Monetary Policy Approaches in India

Kaushik Bhattacharya*

University of Bonn

October 2005

1 Introduction

Monetary policy approaches in a country have come to sharper scrutiny in recent times. A major reason behind this interest is the emergence of transitional economies in East Europe that needed an altogether new policy framework during the 1990s. By a curious coincidence, the economies in West Europe were no exception. Emergence of supra-national bodies like the European Central Bank (ECB) heightened the neeed for an appropriate monetary policy framework in West Europe. At the same time, a few major financial crises that shook large parts of Asia, North America and Latin America during the 1990s raised questions on the roles of the respective central banks and on the frameworks under which they operated. The debate on the efficacy of different monetary policy approaches heightened with the increasing success of inflation targeting (IT) in many developed and emerging market economies. As a consequence, major attention was devoted on studying institutional architectures, transparencies, communication strategies and public accountabilities of different central banks during the 1990s.

Partly due to increased focus on this area and partly due to increased interaction among countries that the force of globalisation ensued, the period since the 1990s witnessed some convergence in the conduct of monetary policy worldwide.[1] By the end of the 1990s, most central banks have strengthened the market-orientation of their policy implementation, cut reserve requirements, widened the range of available instruments, increased the flexibility of liquidity management, sharpened the focus on interest rates as operating targets, improved the transparency of policy signals and shortened the maturity of interest rates serving as the fulcrum of policy (Borio, 1997). The convergence was also conspicuous in the tools that monetary authorities employed to assess macroeconomic developments (Swank and van Velden, 1997). With the advent of IT, the institutional architectures under which monetary policies were carried out also tended to converge substantially across countries. The convergence was not only observed among developed countries, but also among the ones in transition (Van't dack, 1999). The increasing similarities led some economists to synthesise a few common guiding principles for monetary authorities that can be applied almost universally to any country at any point of time (Mishkin, 2000).

Despite the attempts of synthesis, the policy frameworks and the implementation procedures in individual countries and the experiences they had in mitigating challenges

* Views expressed in this paper are strictly personal and may not to be that of the institution the author belongs to.

[1] The process of convergence was, in fact, evident earlier since the mid 1980-s and could be traced even to the 1970s (Borio, 1997)

still vary in detail (Borio, 1997). Cross-country comparisons of experiences with different monetary policy approaches point out that whether a particular strategy will be successful or not in a country depend on its political, cultural and economic institutions and also on its past history (Mishkin, 1999). To understand the precise role of monetary policy framework, in-depth country-specific studies are still essential. Some of the country-specific studies for developed countries have helped to understand specific aspects of monetary policy framework in general. For example, studies like Clarida and Gertler (1996), Bernanke and Mihov (1997) and Hagen (1999) for Germany are valuable sources to learn the pros and cons of monetary targeting (MT), or that like Clinton (1997) for Canada to understand the challenges before a central bank in an environment of zero reserve requirement. Country papers in Bank for International Settlements (1997) also contain wealth of information on many other countries. So far as the emerging market economies are concerned, the papers in Bank for International Settlements (1998, 1999, 2005) summarize different aspects of their experiences.

Among country specific studies on monetary policy framework, a study on India would be important. This is not only because of the large size of its population or economy or because of its heterogeneity that can easily be compared to that of an entire continent like Europe, but because a few specific features make India a unique case study among countries. Although India consistently maintained democratic form of governance, prior to the 1990s its economic framework was largely similar to that of a command and control economy.[2] During the past twenty years or so, the Indian economy has oriented itself towards market forces, with a healthy rate of GDP growth and a modest rate of inflation. This change had been gradual and except the balance of payments crisis during 1990-91, has come with minor hiccups. Given that this period is characterized by frequent financial crises in large parts of the world, the Indian experience and the role played by the monetary framework in it can be a valuable lesson in preventing financial crises and also in pacing and sequencing economic reforms in similar situations.

