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***Dynamics of Monetary Policy in
Emerging Market Economies :
A Case Study of India***

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Abstract

The growing complexities of monetary dynamics, particularly in emerging market economies (EMEs), have continued to baffle economists. While capturing the monetary transmission process within elegant models continues to be elusive, the evolution of monetary transmission mechanisms and the various innovations in the operating procedures of monetary policy have made the analysis of monetary policy an exciting pursuit. Discussing the objectives, intermediate targets and operating procedures of Monetary Policy in Emerging Market Economies (EMEs) with special focus on India, the paper examines various channels of monetary transmission in EMEs. Drawing attention to the Indian experience with monetary policy, particularly since the 1990s, the paper observes : (a) a large number of operational constraints have prevented the adoption of price stability as the sole objective of monetary policy, (b) monetary policy has shown considerable flexibility in the pursuit of multiple objectives of price stability, credit expansion and financial stability, (c) greater capital inflows due to financial liberalisation have led to the rise to prominence of interest rates and asset prices, (d) indirect instruments of monetary policy, mainly, open market operations, have emerged as the primary instrument of monetary policy; and (e) the management of market liquidity has come to the forefront of monetary policymaking. Discussing the role of monetary policy in the context of liberalisation of the EMEs, the author underscores the need for development of deep, liquid and integrated financial markets so as to ensure price discovery and to improve the efficacy of monetary transmission channels.

The paper is divided into four broad sections. After the introductory remarks, Section I discusses the objectives of monetary policy in EMEs, with special reference to India. Section II provides a critical review of intermediate targets of monetary policy in EMEs . Section III deals with the operating procedures of monetary policy and highlights the role of financial sector reforms and liberalisation on implementation of monetary policy. The concluding section presents some evidence relating to monetary transmission in EMEs and provides a vision for the future of monetary policy in EMEs in general and India in particular.

DYNAMICS OF MONETARY POLICY IN EMERGING MARKET ECONOMIES : A CASE STUDY OF INDIA

Narendra Jadhav

Introduction

Nowhere does the adage “two economists, three opinions” comes more alive than in the much-contested arena of formulation and conduct of monetary policy. The dilemmas arise essentially from the growing complexities of monetary dynamics. At the heart of these dilemmas lies the fact that the channels of transmission of monetary policy impulses to the real economy remain a “black box”. Although the outpouring literature on the subject identifies several channels of monetary transmission - through money or credit, interest rates, the exchange rate, asset prices, and now recently production costs, these channels appear to work together side by side. More often than not, the monetary authority is not in a position to influence all of them. It is this inability to pinpoint the precise channels of monetary policy transmission, on the one hand and the lack of monetary policy instruments simultaneously spanning all channels, on the other, which give rise to the imponderables that central banks must necessarily confront in formulating and implementing monetary policy. It is precisely also for this reason that central banking is deemed to be “the art of the feasible” or a combination of both the art and science.

The conduct of monetary policy in Emerging Market Economies (EMEs) has been complicated by the lack of clarity about the channels of monetary policy transmission and also by the fact that central banks in most EMEs also assumed the mandate to perform several developmental functions, such as, building the financial infrastructure, including institutions, markets and products. Moreover, the large order of the fiscal deficit often imposes its own set of constraints on monetary operations, especially since the central banks in many EMEs also happen to be the manager of public debt.

The programs of financial liberalisation embarked in the 1990s by several EMEs, while necessary for economic efficiency, have added new

challenges. First, the channels of monetary policy transmission to the goal variables apparently began to shift with the dismantling of the administered regime of interest rates and directed credit. Secondly, although the deregulation of financial prices stimulates the process of price discovery – deemed to be necessary for efficient resource allocation, it has also opened financial balance sheets to market volatility. Thirdly, the evolution of inter-linkages between various segments of the financial markets (including the foreign exchange markets), while integral to the process of price discovery, enhances risks of contagion - domestic as well as external. It is in this milieu of multiple goals, limited instruments and the many uncertainties that the central banks in EMEs formulate and conduct their monetary policies.

Monetary policy broadly comprises a clear specification of the monetary policy reaction function and communicating the reaction function and the actual policy decisions to the public (Houben, 1999). The former component of the strategy includes:

- The objectives of monetary policy;
- the (intermediate) policy target by means of which the ultimate objectives are obtained through the monetary transmission mechanism; and
- the institutional framework of monetary policy decision-making (*i.e.*, the operating procedures of monetary policy).

On the other hand, the latter component of the monetary policy strategy emphasises communication policy, which includes the pre-commitment to policy targets, transparency about the decision making process and the signals to condition or anchor public expectations.

The present paper is structured as follows. Section I discusses the objectives of monetary policy in EMEs, with special reference to India. Section II deals with the intermediate targets of monetary policy. Section III deals with the operating procedures of monetary policy and highlights the role of financial sector reforms and liberalisation on implementation of monetary policy. The concluding section presents the evidence relating to monetary transmission in EMEs and provides a vision for the future of monetary policy in EMEs in general and India in particular.

I. OBJECTIVES OF MONETARY POLICY IN EMEs

The key issue in this regard is whether the attainment of price stability should be the dominant objective of monetary policy. The case of price stability as the prime objective of monetary policy rests on the assumption that volatility in prices creates uncertainty in economic decision making. Rising prices affect savings adversely while they make speculative investments more attractive. The most important contribution of the financial system to an economy is its ability to augment savings and allocate resources more efficiently. A regime of rising prices, thus, clearly vitiates the atmosphere for promotion of savings and allocation of investment. Furthermore, the domestic inflation rate also has a bearing on the exchange rate of the currency. Besides, there is a social dimension, particularly for EMEs as inflation affects adversely the poorer sections of the society who have no hedges against inflation.

A critical question that arises in this context is at what level of inflation the adverse consequences begin to set in. Empirical evidence on the relationship between inflation and growth in cross-country framework is somewhat inconclusive. In many cases, the sample includes countries with inflation rates as low as only one to two per cent as well as countries with inflation rates going beyond 200 and 300 per cent. It is, however, clear that growth rates tend to fall with high inflation (Fry, Goodhart and Almeida, 1996). Nevertheless, even moderate inflation levels are often perceived to be worrisome by the policy makers because, inflationary pressures, if not held in check, can lead to higher inflation and eventually affect growth¹.

The anti-inflationary stance of monetary policy especially among advanced economies during the 1990s was essentially framed against the

¹ While there is a growing consensus among the central bankers regarding the virtues of price stability, the case against price stability is not without its protagonists. Notably, Paul Krugman has argued that: ".....the belief that absolute price stability is a huge blessing, that it brings large benefits with few if any costs, rests not on evidence but on faith. The evidence actually points the other way: the benefits of price stability are elusive, the costs of getting there are large, and zero inflation may not be a good thing even in the long run." Krugman's arguments do not seem relevant for EMEs because his criticism is aimed against those countries which seek 'absolute' price stability and (unlike most EMEs), attempt to bring down inflation rate from about 2 per cent to almost zero. This is evident from what he himself advocates: "...adopt as a long run target fairly low but not zero inflation, say 3-4 per cent. This is high enough to accommodate most of the real wage cuts that markets impose, while the costs of the inflation itself will still be very small."

backdrop of high inflation of the 1960s and 1970s, fuelled by large-scale monetisation of fiscal deficits. In a sharp contrast, the recent co-existence of low and stable inflation - even deflation - with low growth, has naturally fostered a degree of revisionism. Despite a generalised recognition of price stability as the primary goal of monetary policy, in the face of a benign inflationary environment in the last few years, the objective of output stabilisation has also been prominently pursued by central banks all over the world, both in terms of preventing economic overheating and providing stimulus to faster recovery from recessions.

A number of central banks, beginning with New Zealand in 1989, adopted price stability as the sole goal of monetary policy during the 1990s. Presently, there are 18 countries with explicit inflation target [IMF, 2003 and Bernanke and Mishkin (1997)]. This also implies there are many others, including the US Federal Reserve, no less, outside the fold. There is no doubt that inflation targeters have been able to achieve a reasonable degree of price stability. At the same time, there is little evidence to suggest that inflation targeting on average improves performance as measured by the behavior of inflation, output, or interest rates (Ball and Sheridan, 2003).

Most central banks continue to persevere with multiple objectives of monetary policy. Technically speaking, these encompass a variety of objectives such as price stability, growth or financial stability (Table1)². At the same time, in respect of the old issue of the trade-off between inflation and growth, most central banks seem to tend to lean towards the pursuit of price stability. Most EMEs tend to follow multiple policy objectives especially as their central banks traditionally play a key role in economic development. In respect of export-oriented economies, exchange rate often emerges as a key policy target. On the other hand, a number of EMEs such as South Africa and Thailand, are gradually veering to inflation targeting. Many transition economies, including

² A Bank of England survey of monetary policy frameworks reveals the continuing diversity of central bank objectives: while price stability emerged as the main/other important policy objective in 50 out of the 77 central banks, as many as 54 central banks reported exchange rate management to be the main/other important policy objective (Fry *et al*, 2000).

Hungary and Poland, have also adopted inflation targeting – although Russia still continues to follow a dual objective with a monetary target.

Table 1 : Central Bank Objectives

Central Bank 1	Objectives 2
Advanced Economies	
Australia	Price stability over the medium-term with the aim of encouraging strong and sustainable economic growth.
Canada	Inflation target to contribute to rising living standards.
European Central Bank	Price stability.
Japan	Price stability and financial stability as foundations for sound economic development.
New Zealand	Price stability.
U.K.	Inflation target as a precondition for achieving sustainable growth and employment.
USA	Maximum employment, stable prices and moderate long term interest rates.
Emerging Market Economies	
Indonesia	Price stability and exchange rate stability.
Malaysia	Monetary and financial stability for growth.
Mexico	Maintaining stability of the purchasing power of currency, sound development of financial system and proper functioning of payment systems.
Russia	Stability of the currency, development of banking system and efficient settlement system.
South Africa	Value of currency, achievement and maintenance of financial stability.
South Korea	Price Stability.
Thailand	Monetary and financial stability for achieving sustainable economic growth over the long run.

There is some evidence that central banks, in general, can claim some credit for higher macroeconomic stability, in terms of lower inflation and growth variability, in the 1990s as compared with the 1980s (Cecchetti and Krause, 2001). Although the happy mix of strong growth and low inflation in the mid-1990s appeared to vindicate the central bank strategy of stabilising inflation expectations, the downturn in economic activity following the

collapse of the boom in the asset markets in advanced economies subsequently demonstrated that central banks had to pay much greater attention to a variety of macroeconomic indicators, going beyond setting monetary policy by inflation numbers alone. It is, however, necessary to draw a distinction between the deployment of monetary policy to stabilise output fluctuations and the use of central bank money to fund long-term growth in general. Most central banks now accept that monetary policy is likely to be neutral in the long run – and appear reluctant to run risks of inflation all over again. After easing monetary conditions in the wake of the global economic slowdown in the early 2000, several central banks in advanced economies have begun to revise their policy stance at the early signs of inflationary pressures.

It is in this context that the search for an optimal inflation rate remains the holy grail of modern monetary economics. Although recent cross-country studies on threshold inflation suggest that growth rates tends to fall with high inflation, the search for optimal inflation, at the end of the day, has to be country-specific and situation-specific (Sarel, 1996; Khan and Senhadji, 2000).

Objectives of Monetary Policy : The Indian Case

The broad dilemma of Indian monetary policy is to provide credit to both the Government and the commercial sector at a reasonable cost without stoking inflationary pressures. The conduct of monetary policy by the Reserve Bank revolved around the twin objectives *viz.*, pursuit of price stability and ensuring the availability of credit to the productive sectors in the Indian economy. The emphasis between the two objectives have varied depending on the evolving price-output situation. Besides, financial stability has emerged as a prime concern of monetary policy and is being gradually recognised as a third objective of monetary policy (Reddy, 2004). This is in consonance with the spirit of the Preamble of the Reserve Bank of India Act, 1934 which enjoins the central bank:

“to regulate the issue of bank notes and keeping of reserve with a view to securing monetary stability in India and generally to operate the currency and credit system of the country to its advantage.....”

The adoption of the dual objectives of monetary policy, it will be recognised, also reflects the practioner's solution to the debates between the structuralists and the monetarists of the 1970s and the 1980s (Jadhav, 1994). Besides, there is a common perception that the aggregate supply curve in the Indian context is probably steep - largely because of structural constraints - but not vertical. This, in turn, implies that monetary policy can often impact real activity in the short run, although sustained monetary expansion ends up feeding inflation in the long run. This need to balance the dual objectives, thus, constitutes the primary dilemma of monetary policy in India. Governor Reddy points out that:

“...First, the basic dilemma arises out of the trade off between growth and inflation. Although a consensus has emerged on the basis of empirical evidence that in the long run there is no trade off between employment and inflation, it is the inconclusive evidence in the short-run that poses a challenge for monetary management. Given the deleterious effects of inflation on distribution of income, there is an imperative need in developing countries to keep the inflation rate as low as possible...” (Reddy, May 1999)

The primary challenge of economic growth, after the Independence, supported by contemporary big-push theories of development, was perceived to be capital formation on a large scale. In view of the scarcity of domestic capital and the emphasis on self-reliance, the State emerged as the natural primary entrepreneur in the economy. There was a common consensus that public investment, funded by printing money, if necessary, would leap frog the process of industrialisation, especially as inflation was largely believed to be structural (Iyengar, 1959)³.

