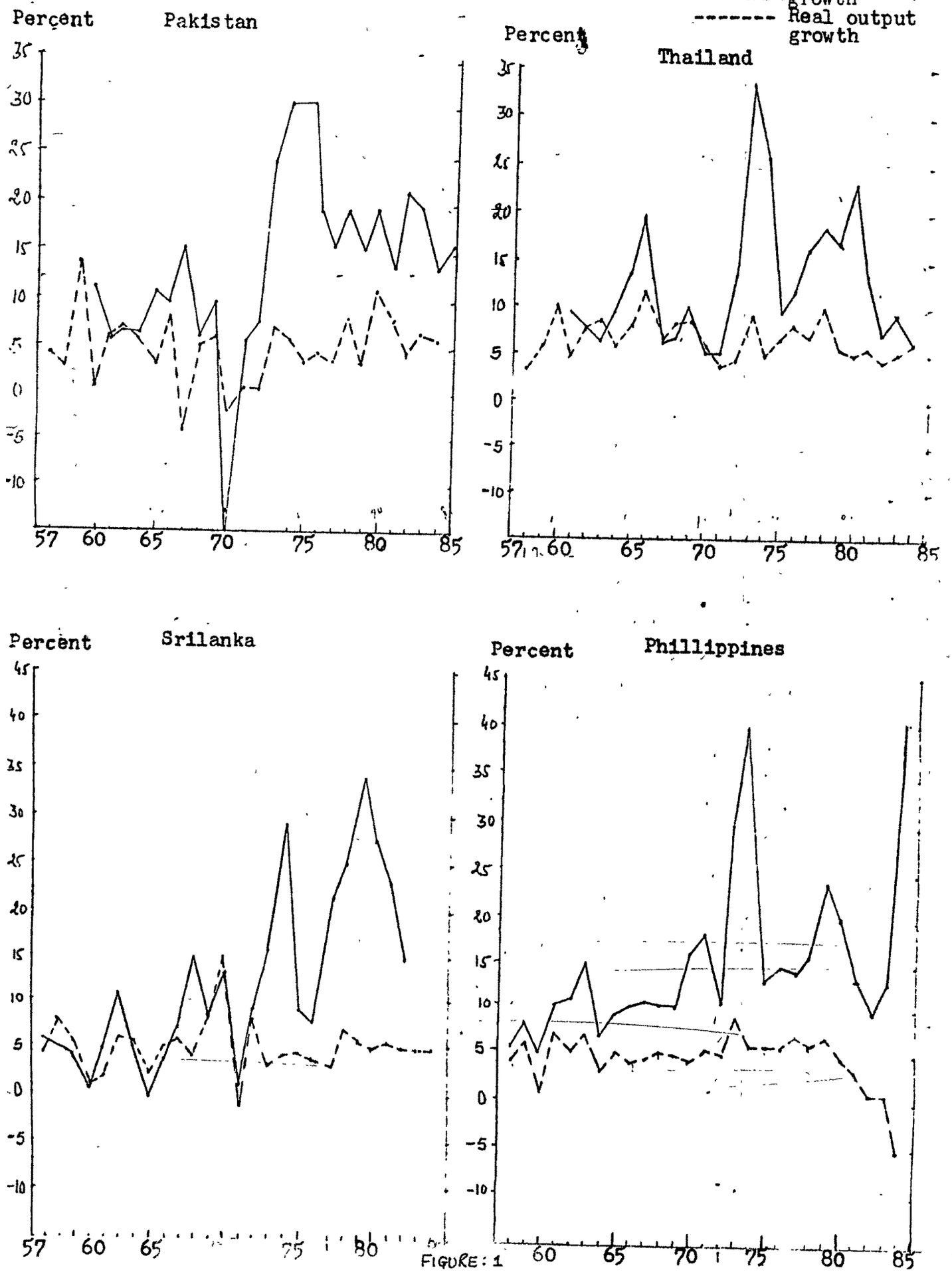

FIGURE: 1

OUTPUT AND INFLATION TRENDS

——— Nominal Output growth
------ Real output growth

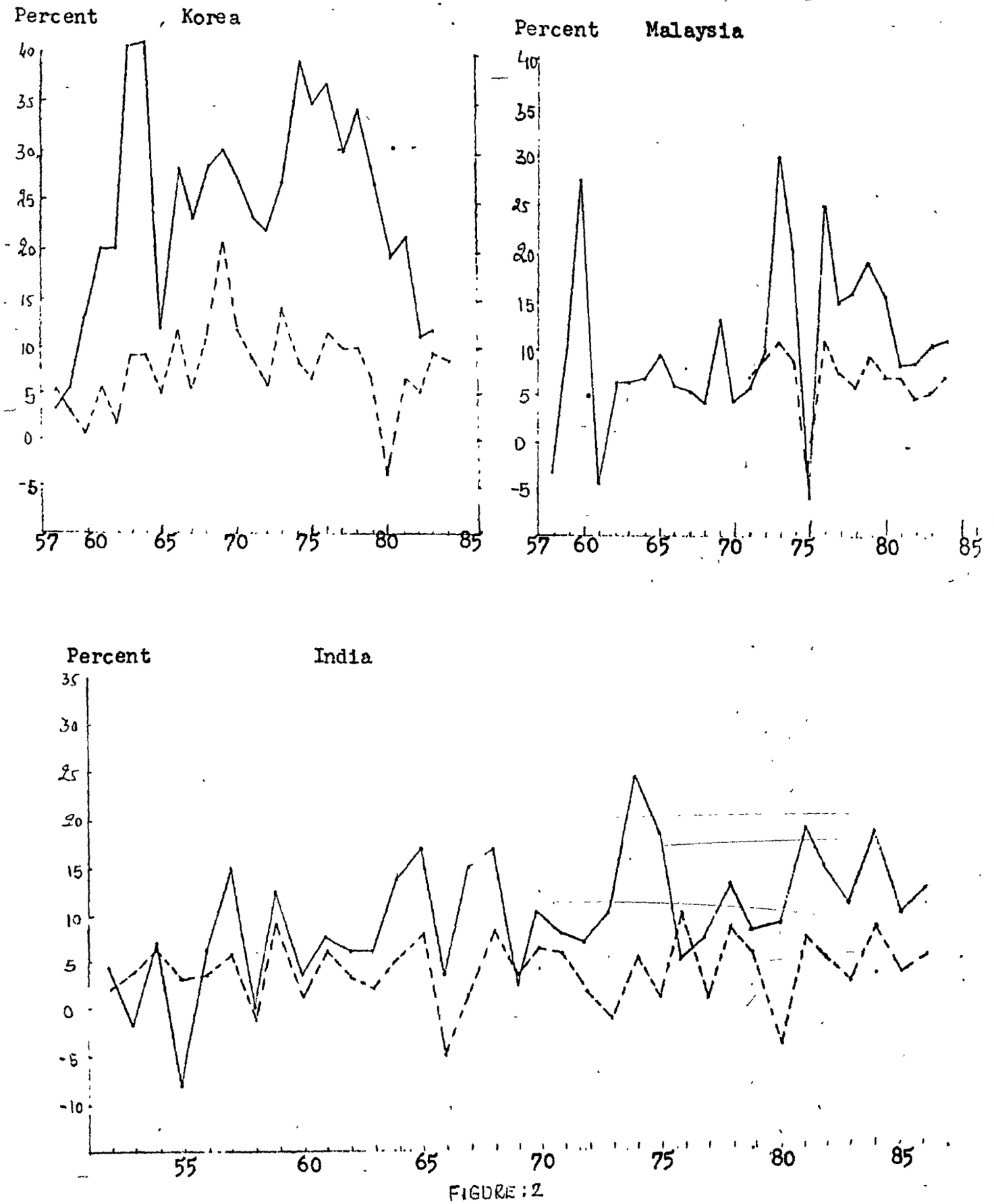

FIGURE : 2

TABLE : 5 : NOMINAL OUTPUT GROWTH TRENDS (Average growth rate and its variability)

Country	1957-68 $\bar{X}$	1957-68 $\sigma\bar{X}$	1969-76 $\bar{X}$	1969-76 $\sigma\bar{X}$	1957-76 $\bar{X}$	1957-76 $\sigma\bar{X}$	1977-88 $\bar{X}$	1977-88 $\sigma\bar{X}$	1957-88 $\bar{X}$	1957-88 $\sigma\bar{X}$
India	9.41	5.84	10.81	6.68	10	6.25	12.46	3.78	10.85	5.65
Korea	21.73	12.32	30.47	6.05	25.41	11.04	22.7	8.00	24.67	10.38
Malaysia	6.88	8.00	13.1	11.1	9.50	9.92	13.1	4.00	10.54	8.73
Pakistan	9.12	3.34	11.65	19.2	10.32	13.84	16.68	2.98	12.48	11.81
Phillippines	9.66	2.71	19.58	9.91	13.84	4.34	19.32	9.5	15.44	9.06
Srilanka	6.03	4.18	12.01	7.64	8.53	6.58	22.07	7.62	12.34	9.26
Thiland	9.72	4.18	14.43	9.43	7.66	9.72	13.93	5.60	12.69	7.09

($\bar{X}$ is average mean growth rate of nominal income for the years and
$\sigma\bar{X}$ is standard deviation of growth rates for the years in consideration).

Source : For India, National Accounts Statistics and for others, International Financial Statistics, various issues.

TABLE : 6 : REAL OUTPUT GROWTH TRENDS (Average growth rate and its variability)

Country	1957-68		1969-76		1957-76		1977-88		1957-88	
	$\bar{X}$	$\sigma\bar{X}$	$\bar{X}$	$\sigma\bar{X}$	$\bar{X}$	$\sigma\bar{X}$	$\bar{X}$	$\sigma\bar{X}$	$\bar{X}$	$\sigma\bar{X}$
India	3.43	4.25	3.92	3.24	3.64	3.86	4.26	3.80	3.85	3.85
Korea	4.70	6.57	11.46	4.73	8.63	4.70	6.89	4.08	8.11	4.60
Malaysia			8.14	3.67			7.17	1.07	7.60	2.60
Pakistan	4.58	4.38	3.04	2.97	3.93	3.93	6.20	2.43	4.60	3.70
Philippines	4.90	1.54	6.08	1.44	5.40	1.61	3.30	3.91	4.78	2.70
Srilanka	4.79	1.83	6.04	4.41	5.31	3.24	5.49	9.08	5.37	2.76
Thiland	7.72	2.21	6.83	1.65	7.34	2.04	6.39	1.58	7.06	1.96

($\bar{X}$ is average mean growth of real income for the years and

$\sigma\bar{X}$ is the standard deviation of growth rate for the years in consideration)

Source : The same as for Table:5.

output growth for the full 1957 to 88 period; for sub-intervals 1957 to 1976, 1957 to 68 (Prior to first oil shoik) period, 1969 to 1976 and 1977 to 1988 period.