The story of economic reforms in India has been discussed in detail by several researchers from different perspectives (Joshi and Little, 1996; Ahluwalia, 2002; Pangariya, 2004; Rodrik and Subramanian, 2004). Specific aspects like reforms in monetary and financial sectors in India and the role played by the Reserve Bank of India (RBI) in this endeavour have also been reviewed in some of these studies. A few reviews like Reddy (1999) were specifically devoted to the financial sector reforms and listed the changes in detail. A few studies have also documented the evolution of monetary policy framework in India in detail and taken a view on the applicability of specific frameworks in the Indian context (Mohanty and Mitra, 1999; Kannan, 1999; McKibbin and Singh, 2000; Jadhav, 2003). Off late, some studies – mostly by current and ex central bankers – have begun to take a futuristic look, critically assessing the changes and raising the issues of concern (Rangarajan, 2001; Mohan, 2005a, 2005c). Aspects of past and future of monetary policy in India and the framework under which it operates can also be gleaned from the speeches of the RBI management, sometimes on a general note (Reddy, 2001a, 2001b, 2002, 2005a, 2005b) and sometimes on more specialised areas like central bank independence (Reddy, 2001c) or communication strategies (Reddy, 2001d; Mohan, 2005b). Reports of different advisory groups appointed by the RBI also summarize the changes in specialized areas like transparency in monetary and financial policies (RBI, 2000), or data dissemination (RBI, 2001a). These reports often review country experiences and are valuable sources to analyse India's relative strengths and weaknesses among countries.

[2] Mohan (2005a) considered the state of financial sector in India during this period as a "classic example of 'financial repression' a la Mackinon (sic!) and Shaw" (p. 1106).

With such plethora of information, the purpose of this paper is neither to repeat the story of Indian financial sector reforms, nor to tell the story of the evolution of its monetary policy framework. Although aspects of these will inevitably crop up in what follows, they are discussed from a specific perspective. To motivate the readers, it is observed that almost all the studies on India cited above were done from the Indian perspective and suggested what they considered as appropriate policies for India. The cross-country analyses some of these studies attempted were also tuned to this perspective, the major focus being what India can learn from the experiences of other countries. While extremely useful in the Indian context, to an international audience the findings in these studies may not be interesting enough. India was certainly not the first country to traverse along the path of reforms. In fact, it was a latecomer. Discussed from the international perspective, most of what we know from these studies are, therefore, either mere confirmations of economic theories that are already firmly established, or repetitions of the experiences of other countries.

The major purpose of this paper is motivated from the above observation. It attempts to focus on a relatively unexplored area, its purpose being to find out what new lessons can the evolution of the monetary policy framework in India offer either to the grey areas of economic theory, or to other countries in similar situations. It may be noted that in some of the benchmark papers on cross-country experiences on monetary policy framework, the Indian experience has either not been reviewed at all or, if done, were not done with sufficient detail.[3] So far as the first purpose of the paper is concerned, the Indian evidence, therefore, has the potential to either strengthen or weaken certain theories. So far as the second purpose is concerned, both the successes and the failures of Indian policymakers might lead to some general practical lessons that have not yet been articulated in sufficient detail.

So far as the grey areas of economic theory is concerned, the Indian experience could be of help on two problems. The first relate to the choice of a monetary policy strategy by a central bank. In the theoretical literature, choice for a monetary policy strategy is often seen as a part of an optimal control problem (Poole, 1970). The optimal strategy in this problem depends on issues like the stability of demand for money and the relative variances of shocks to the real and the financial sector. Empirical observations, however, do not match with this theory. Central banks that swear to different monetary policy strategies have been found to use similar instruments and to react to shocks in similar manner. The puzzle could be resolved either by admitting the possibility that central banks do not practice what they preach, or by incorporating "closed-loop" strategies in place of "open-loop" ones.[4] These explanations, however, do not provide the answer to the question why central banks do make efforts to identify their monetary policy strategy in the first place. Citing the example of Germany, Hagen (1999) suggested the possibility that monetary strategies are helpful in solving internal and external coordination problems for the central bank. A major purpose of this paper is to examine whether the Indian experience is consistent with this theory.

[3] For example, in the benchmark paper of Mishkin (1999), there is no mention of the Indian experience.

[4] An open loop monetary policy strategy is one that fixes an intermediate target during a given period with no regard to incoming information during that period. A closed loop strategy, in contrast, continuously revises the intermediate target (which may be explicit or implicit) based on incoming information to achieve better control over the ultimate targets of monetary policy. Admitting closed-loop strategies imply that central bank behaviour is similar under different strategies and that the performance of monetary strategies in terms of the target variables of monetary policy becomes very similar, provided that the ultimate goals of monetary policy are the same.