Although the impetus provided by public investment to economic growth could not be sustained beyond the early 1960s, the Government deficit continued to climb steadily. Large-scale deficit financing fuelled monetary

³ A parallel concept of development central banking crystallised with the First Five-Year Plan (1951) which stated that: “Central banking in a planned economy can hardly be confined to the regulation of overall supply of credit or to a somewhat negative regulation of the flow of bank credit. It would have to take on a direct and active role, firstly in creating or helping to create the machinery needed for financing developmental activities all over the country and secondly, ensuring that the finances available flow in the directions intended.”

expansion, which in turn, began to spill over into inflation, without a matching supply response⁴. Although growth slowed down by the 1970s, there was a sharp increase in the inflation rate (Table 2). The conduct of the Reserve Bank's monetary policy gradually came to be dominated by the need to neutralise the monetary - and inflationary - effect of the monetisation of the Centre's fiscal deficit.

Table 2 : Decadal Macroeconomic Outcomes

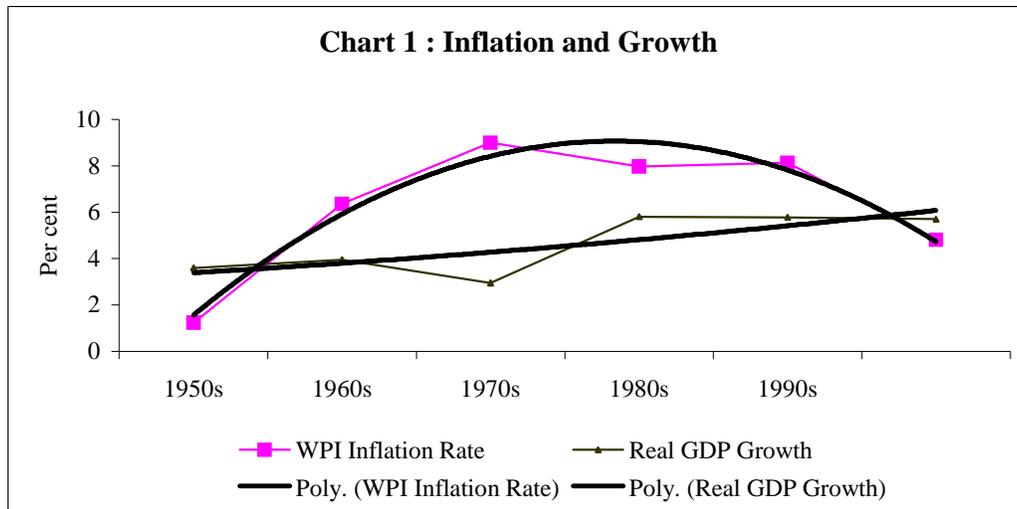
Decade	M ₃ Growth	WPI Inflation Rate	Real GDP Growth
1	2	3	4
1950s	6.7	1.2	3.6
1960s	9.2	6.4	4.0
1970s	17.4	9.0	2.9
1980s	17.2	8.0	5.8
1990s	17.3	8.1	5.8
1999-2004	15.0	4.6	5.7

Notwithstanding the then debate over the monetary and non-monetary causes of inflation, this shift in the policy thinking was codified by the Chakravarty Committee, which recommended that price stability emerge as the “dominant” objective of monetary policy (RBI, 1985). An inflation rate of four per cent was perceived as “the acceptable rise in prices” purported to reflect “changes in relative prices necessary to attract resources to growth sectors”.

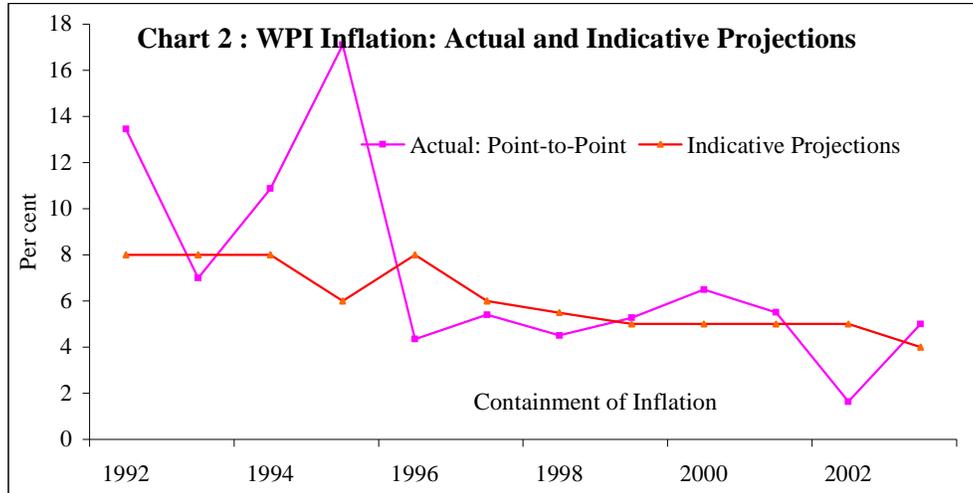
The case for price stability as the dominant - if not sole - objective of monetary policy gathered momentum in India by the 1990s. Besides affecting the horizons of business decisions and thus impeding the process of growth, inflation was also seen as a social injustice, especially as the poor seldom had hedges against inflation in a labour surplus economy (Rangarajan, 1988). The revival of growth in the 1980s, essentially driven by deficit financing of public expenditure, could not be sustained as the macroeconomic imbalances arising out of the sharp increase in the fiscal deficit in the 1980s - 7.7 per cent by the latter half of the 1980s - began to push the current account deficit to an

⁴ For reviews of the literature see, Bhattacharyya and Lodh, 1974; Jadhav, 1994.

unsustainable 3.2 per cent of GDP by the 1989-90, eventually landing the economy into a payments crisis in July 1991 (Chart 1).



The pursuit of price stability acquired a new urgency in the early 1990s as strong capital flows, which began to pour in after the liberalisation of the external sector, began to push inflation into the double digits. The very fact that the Reserve Bank was able to rein in inflation by the mid-1990s by tightening monetary conditions appeared to demonstrate the potency of monetary policy (Chart 2 and Table 3&4). In this high noon of price stability, Governor Rangarajan argued “...monetary policy as an arm of economic policy is best suited for the pursuit of price stability...”. It is in this context that the Advisory Group on Monetary and Financial Policies (Chairman: Shri M. Narasimham) recommended that the Reserve Bank should be mandated a sole price stability objective.



However, there are a number of reservations that constrain a sole price stability objective for India. This stance was enunciated very lucidly by Governor Jalan in December 2000, when he pointed out that:

“...There is a growing consensus now – in theory as well as in practice – that Central Bank should have instrumental independence, and concentrate on a single target of inflation control with the use of a single instrument. The position, no doubt, is theoretically sound, but as I look at the history of economic thought and changing fashions in economic policy making, I must confess to a sense of discomfort on whether the current dominant view on “one target, one instrument” will survive the test of time...In developing countries this whole question of trade-off – particularly at the margin – and during periods of external or domestic uncertainties, becomes even more relevant because of a large non-monetised and agricultural economy. It seems to me that a certain amount of target flexibility and balancing of conflicting objectives are unavoidable...” (Jalan, December 2000).

There is, of course, very little disagreement about the undesirability of high inflation. While it is true that a little inflation greases the wheel of economic activity, the inflation rate of about 8 per cent during 1970-2003 has been clearly higher than most estimates of threshold inflation in the Indian economy, which lie in the range of 4-7 per cent, depending on the period and methodology (Kannan and Joshi, 1999). The key issue of debate, however, is not whether the central bank should target inflation, but whether it should target inflation alone.

Table 3 : Inflation and Its Major Determinants

Variable	(Annual Averages in per cent)				
	1980-85	1985-90	1990-95	1995-2002	1999-2004
1	2	3	4	5	6
WPI Inflation Rate	9.3	6.7	11.0	5.3	4.8
CPI Inflation Rate	10.1	8.0	10.5	7.6	4.0
Food Articles Inflation	10.7	6.4	11.9	6.6	4.3
Increase in Procurement Prices:					
Paddy	7.6	6.3	13.5	6.6	2.9
Wheat	6.1	6.6	12.1	8.5	2.8
Fuel Inflation	12.5	6.0	12.8	11.3	10.3
M ₃ Growth @	16.8	17.6	17.5	16.8	15.0\$
				(16.3)	(14.8)
GFD/GDP @@	5.9	7.7	6.3	5.6	(5.6)
			(5.5)	(5.0)	
GDP Growth	5.6	6.0	5.0	6.0	5.7
Increase in Unit Value Index of Imports	5.6	8.0	7.6	7.1	6.7

S: Excludes merger effects.

@: Figures in brackets are growth rates excluding RIBs/IMDs.

@@: Figures in brackets are excluding States' share in small savings.

Source: RBI Reports.

Table 4 : Monetary and Credit Trends, 1994-98

Variable/Period	(Per cent)	
	1994-96	1996-98
1	2	3
Index of Industrial Production	11.2	6.4
M ₃	17.8	16.6
Non-food Credit	26.2	13.0
Non-food Credit/M ₃	53.6	52.2
Primary Issues (% of GDP)	1.6	0.4
Euro Issues (% of GDP)	0.4	0.35
WPI	10.3	4.5
Of which: Primary articles	12.0	5.6
Prime Lending Rate	15.0-16.5	14.0-15.0
CRR	14.0-14.5	10.0-14.5

The Rationale for Dual Objectives

The primary case against inflation targeting *per se* emanates from the fact that Indian inflation is not a monetary phenomenon alone. There are a number of other supply-side factors, such as agricultural shocks and oil price hikes, which influence prices, especially in the short run (Bhattacharyya and Lodh, 1974; Jadhav, 1994). This limits the ability (and credibility) of the Reserve Bank to control inflation through demand management. The challenge of monetary policy is, thus, really to identify the underlying causes of inflation⁵. It is often difficult to ignore the view that as long as there is sufficient unemployment in the Indian economy, judicious credit creation by the central bank could spur growth rather than feed into inflation. Public investment, if necessary, financed by printing money, could arguably provide a push to growth. Most monetary models also show that monetisation of public investment emits a positive supply response (Rangarajan and Mohanty, 1996). Although notoriously fickle, most empirical work now place potential output growth at around 7.0 per cent. This suggests that the Reserve Bank could at least take calculated risks with inflation in years of relatively low growth such as the later half of the 1990s. A difficulty is that Indian prices, at least in the short run, often emanating from supply side agricultural or oil shocks, so that periods of lower than potential output also witness a pick up in inflation. As a result, the Reserve Bank has to keep a constant vigil over the price level lest a softer monetary policy designed to spur growth actually ends up accommodating periodic spurts in inflation, scaling up inflation expectations. Finally, although it is true that monetisation of the fiscal deficit is not, *per se*, inflationary, there is sufficient evidence to suggest that the large order of government deficits remain a major source of inflation in India (Prasad and Khundrakpam, 2000).

⁵ This was brought home in 1998-99, when the Reserve Bank eschewed monetary tightening at a time when agricultural shocks briefly pushed up prices. The Reserve Bank did experiment with measures of core inflation, *i.e.*, inflation adjusted for supply shocks, which offered a way of distinguishing between the pull- and push- factors behind inflation (Samanata, 1999). At the same time, the difficulty appeared to be that a measure of 'core' inflation could lose public credibility since a large part of the inflation is driven by a wide-range of regular supply shocks .

There are a number of “operational” constraints, which limit the ability of the Reserve Bank to adopt an explicit narrowly defined objective like an inflation mandate (RBI, 2000). As the Reserve Bank is also the manager of public debt, the monetary management function continues to get inextricably linked to the debt management function while steering the interest rates. Besides, in the absence of fully integrated financial markets, which remain still imperfect and segmented, the transmission channel of policy to the price level and output is rather weak and yet to evolve fully. Finally, the high frequency data requirements including those on a fully dependable inflation rate for targeting purposes are yet to be met.

Besides the issue of the merit of price stability as a central banking objective, there is also the question of measuring inflation in a large economy (Jadhav, 2002). First of all, there is the choice between wholesale and consumer prices. The Wholesale Price Index (WPI) and the Consumer Price Index (CPI) occasionally diverge because of the differences in coverage and the weights assigned to the commodities comprising the indices. As pointed out in the Reserve Bank’s April 2001 Monetary and Credit Policy Statement, this divergence between retail and consumer prices is a reason why central banks need to monitor several indicators. Secondly, the vast and diverse range of the consumption basket often makes it difficult to create a comprehensive representative price index. The measurement of services inflation remains an important issue, as highlighted by the Working Group on the Index Numbers of Wholesale Price in India (1999). Thirdly, the rapidity of product innovations in the 1990s makes inter-temporal comparisons increasingly difficult. Finally, individual consumption baskets have been rapidly expanding, especially after the opening up of the economy in the 1990s. Thus, individuals could, *ceteris paribus*, be worse-off because the list of items of consumption they perceive as a ‘standard need’ has expanded although their prices have not changed.

On balance, it is important to appreciate that the monetary policy decisions of most central banks in EMEs are essentially environment- specific. Thus, just as price stability is of prime importance, growth is equally a matter

of policy concern. Although the two objectives are mutually reinforcing in the long run, short-run trade-offs are often live and real, especially in case of structurally constrained EMEs, wherein as Governor Jalan reminded, "a certain amount of target flexibility and balancing of conflicting objectives are unavoidable".