Perhaps the most stricking feature of the graphs (from Figures 1 and 2) is how co-incident are the fluctuations in real and nominal output growth. This is true for virtually all countries upto the early 1970s. During the 1970s opposite movements in nominal and real income growth are observed in a number of countries. For some countries like Pakistan, Srilanka, Philippines and Malaysia, there seems to have been a secular increase in the average rate of nominal income growth; for almost all the countries, there was a peak in the early 1970s. Real output growth generally exhibits a much more stable trend so that many of the graphs are 'Open mouthed'. This could suggest that control of nominal income growth may imply a significant degree of control over short-run movements in real income growth, but less, if any, control over long-run real output growth. The volatility of nominal income growth (as measured by the standard deviation) was much higher in the period 69-76 compared to the period 57-68 (Table:5) for all the countries except Korea and this again fell in the period 77-88. For most of the asian countries nominal income growth was actually more stable prior to the first oil shock. There does not seem to be any definite, consistent pattern observed in the growth rates of real output. For countries like Korea, Philippines and Srilanka, Average real growth rate, after oil

price shock has increased whereas for other countries, average real growth rate has remained, mere or less, constant. For the entire period of 1957-88. Korea, Malaysia and Thiland have shown highest real growth rate increases. Interesting, Korea has shown the highest percentage increase in the rate of inflation during 1957-88. Considering table:4 (inflation trends on the basis of GDP deflators), it is apparent that variability of inflation in the post oil price shock period had increased for all the countries except Korea. If one considers the whole period 1957-84 which covers both oil price shock periods, the variability of inflation seems to have been maintained at a higher level.

Considering the Figure 1 and 2, the graphs of nominal and real output growth are generally close together until the early 1960s and even for sometime thereafter upto 1970s for countries like India, Thiland, Srilanka reflecting low rates of inflation. In particular, there is a tendency for the graphs to coincide at the troughs indicating very low or in some cases negative inflation during recession. Many asian countries experienced a relatively sudden increase in inflation in the half decade to 1970 and over a long period (1957-88), inflation differentials have widened considerably. For the period as a whole, it seems that real growth rate has shown relatively greater stability than inflation and this is true for all countries. This has the implication that real growth in general is less subject

to short-run shocks than is inflation. This is further reinforced by the fact that variability of inflation in 69-76 period is greater than the period 57-68 for many countries whereas variability of real growth rates even after price shock remained more or less constant and in countries like India, Pakistan and Thiland it actually fell.

Apart from an analysis of and association between inflation trends and its variability and also those of nominal income and real growth, the issue of the empirical relationship between money and money income is yet an unexplored area. This is all the more important since it is difficult to decompose or separate the influence of money on real output and prices and hence the preferable alternative has been to assess to what extent the variations in money stock produce variations in money income.

4.10 Money and Money income in India - Theory and evidence

M.Friedman and D.Meiselman in their earlier study interpreted the quantity theory and the Keynesian theory as essentially the theories of money incomes determination[20]. As

20. M.Friedman and D.I,Meiselman(1963), "The relative stability of monetary velocity and the investment multiplier in the United States 1897-1958' in Commission on Money and Credit, Stabilization policies, printice-Hall, Englewood Cliffs.

they pointed out, the general comparative static income expenditure model can explain either the fluctuations in price level or the fluctuations in real income, but it is inadequate to explain the simultaneous determination of real income and price level. Making real income and price-level as endogeneous variables raises the problem of number of unknowns exceeding the number of equations. To have a determinate model in this context, requires one more equation, Prof. Friedman tackled this problem of 'missing equation' by interpreting the Keynesian and quantity theory approaches as providing alternative explanations for changes in the level of money incomes.[21] Now in terms of the general Income-expenditure framework (The ISLM Analysis), it can be shown that if the demand for money is completely interest inelastic and solely a function of income, then fluctuations in money income are caused by fluctuations in the nominal stock of money alone. On the other hand, an infinitely interest elastic demand for money, coupled with a completely interest inelastic investment demand would yield a model in which fluctuations in 'autonomous expenditures' is the sole determinant of the

fluctuations in money incomes. the former is the simple quantity

---

21. However, it may be pointed out that once we relax the fix price assumption of the Keynesian approach, it turns out to be logically inadequate even as a theory of money income.

theory model (the velocity analysis) and the later is the simple Keynesian model(the multiplier analysis)[22]. Utilising the U.S. data Friedman and Meiselman tested these two 'extreme' versions, and found that the quantity theory model decisively outperforms the Keynesian model, However, subsequent discussions about Friedman-Meiselman study brought out that their study was attempting to assess the empirical performance and validity of the two models by testing their 'reduced forms'. The proper procedure in this context should have been to test the respective structural forms. Consequently the evidence from Friedman-Meiselman study has not been accepted as unabmiquously conclusive. However, there can be hardly any dobbt that the study has furnished insightful - if not conclusive - evidence in this regard.

Following Friedman-Meiselman study, B.B.Bhattacharya[23] has tested the quantity theory and Keynesian models with Indian data. However in Indian context one important point requires

---

22. As subsequently shown by Friedman, even if we assume a 'normal' demand for money function with finite interest clasticity, under certain assumption and the existence of Fisherian relationship between anticipated rate of inflation and the nominal interest rate plus the assumption of constant difference between the ral rate of interest and the rate of growth of output,we can obtain a model in which the stock of money is a sole determinant of nominal income.
    See Friedman M.(1971), 'A monetary theory of nominal income, Journal of Political Economy, 79, March/April, pp.323-37

23. B.Bhattacharya(1975), Short term income determination Macmillan, Delhi.

to be emphasised. Since the commencement of the second five year plan and the adoption of the policy of large-scale deficit financing, changes in money supply have increasingly been dependent upon the budget deficits. In view of the substantial magnitude of deficit financing, it would be very difficult to discriminate between the effects of the changes in nominal stock of money and the changes in autonomous expenditures. The functional dependence of money-stock on budgetary policy necessiates a model in which nominal stock of money is also endognised. Due to this fact, no attempt is made here to test these competing hypothesis. Instead a more modest task of assessing the empirical relationship between money incomes and money stock is undertaken. Needless to add that in view of the dependence between government expenditure and money supply our results are, to some extent, likely to be affected by the well-known simultaneous equation bias.

We start with the following simple equation with hypothesis that nominal income is a liner function of nominal stock of money.

$$Y_t = \beta_0 + \beta_1 M_t + u_t \qquad \ldots.(I.a)$$

Where Y_t and M_t are respectively the level of money income and the nominal stock of money in period t. β_0 and β_1 are the parameters with β_1 expected to be positive in sign. u_t is the disturbance term. The equation is estimated on the basis of the data spanning the period between 1950-51 to 1987-88. For the money stock variable, the narrow as well as the broad definitions are used.[24] The estimates are presented below :

24. M_1 = Currency + demand deposits + other deposits with RBI
M_3 = M_1 + time deposits.

$$Y_t = 1329.39 + 5.04\ M_{1t} \quad \bar{R}^2 = .99$$
$$\qquad\qquad (94.91) \quad D.W. = 1.24$$

$$Y_t = 14134.4 + 1.77\ M_{3t} \quad \bar{R}^2 = .98$$
$$\qquad\qquad (48.61) \quad D.W. = .19$$

It can be seen that the equations have a very good fit, variations in the narrowly defined stock of money account for the ninety eight percent variations in money income. While the corresponding R^2 for the broadly defined stock of money is also approximately same. However the D.W.Statistic indicates a substantial amount of auto correlation in both the equations. This has resulted in extremely high 't' values of the estimated coefficients of B_1 in both the equations. As it is well-known presence of serial correlation in the error term results in under estimating the standard errors of the estimated coefficients.

The usual procedure in this context, would be to regress the first difference of Y_t on the first difference M_t. However, this is an arbitary procedure in as much that it emplicity assumes that the serial correlation coefficient - ρ - is equal to unity. Consequently instead of estimating the equations in their first difference form we have adopted Durbin's two stage procedure to deal with the serial correlation problem.

In this procedure we estimate the coefficient of the serial correlation - ρ from the first regression and subsequently by estimating the following equation we obtain the consistent estimate of β_0 and β_1.

$$Y_t = \beta_o + \beta_1 M_t$$

Where $Y_t = (Y_t - \rho Y_{t-1})$, and $M_t = (M_t - \rho M_{t-1})$

The empirical results for the corrected versions are as follows :

$$Y_t = 98.1 + 4.93\ M_{1t}$$
$$(27.22)$$
$$\hat{\rho} = .54$$
$$R^2 = .972 \quad \bar{R}^2 = .956 \quad D_W = 1.75$$

$$Y_t = 1011.12 + 2.92\ M_{3t}$$
$$(17.86)$$
$$R^2 = .938 \quad \bar{R}^2 = .910$$
$$\hat{\rho} = .70 \quad D_W = 1.81$$

The following important results emerge from the above estimated equations.

(a) Even after correcting for serial correlation money stock variables turns out to be highly significant. A significant empirical relationship between contemporaneous covariations between changes in money stock and changes in money income are strongly indicated.

(b) One point which require further investigation is that in terms of goodness of fit criteria = R^2 - the perfommance of the narrowly defined stock of money turns out to be some what better than the broadly defined stock of money.

We also estimated a dynamic version of the equation by incorporating the lagged value of Y_t.

Thus the following equation is specified and tested

$$Y_t = B_o + B_1 M_t + B_2 Y_{t-1} + M_t$$

It is now well-known that the above equation can not be estimated by ordinary least squares method for obtaining consistent estimates. This is because the lagged endogenous variable appears as one of the explanatory variable. In this situation application of OLS results in biased as well as inconsistent estimates. In additions to this fact, we cannot use the Durbin-Watson test for first order serial correlation. The estimation procedure used in the context of the above equation, is to apply the Hildreth-Liu search procedure. It consists in estimating the following equation for different values of ρ and choosing that set of estimates for which R^2 is maximised[25].

Thus the iterations were performed for the following equations :

$$Y^*_t = B'_o + B_1 M^*_t + B_2 Y^*_{t-1} + U'_t$$

Where $Y^*_t = (Y_t - \rho Y_{t-1})$

$M^*_t = (M_t - \rho M_{t-1})$

$Y^*_{t-1} = (Y_{t-1} - \rho Y_{t-2})$

25. The estimates obtained through this procedure have the asymptotic properties of consistency and efficiency. However, due to the presence of Lagged Y_{t-1} on right hand side, there is a possibility of finite small sample bias.

First, we present the results obtained through the OLS method :

(I) $Y_t = 888 + 1.27\ M_1 + .88\ Y_{t-1}$
(2.02) (1.11)

$\bar{R}^2 = .99$; D.W. = 1.20

$Y_t = 188 + .17 M_3 + 1.04\ Y_{t-1}$
(1.98) (1.05)

$\bar{R}^2 = .98$; D.W. = 1.15

The estimates obtained through the Hildreth-liu iterative search procedure are as follows :

(II) $Y^*_t = 518 + 2.25\ M^*_1 + 1.94\ Y^*_{t-1}$
(2.02) (8.80)

$R^{-2} = .97$; The $\bar{R}^2$ maximising value of ρ was found to be 0.6.