What makes India an especially attractive case to examine the generality of the theory is the fact that the monetary policy framework in India have changed twice since the 1980s. From both theoretical and cross-country perspective, the changes occurred at interesting points. The first change of policy framework to "monetary targeting with feedback" (1984-85) occurred when MT had already been discarded or being discarded in most of the industrial countries. The second change to multiple indicator approach (MIA) (1998-99) occurred at the height of Asian financial crisis. Internationally, this was also a point when IT as a framework had demonstrated success to its credit in a number of countries and had started to gain increasing popularity worldwide.

In both cases, the change in monetary policy framework in India took place without substantial changes in the RBI Act, so that apparently the objectives of monetary policy in India remained same. However, despite no change in the stated objectives, the operating frameworks of the central bank in India experienced tremendous changes. The operating environments at those two time points of change in policy frameworks were, therefore, sharply different. The first change occurred during the heydays of command and control era, with a host of administered interest rates and commodity prices and a fixed exchange rate. The RBI lacked tools other than direct credit control and cash reserve ratio (CRR) at that time. The second change, however, took place when the so called first generation reform in India was either complete or in the verge of completion. Successful implementation of market-friendly reforms armed the RBI with a host of standard indirect tools. Interestingly, in each case, the change occurred at points where it is possible to argue that there was no immediate urgency to act. RBI's motivation for the change in both cases, therefore, could throw interesting insights on central bank's strategic preferences in diverse conditions.

The second grey area in literature where the Indian experience could be of additional help is to understand to what extent monetary policy framework helps in improving economic performance. Both country-specific and cross-country experiences do not provide clear answers to this problem (Mishkin, 1999). Country specific studies indicate that changes to IT have sometimes been followed by dramatic reduction in inflation (e.g., in New Zealand, the United Kingdom, Chile and Israel). However, due to post hoc fallacy, to what extent the change in monetary framework is responsible for this reduction is not easy to determine. For example, in case of New Zealand, there is evidence that inflation was already falling sharply before the final change to IT occurred (Brash, 1999). The admission of "closed-loop" strategies and the possibility that central banks do not act the way they preach are other impediments in obtaining a precise answer to this problem. General conclusion appears to be that both transparency and accountability are crucial to constraining discretionary monetary policy so that it produces the desired long-run outcome (Mishkin, 1999). As the details of transparency and accountability are often difficult to quantify, this is a serious impediment in obtaining definitive results.

The Indian experience might throw some interesting insights on the role of monetary framework as well. Rather than a dramatic cut-off, the fall in inflation in India had been gradual. Among emerging market countries, its performance in containing inflation – especially after the adoption of MIA, looks impressive. As India is not a formally declared inflation targeting economy, this observation assumes additional importance. A juxtaposition of the Indian versions of transparency and accountability to other economies with diverse monetary policy frameworks may perhaps extract what aspects of them are essential for better economic performance.

The paper attempts to attack this problem in three alternative ways. First, in the specific

context of India, it examines the performance of the Indian economy under different monetary policy frameworks. Second, it also compares the performance of Indian policymakers to select other economies. It may be noted that by “performance”, the focus is not on measurable economic performances like inflation and growth; rather some other intangible aspects like transparency, accountability and credibility are considered. Third, it attempts to assess to what extent the role monetary policy in India played in ushering the observed changes. Admittedly, any firm conclusion here is difficult. Addressing this problem with a full scale econometric model that isolates shocks from different sources is beyond the scope of this paper. Our approach here is more to rely on common sense, and whenever available, to piece together the scattered evidences from earlier studies. As a bi-product, the discussions in this part also expose a few limitations within which monetary policy was (and to a large extent, is) carried out in India. The discussions, with this perpective, also helps us to offer a few suggestions to the RBI.