A common complaint during the mid-1990s was that the Reserve Bank had created a credit crunch in trying to deflate the economy. An analysis of the macroeconomic developments during the 1990s shows that the deceleration in inflation in the latter half of the decade really emanated from a number of factors, apart from the cut in monetary growth, including a much lower increase in procurement prices (Table 3). This is borne out even more clearly if we take a closer look at the inflection point of the mid-1990s (Table 4). The sharp drop in inflation around this time was probably driven as much by a reduction in the M_3 growth rate as a drop in foodgrains price rise inflation, as a result of an improvement in production. Besides, although exchange rate volatility resulted in a degree of monetary tightening in the second half of 1995-96, the Reserve Bank began to ease monetary policy with a 450 basis point cut in CRR as the sudden drop in inflation resulted in an increase in real interest rates (Rangarajan, 1997). While the much sharper reduction in the credit off-take than the M_3 growth rate could be interpreted as a classical crowding out because of the fiscal constraint, the simultaneous drop in resource mobilisation from the capital market also suggests a general weakening of the demand for funds.

Monetary Management in India in the Recent Past

The fact that the Reserve Bank of India, like other central banks, has to constantly evaluate the evolving macroeconomic conditions and fashion its response accordingly comes out quite clearly from an analysis of the conduct of monetary policy of the Reserve Bank in the recent past. Illustratively, with the slowdown of the Indian economy from 1997-98, the Monetary and Credit Policy Statement for 1999-2000 (April 1999) indicated that the stance of

monetary policy will continue to be in the direction of facilitating adequate availability of liquidity along with stable medium and long-term interest rates, with policy preference for softening to the extent circumstances permit. The Monetary and Credit Policy Statement for 2002-03 (April 2002) added that the endeavour will also be to impart greater flexibility to the interest rate structure in the medium-term. The Monetary and Credit Policy Statement for 2003-04 (April 2003) indicated that monetary policy will continue with the present stance of preference for a soft and flexible interest rate environment within the framework of macroeconomic stability.

With signs of incipient economic recovery, persistent and large capital flows and the upturn in international commodity prices, the Annual Policy Statement for 2004-05 (May 2004) stressed upon the

“need to consolidate the gains obtained in recent years from reining in inflationary expectations. ... It is important to appreciate that sustained efforts over time helped to build confidence in price stability and that inflationary expectations can turn adverse in a relatively short time if noticeable adverse movements in prices take place. While the economy has the resources and resilience to withstand supply shocks, the possible consequences of continued abundance of liquidity need to be monitored carefully. As such, the inflationary situation needs to be watched closely and there could be no room for complacency on this count”.

Accordingly, the Annual Policy Statement (May 2004) stated that the overall stance of monetary policy for 2004-05 will be:

- Provision of adequate liquidity to meet credit growth and support investment and export demand in the economy while keeping a very close watch on the movements in the price level.
- Consistent with the above, while continuing with the status quo, to pursue an interest rate environment that is conducive to maintaining the momentum of growth and, macroeconomic and price stability.

Monetary management in the first half of 2004-05 faced severe challenges on two counts. One, overhang of liquidity. Two, acceleration in headline WPI inflation beyond the anticipated level with implications for inflationary expectations. The Reserve Bank sought to manage the liquidity essentially through two instruments, viz., the Market Stabilisation Scheme

(MSS) and the repo operations under the LAF. On the prices front, the Mid-Term Review for 2004-05 (October 2004) dwelt at length the need to keep inflation expectations low and stable. While noting that the upward pressure on WPI inflation in the first half of 2004-05 largely emanated from supply shocks – increases in international commodity prices, particularly oil - the Mid-Term Review observed that the response of inflation to supply shocks is quick but transient. The response to demand shocks, on the other hand, is more subtle but persistent. As the overall assessment of the current inflation scenario indicated that that it was largely supply induced, the Reserve Bank stressed that monetary authorities have to balance the pros and cons of using monetary policy instruments as a means of stabilising inflationary expectations. Accordingly, the Reserve bank undertook a series of calibrated responses: First, the Reserve Bank communicated its assessment of the nature of inflation to the market on several occasions. Second, given the supply induced nature of inflation, the Government responded with fiscal measures, particularly relating to oil. The fiscal actions and some responses from corporates on moderating the exercise of their pricing power were part of the measured but harmonised responses along with monetary policy actions in liquidity management. Third, in order to enable the Reserve Bank to address the overhang of liquidity, the Government raised the ceiling of MSS from Rs.60,000 crore to Rs.80,000 crore. Fourth, for a more flexible management of liquidity, overnight fixed rate repo under LAF was introduced. Fifth, CRR was raised by one-half of one percentage point to 5.0 per cent, even as the Reserve Bank reiterated it will continue to pursue its medium-term objective of reducing CRR to its statutory minimum of 3.0 per cent. The Reserve Bank chose to increase the CRR, partly for absorbing liquidity in the system, but more importantly for signalling its concern at the unacceptable levels of inflation so that inflationary expectations are moderated while reiterating the importance of stability in financial market conditions. Based on its overall assessment, the Reserve Bank indicated that the overall stance of monetary policy for the second half of 2004-05 will be:

- Provision of appropriate liquidity to meet credit growth and support investment and export demand in the economy while placing equal emphasis on price stability.
- Consistent with the above, to pursue an interest rate environment that is conducive to macroeconomic and price stability, and maintaining the momentum of growth.
- To consider measures in a calibrated manner, in response to evolving circumstances with a view to stabilising inflationary expectations.

Reflecting the likely pressures of monetary management in an open economy, the successive Policy Statements have stressed that the policy stance can change quickly in response to unexpected developments. Illustratively, the Monetary and Credit Policy Statement for 2000-01 (April 2000) noted that it cannot be over-emphasised that the

“outlook can change dramatically within a relatively short period of time in the event of unanticipated domestic or international events. ...On the inflation front, therefore, there is need for continuous vigilance and caution. The Reserve Bank will continue to monitor domestic monetary and external developments, and tighten monetary policy through the use of instruments at its disposal, when necessary and unavoidable. Banks and other financial institutions should make adequate allowances for unforeseen contingencies in their business operational plans, and take into account the implications of changes in the monetary and external environment on their operations”.

In a similar vein, the Mid-Term Review for 2004-05 (October 2004) observed that,

“in the context of current inflation scenario, an issue of policy interest for financial management by banks and other market participants is whether, after a sharp decline in the past four years, the interest rate cycle has turned. As is well known, the outcome for interest rates depends mainly on the outlook for inflation, growth prospects and investment demand and it is not possible to predict short-run movements in interest rates, either up or down, without taking cognizance of possible movements in all other macroeconomic variables. These variables are also subject to unanticipated changes because of unforeseen domestic or external developments. However, the system has to recognise interest rate cycles and strengthen risk management processes to cope with eventualities so that financial stability could be maintained and interest rate movements could be passed in a non-disruptive manner”.

To conclude, as the above review of the monetary policy in India since the second half of the 1990s shows, monetary authorities face ongoing challenges in their assessment of macroeconomic and financial conditions. Central banks are constantly required to take positions on the short-run trade-offs between inflation and employment. In conditions of rising unemployment and fall in economic activity, central banks typically ease their monetary policy stance through reductions in key short-term nominal interest rates (and vice versa). The critical issue is, however, to ensure that, with return of output and employment to their natural levels, the monetary stimuli provided through such measures is withdrawn in calibrated manner in order to keep inflation low and stable and, more importantly, to anchor inflation expectations.

II. CHOICE OF INTERMEDIATE TARGETS

Central banks typically set “intermediate targets” in terms of macroeconomic variables, which can influence the overall objectives of monetary policy (Friedman, 1990). A macro variable, if too narrow, such as base money, may be fully within central bank purview but incapable of providing an effective conduit to the overall objectives. On the other hand, a macro variable, if too broad, such as nominal income, may not be amenable to the central bank’s control.

Central Banks in advanced economies have experimented with various intermediate targets in order to influence the economy in general and prices in particular. In choosing appropriate targets, central banks generally keep three major aspects in view: First, the ability to influence the target variable in a reasonably predictable manner is important. Secondly, the target must exhibit a stable (if not constant) relationship with the end objective of monetary policy. Thirdly, the target must lead to the final objectives, even though feedbacks from developments in the goal variable to the target are also important. In the context of the growing emphasis on monetary policy transparency, the chosen target should also be clearly communicable to the public.

In the choice of the target, there is always a trade-off between 'controllability' of the target and the 'attainment' of the end objectives. The monetary policy transmission mechanism holds the key in determining the target. If variables at the beginning of the transmission process are selected (such as interest rate or base money growth), the target may be controllable but may not show a strong influence on the goal variable. At the other extreme, the final objectives (such as inflation or nominal income) that lie at the end of the transmission process could also be targeted. In such cases, however, the monetary authority may have little control over the target. The middle option could be to adopt intermediate targets (such as money growth or exchange rate) which could lie somewhere at the middle of the transmission process. The importance assigned to targets *vis-a-vis* objectives in the design of the monetary policy strategy is particularly critical because a mere achievement of

targets while missing the objective could erode the credibility of monetary policy.

Monetary Targeting

Central banks traditionally set interest rate or credit targets, till Monetarists introduced the concept of a money target in the 1960s, based on the empirical validity of a stable relationship between money, output and prices (Goldfeld and Sichel, 1990). In case, the demand for money is entirely driven by transactions demand - *i.e.*, the interest rate sensitivity of money is negligible and the velocity of money is reasonably stable, the central bank could simply target a stock of money which is consistent with the given level of output.

$$[(\delta M/M) = (\delta Y/Y) + (\delta P/P) \quad \text{..... (Eq. 1)]$$

The question relating to the choice of appropriate target for conducting monetary policy goes into the basic question of the interrelationship between money, output and prices. Most central banks, including Germany in 1975, Japan (1975-94), UK (1976-94) and the USA (1975-94) adopted money targets in the mid-1970s. Financial innovations, however, began to affect the stability of money demand in the 1980s as a given stock of money was increasingly able to service a larger volume of transactions. With the observed instability of the money demand function, several central banks were disenchanted with monetary targeting and have accordingly either switched over to a 'menu' or 'check list approach' or gave up monetary targeting altogether⁶. Most central banks in EMEs continued to target money well into the 1990s since the lack of developed financial markets did not really leave much choice. The process of financial liberalisation, however, brought financial innovations, which did weaken the money demand function, especially in market-oriented economies,

⁶ The impact of financial innovations was, however, not uniform. The lack of unanimity is clear in a comparison of the monetary policy operating frameworks of the three leading central banks. The US Federal Reserve sets a inter-bank interest rate target (*viz.*, the Federal Funds Rate). The European Central Bank monitors monetary aggregates as a reference value as part of its twin pillar policy framework. The Bank of Japan switched from targeting interest rates to bank reserves in March 2001. On the other hand, money demand continues to remain stable in many developing countries, which are yet to witness large-scale financial liberalisation (Sriram, 2001).

and gave rise to occasional bursts of financial volatility, which could not be handled within the monetary targeting framework. Under the circumstances, many central banks in EMEs, such as the Bank of Mexico and the South African Reserve Bank, switched to a inflation targeting framework – although monetary aggregates still remain a key policy variable since inflation, their target variable, is determined both by monetary and non-monetary factors⁷.

A monetary target was seen to perform better than an interest rate target for two reasons: first, it is really the rather ephemeral real interest rate and not the nominal interest rate which affected final targets. Secondly, attempts to keep nominal targets low by increasing liquidity often ended up pushing up nominal interest rates by the resultant inflation. The attendant quest for some kind of an optimal non-inflationary interest rate structure revived recent interest in the Wicksellian natural rate of interest (NRI), defined as ‘the rate on loans, which is neutral in respect to commodity prices and tends neither to raise nor to lower them’ (Woodford, 2001)⁸.

Interest Rate Targeting

In advanced economies, an alternative to monetary targeting has been the interest rate. This has been primarily due to the fact that interest rates in those countries play a more important role in equilibrating markets. Various segments of the financial markets are closely integrated with interest rates in the different markets mutually influencing one another. This is hardly the case with most developing countries although such an integration could be seen emerging in several EMEs.

The burst of financial innovations in advanced economies in the 1970s led to a breakdown of the stability of money demand. In view of the instability

⁷ In the case of transition economies, central banks, such as Hungary and Poland, used direct instruments such as credit ceilings besides easily understood and highly visible targets such as the exchange rate during the period of stabilisation in the mid-1990. Now that market institutions are in place, most of these central banks are beginning to switch to an inflation targeting framework, based on indirect instruments of policy - although Russia is still a money targeter.

⁸ Although empirical exercises report that the long-term average real interest rates are reasonably close to the NRI, usually worked out by stripping the real interest series of the ‘cyclical’ component, there is no evidence that this serves as a basis of policy (Crespo-Cuaresma, Gnan and Ritzberger-Gruenwald, 2004; Laubach and Williams, 2003).

of money demand, a number of central banks therefore, switched to targeting interest rates, *a la* Poole (1970), as a means of modulating aggregate demand.

In this context, the debate on "rules *versus* discretion" has engaged the attention of policy makers. Given the scope for time-inconsistent behaviour and the associated anti-inflation bias of central bankers, there has been a growing emphasis on policy rules. Constrained discretion seems to be the preferred rule for most central banks today.

The initial literature on policy rules was based on stable relationship between money, income and prices, which allowed central banks to target inflation by fixing a monetary target given a rate of growth through the equation:

$$m_t = k_t + p_t + y_t, \quad \dots\dots\dots \text{Eq.(1)}$$

where m is money growth,
 p is the inflation rate,
 y the real growth rate and,
 k the rate of change of the inverse of income velocity of money taken to be zero.