$Y^*_t = 1899 + 0.53\ M^*_3 + 1.45\ Y^*_{t-1}$
(2.40) (12.08)

$\bar{R}^2 = .96$; The R^2 maximising value of ρ was found to be 0.4

The broad conclusions which emerge from the above results are as follows :

1. Although the results for OLS estimates are impressive, they seem to be partly due to the autoregressivity that exists between Y_t and Y_{t-1}.

2. When the implied serial correlation is corrected R^2 to some extent gets reduced. However, still the empirical performance is quite impressive. Almost ninety seven percent variation in money income can be

accounted for in terms of variations in the narrowly defined stock of money. For M_3, it is ninety six per cent.

3. A more significant result which is specific to the dynamic version of the money income relation is the differences in the statistical significance of the estimated coefficients of the Y_{t-1} in equations. It can be observed that in the former equation B_2 is statistically insignificant while in the latter equation B_2 is found not only to be highly significant but also more significant that in equation (I) This implies significant adjustment lags in the relationship between nominal money income and narrow & broadly defined stock of money.

All in all, it is found that there is a significant evidence of indicative nature between money income and money supply. None the less a cautionary caveat should be noted. As remarked earlier, our investigation is based upon test of the reduced form equation. Hence the problem of causality and the feed-back effect that emanate from the real sector to the monetary sector is largely ignored here. This issue is partially dealt with in a later section.

The analysis of the issue of the stability of demand for money and also the stability and predicatability of the money multiplier has profound implications for the conduct and formulation of Monetary policy in India. If on the one hand, it highlights the importance of money stock as an instrument

of policy, on the other hand, it raises the question whether money stock is a good target variable ! Whether it is narrow monetary aggregate, M_1 or a broader monetary aggregate, M_3, that is more appropriate a target variable ! As an intermediate variable serving as indicator to show properly the stance of policy, which is the appropriate monetary aggregate to serve as indicator ! What criteria one can adopt or what type of arguments and evidence one can furnish and muster to resolve these issues ! The following sections attempt to tackle these questions.

4.11 Demand for Money :

In the long run as well as in the short run analysis of inter relationship between monetary and real variables, the demand for money function is accorded a crucially important place. It becomes far more important in the conduct and formulation of Monetary policy. An appropriate conduct of monetary policy essentially involves monetary management which is a part of aggregate demand management. The objective of monetary management is to so manage variations in the stock of money that no inflationary or deflationary pressures in the commodity market originate from the money market or get validated by the money market. This requires that money market is kept in (longrun) equilibrium at stable prices and maximum feasible output. Since the demand for money cannot be controlled directly by the monetary authority and since the supply of

money is very much under its control, the aforesaid equilibrium in the money market is to be arrived at and maintained primarily by adapting suitably the supply of money to the demand for money. More specifically, what is required is to keep the stock of money equal to the amount of money demanded at constant prices and maximum feasible output over each long period when stated in terms of the rate of growth of the stock of money, the proper monetary policy would require that, starting with a position of monetary equilibrium, the stock of money over a period is increased at the same proportionate rate at which the demand for money at constant prices grows when the economy grows along its maximum feasible output path. This type of monetary policy prescription is based on the assumptions i) that the demand for money is a stable function of a few specific variables, so that changes in it can be predicted with a reasonable degree of confidence; and ii) that, if the authorities so desire, they can successfully control actual changes in the stock of money within narrow limits.

The first of the aboveassumptions has already been addressed by number of empirical studies on demand for money in India. Different researchers have used different specifications and have attempted to answer different questions pertaining to demand for money in India. Some of the empirical issues are :

a) What is the relevant concept of money, M_1 or M_3 !

b) What is the appropriate concept of income that should be included in the function - measured or permanent ?

c) Which is the appropriate rate of interest to be considered as an argument in the demand for money function?

d) Is the inflation rate an important variable in the function?

e) What are the magnitudes of various elasticities concerning the money demand function ?

f) Is the money demand function stable over time or have the money demand elasticities changed over time ?

Above issues have already been dealt with by major research studies both at theoretical and empirical levels. Major studies on demand for money in India have been by S.B.Gupta(1979),R.L.Sharma(1977),Vasudevan(1977), M.S.Trivedi (1980),A.K.Lahiri(1986),and G.S.Gupta (1984).[26]

---

26. Gupta S.B.(1979) Monetary Planning for India, Oxford University Press.
Sharma R.L.(1977) Demand For Money in India, Indian Economic Review.

Vasudevan,A(1977)"Survey of Demand for money in India" RBI Occassional Staff Papers

Trivedi M.S.(1980,"Inflationary expectations and Demand for Money in India"(1951-75), The Indian Economic Journal, No .1,Vol.28,July-Sept.pp.52-76.

Lahiri, A.K.;Madhur SriNivasa & Wadhwa Wilima(1986),"Price Determination in Macro econometric Framework",Economic Bulletin.

Gupta,G.S.(1987),"Demand for money: An empirical examination of unsettled issues for India," PRAJNAN, Vol.XVI, No.4 Oct-Dec., National Institute of Bank Management.

S.B.Gupta and experimented with alternative specifications of the demand function for money for India for the period 1950-1 to 1975-6 (annual data). Some relevant results are reported below in the table :

TABLE : 7 : MONEY DEMAND FUNCTIONS : I

Dependant Variable : $\text{Log}(M_1/P)^d$

Equation No.	Intercept	Independent variables	$\bar{R}^2$	D.W.
(1)	-1.68 (-1.39)	+1.019 log Y (7.62) - 0.119 log P (-1.69) - 0.026 r_{12} (-1.07)	0.939	1.45
(2)	1.71 (0.98)	+0.918 log Y (7.23) - 0.610 log Ya/Y (-2.49)		
		-0.043 R_{12} (-1.867) - 0.058 log P (-0.852)	0.95	1.26
(3)	0.802 (0.379)	+0.969 log Y (5.45) - 0.506 log Ya/Y (-2.07)		
		-0.112 log r_{12} (-1.326) - 0.143 log P (2.436)	0.94	1.21

Source : Suraj B. Gupta (1979) *op.cit.*

In the above table, figures within parentheses are t-values of the estimated coefficients above them, Y stands for real net national income, Ya/Y is the ratio of Agricultural income at current prices to that of national income at current prices, r_{12} the 12 month time deposit rate, p the general price level proxied by wholesale price index and M/P stands for real money balances.

From the table, it is clear that in equation 1, the estimated income elasticity of demand for narrow money turns out to be 1.019; r_{12}, a proxy for interest rate is not significant in equation 1; In all equations, the coefficient of P has a negative sign indicating that a rise in level of P lowers the real demand for money. Equation 1 gives a very good fit, explaining about 94 per cent of the observed variation in the log in M/P and without any serial correlation among its residuals at only one percent level of significance. Since the study of the demand for money by S.B.Gupta refer to the period 1950-75, we have attempted to estimate demand for money for the period 1951-87 and for this, the estimates on both income elasticity and interest elasticity were obtained using both the definitions of money stock, M_1 and M_3. The estimates are given in the following table :

TABLE : 7 : MONEY DEMAND FUNCTIONS : II
Dependent Variable : Log (M_1/P)

Equation No.	Sample Period	Coefficients of independent variables (and t-ratios)			R^2	D.W.
		Constant	Log Y	Log iS		
1	1951-87	-0.212	1.02 (9.93)	-0.30 (-3.22)	.94	1.32
2	1951-71	-0.38	0.95 (2.91)	0.03 (0.26)	.87	1.17
3	1972-87	-1.35	1.23 (8.23)	-0.56 (3.34)	.86	1.42

Y refers to real income and iS is interest rate on 12 monthly time deposit rate.

TABLE : 7 : MONEY DEMAND FUNCTIONS : III

Dependent Variable : Log (M_3/P)

Equation No.	Sample Period	Coefficients of independent variables (and t-ratios) Constant	Log Y	Log iS	R^2	D.W.
1	1951-87	-4.65	2.05 (15.8)	-0.51 (-3.9)	.97	1.38
2	1951-71	-0.47	0.97 (3.25)	0.08 (0.50)	.98	1.52
3	1972-87	-5.48	2.13 (14.6)	-0.28 (1.7)	.96	1.55

TABLE : 7 : MONEY DEMAND FUNCTIONS : IV

Dependent variables : Log (M_1/P)

Equation No.	Sample Period	Coefficients of independent variables (and t-ratios) Constant	Log Y	Log iS	Log P	R^2	D.W.
1	1951-87	-1.81 (-2.44)	1.33 (6.48)	-0.62 (-2.75)	-0.052 (-1.15)	.95	1.48
2	1951-71	-0.40 (-3.10)	1.10 (3.20)	-0.13 (-2.10)	-0.010 (-2.68)	.96	1.70
3	1972-87	-4.50 (5.41)	1.12 (4.72)	-0.40 (2.07)	-0.014 (2.440)	.95	1.14
	Dependent variable : Log (M_3/P)						
4	1951-87	-2.48 (-2.72)	1.36 (5.32)	-0.61 (-5.15)	-0.021 (-2.12)	.97	1.44
5	1951-71	-0.8 (-1.95)	0.95 (4.74)	-0.067 (0.42)	-0.002 (0.16)	.86	1.65
6	1972-87	-7.7 (3.32)	2.21 (7.74)	-0.27 (0.88)	-0.015 (2.41)	.95	1.67

P stands for wholesale price index representing general price level.

It seems the empirical findings on the function are quite encouraging. The three variables, viz. income, interest rate and the prices explain upto 95 per cent of variations in both narrow and broad money holdings. The measured real income variable enters with a highly significant and correct sign of coefficient in all specifications. The prices and interest rate appear with expected sign and have been found to be significant. The income elasticity of demand for real balances for M_1 turns out to be around 1.2 and that for M_3 turns out to be around 2.1. The interest elasticity of demand for real balances for M_1 .30 and that for M_3, it is around .28, These estimates pertain to the whole period. The significance of these variables is found to be maintained over the two sub-periods The absolute value of the coefficient of price level, though significant, is not found to be large; however, its negative sign is as expected. This is because in times of inflationary situations, rate of inflation is thought to be a proper opportunity cost variable and this implies that money and real goods bear a substitute relationship. A rise in the level of price level. Lowers the real demand for money. All in all, on the basis of empirical evidence furnished here, the following tentative conclusions about the demand for money in India may be drawn :

1. that the demand for money in India is highly stable.
2. that real income is a major determinant of it
3. that income elasticity of demand for money is near unity for M_1 and it is around two for M_3.