So far as the practical angle is concerned, a major motivation of this paper is to examine to what extent the Indian experience is relevant for other central banks in similar situations. While the Indian experience, with all its successes and failures, appears to be consistent with the “seven commandments” of Mishkin (2000) to central banks, a part of this experience – especially that in pacing and sequencing of reforms in the financial sectors – is unique. A major purpose of this paper is, therefore, to examine whether these “commandments” need to be extended or modified, especially when central banks face rapidly changing situations. While the historical experience of a single country like India may not be strong enough to lead us to form general guiding principles a la Mishkin (2000), the evidences may at least be strong enough to be considered as hypotheses.

The paper is organized as follows: Section 2 provides a brief review of the evolution of the monetary policy framework in India. Our special emphasis in this review is on the possible motivations that led Indian policymakers to change the framework twice since the 1980s. Section 3 examines to what extent the Indian experience can extend our knowledge of the role of monetary policy framework on economic performance. Section 2 and 3, taken together, also form the basis for the subsequent discussion in Section 4, which evaluates the practical relevance of the Indian experience for other economies. Finally, Section 5 concludes the paper. Appendix A, as a bi-product of this paper, offers a few suggestions for the RBI. While many of these suggestions are purely subjective and are nothing more than personal opinion, it is stressed that at least a debate on them is necessary to improve the foundations of the Indian monetary policy framework.

2 Evolution of the Monetary Policy Framework in India

The first and the most important part of the monetary policy framework in a country is the mandated task to the monetary authorities. In a democracy, this task is typically specified in the central bank act. It is interesting to note that despite overwhelming changes in the financial sector in India, the mandate to the monetary authorities in India mentioned in the Reserve Bank of India Act, 1934, has remained unchanged.

Subsection 2.1 discusses specific aspects of this act. In particular, it examines the different interpretations of the mandated tasks and their implications for central bank independence and transparency of monetary policy in India. Subsection 2.2 briefly reviews the evolution of the framework around this act. In this part, our special emphasis is to understand the motivations that led the RBI to change its monetary policy strategy twice

since the 1980s. Subsection 2.3 then compares different aspects of the current framework to those of a few benchmark central banks like the Federal Reserve (Fed) or the ECB.

2.1 The RBI Act 1934: Different Interpretations and Implications for Central Bank Independence and Transparency

The preliminaries of the Reserve Bank of India Act, 1934 sets the mandated tasks as

> "...to regulate the issue of Bank Notes and keeping of reserves 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 mandated tasks to the RBI can, however, be interpreted in several ways. In particular the words "monetary stability" may mean both internal and external stability. If it is interpreted in the narrow sense of internal stability, then price stability becomes a major objective. If, in contrast, the interpretation also includes external stability, financial stability as a whole (including price stability) becomes the mandated task. The phrase "to its advantage" in the expression "…generally to operate the currency and credit system of the country to its advantage" suggests that RBI should not only operate these systems, but also should constantly explore possibilities of further improvements in both these systems.

The multiple ways the mandated task is interpreted in India might sometimes be confusing. For example, the RBI website interprets the objective of RBI as monetary authority as: "maintaining price stability and ensuring adequate flow of credit to productive sectors" (http://www.rbi.org.in/scripts/AboutusDisplay.aspx#EP1). This interpretation of the mandated objective to the RBI has a long history. Alternatively, Rangarajan, one of the main architects of economic reforms in India, interprets the objectives as:

> "(1) to maintain a reasonable degree of price stability and (2) to help accelerate the rate of economic growth." (Rangarajan, 2001)

It may be noted that though the interpretations of the RBI and Rangarajan (2001) are not mutually incompatible and are, in fact, largely similar, they are not same. It is expected that credit growth in an economy would be positively associated with GDP growth at any point of time, but the strength of association between GDP growth and credit growth may vary over time, depending upon the efficiency of the banking system as well as corporate behaviour in raising finances for projects. Gauging the "adequate" level of credit is, therefore, not an easy task. In Section 3, this aspect will be elaborated further.

The additional emphasis on credit growth gives Indian monetary policy objectives a distinct feature that is not typically discussed in standard textbooks.[5] It may be argued that so far as economic growth is concerned, RBI's official interpretation in its website is only a means to facilitate growth and not an end in itself.[6] During the 1980s, monetary policy in India was geared towards controlling the quantum, cost and direction of credit flow. It is interesting to note that to this date this interpretation is repeated in the writings of the top

[5] For example, Mishkin (2001, Sixth Edition, pp.454–457) lists six goals of monetary policy (e.g., high employment, economic growth, price stability, interest rate stability and stability of financial markets. And stability in foreign exchange markets) in which 'provision of adequate credit' is conspicuous by its absence.