As financial innovations allowed larger number of transactions to be serviced by a smaller amount of money (*i.e.*, k turned non-zero), central banks attempted to retain a fix on the macroeconomy through the price rather than the quantum of money. The most prominent of the interest rate based rules was the Taylor rule, which posited that

$$i_t = r_t + \pi_t + \lambda_1 (y_t) + \lambda_2 (\pi_t - \pi_t^o), \quad \dots\dots\dots \text{Eq. (2)}$$

where i is the nominal interest rate to be set by the central bank,
 r_t the equilibrium interest rate, π_t the actual inflation rate,
 π_t^o the targeted inflation rate, and
 y the output gap, *i.e.*, the difference between the actual and potential output, with the weights λ measuring the monetary policy reaction to the deviations of the actual output from the potential and actual inflation from the target.

In this case, the policy rule, explicitly assumes interest rate targeting, in line with the evolving operating procedures of monetary policy.

Credit Targeting

Bank credit returned to the centre-stage of monetary policy making in the early 1990s, with the “credit view” (Bernanke and Gertler, 1995; Bernanke and Blinder, 1988). The proponents of the credit view agree with the proponents of the “money view” that banks are “special” but they focus on the asset side of the banking system in terms of the process of credit creation, rather than the liability side in terms of money creation. Simply put, credit volumes could differ at the same interest rate because of changing macroeconomic circumstances, as banks might ration credit among borrowers at some block price, because they are not able to individually evaluate each project on account of information asymmetries. In order to get a fix on this multiple equilibria of credit and interest rates, central banks, therefore, need to monitor credit volumes so as to analyse the impact monetary policy has on aggregate demand.

Exchange Rates

Beyond the traditional debate over targeting money, credit or interest rates, exchange rates often serve as a target of monetary policy. Although in a strict theoretical sense, setting money supply along with some band for the exchange rate poses an obvious dilemma, most central banks often work out their compensatory sets of monetary policy to maintain internal and external balance in terms of the Mundell-Fleming model (Mundell, 1968). Notwithstanding the “impossible trinity” of a fixed exchange rate regime and an open capital account, monetary authorities, nevertheless, continue to set an informal band for the exchange rate consistent with their macroeconomic overview. Some central banks have, in fact, experimented, though not very successfully, in the mid-1990s, with so-called monetary conditions indices (MCI) constructed by a linear combination of domestic interest rates and the exchange rate, weighted by a measure of the degree of openness of the economy.

Inflation Targeting

A number of central banks are now veering to directly targeting inflation, by-passing the passionate debates over the appropriateness of money or interest rates as intermediate targets of policy (Fischer, 1993). The primary advantage of inflation targeting lies in its transparency - since the central bank is explicitly committed to an inflation rate target.

Full-fledged inflation targeting is based on five pillars: an institutional commitment to price stability, absence of other nominal anchors, absence of fiscal dominance, policy instrument independence, and policy transparency and credibility (Mishkin and Schmidt-Hebbel, 2001). It is, however, necessary to distinguish between central banks, which adopt price stability as a goal of policy – perhaps through an intermediate target, such as money or interest rates, or a combination of both, such as the European Central Bank and central banks, which *directly* target inflation. A number of central banks, such as the Bank of Mexico and the South African Reserve Bank, have done away with intermediate targets of monetary policy and now directly target inflation. Besides, most inflation targeting central banks are known to follow a ‘flexible’ rather than ‘strict’ inflation targeting, *i.e.*, taking into account deviations of output from the potential, as evidenced by the fact that the horizon over which deviations from the inflation target are tolerated is usually close to eight quarters.

While it is true that most central banks which have adopted inflation targeting have been able to achieve a low and stable order of inflation, many central banks, such as the German Bundesbank (targeting money) and the US Federal Reserve (targeting interest rates) have also succeeded in reducing their inflation rates without a change in the monetary policy framework (Friedman and Knutter, 1996). The inflation targeting record in emerging market economies is relatively weaker, partly because the trade-offs are sharper and because in some cases, the credibility of the monetary authority is relatively low. A recent study estimates that both average inflation (3.37 per cent as against 1.24 per cent) and volatility (3.22 as against 1.02) was higher in

emerging market economies than in developed countries during 1997-2002 (Fraga, Goldfajn and Minella, 2003).

Multiple Indicators Approach

The increasing complexities of macroeconomic management are also forcing central banks to monitor a large set of multiple indicators irrespective of whether they have an intermediate target or not (Table 5). The European Central Bank, for example, bases its process of monetary policy formulation on the twin pillars of monetary analysis and inflation analysis. Many central banks in EMEs, such as the Bank of Mexico and the South African Reserve Bank, switched to a inflation targeting framework suggest that they follow multiple indicators since inflation, their target variable, is determined both by monetary and non-monetary factors. A report of the IMF's Interdepartmental Task Force on Deflation (IMF, 2002) suggested that central banks need to pay attention to a wider menu of macroeconomic indicators, including aggregate prices, output gaps, and developments in asset, credit and other financial markets (which are aggregated to construct an index of deflation vulnerability) in order to ward off potential deflationary tendencies.

Table 5 : Multiple Indicators of Monetary Policy

Country	Objective	Intermediate Target	Indicator				
			Money	Credit	Interest rates	Output gap	Employment data
1	2	3	4	5	6	7	8
Canada	Price stability	Monetary conditions index	√	√	√	√	√
European Central Bank	Price stability		√	√	√	√	√
Japan	Price stability and growth	Bank reserves	√	√	√	√	√
USA	Price stability and growth	Federal funds rate			√	√	√
Emerging Market Economies							
Brazil	Growth and price stability		√	√	√		
Indonesia	Exchange rate and price stability		√	√	√	√	√
Malaysia	Price stability and growth	Inter-bank rates	√	√	√	√	√
South Africa	Price stability		√	√	√	√	√

Note: √ denotes that the variable is used as an indicator.

Source:

Intermediate Targets - The Indian Case

The Reserve Bank formally switched to a multiple indicator approach in April 1998 from a monetary targeting framework. Apart from money supply which remains an important information variable, the central bank information set now spans a number of macroeconomic variables such as interest rates or rates of return in different markets (money, capital and government securities markets) along with such data as on currency, credit extended by banks and financial institutions, fiscal position, trade, capital flows, inflation rate, exchange rate, refinancing and transactions in foreign exchange available on high frequency. These are juxtaposed with output data for drawing policy perspectives.

The Reserve Bank had traditionally used credit - aggregate as well as sectoral - as a proximate target of monetary policy (RBI, 1961, Jalan, 2002). This loose concept of credit targeting in fact was well woven into the concept of development central banking envisaged in the First Five Year Plan. Since inflation was largely thought to be structural, selective credit controls were used, since 1956, to regulate bank advances to sensitive commodities to influence production outlays, on the one hand and to define sensibilities of speculation, on the other. As the deficit financing of public investment began to spill over into inflation, in view of the lack of a matching supply response, the focus of monetary management had to shift to the management of demand rather than the regulation of supply. It is in this context that the Chakravarty Committee recommended a monetary targeting framework to target an acceptable order of inflation, in line with output growth (RBI, 1985). Given a reasonably stable velocity of circulation of money, resulting in a reasonably stable relationship between money, output and prices, the Reserve Bank could estimate the money supply necessary to target an inflation rate through a money demand function :

$$(\Delta M/M) = \alpha (\Delta Y/Y) + \beta (\delta P/P) \quad \dots\dots \text{Eq (3)}$$

where α is income elasticity of demand for money which was estimated initially at 1.8 by the Chakravarty Committee and later at 1.6 by the Reddy Working Group (1998) and β is price elasticity of demand for money approximating unity in line with the assumption of lack of money illusion.

This provided reasonable predictions of average changes in prices over a medium-term horizon of 4-5 years, though not necessarily on a year-to-year basis (Rangarajan and Arif, 1990; Jadhav 1994).

Money Targeting

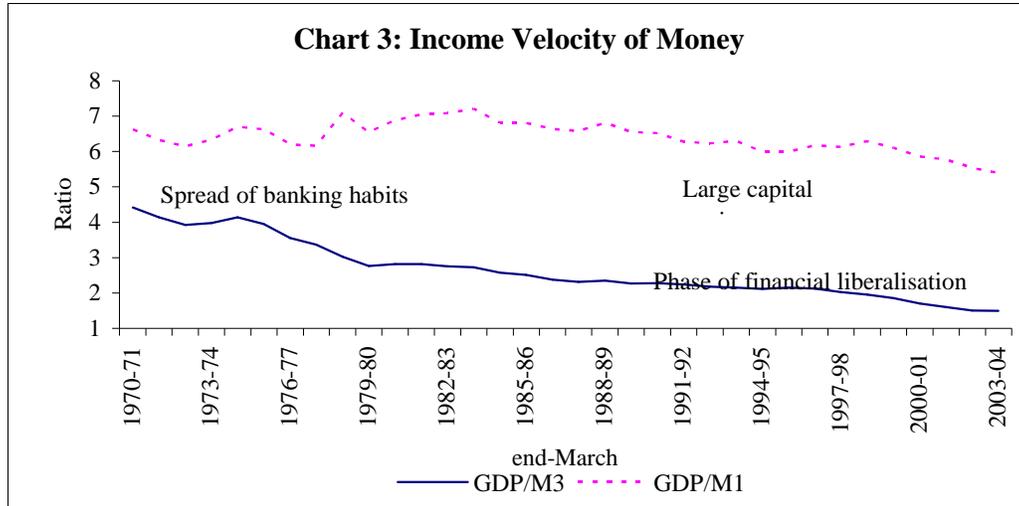
Money targeting was reasonably successful as a tool of monetary policy in the late 1980s and early 1990s, as inflation was driven by excessive monetary expansion. The Reserve Bank's 1996-97 Annual Report in fact claimed that better control over monetary aggregates was getting reflected in a

lower and stable order of inflation. The process of financial liberalisation, during the mid-1990s, brought fresh challenges, which necessitated a re-look at the efficiency of broad money as a sole intermediate target of monetary policy. There were two basic concerns regarding the monetary targeting framework: the possible instability of money demand given the financial innovations, taking place, and the ability of the monetary target to ensure stability in financial markets during the era of financial liberalisation. Perhaps the most compelling reason to augment the information context of monetary data is the need to maintain stability in financial markets. It is not a coincidence that the switch to multiple indicators took place against the backdrop of the East-Asian crisis of 1997-98 when contagion suddenly infected Indian financial environment, necessitating swift monetary policy action.

The jury is still out on the vexed issue of money demand. Most studies show that the demand for money continues to be stable (Jadhav, 1994; Joshi and Saggar, 1995; Nag and Upadhaya, 1996; Arif, 1996). Money routinely appears in most explanations of inflation: a Reserve Bank study recently reported that the real money gap (defined as the deviations of the real money aggregate from its projected path) contained one-month lead information on the path of future inflation (RBI, 2001; Pethe and Samanta, 2001). *Prima facie*, it would appear that most financial innovations continue to take place through the banking channel, as is the case in most banking economies. In case of most new instruments, such as certificates of deposit (commercial paper), banks continue to be the dominant issuer (buyer). Besides, although the mid-1990s did see a boom in the primary issues in the stock market as well as an expansion of non-banking financial companies, the subsequent downturn in the capital market and the sharp shrinkage in the business of non-banking financial companies has practically killed off possible sources of financial disintermediation.

The case for stable money demand, moreover, is buttressed by the fact that the velocity of money continues to be reasonably stable (Chart 3) (RBI, 2000). The M_3 velocity of money has, in fact, continued to move downwards,

in line with the long-term trends, suggesting that the process of monetary deepening is still not complete. Financial innovations, once they are sufficiently deep, should enable a smaller money stock to support a larger nominal demand and induce an increase in the income velocity of money – which was actually the case for a brief period in the mid-1990s (Jadhav, 1994).



The room for doubt arises from the fact that it is not very clear if breaks in the late 1990s, if any, are picked up by the various tests in view of the paucity of data. Most of the studies on the money demand function appear to have ended in the mid-1990s. Besides, the most dramatic evidence in support of money targeting, the simultaneous sharp increase in both money and inflation in 1994-95 followed by a steep drop in both in 1995-96, turns out on closer inspection to be a bit of a mirage. The decline in monetary growth, for instance, was largely statistical: the end-March 1995 deposit data was pumped up by year-end window dressing and interest applications because the last reporting Friday of the year happened to coincide with the balance sheet date, March 31. The turn in inflation was also largely contributed by a bad harvest in 1994-95 and a good harvest in 1995-96.

This ambiguity is reflected in the Reserve Bank's Monetary and Credit Policy Statement of April 1998:

“Most studies in India have shown that money demand functions have so far been fairly stable. However, the financial innovations that have recently emerged in the economy provide some evidence that the dominant effect on the demand for money in near future need not necessarily be real income, as in the past. Interest rates too seem to exercise some influence on the decisions to hold money”.

The contemporaneous report of the Reddy Working Group on Money Supply echoed that monetary policy exclusively based on the demand function for money could lack precision. Although there existed a long-term equilibrium relationship between real money balances and real income, there were short-term deviations from the long-run equilibrium, which could be explained by other relevant variables to ensure predictive accuracy.

The long-run equilibrium relationship between money, output and prices established by mean reverting behaviour (presence of cointegrating vector) is probably not adequate for policy making as the margin of error *i.e.*, deviation from the long-term relationship may be too high in the short-run. It is the short-run demand for money which ought to be stable to provide comfort to the policy makers. Therefore, in the short-run, parameters of money demand (income and price elasticities of the demand for money) need to be stable and they should predict the demand for money out-of-the sample, at least for a few years, so that targeting framework would work without doubt. In the Indian context, parameter stability of short-term demand for money was questioned and structural breaks were found by a few researchers (Deadman and Ghatok, 1981; Jadhav, 1994; Bhoi, 1995).