4.12 Money Multiplier :

Turning to the 2nd assumption of controllability and predictability of money stock within narrow limits, the empirical evidence does suggest that the reserve bank of India can control money stock by controlling the reserve money. (S.B.Gupta, 1976 and Kulkarni V.C. and Miller S.M.(1986).[27] It is found that the value of money multiplier in India does not show marked fluctuations over the period of 4-5 years which means that it can safely be assumed to be stable for the policy purposes over the same time horizon (Table : 8); This also means that variations in money stock could easily be ascribed to variations in high powered money, a policy variable. The existing empirical evidence supports the use of money multiplier models as a guide to monetary policy. On a long-run basis, there exists a strong link between base-money growth and money-stock growth; it is also found that short run movements in the money stock are primarily explained by short run movements in base money. In short, the bulk of evidence suggests that the money multiplier model has operational significance in the Indian economy. Gupta S.S.(1972), while examining money supply determinants and their relative contribution to monetary growth in India, has furnished the evidence which suggests that over the first three plan periods, the reserve money growth had accounted for

---

27. Gupta S.B.(1976) "Money supply analysis - A reply" Economic and Political weekly, November 20, 1934-44.
Kulkarni V.C. and Miller S.M.(1986) "The money supply process in India : Does it have operational significance?" Indian Economic Journal, Vol.34, No.1, July-Sept, pp.1-22.

TABLE : 8 : MONEY MULTIPLIER

Last Friday of the Year	Value of m.1	Value of m.3
50-51	1.32	1.53
55-56	1.32	1.60
60-61	1.28	1.78
65-66	1.40	1.90
66-67	1.43	1.97
67-68	1.46	2.04
68-69	1.42	2.04
69-70	1.46	2.13
70-71	1.52	2.28
71-72	1.55	2.36
72-73	1.61	2.50
73-74	1.54	2.42
74-75	1.61	2.63
75-76	1.70	2.88
76-77	1.60	2.79
77-78	1.32	3.01
78-79	1.22	2.83
79-80	1.20	2.82
80-81	1.23	2.85
81-82	1.21	3.05
82-83	1.23	3.15
83-84	1.15	2.95
84-85	1.26	3.24
85-86	1.15	3.13
86-87	1.14	3.14
87-88	1.08	3.05

m.1 = Narrow money multiplier = M_1 + Reserve money

m.3 = Broad money multiplier = M_3 + Reserve money

Source : Reserve Bank of India Bulletin, Various issues.

on average, 85 percent of the growth of quantity of money; and contribution of money multiplier to the growth of the quantity of money was found to be only 6 percent over the sample period[28].

In Table 9 an attempt is made to analyse the relative contribution of reserve money and money multiplier to monetary expansion during the time periods shown. The exercise throws light on the sources of monetary expansion during different periods in a money multiplier framework. In the period 1960-65, of the total money supply expansion, reserve money accounted for 93.04 per cent and money multiplier for 7 per cent(columns 6 and 7); in the second quinquennium the relative contribution of reserve money marginally rose to 93.74 percent while that of multiplier dropped to 6.26 percent. In the subsequent period, i.e., 1971-78, there was considerable improvement in the contribution of reserve money to 94.22 percent and that of money multiplier got substantially reduced to 5.78 percent. With respect to the contribution of reserve money and money multiplier to M_3 growth the picture is somewhat at variance. In 1960-65 reserve money variations explained 91 per cent of change in M_3 and money multiplier 9 percent (column 8 & 9). The contribution of RM got reduced to 88.00 percent in 1979-88, however, the role of reserve money improved accounting for over 90 percent of M_3 expansion. As opposed

28. G.S.Gupta(1972) - Money supply determinants and their relative contribution to monetary growth in India - The Indian Economic Review, Vol-VII, No.1, P.33-52.

TABLE : 9 : RELATIVE CONTRIBUTION OF RESERVE MONEY (RM) AND MONEY MULTIPLIER (m) TO INCREASE IN M_1 AND M_3[29]

	d log RM (1)	d log M_1 (2)	d log M_3 (3)	d log m_1 (4)	d log m_3 (5)	$\frac{d \log RM}{d \log M_1}$ (6)	$\frac{d \log m_1}{d \log M_1}$ (7)	$\frac{d \log RM}{d \log M_3}$ (8)	$\frac{d \log m_3}{d \log M_3}$ (9)
1960-65	6.55	7.04	7.22	0.49	0.67	93.04	6.96	90.72	9.28
1965-70	7.19	7.67	8.17	0.48	0.98	93.74	6.26	88.0	12.00
1971-78	8.64	9.17	9.90	0.53	1.26	94.22	5.78	87.27	12.73
1979-88	10.53	10.55	11.66	0.02	1.13	99.81	0.19	90.31	9.69

Note : d log refers to variations of the natural log of the respective variables between the periods.

29. The role of reserve money and money multiplier in determining the money stock variation has been assessed in the following manner : $M = RM.m$ ..(1) In logarithmic form this could be transformed as : $\ln M = \ln RM + \ln m$ ...(2).

This specification is worked with the natural logarithms in order to capture the exponential growth between two chosen periods. The relative contribution of RM is estimated by dividing natural Logarithm value of RM with natural Logarithm value of M_1 and M_3 differentiated with respect to time. Similarly the contribution of money multiplier is estimated by dividing the values m with values M_1 and M_3.

to the growing influence of reserve money on M_3 expansion, the role of multiplier in inducing Monetary expansion got considerably diminished between 1965-70 and 1979-88.

4.13 Indicators of Monetary Policy - M_1 or M_3 : Some Arguments and Evidence

The Report of the Committee to Review the Working of the Monetary System[30] had examined the monetary policy during the period 1970-84 to assess its effectiveness under different economic situations prevailing during that period. While examining this aspect, it has repeatedly referred to the annual rates of change in prices, output and the nominal money supply. The way the contemporaneous relationship between these variables is conducted gives one an impression that such association exists between those variables. In a number of years, growth rates of nominal money supply M_3 were held responsible for the increase in prices. In some years growth rates of nominal money supply were indicative of relatively high expansion in M_3[31]. It is our view that the use of nominal money supply growth

30. Reserve Bank of India, "Report of the Committee to Review the Working of the Monetary System", Bombay, 1985;
Chakravarty, S, "Report of the Committee to Review the Working of the Monetary System - Reexamination", Sir Purshotamdas Thakurdas Memorial Lecture, Indian Institute of Bankers, World Trade Centre, Bombay, 1986, and
Shetty, S.L., "New Dimensions of Monetary Policy - A Brief Summary", Seminar on Economic Policy, Sardar Patel Institute of Economic and Social Research, March 1988, pp.20-21.

31. This is not to suggest that the Committee has been very explicit or categorical about the analysis of monetary policy. Strictly speaking we do not ascribe any views to the Committee, but following the Committee's analysis, one gets a distinct impression that this is what the committee must have meant.

rates gives a misleading picture of the relative tightness or easiness of monetary policy and especially about any causal relation between prices and money stock. Regarding monetary targetting, in its analytical framework, the Committee seems to have followed a monetarist approach (pp.168-69) when it explicitly says that there is a stable money supply relation or a stable money multiplier and also a stable demand for money function of the cambridge equation type. In our view, though the Committee seems to have been monetarist in its approach, its formulation of a quantitative monetary target is not strictly monetarist as it is popularly believed. It is also our view that the choice between M_1 and M_3 as an indicator of monetary policy is an important issue. We are not in agreement with the Committee in the selection of M_3 over M_1 for its analysis; on the contrary we believe that it is the growth rate of the real value of M_1 which is more appropriate to judge the easiness or tightness of monetary policy. Since, these are some of the observations made against the work of a Committee (which had a distinguished group of economists), our views need to be carefully examined. Hence within the limited scope of this study, we present some theoretical arguments and empirical evidence in support of our views.

Theoretical Arguments and Empirical Evidence

There is no generally accepted criterion by which to judge whether monetary policy has been 'tight' or 'loose'. The traditional indicator has been the level of interest rates, but

The prevalenceof inflation and administered interest rates in India have reduced the significance of this indicator. The other indicator which can be used is the rates of growth of monetary aggregates. Table 10 gives the rates of growth of nominal money supply and real money supply (nominal money supply deflated by the whole sale price index) of M_1 and M_3 and the rates of growth of real net national product (NNP).

From the Table, the first point to note is that in a number of years nominal growth rates of M_1 and M_3 are markedly different and it seems M_3 has been growing at 3 to 4 percent per year faster than M_1 growth. This indicates that the choice between M_1 and M_3 as an indicator of monetary policy is very important since the policy may appear to be tight if one looks at M_1 or loose if one works out a simple average of growth rates. For example, if one takes the average of three years (say 1976-78), then the average growth rate for M_1 (i.e. 7.77 per cent) indicates substantial tightening of monetary policy compared to other periods (say 1973-75); While the average growth rate for M_3 (i.e. 20 per cent) depicts a totally different picture. Similar observations have been found for the Canadian economy.[32]

Hence, in our opinion, the tightness or easiness of the monetary policy should be judged primarily by the rate of growth of real value of M_1. We can elaborate our point with an illustration. Suppose the growth rate of nominal M_1 is ten per cent,

---

32. Barber, C.L. and John C.P.McCallum, Unemployment and inflation: The Canadian Experience, Canadian Institute for Economic Policy, 1980.

TABLE : 10 : GROWTH RATES IN MONEY SUPPLY 1970-1987

Year	Annual Percentage Rates of Growth of Monetary Aggregates				Rate of growth of real NNP
	Nominal money supply		Real money supply		
	M_1	M_3	M_1	M_3	
1970	10.25	12.40	3.33	5.34	6.3
1971	12.00	17.37	8.42	13.62	5.6
1972	13.64	16.36	5.44	7.45	1.4
1973	16.39	18.50	3.22	5.05	-1.5
1974	15.36	16.88	-10.72	-9.54	5.2
1975	6.57	10.77	-3.85	-0.12	1.5
1976	10.38	14.43	18.53	23.00	9.8
1977	18.76	22.40	5.57	8.81	0.5
1978	7.83	20.62	-12.47	14.52	9.1
1979	19.94	21.22	16.10	17.31	5.6
1980	15.62	17.32	-6.29	-5.00	-5.5
1981	15.85	18.28	0.24	2.35	7.9
1982	6.97	12.76	4.30	9.95	4.0
1983	15.39	16.72	7.78	9.47	1.6
1984	17.04	16.72	7.78	9.47	1.6
1985	19.51	19.16	13.50	13.17	3.1
1986	10.44	15.93	4.31	9.49	4.7
1987	17.04	15.65	4.22	7.58	3.6
1988	12.90	15.66	3.77	6.39	3.5

Source : 'RBI Committee Report", Reserve Bank of India, 1985.
Chakravarthy Committee Report.

it would be highly expansionary at a zero inflation rate as the entire expansion in the money supply would be available to finance additional real spending. On the other hand, if the inflation rate is 14 per cent, then for an unchanged turnover rate of money(velocity), i.e. to finance an unchanged volume of real purchases, the economy requires 14 percent increase in money supply. Thus, apparently a high nominal rate of growth in M_1 might actually be low or modest relative to the rate of inflation and hence might imply a large increase in the interest rates and also decrease in production and employment.

We do understand that it is difficult to determine, with any precision, the dividing line between expansionary and restrictive monetary policy.[33] However, for the Indian economy, a case could be made out, that this dividing point lies somewhere between the long term average actual growth rate of real money supply (i.e. 3.4 per cent year between 1951-87) and the average growth rate of real income (i.e. 3.6 per cent for the same period). Rates of growth of real money supply considerably above this range(say 4 per cent) might be considered as expansionary,[34]

33. This is because not only the rate of inflation is taken into account, but also the changes in real output and desired money holdings relative to income that may result from institutional or technological changes in the financial system is taken into account.

34. Prof.Gupta had recommended 4.5 per cent as the optimal rate of growth of money supply for price stability. Dr.Lahiri had recommended 7.5 per cent as the optimal rate of growth of money supply. See Gupta, G.S."Monetary Target Setting" a commissioned study by a committee to review the working of the monetary system set up by the Reserve Bank of India, August,1984;
Gupta, Suraj B, Monetary Planning for India,Oxford Univ.Press'79
Lahiri, A.K.,Madhur Shrinivasa and Wadhwa Wilima, "Price Determination in Macro-econometric Frame work", Economic Bulletin,1986.

while rate of growth considerably below this range (say 3 percent) might be considered as restrictive, leading to upward pressure on interest rates, lower real growth and employment. It is clear that the monetary policy has been tight in a number of years - especially between 1970 and 1981; real M_1 increased at an annual average rate of less than 3 per cent and after that period the Indian economy experienced some phase of expansionary monetary policy. It is doubtful whether some one would have even thought that monetary brakes were hard to apply even in a single year since 1970, if such an assessment were to be made on the basis of growth rates of nominal money supply. Few would deny that when monetary policy was tight in many of the years since 1970, nominal M_3 continued to increase at a rate of about 15 per cent per year.

Choice Between M_1 and M_3

There are two sets of reasons for choosing M_1 over M_3 - one relating to the positive response of time deposits not only to higher incomes but also to higher rates of return, the other relating to the link between personal savings rate and changes in time deposits. There is a widespread consensus among researchers that a significant change has occured in the structure of asset demand in India - with a shift out of narrow money into time deposits. It has been argued that changes in relative rates of return on these assets have largely been responsible for the shift.[35]

[35] Vasudevan, A. "The Monetary Impact of Time Deposits: The Indian Experience 1951-78", Occasional Papers, Reserve Bank of India, Vol.1, No,1, June 1980, pp.33-46; and Subrahmanyam, Ganti and Kolluri, B.R., "Monetization, Development and Near-money substitution", Prajnan, Vol.XVI, No.4, Oct-Dec.1987, National Institute of Bank Management, Pune.

We believe that the rate of growth of time deposit in the banks is due to their success as financial intermediaries competing for the flow of funds. The spread of institutional infrastructure covering geographical and functional areas through rapid branch expansion of commercial banks and the Regional Rural Banks has provided the base for higher mobilization of savings - especially of time deposits. It is not evident that the rapid growth in time deposits in anyway aggrevates the rate of inflation - as is usually alleged to argue out a case for M_3 as a more appropriate target variable. John Comlisk, using long-run cross country data, has provided evidence on the moneyness of time deposits, clearly indicating that savings and time deposits are better left out of the definition of money.[36] Secondly, the savings-income ratio has been around 21 per cent, which is indeed very high for an economy like India. It is also not just a coincidence that increase in the growth rate of M_3 relative to M_1 has been matched by a sharp jump in personal savings rate. A rise in the desire to save is likely to be accompanied by a rise in the demand for time deposits and hence an increase in M_3. To that extent it would be improper to restrict the growth of M_3 in an effort to reduce spending. The crucial issue to consider is: in the Indian case, which of the two, M_1 or M_3, is more directly relevant to demand management objectives implicit in monetary management.

---

36. John, Conlisk, "Cross Country Inflation Evidence on the Moneyness of Time Deposits" The Economic Record, June 1970, pp.222-229.

The Indian milieu can be broadly sketched as follows : "The household sector is the generator of the bulk of savings in the economy. The average gross savings rate has remained around 22 per cent of national income..., the household sector alone accounting for 15 per cent or about 2/3 of the total domestic savings. Again the share of bank deposits in the gross financial savings of the household sector has risen sharply from 31.6 per cent in 1968-69 to more than 60 per cent in recent years. As a percentage of gross financial savings, household sector deposits with commercial banks have risen from 18 in 1970 to 67.5 in 1987-88. More importantly the share of time deposits in total deposits of commercial banks is overwhelmingly preponderant; and the strong preference in India for longer maturity deposits is well-known. For instance, deposits of five years and above, which constituted only 7 percent of total fixed deposits of scheduled commercial banks in 1970, rose to more than 60 per cent in 1980. The main conclusion that can be drawn from the above is that in the Indian milieu time deposits with the banks represent the abode of saving rather than the abode of purchasing power and hence, this component is hardly relevant to any measures designed to control liquidity or demand management. The monetary aggregate M_3 is thus ill suited for monetary targetting.[37]

---

37. Majumdar, N.A."Monetary Targetting Objectives and Appropriate Indicators", Economic and Political Weekly, August 26 1989; and
Majumdar,N.A.; T.R.Venkatachalam and Raghavachari,M.V.,"The High Savings Phase of the Indian Economy: 1976-79 - An Explanatory Interpretation," Occassional Paper, Reserve Bank of India, Vol,1, No.1, June,1980.

Monetary Targetting

While arriving at a money supply target of 14 per cent, the Committee had in fact predetermined or had postulated the rate of inflation at 4 per cent. We believe that this is inappropriate as it is neither consistent with the monetarist frame work nor theoretically convincing. A monetarist would never bother about what should be the rate of inflation as such in the technical analysis. He would, on the contrary, prefer to advocate a rule regarding what should be the rate of growth of money supply - rather than deriving it from a predetermined rate of inflation. Such a rule is desirable in order to create a framework or an institutional arrangement under which decision-makers can take decisions with maximum efficiency or with least amount of social and private cost. This is, then, one major reason for according greater priority to a monetary rule.

The second reason relates to the uncertainty regarding the growth rate of money as an asset and a correct measure of inflation.[38] Money as an asset will have different implications for the asset prices as well as for the consumption and other goods prices. It is true that conventional price indices (inflation) do not represent asset prices adequately. To the extent that the consumer price index excludes the asset prices, concentrating on CPI to measure the rate of inflation would be inappropriate,[39] since there exists an inter-relationship between

38. Alchian, A.A. and Klein,B."On a Correct Measure of Inflation", Journal of Money,Credit and Banking,Vol.5,No.1,1973,pp.17-3-91

39. Alchain and Klein observed that the effect of inflation on asset prices was sufficiently important and that conventional price indices in which asset prices were unrepresented, were inappropriate as a base for measuring inflation.

the prices of assets and prices of consumer goods through the whole structure of interest rates. If the rate of CPI is stabilized or predetermined and then if money supply growth rate is derived, at least theoretically speaking, one would run the risk of distorting all the relationships between asset prices and consumption goods prices. That is why stabilizing monetary growth assumes a greater significance than stabilizing a particular rate of inflation[40].

Hence, a more appropriate procedure for deciding an appropriate monetary target variable is to appraise the behaviour of the variable against some robust quantitative criteria and then to evaluate it in terms of the statistical significance. In order to decide whether M_1 or M_3 is a more appropriate target variable, the criteria of:[41] (a) degree of controllability, (b) closeness and stability of the relationship with the ultimate goal variable, and (c) extent of exogeniety with respect to the ultimate goal variable. In what follows, we have tried to apply all these criteria, using Indian data for the period

---

40. Trivedi M.S., "Inflationary Expectations and Demand for Money in India(1951-75)", The Indian Economic Journal,No.1, Vol.28, July-September 1980, pp.52-76; and

    Trivedi, M.S.,"Inflationary Expectations and Demand for Per Capita Real Balances", Artha Vijnana, Gokhale Institute of Politics and Economics, 1983.

41. William, Barnet and P Spindt, "The Velocity Behaviour and Information Content of Division Monetary Aggregates", Economic Letters, Vol.4, pp.51-57; and

    Fellner, W, "Criteria for Useful Targetting - Money vs Base and other Variables", Journal of Money, Credit and Banking, Vol.14, No.4 Part 2, 1982, pp.641-60.

1950-51 to 1986-87. Further, to examine the comparative limitations[42] of M_1 and M_3 in relation to reserve money as the appropriate target variable, the following three approaches have been adopted :(a) variability and growth rates of money multipliers, M_1/RM, M_3/RM, (b) simple correlation between each of money measures and reserve money, and (c) estimation of money supply function. Values of money multipliers are given in Table 11.

Controllability and Variability

Examination of variability and growth rate of money multipliers could throw some light on the issue of appropriability of M_1 or M_3 as targets of policy - the simple criteria is to have a lower variability and lower growth rate of money multiplier.

42. The Technical study on Monetary Target Setting, commissioned by the Committee could not conclusively establish the superiority of M_3 and M_1, even after applying criteria of controllability, stability, velocity and exogeniety. In this context some caveats are worth mentioning. Even if one believes that a monetary rule is desirable, there is no guarantee that subsequent government will continue with it and it is more likely that the new government may actually change the rules and may institute a new policy. So, what matters most is the responses of the government to its total action - including monetary and fiscal. This is the problem of political economy, on which our science has been quite naive and to great extent simplistic. Even on technical grounds, targetting procedure, in our view, is susceptible because of the probability of generating successive targets that either are inconsistent or represent inadvertant departure from the steady growth paths desired by the policy makers and a further possibility of short run fluctuations to be automatically built into the target some time ahead(say one year) thus making it far more difficult for achieving the specified targets.

TABLE : 11 : MONEY MULTIPLIER

Last Friday of the year	Value of m_1	Value of m_3
1950-51	1.33	1.54
1955-56	1.32	1.60
1960-61	1.28	1.78
1965-66	1.40	1.90
1966-67	1.43	1.97
1967-68	1.46	2.04
1968-69	1.42	2.04
1969-70	1.46	2.13
1970-71	1.52	2.28
1971-72	1.55	2.36
1972-73	1.61	2.50
1973-74	1.54	2.42
1974-75	1.61	2.63
1975-76	1.70	2.88
1976-77	1.60	2.79
1977-78	1.32	3.01
1978-79	1.22	2.83
1979-80	1.20	2.82
1980-81	1.23	2.95
1981-82	1.21	3.05
1982-83	1.23	3.15
1983-84	1.15	2.95
1984-85	1.26	3.24
1985-86	1.15	3.13
1986-87	1.14	3.14
1987-88	1.09	3.06

Note : m_1 = Narrow money multiplier (M_1/RM)
m_3 = Broad money multiplier (M_3/RM).