The Reddy Working Group on Money Supply also confirmed the predictive failure of money demand function in India. While the academic research may afford to debate the issue for as long as possible, policy makers cannot afford to commit serious policy mistake. Until a suitable framework emerges, multiple indicator approach is deemed to be desirable in an evolving financial system like India.

Interest Rate Targeting in India

There is some evidence that interest rates are emerging as a channel of monetary policy transmission in the Indian economy - although quantum variables continue to be significant (RBI, 1998). The case for interest rates as a monetary target is pretty much as finally balanced as that of money. The principal unique selling proposition is that interest rates undoubtedly serve as effective instruments of monetary policy during episodes of volatility in financial markets. The Reserve Bank is able to drive domestic interest rates above the interest rates implied by the forward agreements and thus change the relative attractiveness of domestic currency *vis-a-vis* the international economy. This has been effectively demonstrated in several episodes of financial market volatility since the late 1990s.

While there is little doubt that liquidity operations are able to impact the interest rates at the short end of the spectrum, the pass-through to the longer end, especially in the credit markets is still sluggish.

The impact of changes in interest rates on the goal variables of price stability and growth are still not very clear. The linkage between interest rates and inflation is far from being established. In the case of output, the case for interest rates as instruments of monetary policy rests on the fact that the sharp reductions in interest rates in the late 1990s could have facilitated a revival of production. The set of counter arguments appear equally persuasive. Given that the interest cost of corporate outlays usually limited (4-5 per cent), it is difficult to assess the impact marginal changes in the cost of credit had on producer plans.

Bank Credit as Target

Bank credit, as we have seen, traditionally served as a proximate determinant of Indian monetary policy. The shift to monetary targets in the 1980s was, in fact, an issue of much debate - although it was held that the act of money creation was simultaneously an act of credit creation, in view of the relatively autarkic character of the economy (Rangarajan, 1985). The Reserve

Bank's monetary and credit policy statements – the nomenclature was probably significant in itself – set credit targets alongside monetary targets throughout the 1990s. Although there is little disagreement about the fact that banks continue to be “special” in the Indian economy, the macroeconomics of credit has been changing rapidly in response to the process of financial deepening, in general, and the process of financial liberalisation, during the 1990s, in particular. The literature reveals a strong and recurrent view, that in emerging markets such as India, the availability of credit is as important - and often more important – than the cost of credit, especially given the reliance of small and medium enterprises on bank credit.

Indian experience with Multiple Indicators

It is, thus, in the absence of this clear correlation of intermediate targets with the final objectives, that the Reserve Bank has turned to the multiple indicator approach. This large panel of indicators are sometimes criticised as a ‘check list’ approach, which tends to water down the concept of a nominal anchor for monetary policy. It is certainly true that a single intermediate target is theoretically more appealing and operationally easier. At the same time, it is very difficult to find a variable which would be able to encapsulate the larger number of factors which need to go into monetary policy making at this stage of transition from a relatively autarkic administered economy to a relatively open market oriented economic system. As channels of monetary policy transmission shift course as a result of financial liberalisation, the central bank has to naturally operate through all the paths that transmit its policy impulses to the real economy. Governor Reddy points out that:

“... in a dynamic setting, when the financial markets are continually evolving, and payment systems and technology are changing, one may not find a clear cut evidence of stability in the money demand, which is taken as a basis for intermediate targeting; and in such circumstances, one needs to look also at other relevant indicators. It is not that such dilemmas are specific to us and by and large, countries follow a menu approach or a ‘check list’ to track a number of relevant variables...”
(May 1999)

The set of multiple indicators, however large, remains critically incomplete because of the paucity of data on the labour market in the Indian economy. Apart from the difficulties of collecting regular information on employment or wages in such a large and populous economy, it is not clear what the definition of employment should really be in a labour surplus economy with a large segment of the population self-employed on family farms. This effectively means that the Reserve Bank has to make monetary policy decisions without either estimating wages or employment. The process of monetary policy formulation, is, thus broadly driven by estimates about aggregate demand without commensurate information about aggregate supply.

III. OPERATING PROCEDURES

The operating procedures of monetary policy have been changing the world over in response to financial liberalisation. The choice of a particular operating procedure of monetary policy really hinges on the *milieu* in which the central bank operates.

Instruments of Monetary Control

The relative efficiency (and costs) of various instruments of monetary policy poses a second set of challenges for the conduct of monetary policy (Table 6). The central bank's power to conduct monetary policy stems from the fact that it is the sole source of primary money in the economy (Friedman, 2000). Given this monopoly, the central bank is typically able to fix either the supply or the price of primary liquidity; sometimes it can even control both in relatively imperfect financial markets. The dominant model of monetary design is usually to fix the supply of primary liquidity in consonance with a broader money or interest rate target. The issue, then, is to determine the form and pricing – administered or market determined – of primary liquidity.

Table 6 : Instruments of Monetary Control

Instrument	Advantages	Disadvantages	Issues in design
1	2	3	4
Reserve requirements	Improves predictability of reserves and useful in economies without functioning markets.	Imposes tax on financial intermediation.	Definition and monitoring of requirement base; averaging provides flexibility in banks' portfolio management.
Rediscount window	Important announcement effects.	Not very convenient for liquidity targeting.	Determination of eligibility and access criteria
Secondary market operations, including repos	Immediacy of response in money market and also facilitates market development.	Requires deep and liquidity secondary market, and the central bank must have sufficient stocks.	Pricing policies.
Foreign exchange operations, including swaps	Effective if foreign exchange market more developed than government securities markets.	Central bank can suffer losses if exchange rate is unsustainable.	Need to design appropriate risk management procedures

Note: Adapted from Alexander, Balino and Enoch (1995).

The cash reserve ratio (CRR), which alters the money multiplier, is often used as an instrument of monetary control in economies in which financial markets are not deep enough to transmit policy impulses to the real economy. Since a portion of banks' lendable resources are impounded by the central bank, there is a direct impact on banks' deposit and lending rates. The principal drawback of reserve requirements as a tool of monetary policy, of course, is that they are an across-the-board levy, which does not take into consideration the *relative* liquidity position of the agents of the economy.

Most central banks prefer open market operations as a tool of monetary policy, which allows them to adjust market liquidity and impact on the interest rate structure at varying tenors. The particular form in which open market operations are conducted often depends on the particular macroeconomic circumstances and the legal framework of the economy in question. There are three standard forms: first, outright transactions in eligible securities, including government stock and sometimes central bank bills; second, repo transactions in similar paper and finally, uncollateralised repo transactions, in the form of a standing deposit/lending facility. Outright open market operations result in a transfer of ownership of the security resulting in a permanent change in market liquidity. Repo operations are a temporary transfer in that the purchase (sale) in the first leg of the transaction is accompanied by a commitment to sale (buy) in the second leg, over a mutually agreed time period, which could be as short as overnight. In case of uncollateralized repo operations, the central bank borrows (lends) funds, again for a mutually agreed timespan, but there is no transfer of security in this case.

Three observations are in order here. First, although the monetary implications of the three sets of transactions are essentially the same, the fiscal implications are very different. In case of government stock, the coupon rate is a charge against the fisc while in the other cases, the entire cost of issuance is borne by the central bank. Secondly, the scope of open market operations through uncollateralised repo transactions or central bank bills is only limited by the credibility that the central bank enjoys. In case, open market operations

are conducted in government stock, the limit is obviously defined in terms of the stock of the public debt, which could be a constraint in economies which run a fiscal surplus or if the central bank is barred from financing the fiscal deficit, and is thus unable to replenish its own stock of government paper. Finally, the issuance of central bank paper along with government paper in economies with a fiscal deficit, results in two sets of “risk-free” bonds available in the market which could fragment the demand for government paper.

The operating procedures of monetary policy have changed quite dramatically in the 1990s with the progress of financial liberalisation. The principal challenge of contemporary monetary management is to modulate liquidity conditions in financial markets consistent not only with the ultimate macroeconomic objectives but also with the market outcome. Most central banks have gradually shifted from direct instruments to indirect instruments of monetary control, gradually putting in place a liquidity management framework, which allows them to target the quantum or price of primary liquidity – or, at times, a mix of both (Alexander, Balino and Enoch, 1995). While it is universally recognised that the deregulation of financial prices is necessary for efficient allocation of resources, there is now a heightened appreciation of the risks of contagion, in terms of the balance sheets of both the central bank and the other players in the markets, including banks, mutual funds and insurance companies. Alongside the deregulation of financial markets, there is, thus, a search for an appropriate operating framework for financial stability.

Most central banks now follow a two-step procedure of estimating market liquidity, autonomous of policy action and then conducting monetary policy action in terms of open market operations and interest rate signals to steer monetary conditions (Borio, 1997) (Table 7). Although country practices vary, the operating procedure of monetary policy of most central banks are beginning to converge to one of the variants of the three-closely related paradigms. A number of central banks, including the US Federal Reserve,

estimate the demand for bank reserves and then carry out open market operations to target short-term interest rates, especially if their financial markets are deep enough to transmit changes at the short end of the interest rate structure to the longer end and if investment plans are adequately sensitive to changes in financial prices. A second set of central banks, including the Bank of Japan, estimate market liquidity and carry out open market operations to target bank reserves, while allowing interest rates to adjust, especially if their credit channels are strong. A third and growing number of central banks, including the European Central Bank and a large number of inflation targeters, modulate monetary conditions in terms of both the quantum and price of liquidity, through a mix of open market operations (OMOs), standing facilities and minimum reserve requirement and changes in the policy rate, but do not announce pre-set money or interest targets.

Table 7: Select Operating Procedures of Liquidity Management

Central Bank/ Country	Monetary Policy Objective	Intermediate/ Operating Target	Instrument	Supporting Indicator
1	2	3	4	5
Brazil	Sustainable growth and price stability	Money, credit and interest rates	CRR, OMO and financial assistance for liquidity	
Canada	Price stability	Overnight Interest Rate	Repos at target rate	Money, credit, <i>etc.</i>
European Central Bank	Price stability	No official target	OMO, repos, marginal lending and deposit facilities	Money, price, cost, output, demand, employment, fiscal and BoP.
Japan	Price stability	Current account Balances	OMO, repos and complementary lending facility	
USA	Price stability and Growth	Federal funds rate	OMO, repos, reserve requirements, discount rate	Credit, employment.
<i>Emerging market economies</i>				
Indonesia	Exchange rate and price stability	Monetary base and real effective exchange rate	CRR, discount rate, OMO and moral suasion	Interest rates, exchange rate.
Malaysia	Price stability and growth	Intervention rate, inter-bank rates	Direct borrowing/lending, selective credit and administrative measures, CRR, OMO and moral Suasion	Real interest rates, inflation and its indicators, asset prices, credit and money.
Mexico	Purchasing power of currency		Money and foreign exchange market operations	Money and monetary base inflation, employment, BOP and exchange rate.
South Africa	Price stability	Repurchase rate	OMO, CRR, foreign currency swaps	Money, credit, interest rates, output gap, BOP and fiscal position.

A unique feature in emerging market economies, during the 1990s, has been the sudden gusts of capital flows. Most central banks have attempted to balance the domestic and foreign sources of liquidity through sterilisation operations in order to defuse inflationary pressures and retain a relatively soft exchange rate regime. This, in turn, put them face to face with the “impossible trinity” of fixed (or even managed floating) exchange rates, open current

account and independent monetary policy. In view of strong capital flows, a number of central banks have run out of government paper and turned to issuing their own paper in order to carry out open market operations. Although central bank bills are often subject to caps linked to the central bank balance sheet - in terms of net worth (*e.g.*, Malaysia) or money supply (*e.g.*, Korea) – sustained sterilisation operations have often tumbled on central bank profitability. As a result, many central banks eventually have either allowed the exchange rate to appreciate (*e.g.*, as Poland in the mid 1990s or recently, Thailand) or raised reserve requirements all over again (*e.g.*, China in September 2003).

Operating Procedures : The Indian Experience

The increasing liberalisation of the Indian economy required the Reserve Bank to shift from relatively direct instruments of monetary control to indirect instruments in consonance with the market outcome. The operating procedure of monetary policy, thus, changed dramatically during the 1990s in tandem, with the experience in most emerging market economies. The Reserve Bank now modulates market liquidity to steer monetary conditions to the desired trajectory. This is achieved by a mix of policy instruments including changes in reserve requirements and standing facilities and open market (including repo) operations which affect the quantum of marginal liquidity and changes in policy rates, such as the Bank Rate and repo rates, which impact the price of liquidity (Reddy, 2001a; Kanagasabhapathy, 2001).