TABLE : 12 : VARIABILITY OF MONEY MULTIPLIERS :

Variability measure	Money Multiplier M_1/RM			M_3/RM		
	1951-1970	1970-1987	1951-1987	1951-1970	1970-1987	1951-1987
Range	1.05 to 1.18	1.40 to 1.58	1.11 to 1.31	1.27 to 1.96	1.70 to 3.11	1.62 to 2.94
Standard deviation	0.037	0.059	0.049	0.310	0.491	0.427
Coefficient of variation	0.032	0.044	0.049	0.158	0.210	0.187

TABLE : 13 : GROWTH RATE OF COMPONENTS OF MONEY MULTIPLIER EQUATION

Period	RM	m_1	M_1	m_3	M_3
1950-51 to 55-56	2.02	0.00	2.02	0.90	2.84
1955-56 to 60-61	5.76	-0.60	5.12	2.24	7.90
1960-61 to 65-66	7.68	1.82	9.64	1.21	9.20
1965-66 to 70-71	8.33	1.61	10.08	1.21	9.54
1970-71 to 76-77	12.56	0.84	13.50	3.67	16.23
1950-51 to 76-77	7.42	0.73	8.20	2.33	9.92
1977-78 to 87-88	17.12	-1.96	14.91	0.22	17.35
1950-51 to 87-88	10.07	-0.51	9.50	1.87	12.14

Note : Growth rates are compound growth rates based on natural log.

Variability is measured through range (between minimum and maximum value) standard deviation and the coefficient of variation. The values for each of these measures are presented in the Table 12.

It can be seen from the Table 12 that on the basis of all the three measures, the variability of the narrow money multiplier (M_1/RM) is less than that of the broad money multiplier (M_3/RM) over all the three time periods.

Table 13 indicates that the compound growth rate of m_1 during the period 1950-51 and 1987-88 was -0.51 percent and for m_3 it was 1.87 percent. It is interesting to note that during the First Year Plan period, the growth rate of m_1 was zero and during the Second Five Year Plan period there was a negative growth rate (-0.6). Furthermore, the growth rate of m_1 was lower than that of m_3 in all the periods except during 1960-61 to 1970-71, when it was marginally higher than m_3. Thus, the evidence presented here suggests that m_1 is a more appropriate target variable than m_3. The lower variability (Table 12) and lower growth rate (Table 11) of m_1 indicate that the extent of policy influence (and non-policy) on M_1 was much less than on M_3. Hence, with lower potential for fluctuations, the possibility of achieving a monetary target in terms of M_1, by the authorities, was greater.

Correlation between Money and Reserve Money

The simple correlation coefficients are computed for each of the concepts of money supply with respect to reserve money

TABLE : 14 : CORRELATION COEFFICIENTS BETWEEN MONEY AND RESERVE MONEY 1951-87

	M_1	M_3	RM
M_1	1.0	0.998	0.998
M_3		1.000	0.998
RM			1.000

TABLE : 15 : MONEY SUPPLY FUNCTIONS (1950-51 TO 1986-87)

Equation No.	Dependent variable	Independent Variables (& t-ratios) Constant	RM	i_e	T	$\bar{R}^2$	DW	SEE
1.	M_1	-14.5	1.18 (62.5)	5.86 (4.05)	0.35 (1.67)	0.999	1.39	2.7
2.	M_1	-16.2	1.20 (64.11)	7.05 (6.35)		0.998	1.33	2.8
3.	M_1	3.4	1.41 (65.52)			0.996	0.84	4.1
4.	M_3	-41.2	4.12 (46.32)	12.23 (3.19)	-2.23 (2.88)	0.998	1.59	7.1
5.	M_3	-28.3	3.89 (47.01)	1.20 (0.63)		0.997	1.38	8.4
6.	M_3	-25.2	3.56 (90.66)			0.998	1.51	8.1

Notes : RM = Reserve money or high powered money :

i_e = Treasury bill rate; and

T = Time

Figures in brackets are t-ratios.

to ascertain the degree of their mutual associations. The results are presented in Table 14.

All the three correlation coefficients between any two of the three variables under study are closer to unity. Thus, the choice among them is really immaterial.

Money Supply Functions

The supply of money was postulated to vary positively with total reserve money and the interest rate. Also, the trend variable was used as a proxy for residual determinants like degree of monetization, bank branch expansion, etc. The OLS estimates are reported in Table 15. The results are encouraging. Almost all the total variation in each of the money concepts is explained by their corresponding equations. Although the difference is not substantial, M_1 is better explained than M_3; while M_3 has a negative trend, M_1 has a positive trend.

Test for Closeness and Stability

The relationship between the ultimate goal variables and the alternative monetary targets (M_1 and M_3) can be studied through either a complete structural model of the economy or a reduced form equation for each of the goal variables. The formal approach has the advantage of recognising all the causal relationships among economic variables, but has the limitation of having enormous number of equations leading to complications in evaluating the effect of any one variable like the money supply.

TABLE : 16 : RELATIONSHIP BETWEEN ULTIMATE GOAL AND TARGET VARIABLES DEPENDENT VARIABLE : Y

Equation No.	Sample Period	Independent Variables (& t-ratios) Constant	M_1	M_{1t-1}	M_{1t-2}	$\bar{R}^2$
1.	1951-87	151.2	0.65 (2.10)	0.81 (1.92)	-0.52 (0.63)	0.98
2.	1970-87	130.1	0.58 (1.82)	0.64 (1.64)	-0.34 (0.20)	0.95
3.	1951-87	180.1	0.30 (1.78)	0.41 (1.89)	-0.86 (0.71)	0.97
4.	1970-87	160.5	-0.14 (1.25)	0.39 (1.84)	-0.80 (0.32)	0.89

Note : Figures in brackets are t-ratios.

TABLE ; 17 : RELATIONSHIP BETWEEN ULTIMATE GOAL AND TARGET VARIABLE :DEPENDENT VARIABLE : P

Equation No.	Sample period	Independent variables (& t-ratios) Constant	M_1	$M_{1\ t-1}$	$M_{1\ t-2}$	$\bar{R}^2$
5.	1951-87	22.5	0.39 (2.18)	1.19 (4.32)	-0.65 (0.29)	0.980
6.	1970-87	0.39	0.53 (3.19)	1.76 (5.15)	-0.37 (0.18)	0.978
		Constant	M_3	$M_{3\ t-1}$	$M_{3\ t-2}$	R^{-2}
7.	1951-87	25.5	-0.23 (1.41)	1.15 (2.23)	-1.38 (1.71)	0.973
8.	1970-87	-20.3	-1.48 (2.89)	-0.80 (1.31)	2.23 (1.86)	0.926

Note : Figures in brackets are t-ratios.

The latter approach is much simpler and focuses on a more specific relationship among the variables. Here, we examine empirically the relationship between M_1, M_3 and real income, Y, and price level, P. The ordinary least squares procedure is used to obtain the estimates. The results are presented in Table 16.

From the Tables 16 and 17 it can be seen that the relationship among the ultimate goal variables and monetary variables are very close. Most of the R^{-2} are very close to one, especially the ones associated with M_1 as independent variables. Compared to M_3, M_1 is found to be significant in a more robust way for contemporaneous and lagged relation. The results are also consistent with the theory to the extent that in the short run, money stock influences both price and output, though to a limited extent. It is also revealing that one year lagged money stock influences prices and output and it is found statistically significant. Here, a more appropriate procedure would be to run regression between money stock and money income but since our interest is to ascertain whether there exists an association between Y(real income), P(Price level) and M_1, M_3 and whether the association is statistically significant, the evidence furnished here points to a statistically significant association and this association seems to be stronger in the case of M_1 compared to M_3, though not unambiguously.

Correlation between Ultimate Goal Variables and M_1 and M_3 :

In a number of studies in the early 1960s, Friedman and Schwartz[43] investigated throughly the length and variability of the time lags involved in the influence of money on income activity. They accomplished it by examining various correlations and comparing the turning points of various series. The correlation coefficients between the selected goal variables and M_1 and M_3 (current and lagged values) are presented in Table 18.

All the simple correlation coefficients are pretty high. However, M_1 enjoys the highest correlation with respect to each of the three goal variables. This also suggests that M_1 is a better candidate for monetary targetting.

Velocity Functions :

Phillip Cagan[44] has employed the income velocity as another criteria for choosing the appropriate variable for monetary targetting. Accordingly, the variable whose income velocity is more stable over time is a better variable for targetting than the others whose velocities are less stable over time. This test is utilized here for M_1 and M_3. We have estimated equations for Y/M_1 and Y/M_3 against time as independent variables for the time periods 1951-87 and 1970-87. The results are given in Table 19.

43. Friedman, N and A.J.Schwartz, The Monetary History of the U.S.A., National Bureau of Economic Research, 1963.

44. Cagan, Phillip, "The Choice among Monetary Aggregates as Targets or Guides for Monetary Policy", Journal of Money, Credit and Banking, Vol.14, No.4, Part 2, 1982, pp.661-686.

TABLE : 18 : CORRELATION COEFFICIENTS BETWEEN GOAL AND TARGET VARIABLES

Goal Variables	Target Variables					
	M_1	$M_{1\,t-1}$	$M_{1\,t-2}$	M_3	$M_{3\,t-1}$	$M_{3\,t-2}$
Y	0.99	0.99	0.96	0.98	0.98	0.95
Y	0.93	0.92	0.90	0.91	0.91	0.89
P	0.97	0.98	0.99	0.95	0.97	0.97

Note : Y = Nominal Income, Y = Real income; P = Price level

TABLE : 19 : VELOCITY FUNCTIONS :

Equation No.	Period	Dependent variable	Independent Variable (& t-ratios) Constant	T	$\bar{R}^2$	DW	SEE
1	1951-87	M/M_1	1.3	0.091 (2.05)	0.54	1.66	0.30
2	1970-87	Y/M_1	1.7	0.102 (2.04)	0.74	1.72	0.24
3	1951-87	Y/M_3	1.6	-0.027 (4.35)	0.75	0.85	0.22
4	1970-87	Y/M_3	2.1	-0.023 (5.19)	0.79	0.90	0.12

Note : Figures in brackets are t-ratios.

As can be seen from the Table, the results for M_1 and M_3 are different. The trend variable is significant in all the four equations. However, with M_1, it has a positive sign, while with that of M_3, it has a negative sign.

The results imply that over time, income velocity of M_3 is falling and that of M_1 is rising. The relationship reported seems to be stronger in the case of M_3 compared with M_1 in terms of R^2 and SEE.

Test for Exogeneity

As mentioned earlier, the exogeneity issue is also a vital part of monetary targetting. The target variable must be exogenous with respect to goal variables otherwise it will be difficult to achieve goals through intermediate targets. More specifically, the variations in the target variables should be independent of variations in gial variables, so that the underlying relationship is unidirectional in the sense that the policy variables influence and cause changes in goal variables and they are not influenced by goal variables. This suggests that the causality between monetary targets and goal variables, whether unidirectional or bidirectional, has to be assessed at the empirical level.

The results indicate that when Granger test[45] is administered

45. Granger, C.W.J., "Investigating Casual Relations by Econometric Models and Cross Spectral Methods", Econometrics, July, 1969, pp.424-438.

Sims, C.A., "Money Income and Causality", American Economic Review, 62, 1972, pp.540-12 and

Pierce, D.A. and Haugh, L.D. "Causality in Temporal Systems; Characterizations and a Survey", Journal of Econometrics, Vol.5, 1977, pp.265-93.

TABLE : 20 : SUMMARY OF CAUSALITY EMPIRICAL RESULTS

Equation Number	Dependent Variable	Constant	Y_1	Y_{t-1}	Y_{t-2}	Y_{t-3}	M_{1t}	M_{1t-1}	M_{1t-2}
1.	Y_1	0.57 (3.49)	-	0.61 (3.47)	-0.24 (-1.16)	-0.21 (1.37)	-	-	-
2.	Y_1	0.597 (6.16)	-	0.26 (-1.87)	0.48 (4.85)	0.065 (-1.18)	0.41 (4.02)	1.17 (6.90)	-0.75 (-4.89)
3.	M_{1t}	0.18 (2.05)	-	-	-	-	-	0.83 (4.28)	-0.66 (-0.34)
4.	M_{1t}	-0.15 (-0.62)	1.009 (4.02)	-0.404 (-1.81)	-0.656 (-3.76)	0.254 (3.55)	-	-0.34 (-0.75)	1.24 (5.19)
5.	Y_1	0.50 (3.9)	-	0.043 (0.18)	0.45 (3.42)	-0.37 (-2.91)	-	-	-
6.	M_{3t}	0.15 (1.73)	-	-	-	-	-	-	-
7.	M_{3t}	0.11 (0.58)	0.75 (3.83)	-0.86 (-3.92)	-0.51 (-3.15)	0.48 (3.34)	-	-	-

Notes : Figures in brackets are t-ratios
For futther details see foot note No.46.

Contd...

Contd. Table: 20

	M_{1t-3}	M_{3t}	M_{3t-1}	M_{3t-2}	M_{3t-3}	R^{-2}	DW	SEE
1.	-	-	-	-	-	0.37	7.45	0.0726
2.	-0.002 (-0.59)	-	-	-	-	0.96	124.7	0.0039
3.	-0.004 (-0.35)	-	-	-	-	0.53	13.2	0.0514
4.	0.003 (0.66)	-	-	-	-	0.91	46.4	0.00986
5.	-	0.52 (3.83)	0.76 (2.85)	-1.09 (-5.06)	0.55 (2.49)	0.95	93.1	0.0053
6.	-	-	0.91 (5.33)	-0.46 (-2.04)	0.45 (2.64)	0.71	27.26	0.0418
7.			0.44 (1.22)	1.26 (3.75)	-0.58 (-2.15)	0.94	82.7	0.0075

on the regression equation of current and past values of money stock against nominal income, with the help of seven equations changes in M_1 causes changes in nominal income; but when past values of money stock is alone taken in the regression equation against current and past values of income, it was found that variation in income causes variation in M_1 thus indicating absence of unidirectional causation. Further, bidirection of causation[46] is seen even when M_3 and Y are used in the regression equation. Again, the values of coefficient of one period lag are significant - thus refuting the unidirectional causation between the variables. Hence, money stock cannot be strictly treated as exogenous as can be seen from the summary results of this statistical exercise[47](Table 20).

Further, the results indicate that the $\bar{R}^2$ value of equation(2) was 159 per cent improvement over the equation(1) $\bar{R}^2$ value; similarly $\bar{R}^2$ value of equation (4) was 71 per cent improvement over the $\bar{R}^2$ value of equation (3); $\bar{R}^2$ value of equation (5) was 156 per cent improvement over the $\bar{R}^2$ value

46. Strictly speaking there cannot be an instantaneous causality as there should be a time lag between a cause and effect. The data limitations may indicate instantaneous causality - e.g. observed data may be monthly whereas true lag may be one week only. Pierce and Haugh have proved that it is impossible to determine a unique direction of causality if instantaneous causality exists.

47. Joshi K.M."Stabilization Policies in India: An Analytical Note, Prajnan, Vol.XVI,No.4,Oct-Dec 1987,National Institute of Bank Management, Pune; and
Joshi K.M. and Joshi,S.M."Tests of Causality between Money stock and Money Income",Prajnan, Vol.XV,No.1,National Institute of Bank Management,Pune.

of equation (1), and finally $\bar{R}^2$ value of equation (7) was 82 percent improvement over the $\bar{R}^2$ value of equation (6). Again the results also indicate that value of equation (2) was 94 per cent less than the value of equation (1); e^2 value of equation (4) was 80 percent lower than the e^2 value of equation (3) e^2 value of equation (5) was 92 percent less than the e^2 value of equation (1), and finally e^2 value of equation (7) was 82 percent lower than the e^2 value of equation (6).

Thus, on the criteria of exogeneity money stock - both M_1 and M_3 is found to be influenced by variations in nominal income. Hence, this evidence suggests that money stock is not strictly exogenous. And the existence of bidirectional causality also suggests that money stock influences nominal income to a significant extent. However, the endogeneity of money stock - both M_1 and M_3 with respect to money income goes against it (Money stock) as appropriate targets. This is because achievability of a specific target either in terms of M_1 or M_3 is susceptible - as money income could produce changes in money stock which might not be compatible with the already targetted growth path of money stock desired by the policy makers.

4.14 Monetary Policy Formulation

The primary emphasis of monetary policy is usually placed on its role as an instrument of macro economic demand management. Hence great importance is attached to the permissible magnitude of monetary expansion consistent with the anticipated rates of growth of the economy as well as some broad assumptions regarding price trends. However in the formulation of policy, in addition to the quantity of money supply expansion, the 'quality' of money supply expansion also merit special significance. This is because the quality of money supply expansion in certain situations might compensate for more than the anticipated increase in the quantity of money supply, in other words, different "sources" of money supply expansion may exert varying degrees of pressures on aggregate demand(N.A.Majumdar, 1979).

Composition of Money Supply

It appears that some structural changes have taken place in the composition of money supply in the last decade. These have important implications for monetary management. To indicate the structure transformation, the relative contribution of selected factors to money supply has been indicated in the data set out in the accompanying tables. These data relate to 'money stock', that is 'outstanding levels of money supply' as well as the 'incremental' money supply for each of the years between '70-71' to '87-88' three factors have been taken up

TABLE : 21 : MONEY STOCK (M_1) AND FACTORS AFFECTING M_1

(Rs.Crores as on last Friday) (Outstandings)

Year	NCBg (1)	BCCs (2)	FPc (1.2a)	Non-FPc (1.2b)	NFE (3)	GCL (4)	NML (5)	M_1 (6)
1969-70	4752	5407	56	4653	584	360	4567	6536
1970-71	5264	6455	2144	5336	559	384	5341	7321
1971-72	6444	7368	345	5946	619	411	6522	8320
1972-73	7770	8729	339	7036	577	457	7813	9684
1973-74	8726	10701	366	8487	674	502	9456	11172
1974-75	9533	12647	613	9957	392	531	11215	11911
1975-76	10112	15392	1520	13149	1094	555	14022	13143
1976-77	11022	18503	2190	15431	2471	568	17041	15609
1977-78	13470	21222	2533	18379	4445	593	25343	18383
1978-79	15391	25347	2793	19705	5434	603	29706	21819
1979-80	20101	30630	2098	19430	5295	592	37052	19947
1980-81	24731	36236	1759	23612	4665	619	43243	23117
1981-82	30139	43913	2127	27553	2579	657	51677	24729
1982-83	34748	51162	2962	32530	1828	682	59885	28535
1983-84	40505	59992	4021	37272	1646	720	69655	33066
1984-85	48950	70801	5507	42928	3279	777	84292	39649
1985-86	58522	81852	6418	50191	3478	940	101034	43599
1986-87	71298	93146	4334	58106	4788	1192	118995	51177
1987-88	84107	104346	2628	63490	5398	1338	137544	57645

Source : Reserve Bank of India Bulletin, Various issues

Note : Notation used is as follows :

(1) NCBg = Net Bank Credit to Government
(2) BCCs = Bank Credit to Commercial Sector
(1.2-a) FPc = Food Procurement Credit
(1.2-b) Non-FPc = Non-Food Procurement Credit
(3) NFE = Net Foreign Exchange resources
(4) GCL = Government's Currency Liabilities
(5) NML = Non-Monetary Liabilities of Banking System
(6) M_1 = Money Stock = Currency with the public and demand deposits + Other deposits. and
M_1 = (1) + (2) + (3) + (4) - (5) or
M_1 = NBCg + BCCs + NFE + GCL - NML
(7) FPc and Non-FPc are some part of Net Bank Credit to government and Commercial Sector.
(8) The non-monetary liabilities of Banking System include items like paid up capital and reserves, contribution to three national funds. For Agriculture (long term and stabilization Operations) and Industry (Long term Operations), Balances under compulsory deposit scheme, time deposits etc. For a fuller discussion, see Surat B.Gupta (1979) Monetary Planning for India pp.82-94, Op.cit.

TABLE : 22 : STRUCTURAL COMPOSITION OF M_1
(expressed as Percentages to M_1) - (Outstandings)

Year	NBCg (1)	BCCs (2)	FPc (1.2a)	Non-FPc (1.2b)	NFE (3)	GCL (4)	NML (5)	M_1
1969-70	72.70	82.72	2.85	71.19	8.93	5.50	69.87	100.00
70-71	71.90	88.17	2.92	72.89	7.63	5.24	72.95	100.00
71-72	77.45	88.55	4.15	71.47	7.44	4.93	78.39	100.00
72-73	80.23	90.14	3.50	72.66	5.96	4.72	80.67	100.00
73-74	78.10	95.78	3.28	75.97	6.03	4.50	84.64	100.00
74-75	80.03	106.17	5.15	83.60	3.29	4.46	94.15	100.00
75-76	76.93	117.11	11.57	100.05	8.32	4.22	106.68	100.00
76-77	70.61	118.54	14.03	98.86	15.83	3.64	109.17	100.00
77-78	73.27	115.44	13.78	99.98	24.17	3.22	137.86	100.00
78-79	70.53	116.16	12.80	90.31	24.90	2.76	136.14	100.00
79-80	100.77	153.55	10.52	97.41	26.54	2.96	185.75	100.00
80-81	106.98	156.75	7.61	102.14	20.17	2.67	187.06	100.00
81-82	121.87	173.53	8.60	111.42	10.42	2.65	208.97	100.00
82-83	121.77	179.29	10.38	114.00	6.40	2.39	209.86	100.00
83-84	122.50	181.43	12.16	112.72	4.98	2.17	210.65	100.00
84-85	123.45	178.56	13.89	108.27	8.27	1.95	212.59	100.00
85-86	134.22	187.73	14.72	115.12	7.96	2.15	231.73	100.00
86-87	139.31	182.00	8.47	113.54	9.35	2.33	232.51	100.00
87-88	145.90	181.01	4.56	110.14	9.36	2.32	238.62	100.00

Source : Derived from Table : 21

Note : Column (1), for example, is derived as follows :
(NBCg $\div M_1$) x 100;
Column (2) = (BCCs $\div M_1$) x 100.
The percentages are calculated on the basis of working out the ratios of each of the variables from (1) to (5) to that of M_1 where the numerator refers to actual outstanding values of the variable for that particular year and denominator is the outstanding Money Stock figure for M_1