The Challenges of Financial Liberalisation

In India, the changes in the operating procedure of monetary policy had to be calibrated with the changes in the macroeconomic environment (Jadhav, 2002). The 1990s began with a balance of payments crisis, which necessitated swift monetary policy action in terms of domestic demand containment and import compression. As capital flows began to pour in with the liberalisation of the external account in the early 1990s, the Reserve Bank had to absorb the foreign currency in its balance sheet to maintain the competitiveness of the

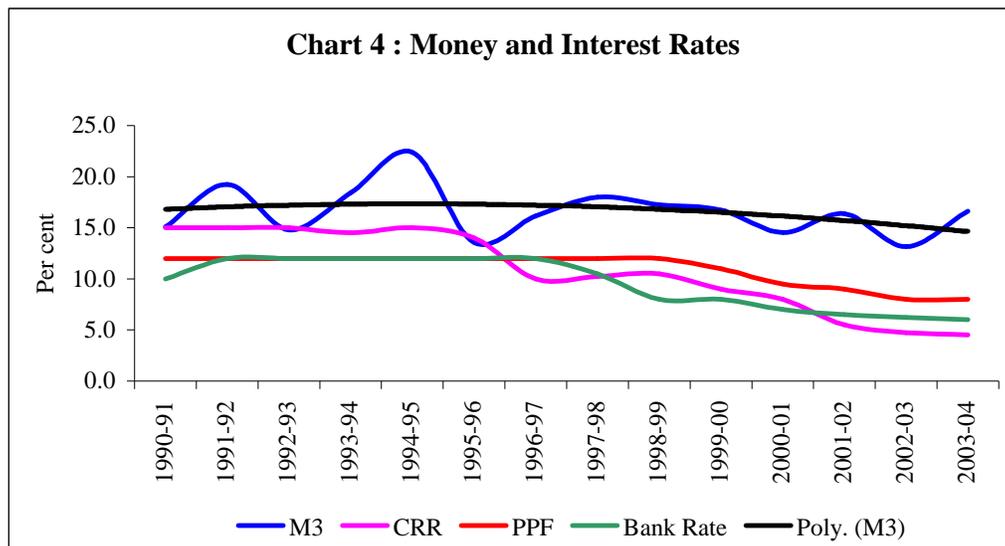
economy and at the same time, sterilise the surplus liquidity to rein in inflation, which began to cross into double digits. This necessitated the introduction of open market (including repo) operations in 1992-93. At the same time, the Reserve Bank had to repeatedly raise reserve requirements to contain monetary expansion, notwithstanding its professed policy of reducing reserve requirements in the medium term. Once the battle against inflation was won in the second half of the 1990s, the Reserve Bank was free to pursue its medium-term goal of paring reserve requirements to the statutory minimum, especially as the parallel slowdown in economic activity simultaneously necessitated easing of monetary conditions. The gradual deregulation of interest rates by the mid-1990s enabled the Reserve Bank to reactivate the Bank Rate as a signalling device in 1997-98. The repeated episodes of volatility in the financial markets in the latter half of the 1990s began to underscore the need for effective day-to-day management of liquidity. The tenor of repo operations, originally introduced to sterilise capital flows in 1992, was gradually cut from 14 days to daily auctions in order to stabilise markets. Pursuant to the recommendation of the Committee on Banking Sector Reforms (Chairman: Shri M. Narasimham), the Reserve Bank instituted an Interim Liquidity Adjustment Facility in April 1999, which later evolved into a full-fledged Liquidity Adjustment Facility in June 2000. The LAF, which allows the Reserve Bank to manage market liquidity on a daily basis and also transmit interest rate signals to the market, is now emerging as the principal operating instrument of monetary policy.

Besides honing up the indirect instruments of monetary policy *per se*, the Reserve Bank was also able to build on experience to design strategy sets to spearhead the effective conduct of monetary policy in the later half of the 1990s (RBI, 1999). The Reserve Bank is now able, for instance, to combat sudden switches in capital flows with a mix of policy actions such as foreign currency sales and hiking the cost of export finance on the supply side and tightening monetary conditions to pre-empt speculation and raising the cost of import finance on the demand side. This is reinforced by the strategy of

temporarily monetising the Government deficit through private placements/ devolvments in government auctions during times of tight liquidity and offloading such paper when liquidity conditions improved to insulate the cost of public debt from temporary vicissitudes of financial markets (Reddy, 2000).

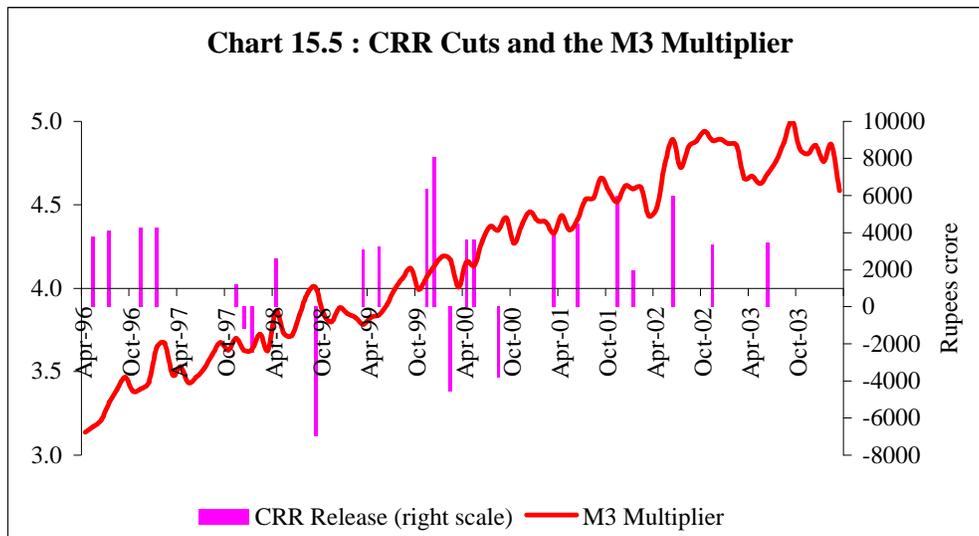
Challenges of Transition

The management of diverse channels of monetary policy transmission, seemingly theoretically impossible, has actually been reasonably easy in the Indian context thus far. This has been made possible because of two fortuitous factors. First, strong capital flows at a time of weak credit demand have enabled the Reserve Bank to trade the surplus on the external account with the Government deficit, easing interest rates without enlarging money supply. Second, reductions in interest rates have tended to respond to the easing of structural constraints such as cuts in reserve requirements and reductions in the opportunity cost of holding bank deposits, especially interest rates on small savings in the second half of the 1990s (Chart 4).



A related issue has been the stability of the M_3 multiplier, which is critical to the ability of the Reserve Bank to control money supply (RBI, 1985; Nachane and Ray (1991)). The question arises because the M_3 multiplier has

tended to drift upwards to 4.8 by end-March 2004 from 3.14 in the first half of the 1990s. It is necessary to appreciate that the currency deposit ratio has actually stabilised in the 1990s after trending down during the 1970s and 1980s with the spread of banking habits. The reserves to deposit ratio has actually gone down because of the cut in reserve requirements as a result of the shift from direct to indirect instruments of monetary control. At the same time, it is equally true that the interest sensitivity of bank reserves can be now higher with i) averaging requirement, allowing banks to allocate their portfolios across financial instruments and their balances with the Reserve Bank depending on the evolving liquidity situation and ii) a parallel development of money, foreign exchange and government securities market. It is, however, not clear if these transitory shifts matter much in the overall process of money supply generation. As a matter of fact, the M_3 multiplier remains reasonably stable if bank reserves are adjusted for CRR changes (Rangarajan and Singh, 1982; RBI, 1998).



The Fiscal Constraint

Monetary policy dilemmas also arise because of the standard conflicts between the monetary management and internal debt management functions of the Reserve Bank. The quest for central bank autonomy in this regard is not

new. As early as 1981, a RBI Working Group on Internal Debt Management had recommended the activation of a debt management policy independent of the monetary management function (Tarapore, 2002). This was buttressed by the Chakravarty Committee, which also proposed a cap on the monetisation of the fiscal deficit. Governor Rangarajan took up the case in his celebrated M. G. Kutty Memorial Lecture, when he observed:

“In the Indian context, perhaps the first step should be to move away from a system in which the deficits that are incurred by the central government automatically get financed by the Reserve Bank...Then the onus of responsibility for the conduct of monetary policy will be squarely on the shoulders of the Reserve Bank, where it should logically rest” (September 1993).

There is very little doubt that the fiscal constraint on monetary policy has eased in recent years. The ability of the fisc to monetise its gap by administrative *fiat* was curtailed by the abolition of *ad hocs* in April 1997 and is expected to be almost completely eradicated from April 2006, when the provisions of the Fiscal Responsibility and Budget Management Act would restrain the Reserve Bank from primary subscription to government paper. The case for functional autonomy which has been so eloquently urged by successive Reserve Bank Governors now appears within the bird’s eye view of fruition. In this context, the Union Finance Minister noted in his 2000 February Budget Speech,

“...In the fast changing world of modern finance it has become necessary to accord greater operational flexibility to the RBI for conduct of monetary policy and regulation of the financial system. Accordingly, I intend to bring to Parliament proposals for amending the relevant legislation...”

Administrative changes apart, the fiscal constraint on monetary policy has also considerably eased because the market demand for government paper has been substantial in view of a number of factors, *viz.*, i) strong capital flows and ii) reductions in reserve requirements, on the supply side and iii) weak credit demand, on the demand side as well as iv) the parallel broadening of the government securities markets and (vi) market determined G-sec yields. This

has enabled the Reserve Bank to tide over temporary pressures by monetising the fiscal deficit when liquidity conditions are tight and sell the government paper when the situation changes.

Fiscal dominance, however, continues to be the primary issue in the conduct of monetary policy. It is now clear that the Reserve Bank is able to control the timing and form of its accommodation of its support to the Government. The critical issue is that whether the central bank would be able to contain the volume of its support – primary and secondary combined - to the Government.

As a matter of fact, the conflict between the conduct of monetary policy and the management of public debt takes several interesting forms. The maturity of public debt, which was shortened in the early 1990s in order to make government paper more attractive, has been gradually elongated again in order to avoid bunching of repayments. This, in turn, implies that commercial banks, which hold a large proportion of government paper, are investing long, although their deposit liabilities are usually short, creating an inherent maturity mismatch in commercial bank balance sheets. As their demand for longer-term assets is already met by investments in government paper, the ability of commercial banks to fund infrastructure financing is thus limited. This, in turn, creates a long-term funding gap in the economy, at a time when development financial institutions, which traditionally provided project finance, are slowly converting themselves into banks.

The issue arises as the Reserve Bank has to increasingly respond as much to stabilisation of markets as to the medium-term objectives of monetary policy. It is for this reason that the Reserve Bank usually buttresses its monetary policy actions, at times of market volatility, by policy announcements, which stress the temporary character of such policy initiatives as a specific response to the episode rather than a fundamental shift in monetary policy. This emphasis on the temporary character of the monetary policy measures is all the more important because episodes of financial market

volatility require the central bank to tighten monetary conditions although the growth objective presages for a softer interest rate regime.

Efficacy of Instruments

A fourth set of issues centre around the relative effectiveness of the various policy instruments at the disposal of the Reserve Bank. First, there is the question of reserve requirements, best analysed in terms of two inter-related sets of issues: the optimal level of CRR balances, on the one hand and the appropriateness of CRR as a monetary policy instrument in a market determined economy, on the other. As a result of successive hikes in the 1980s and the first half of the 1990s to contain the monetary impact of deficit financing, reserve requirements amounted to as much as 15 per cent of banks' demand and time liabilities, which received an effective compensation of 3-4 per cent from the Reserve Bank. This effectively acted as an indirect tax on the banking system since banks had to either charge higher interest rates on other loans or absorb the shortfall in their balance sheet. Since central banks should ideally intervene in the markets by changing the liquidity position at the margin, the Reserve Bank is now committed to reducing the cash reserve ratio to the statutory minimum of 3.0 per cent of banks' demand and time liabilities in the medium term: the CRR today is already nominal at 5.0 per cent effective October, 2004.

The second and more controversial issue is the impact the cash reserve ratio has on a market-oriented economy. The principal objection to applying reserve requirements in such a market-determined financial system is that it tends to impound (or release) resources across-the-board without reference to the particular entities' liquidity position. Besides, increasing interest rates *per se*, there is thus a cost in terms of the resultant market distortions. Ironically, it is this very ability to defuse the costs of stabilisation to the financial system in general rather than the central bank balance sheet in particular, which impel central banks to sometimes take recourse to the cash reserve ratio, as will be discussed later. The cash reserve ratio, in fact, remains an effective even

though a blunt instrument of monetary policy. There are several instances when the Reserve Bank had to eventually raise reserve requirements to effectively tighten monetary conditions in the latter half of the 1990s.⁹ Open market (including repo) operations are now emerging as the primary operating instrument of monetary policy in the Indian economy. Besides outright transactions, the Reserve Bank has been able to inject (absorb) liquidity through repos (reverse repos) under the Liquidity Adjustment Facility on almost a day-to-day basis. This has enabled it to encase short-term interest rates (and by extension, gilt prices) within an informal corridor set by the repo and reverse repo rates during the past three years. The decision to operate the OMO window and the LAF should depend, technically speaking, on the distinction between “temporary” and “enduring” sources of liquidity. While this is conceptually easy to appreciate, such differences are often operationally difficult to delineate. Analytically, it is possible to distinguish partition the LAF experience of market stabilisation into six sets of roles (Jadhav, 2002):

- Stabilising regular liquidity cycles, by allowing banks to tune their liquidity requirements to the averaging requirements over the reporting fortnight and smoothening liquidity positions between beginning-of-the-month drawdown of salary accounts to fund household spending and end-of-the-month post-sales bulge in business current accounts.
- Stabilising seasonal fluctuations, by injecting liquidity during quarterly advance tax outflows or at end-March, when banks avoid lending on call which adds to their CRAR requirements and mopping up liquidity in April to counter the large ways and means advances drawn by the Government prior to the inception of its borrowing programme.
- Stabilising sudden liquidity shocks, by injecting liquidity on account of say, temporary mismatches arising out of timing differences between outflows on account of government auctions and inflows on account of redemptions.
- Stabilising markets in face of sudden capital outflows (as was done during June 2000) by injecting high-cost liquidity, through higher cost reverse repos, to meet the liquidity gap on the one hand and raise domestic interest rates, on the other, to ward off the possibility of speculative attacks on the foreign exchange market.

⁹ During the East-Asian crisis, for example, notwithstanding earlier measures such as increasing repo rates, the Reserve Bank had to raise cash reserve requirements on January 16, 1998. Similarly, during the episode of financial market volatility in 2000-01, the Reserve Bank had to eventually increase reserve requirements in July 2000 to stabilise monetary conditions.

- Stabilising markets in the face of sudden capital outflows and at the same time neutralising the impact of market volatility on the cost of public debt (as was done during July-August 2000) by funding the Government through private placements and mopping up the liquidity by aggressive repo operations at attractive rates,
- Stabilising markets in face of sustained capital flows, especially since November 2000, by mopping up bank liquidity through repos and at the same time, gradually reducing repo rates to enable a softening of the interest rate structure.

The scope of open market (including repo) operations in the Indian context remains defined by the provisions of the Reserve Bank of India Act, 1934. The Reserve Bank cannot pay interest on government balances or on bank balances, in excess of CRR stipulations, borrow clean beyond the paid-up capital of Rs.5 crore or issue paper in its name. This implies that the Reserve Bank must necessarily possess sufficient stock of government paper, either for outright OMO sales or for furnishing as collateral in case of repo operations, which are, after all, an act of borrowing from the market. Since the Reserve Bank cannot pay interest on bank balances, over and above CRR stipulations or borrow more than its paid-up capital, reverse repo (repo) operations, which are essentially collateralised borrowing (lending) to absorb (inject) market liquidity have to be camouflaged as two-leg sell-buy (sell-buy) outright transactions in underlying Government securities.¹⁰ There is thus, an asymmetry in the scope of repos (limited to the Reserve Bank's holding of Government securities) and reverse repos (limited, technically, only by the stock of non-monetised public debt). While there is very little doubt that these are sound principles of central banking, they create an artificial central bank demand for domestic assets in the present macro-economic context when its stock of government paper has been depleted by the substitution effect of strong capital flows and the scale effect of the sustained reduction in reserve requirements.

¹⁰ With effect from October 29, 2004, nomenclature of Repo and Reverse Repo has been interchanged as per international usage. Till October 28, 2004 Repo indicate absorption of liquidity by the Reserve Bank and Reverse Repo indicated injection of liquidity. The nomenclature in the text refers to the current usage of these terms.

Challenges of Liquidity Management

Another critical issue is the assessment of market liquidity for the conduct of monetary policy. There are several issues involved in the estimation of the market liquidity upon which the monetary authority must eventually base its action. First of all, given the regime of average reserve requirements with a stipulated minimum, the computation of excess reserves itself poses conceptual problems. Ideally speaking, excess reserves should be computed as the average excess balances maintained over the reporting fortnight. This, however, implies that information about excess reserves, or otherwise, would only be available only when the reporting fortnight is over, limiting its relevance to day-to-day liquidity management. An alternate procedure is to compute the excess (deficit) from the deviations from the average balance to be maintained. Although this provides a guidance to daily management, it is necessary to distinguish between genuine changes in liquidity and re-deployment of funds between competing uses such as bank balances with the Reserve Bank, its Liquidity Adjustment Facility and often, bids in primary government securities auctions. Secondly, the demand for settlement balances are equally hard to estimate because the process of market development makes inter-temporal comparisons very difficult.

Management of Capital Flows

The monetary management of capital flows was woven around a strategy of absorbing the foreign exchange in the Reserve Bank's balance sheet, in order to stabilise the foreign exchange market and then sterilising the monetary (and inflationary) impact by disposing off domestic assets. A recent Reserve Bank study estimates that the Reserve Bank sterilises about 60-80 per cent of the increase in the monetary component of the accretion to its net foreign assets (RBI, 2003 a, b). Besides, the offset coefficient - the response of net foreign assets to net domestic assets - has been estimated at (-) 0.3 suggesting sufficient scope for an independent monetary policy (Pattanaik, 1997). The repeated switches in capital flows during the latter half of the 1990s

ensured an inter-temporal balance between the domestic and external sources of monetisation, which has been frayed by the sustained inflows since November 2000. As a result, the Reserve Bank is beginning to run out of government securities to conduct open market operations, posing a challenge to the present strategy of sterilisation.

The challenge of sterilisation, in the Indian case, is not very acute, *per se*, because the large order of fiscal deficit allows the banking system to park the surplus liquidity emanating from capital flows in gilt-edged paper. The problems in this regard are really technical in nature because of the limited degree of manoeuvrability available to the Reserve Bank under the Reserve Bank of India Act, 1934. It is in this context that the Reserve Bank is now seeking a legislative amendment in order to waive the requirement that its clean borrowing be capped by its paid-up capital of Rs.5 crore, especially as the size of the Reserve Bank's balance sheet has expanded about 2000 times since 1935. This would allow the central bank to conduct uncollateralised repo operations, on the lines of a standing deposit facility. While it could be prudent to insist on collateral in reverse repo transactions in which the Reserve Bank is lending money, there is certainly a strong case for allowing the central bank to "borrow" money to mop up liquidity, with collateral. At the same time, it is necessary to ensure that the fundamental principles of central banking are not compromised - especially as *ad hoc* Treasury Bills began from a similar arrangement of administrative convenience.

As legislative amendments take time, a way out is to mop up the surplus liquidity through primary auctions, which in turn, allows the Government to run down its recourse from the central bank. At the same time, since the Government cannot receive interest on surplus balances with the Reserve Bank, it typically 'buys back' Government paper from the central bank for the period of surplus and saves the interest payment. This means if capital flows do not follow the seasonality of the Government expenditure and the Centre runs a surplus, the Reserve Bank needs to have sufficient stock of government paper to transfer to the Government. In view of the extenuating circumstances, the

Government has now decided to waive the 1997 arrangement of interest cancellation for paper issued under a special scheme, entitled the Market Stabilisation Scheme, which would be issued to mop up the Rupee liquidity emanating from capital flows as proposed by the Reserve Bank's Working Group on the Instruments of Sterilisation. The monies raised under this would be immobilised with the Reserve Bank, running down net Reserve Bank credit to the Centre and therefore, effectively sterilising capital flows.

IV. MONETARY POLICY TRANSMISSION

Monetary transmission mechanism (MTM) describes the means through which changes in monetary policy (*e.g.*, a change in central bank interest rates or in money supply) get transmitted into the domestic economic activity and domestic inflation. It is generally believed that monetary policy decisions affect market interest rates and liquidity conditions in domestic financial markets which in turn, get permeated to domestic real sector activity influencing aggregate demand and inflation. There is, however, no consensus on the exact nature of functioning of this mechanism, so much so that it is often referred to as “black box”. The plurality exists both in theory and measurement, *i.e.*, views differ not only about how money affects output and prices but also in respect of the manner in which to identify and measure a given change in output and prices as emanating from central bank policy actions.

One of the major sources of controversies on MTM is the idea that money is unable to influence output. After all, if money is totally neutral or a “veil” as was assumed in the writings of classical economists such as, Fisher or Pigou, all monetary policy can do is to influence the price level, with the output (and hence growth) being determined by real side of the economy (*i.e.*, labour market and production function). Keynesian revolution of the 1940s and 1950s changed all that, where monetary policy was assigned a strong stabilizing and activist role. The Monetarist counter-revolution resurrected the neutrality of money in the long term, which was further buttressed by the rational expectations revolution, which showed that when economic agents are rational, it is difficult to have real effect of monetary policy even in the short-run. Later developments like new Keynesians have established that as long as there is some form of rigidity in the labour or commodity market, even with rational agents money can be non-neutral. The basic question that we ask here is simply: *how does money affect output?* In seeking to answer this two more related questions are often raised: a) what are the roles financial prices (*e.g.*, interest rates, exchange rates, yields, asset prices, equity prices) and financial quantities (money supply, credit aggregates, supply of government bonds,

foreign denominated assets), and b) how do we measure the monetary-policy induced changes in output and inflation? A look into some of these questions is attempted here:

Monetary Transmission Channels : A Theoretical Perspective

One of the major contributions of John Maynard Keynes was to challenge the classical orthodoxy of neutrality of money. As it stands now, the major Keynesian innovation that makes money to be non-neutral is the lack of wage-price flexibility in general and downward rigidity of wages, in particular. With perfect information and wage-price flexibility, while there is no reason for money to be non-neutral, there does exist evidence which suggests a significant positive impact of money on output. Though, of late, there is a significant unanimity about the long-run neutrality of money, opinions differ about the reasons behind the short-term positive impact on output. Explanations quite naturally hinge on the theoretical possibility of non-tenability of postulates like complete information and absence of rigidities in the system. The standard Keynesian fix-price channel, as epitomized in the IS-LM model, sees an expansionary monetary policy in a two-asset world (comprising money and bond) as leading to a rise in the demand for bonds, and a fall in the short-term nominal rate of interest. Because of sticky prices, the fall in the short-term nominal interest rate gets translated into a reduction in the short-term real interest rate, ultimately boosting investment which, through the operation of the Keynesian multiplier channel, leads to an increase in effective demand and finally to expansion in output. The story gets slightly altered in a flex-price version, where a reduction in real interest rate takes place through an upward revision of expected price.

Four major MTMs have been identified in modern financial systems. The first is the direct interest rate effect, influencing not only the cost of credit but also the cash flows of debtors and creditors. Changes in interest rates alter the *marginal* cost of borrowing, leading to changes in investment and saving and thus in aggregate demand. Changes in *average* interest rates also have

cash- flow effects on borrowers and lenders. The second channel is through the impact of monetary policy on domestic asset prices – including bond, stock market and real estate prices. The third channel is the exchange rate channel. Credit availability is the fourth major channel. Let us now look into these channels in some detail.

(a) Interest Rate Channel

An important MTM is the interest rate channel. The interest rate channel is, however, of two variants – real and nominal. A contractionary monetary policy leads to a hike in nominal short-term interest rate, which given nominal rigidities (sticky nominal wages and prices) and the expectations model of the term structure, translates into higher real interest rates. The resultant increase in the price of currently purchased goods *vis-a-vis* goods to be purchased in the future reduces investment and consumption and contracts output. As wages/goods prices adjust over time, real GDP returns to the potential level and the real interest rate and the real exchange rate also return to their fundamental levels (Table 8).

The efficacy of the interest rate channel, however, stands reduced in case banks ration credit. Even though interest rates charged by banks do not change, the amount of lending by banks would nevertheless increase if the supply curve of funds shifts to the right; to that extent, even with unchanged interest rates, the economic activity will have a positive effect.

Table 8 : Interest Rate Channels

Channel	Causation Chains
1	2
Interest Rate Channel – Nominal Variant	Money \uparrow \rightarrow Interest rate \downarrow \rightarrow Investment \uparrow \rightarrow Aggregate Demand \uparrow
Interest Rate Channel – Real Variant	Money \uparrow \rightarrow Expected Price \uparrow \rightarrow Expected Inflation \uparrow \rightarrow Real Rate of Interest \downarrow \rightarrow Investment \uparrow \rightarrow Aggregate Demand \uparrow

On the other hand, the Monetarist view of transmission argues that interest rate is just one of the many relative prices in the transmission

mechanism. It is not just a single short-term interest rate but actual and anticipated prices on a variety of domestic and foreign assets that also undergo a change. Monetary impulses are, therefore, transmitted through relative price changes and changes in real money balances. The particular pattern of relative price changes varies from cycle to cycle and from country to country.

(b) Credit Channel

With the developments in microeconomic information-asymmetry based credit rationing [*e.g.*, Stiglitz and Weiss (1981)], there has been a revival of interest in the credit channel of monetary policy in the recent past. In fact, there have been a number of empirical and narrative studies highlighting the role of credit crunch in financial crisis and depression [Bernanke (1983)].

The basic thrust of the credit view is the idea that the liability side of the banks' balance sheet (*i.e.*, deposits) is important in understanding future economic activity, but a significant part of the asset side of the balance sheet also contains relevant valuable information, *i.e.*, commercial banks' decision to cut down loans, even with unchanged monetary policy and deposits, is capable of depressing economic activity.

The literature in this context distinguishes between two distinct but complementary approaches to credit channel of monetary policy. The first is the 'credit view' of monetary policy, whereby monetary policy influences the cost and/or availability to, and consequent spending of bank-dependent borrowers. The second approach, on the other hand, is a 'financial propagation / accelerator' mechanism, whereby monetary policy actions induce changes in the spread between the cost of internal and uncollateralized external funds through credit market frictions. The extent of the spread depends, *inter alia*, on borrowers' credit worthiness.

The credit channel can work in two ways, *viz.*, direct and indirect. In the direct channel of the credit view, reserves directly affect the loan supply and in turn, the loan rate. The indirect channel of the credit view, on the contrary, shares elements of the money view insofar as the effect of reserves on the market

interest rate is concerned; however, the similarity ends there. While in the money view the interest rate on open market securities directly affects the aggregate spending, in the indirect channel of the credit view market interest rate affects aggregate spending *via* loan rate. It should be noted that in the indirect channel of credit view there is no credit rationing, and the credit channel operates only through price. The reduced quantity of available bank credit due to open market sale may raise the loan rate relative to the open market lending rate. However, the gap in the rates may persist due to segmentation of the bond and loan markets (Table 9).