TABLE : 23 MONEY STOCK (M_1) AND FACTORS AFFECTING M_1

(Rs.Crores) Yearly Variations

	ΔNBCg	ΔBCCs	ΔFPc	ΔNon FPc	ΔNFE	ΔGCL	ΔNML	ΔM_1
1970-71	512	1048	158	683	-25	24	774	785
71-72	1180	913	131	610	60	27	1181	999
72-73	1326	1361	-6	1090	-42	46	1291	1364
73-74	956	1972	28	1421	97	45	1643	1488
74-75	807	1946	247	1475	-282	29	1759	739
75-76	579	2745	905	3186	702	24	2807	1232
76-77	910	3111	669	2281	1377	13	3019	2466
77-78	2448	2719	-238	2975	1974	25	8302	2774
78-79	1921	4125	273	1437	989	10	4363	3436
79-80	4710	5283	-76	2674	-139	-11	7346	-1872
80-81	4630	5606	-341	4183	-630	27	6191	3170
81-82	5408	6677	368	3942	-2086	38	8434	1612
82-83	4609	8249	837	4975	-751	25	8208	3806
83-84	5757	8830	1058	4742	-182	38	9770	4531
84-85	8445	10809	1488	5658	1633	57	14637	6583
85-86	9572	11051	911	7283	195	163	16742	3950
86-87	12776	11294	-2061	7921	1314	252	17961	7578
87-88	12809	11200	-1672	5373	610	146	18561	6468

Source : Derived from Table : 21

TABLE : 24 : STRUCTURAL CHANGES IN COMPOSITION OF M_1
(Expressed as percentages to M_1) - Variations

Year	△NBCg (1)	△BCCs (2)	FPc (1.2-a)	Non-FPc (1.2-B)	△NFE (3)	△GCL (4)	△NML (5)	$\triangle M_1$ (6)
1970-71	65.22	133.50	20.13	87.01	-3.18	3.05	98.59	100
71-72	118.11	91.39	13.11	61.06	6.00	2.70	118.22	100
72-73	97.21	99.78	-0.44	79.91	-3.80	3.37	94.64	100
73-74	64.24	132.52	1.88	95.51	6.51	3.02	110.41	100
74-75	109.20	263.32	33.47	199.59	-38.15	3.92	238.02	100
75-76	46.99	222.80	73.46	258.58	56.98	1.95	227.84	100
76-77	36.90	126.15	27.13	92.50	55.83	0.52	122.42	100
77-78	88.24	98.01	-8.58	107.24	71.16	0.90	299.28	100
78-79	55.90	120.05	7.94	41.83	28.88	0.29	126.97	100
79-80	251.60	282.21	-37.12	-14.69	-7.42	0.58	392.41	100
80-81	146.05	176.84	-10.70	131.95	-19.87	0.85	195.29	100
81-82	335.50	414.20	22.82	244.54	-129.40	2.35	523.20	100
82-83	121.10	216.73	21.99	130.71	-19.73	0.65	215.65	100
83-84	127.05	194.87	23.35	104.67	-4.01	0.83	215.62	100
84-85	128.28	164.19	22.61	85.96	24.80	0.86	222.34	100
85-86	242.32	279.77	23.06	184.64	4.93	4.12	423.84	100
86-87	168.59	149.03	-27.2	104.53	17.34	3.32	237.01	100
87-88	198.03	173.16	-25.86	83.08	9.43	2.25	286.96	100

Source : Derived from Table : 23

Note : Column (1), for example, is derived as follows :
$(\triangle NBCg \div \triangle M_1) \times 100$ where △ refers to change
Column (2) : $(\triangle BCCs \div \triangle M_1) \times 100$.
The percentages are calculated on the basis of working out the ratios of variations of a variable to variation in M_1 between successive years.

for discussion : Net foreign exchange assets and food procurement credit, Net Bank credit to government and commercial sector.

1) Net foreign exchange assets

The accrual of foreign exchange assets is a sort of an 'autonomous factor' so far the central bank is concerned and hence money supply expansion which is directly attributable to this factor becomes a "given" in the monetary budget. To some extent the room for manoeuvrability in monetary budget perhaps is narrowed down as a consequence.

There is an even more important aspect to be considered. During the years when a sizeable increase in money supply is anticipated because of accretion of foreign exchange assets; there may be a temptation to compensate for it through a policy of compensatory deflation so as to keep the total money supply expansion within a respectable range. For example during the two consequtive years 1976-77, 1977-78 and 1978-79 money supply, M_1 and M_3, expanded at the very rapid rates of 18,7, 17.7, 18.7 (M_1) respectively yet the price situation was one of relative stability in the years' 1976-77, 77-78 and 78-79, with WPI recording rises of 2%, 5% and zero percent. These are precisely the years when contribution of foreign exchange stood at 56%, 72%

and 29% of the money supply. The point is that if an effort were to be made to keep money supply expansion within the range of say 10% during these years, by containing credit to the public or the private sector, this would have probably led to reduced investment expenditures or dampening of demand. Viewed against this background the need to look into the quality of money supply expansion becomes clear. Under the apprehensions of possible inflationary rise in prices, if increased contribution of foreign exchange assets is compensated by curtailing the liquidity to the private sector in order to keep adequate monetary budget, it would lead serious loss of output. That is why the structural composition of M_1 and its change is important.

ii) Food Procurement Credit

The relative weightage of public sector food procurement credit in total money supply has increased in the recent period. The contribution of food procurement credit to money supply expansion has increased to about 22% between '81-'82 to '85-'86. It was ranging around 3% during '70-'71 to '74-'75 and to around 12.5% during '75-'76 to '77-'78(Table 22). Three implications of such a sizeable expansion of food procurement credit may be speltout. Firstly, is there an additionality or excessive element in the injection of say Rs.3000 crores or so of food procurement credit in the economy? In the past food grains trade used to be financed largely by private sector's

own resources and its dependance on the banking system was perhaps nominal. It seems what has really happened is that banking sector's resources have substituted to a large extent private sector's resources. In this sense perhaps the whole of food procurement credit need not be regarded as a net addition to total liquidity in the economy. Secondly, by transferring food grain stocks from the private sector to the public sector, perhaps the end objective of demand management namely price stability is sought to be achieved through supply management. Third implication relates to credit planning. If there is a firm commitment of banking sector's resources to food procurement operations, food credit becomes a pre-empted credit. One can visualize two distinctly different situations. A bumper food grains crop which is accompanied by a moderate growth in the non-agricultural sector and a bumper food grain's crop accompanied by an equality high rate of growth in the non-agricultural sector. While it may be possible to "Accomodate" large food procurement credit in the former situation, it may not be easy to do so in the later situation, given the trend growth in banking sector's deposits. An adjustment mechanism may have to be built in to credit allocation.

iii) Most important fact from the table is that out of all the factors considered, Net Bank Credit to government and Bank Credit to commercial sector have been the most important constituent parts of Money Stock and in the recent past, they have contributed substantially to the growth of Money Stock.

Food procurement credit and foreign exchange assets have declined in importance as their contribution and relative weightage have gone down. The item which merits major attention has been the substantial increases in net Bank credit to the government. This has serious implications for the formulation and conduct of monetary policy. This is because for monetary policy to be effective it is necessary that the monetary authority should have an effective say in regulating money supply which, in turn, requires that the monetary authority must have a reasonable degree of control over the creations of reserve money. Obviously, there are exogenous factors such as movements in the foreign exchange assets which affect the level of reserve money. The degree of independence in regulating reserve money depends upon the institutional arrangements governing the functioning of monetary authority. Over the years, the practice has grown under which the entire budget deficit of the Central Government has been taken by the Reserve Bank of India, leading to an automatic monetisation of the deficit.

The issues that arise in the coordination of fiscal and monetary policies in India can be understood by a brief review of the borrowing programmes of the Government. There has been a significant rise in government borrowing since 1971. The volume of treasury bills outstanding including those funded into special securities rose from Rs.2,500 crores in March 1971 to Rs.39,700 crores in March 1987. Other marketable debt of

the Central Government rose during the same period from Rs.4,000 crores to Rs.42,000 crores. Marketable debt of the State Govt. too rose sharply from Rs.1,200 crores in 1971 to Rs.7,200 crores in 1986. Net Reserve Bank credit to Government also rose significantly from Rs.3,800 crores in 1971 to Rs.45,800 crores in 1987. Out of the increase in treasury bills and other marketable debt outstanding of the order of Rs.81,900 crores, the absorption by the Reserve Bank accounted for about 60 per cent. The Reserve Bank owned more than 93 percent of treasury bills outstanding in 1987.

The developments mentioned above highlight two important features of the government borrowing programme. First, the scale of borrowing was maintained at relatively high level and budgetary deficit pepresented by the increase in volume of treasury bills outstanding has gone up sharply. Government finances have come under increasing pressure in recent years. Surpluses on revenue account have given way to deficits. Interest payments as a proportion of tax receipts have shown a sharp rise to 35 percent in 1990-91. Secondly, the market borrowing of the Government has generally been at lower than market rates even though the rates of return offered on other types of borrowings have been high taking into account the fiscal concession. The discount rate on treasury bills which had risen to 4.6 percent per annum in mid 1974 has been pegged at

that level and even today remains at that level. Banks and the life insurance and general insurance enterprises are required to invest a prescribed proportion of the funds mobilised by them in Government securities. It is to be noted that even the growing coptive market for government securities represented by the fast growing commercial banks could not absorb fully the Government securities which were floated. As the earnings from holding these securities were not attractive and the banks had other alternative avenues for utilising their funds more profitably, they held government securities only to the extent they were required to hold them under statutory obligations. In these circumstances, the Reserve Bank of India, which manages the public debt, became the residual subscriber to Government securities and treasury bills. As Government incurred deficits every year, the question of retirement of treasury bills did not arise. The Reserve Bank had, therefore, to address itself to the difficult task of neutralising to the extent possible the expansionary impact of deficits after taking into account the short term movements in its holding of net foreign exchange assets. The increasing liquidity of the banking system resulting from rising levels of reserve money had to be continually mopped up. The instrument of open market operations is not available for this task, given the interest rate structure. The task of absorbing excess liquidity in the system had to be undertaken mainly by increasing the CRR. At some point, this can result in some crowding out of the credit to commercial sector. With

frequent and sharp increase the CRR has reached its statutory limit.

The growing budget deficits and their absorption by the Reserve Bank highlight not only the close link between fiscal policy and monetary policy but also the need for close coordination between the two. The essence of coordination between fiscal policy and monetary policy lies in reaching an agreement on the extent of expansions in Reserve Bank credit to Government year to year. This will set a limit on the extent of fiscal deficit and its monetisation and thereby provide greater manoeuverability to the monetary authorities to regulate the volume of money. It is in this context that introduction of a system of monetary targetting mutually agreed upon between the Government and the central bank assumes added significance.