Table 9 : Monetary Transmission Channels: Credit View

Channel	Causation Chains
1	2
Bank Lending	Money \uparrow \rightarrow Deposits \uparrow \rightarrow Bank Loans \uparrow \rightarrow Investment \uparrow \rightarrow Aggregate Demand \uparrow
Balance Sheet	Money \uparrow \rightarrow P_s \uparrow \rightarrow Adverse Selection \downarrow \rightarrow Moral Hazard \downarrow \rightarrow Lending \uparrow \rightarrow Investment \uparrow \rightarrow Aggregate Demand \uparrow
Cash Flow	Money \uparrow \rightarrow Interest Rate \downarrow \rightarrow cash flow \uparrow \rightarrow Adverse Selection \downarrow \rightarrow Moral Hazard \downarrow \rightarrow Lending \uparrow \rightarrow Investment \uparrow \rightarrow Aggregate Demand \uparrow
Unanticipated Price Level	Money \uparrow \rightarrow unanticipated P \uparrow \rightarrow Adverse Selection \downarrow \rightarrow Moral Hazard \downarrow \rightarrow Lending \uparrow \rightarrow Investment \uparrow \rightarrow Aggregate Demand \uparrow
Liquidity Effects	Money \uparrow \rightarrow P_s \uparrow \rightarrow Value of financial assets \uparrow \rightarrow Likelihood of financial distress \downarrow \rightarrow consumer durable and housing expenditure \uparrow \rightarrow Aggregate Demand \uparrow

(c) Open Economy Channel

With the liberalisation of current and capital accounts, monetary policy would have different impacts on prices, interest rate and exchange rates than before. With some capital controls, the exchange rate channel of monetary transmission is expected to dampen the real interest rates in response to expansionary impulse. In turn, this should cause a downward adjustment in the nominal relative price of the domestic currency. Depreciation of the exchange

rate can be expected to improve trade and current account balance and kick up the real economic activity. Once capital controls are relaxed and the economy moves to capital account convertibility, the domestic interest rate would be largely set abroad through the uncovered interest parity.

It may be noted that while in most channels, monetary expansion influences aggregate demand *via* investment, this is by no means universal. Bank lending channel stresses the specialty of bank loans and looks at the asset side of the balance sheet of the banking sector. In the exchange rate channel, on the other hand, a fall in domestic interest rate makes domestic deposits relatively less attractive *vis-a-vis* foreign deposits, thereby leading to a depreciation of domestic currency, which finally boosts exports in net terms. But, the relationship may actually turn out to be less straightforward. Two absorption-reducing effects may counter the positive impact of currency depreciation on the real activity. First, if the country is a net debtor, exchange rate depreciation, by raising the general price level, will reduce the real wealth of domestic agents. Second, exchange rate depreciation by turning the terms of trade against the domestic country would reduce real income corresponding to a given level of output (Table 10).

Table 10 : MTM in an Open Economy

Channel	Causation Chains
1	2
International Trade Channel	Money \uparrow \rightarrow Interest rate \downarrow \rightarrow Exchange rate \uparrow (depreciates) \rightarrow Exports \uparrow \rightarrow Net Exports \uparrow \rightarrow Aggregate Demand \uparrow

Other Channels

Changes in the money supply could also affect stock prices. Tobin's q theory develops a link between money and output *via* changes in stock prices. Tobin's q is the ratio of a firm's market value to the cost of new capital. If q is high, a firm will issue stock to buy new capital, and investment will rise. If q is low, a firm will buy up older capital of existing firms and investment will fall. An increase in the money supply will increase spending, including spending on

stock. Higher demand for stock increases stock prices and q . A higher q increases investment and output. Similarly, when an expansionary monetary policy leads to an increase in price of equity, there is increase in wealth of agents that may increase effective demand *via* an increase in consumption (Table 11).

Table 11 : Other Channels of MTM

Channel	Causation Chains
1	2
Wealth Effect Channel	Money \uparrow \rightarrow $P_e \uparrow$ \rightarrow Wealth \uparrow \rightarrow Consumption \uparrow \rightarrow Aggregate Demand \uparrow
Tobin's q Channel	Money \uparrow \rightarrow $P_e \uparrow$ \rightarrow Tobin's $q \uparrow$ \rightarrow Investment \uparrow \rightarrow Aggregate Demand \uparrow

Measurement and Identification of MTM

How do we measure MTM? How do we identify that a given monetary policy action (say, x per cent cut in the central bank policy rate) had actually led to y per cent rise in GDP?

The recent works on the identification of monetary policy shocks and transmission mechanism has followed two distinct paths, *viz.*, narrative evidence and quantitative evidence. While the “narrative evidence” follows earlier works of Friedman and Schwartz (1974), recent work of Romer and Romer (2003) have resurrected this approach. But the most influential work on measuring MTM is what may broadly be called vector autoregression (VAR) models of monetary transmission.

The whole empirical MTM literature has followed some form of VAR model – structural or reduced form. Recent empirical research has confirmed the early findings of Friedman and Schwartz (1963) that real effects of the monetary shocks are not only substantial but also long-lived (though not permanent) with the effects remaining up to three years (Romer and Romer, 1989). The recent vector auto regression (VAR) literature confirms these results.

MTM in Emerging Market Economies (EMEs)

The theories and empirics delved so far have typically emerged in the context of advanced economies. A crucial issue is how far are these valid in an emerging market economy? Is there any reason to expect that a particular MTM is more likely to be valid in an emerging market economy? As far as MTM is concerned, one needs to appreciate various structural rigidities and presence of incomplete markets in EMEs. It is important to recognize that the monetary policy transmission channels in EMEs have also been affected by the process of financial liberalisation. The withdrawal of state controls facilitated the emergence of an interest rate channel, although the credit channel remains important, especially in the context of occasional financial fragility. At the same time, the opening up of the economy together with the withdrawal of balance sheet restrictions enhanced the role of asset prices, in particular the exchange rate, in the monetary transmission process. Further, even in developed markets, credit changes operating in addition to interest rate changes have been identified as important factors influencing economic activity.

Two aspects are particularly important in evaluating how fast monetary policy gets transmitted to the real economy. The first is the transmission from the instruments directly under the central bank's controls – *e.g.*, short-term interest rates or reserve requirements – to those variables that most directly affect conditions in the non-financial sector – loan rates, deposit rates, asset prices and the exchange rate. This linkage is determined primarily by the structure of the financial system.

There is yet another aspect that is important in this connection, *viz.*, the link between financial conditions and the spending decisions of households and firms. Various factors play crucial role in this context, *viz.*, a) the initial financial position of economic agents, b) the extent of leveraging, c) the composition and currency denomination of assets and liabilities, and d) the degree of dependence upon external financing sources (especially to bank financing). Both these aspects of the monetary transmission channel are likely

to have been affected by the process of financial liberalisation in many countries in the past decade.

The reduced role of the government in the financial system – whether in the form of privatization of banking system or credit control stipulations - has lessened the importance of the credit channel of MTM compared with the interest rate channel (and related effects). But the increased fragility of the financial sector in the wake of financial liberalisation could have accentuated other aspects of the credit availability channel – particularly perhaps in the aftermath of crises. At the same time, the opening and deepening of financial systems in EMEs has caused both the assets and the liabilities sides of the private non-financial sector's balance sheet to become more diversified, thereby enhancing the role of asset prices, in particular the exchange rate, in the monetary transmission process.

It is clear from the preceding analysis that central banks in EMEs have to formulate and conduct monetary policies in a milieu of multiple objectives, shifting intermediate (or final) targets, and operative procedure raddled with uncertainties when the channels of monetary transmission remain a "black box". Evidently then, no 'one-size fits all' approach can be adopted even within the group of EMEs.

Monetary Transmission Mechanism in India

A comparison of monetary impulses transmitted through interest rate effects and through liquidity effects for the period 1961-2000 indicates that the interest rate channel has emerged as a significant factor for explaining the variation in real activity in India in the 1990s in contrast to its negligible impact in the 1980s. The liquidity effect, although significant, diminished in terms of magnitude.

It is conceivable that increased play of market forces in the determination of interest rate and exchange rate may have changed the monetary transmission process. In other words, while interest rate channel may have been weak in a regulated regime, in a liberalized environment there is

likelihood that interest rate channel may work. To this end, Ray, Sagggar and Joshi (1998) provided an empirical assessment of the relationship between broad money aggregate (M_3) and the short and medium-term interest rates during the post-liberalisation period. They find that interest rates and exchange rates matter in the conduct of monetary policy in India during 1992-1997. Dhal (2000) provided evidence that the interest rate channel became a significant explanatory factor of variation in economic activity in the 1990s. Al-Mashat (2003) applied a Vector Error Correction model and finds greater role of both interest rates and exchange rates in the post liberalisation phase .

Credit Channel

In India, as in many other EMEs, credit markets were typically segmented till the 1980s with interest rate controls and directed lending stipulations. While interest rate may have emerged as a channel of monetary transmission only in the recent period, credit channel may be expected to be operative in the Indian context much forcefully for a number of reasons. First, Indian economy had and continues to have various stipulation concerning credit to priority sector. Secondly, because of less developed Commercial Paper (CP) market, Indian firms in general, and small and medium industries in particular, are likely to be more dependent on banks for their sources of finance. Interestingly, the recent experience of Indian corporates shows that the medium and large firms in India depend less on banks than before. Thus, the question is: how far is the credit channel valid in India?

A recent RBI Report (*Report on Currency & Finance*, 2002) looked into the details of transmission mechanism in India in the recent years (April 1994 to December 2002) *vis-à-vis* the 1980s (April 1981 to June 1990). For this purpose, a VAR model was constructed with five variables: Index of Industrial Production (IIP), Wholesale Price Index (WPI), Non-Food Credit (NFC), Broad Money (M_3) and Call Money Rate (CALL).

In order to assess the changes in the transmission that could have occurred in the aftermath of the structural reforms initiated in the economy

during the 1990s, the VAR was estimated for the pre-reform (1981:04 to 1990:06) and the post-reform (1994:04 to 2002:12) periods separately. The results of the empirical exercise in terms of impulse responses for both the periods were generally on the expected lines.

- A monetary expansion was seen to have led to higher output.
- A positive shock to the call money rate (*i.e.*, increase) produced the reverse effect. The effect was, however, more pronounced and sharp during the first period as compared with the post-1994 period. In recent years, shocks to the call money rate take almost one year to have the expected negative effect on output, reflecting the monetary policy lags.
- A positive shock to non-food credit (*i.e.*, expansion) had the expected positive effect on output and the response during the post-1994 period was quicker.

This study indicated the role of a narrow credit channel in the Indian context and hence supports the continuing policy stress on the provision of adequate liquidity to meet genuine credit requirements to support investment demand.

As regards prices, a positive broad money shock resulted in higher prices in the post-1994 period. However, in the pre-reform period, the outcome was counter-intuitive *i.e.*, a fall in prices and, at no horizon did the effect become positive, perhaps reflecting the greater degree of administered pricing in the 1980s. Monetary policy tightening through a positive shock to the interest rate had the expected stabilising influence on prices in both the periods. The shocks to non-food credit had a positive impact on the prices, with the effect being weaker in the post-1994 period, supporting the policy rationale of meeting credit requirements with continuous vigil on prices.

Asset Prices Channel

The impact of the stock market on commodity prices and real activity has not attracted much attention in the Indian context. There have been some attempts, nevertheless. Mukherjee (1988), using annual data for the period 1949 to 1981, found that while consumption Granger causes stock prices, in the case of investment the causality is from stock prices to investment. The study found that stock prices Granger caused GDP during this period. For a shorter period using monthly data from 1970 to 1981, however, the study found

unidirectional causality from the index of industrial production (IIP) to stock prices. Recently, Pethe and Karnik (2000) examined the relationship between stock prices and IIP. Using monthly data over the period April 1992 to December 1997, they found no evidence of cointegration between stock prices and IIP on the basis of the Engle-Granger two-step procedure.

Ray and Chatterjee (2001) constructed a five variable VAR model with interest rate, M_3 growth, output gap, stock price inflation, and commodity price inflation. They found that stock price inflation Granger caused commodity price inflation. However, when it comes to the output gap, apart from its own past values, all the variables failed to Granger cause an output gap. There could be two possible explanations for this. First, this may be indicative of the lack of output effect on the part of stock price inflation and, from that standpoint, would be in line with earlier evidence such as Mukherjee (1988) and Pethe and Karnik (2000). Alternatively, this could be due to the failure of the output gap to emerge as an important determinant of inflation in India. Thus, despite the failure of stock price inflation to influence the output gap, it was found to have an effect on inflation. In other words, stock price inflation may turn out to be a leading indicator of inflation.

V. CONCLUDING REMARKS

The paper discusses the monetary dynamics and the process of monetary transmission in Emerging Market Economies. While capturing the monetary transmission process within elegant models continues to be elusive, the evolution of monetary transmission mechanisms and the various innovations in the operating procedures of monetary policy has made the analysis of monetary policy an exciting area of policy research. Discussing the objectives, intermediate targets and operating procedures of Monetary Policy in Emerging Market Economies (EMEs) with special focus on India, the paper examines various channels of monetary transmission in EMEs. Drawing attention to the Indian experience with monetary policy, particularly since the 1990s, the paper observes that in the EMEs, monetary policy has shown considerable flexibility in the pursuit of multiple objectives of price stability, credit expansion and financial stability. The paper observes that a large number of operational constraints have prevented the adoption of price stability as the sole objective of monetary policy. At the same time, greater capital inflows due to financial liberalisation in several EMEs including India led to the rise to prominence of interest rates and exchange rates in the formulation and conduct of monetary policy. The management of market liquidity came to the forefront of monetary policymaking, with indirect instruments of monetary policy, mainly, open market operations, emerging as the primary instrument of monetary policy. Discussing the role of monetary policy in the context of liberalisation of the EMEs, the paper discusses the positive impact of financial liberalisation and financial sector reforms on the conduct of monetary policy and underscores the need for development of deep, liquid and integrated financial markets to ensure price discovery and to improve the efficacy of monetary transmission channels.

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