[6] It may be noted that if the overall objective is economic development, growth is also often believed to be a means and not an end in itself.

managements of RBI. In most cases, however, the objective is stated with an additional "for sustaining overall economic growth" (Reddy, 2005b) or simply "to support growth" (Mohan, 2005a, p. 1119) in the end.

Alternatively, the interpretation of monetary policy objectives by Rangarajan (2001) may be perceived as too ambitious. Acceleration of GDP growth, if it is meant as a positive rate of change of GDP growth over time, can occur only upto a limited period of time. Thus, for example, if the Indian GDP grows by 5 per cent in a year, there could be temptations to accuse RBI of not "helping" to push the growth rate to 6 or 7 per cent in subsequent years. As we shall see, this is not an empty argument of semantics; such accusations, in the Indian context have, in fact, been raised (Balakrishnan, 2005).

In a broad sense, the additional monetary policy objective (besides price stability) in India is "to support growth". For example, while discussing the monetary policy objectives in India, Reddy (2005b) articulates about the "relative emphasis between price stability and growth". Thus, if one interprets the second objective of the RBI as "to facilitate GDP growth", the two interpretations of the RBI and Rangarajan (2001) become largely consistent.

It is also to be noted that the relative emphasis between price stability and growth (alternatively, provision of adequate credit to the productive sectors) is, once again, subject to interpretation. It is, however, interpreted that the objective would depend on underlying macroeconomic conditions. Monetary policy in India, therefore, strives for a "judicious balance between price stability and growth" (Reddy, 2005b). Reddy (2005b), however, observes that due to the democratic process of governance in India, the "judicious balance" is heavily tilted towards price stability which, in some ways, amounts to an "informal mandate" to the central bank for maintaining an "acceptable" level of inflation.

An interesting question here is: who sets these objectives? To answer this, a little digression on the relative powers of the Reserve Bank of India and the Central Government is necessary.

In a democratic framework, the power to set the target typically rests with the elected representatives. In monetary policy frameworks like IT, this target is revealed to the public in the form of a transparent contract between the Government and the Central Bank. In the Indian case, there is no such explicit contract. Rather, Section 7 of RBI Act, 1934 stipulates that the Central Government may from time to time give such directions to the Bank as it may, after consultation with the Governor of the Bank, consider necessary in the public interest. The RBI Act does not stipulate that such directions should be in the public domain or should need the approval of Parliament (or at least, be put before Parliament).

Subject to any such directions, clause (2) of Section 7 of the same Act stipulates that the general superintendence and direction of the affairs and business of the Bank shall be entrusted to a Central Board of directors which may exercise all powers and do all acts and things which may be exercised or done by the Bank. The Central Government also enjoys wide power to nominate the directors in the Central and the Local Boards. The duration of office of Governors and Deputy Governors are for such terms not exceeding five years as the Central Government may fix while appointing them.[7] They are, however, eligible for reappointments. Their salaries and perquisites are approved by the Central

[7] It may be noted that the Parliamentary elections in India are held every five years.

Board (subject to the approval of the Central Government). Further, Section 30 of the RBI Act stipulates that if the Bank fails to carry out any of the obligations imposed on it or under the RBI Act, the Central Government may, by notification in the Gazette of India, declare the Central Board to be superseded and may entrust the general superintendence and directions of affairs at the Bank to any agency of its choice. When action is taken under this section of the act, the Central Government must, however, cause a full report of the circumstances leading to such action and of the action taken to be laid before Parliament at the earliest possible opportunity and in any case within three months from the issue of the notification superseding the Board.

So far as the autonomy of the central bank is concerned, the RBI had been ranked marginally below the median level among a list of seventy countries (Cukierman, 1992). It may be noted that this performance was based on the policy framework during the 1980s and Cukierman's list included 21 industrial countries as well. The institutional arrangement, therefore, represented a reasonable degree of statutory autonomy in case of India – at least within the group of developing countries whose overall policy framework yielded little operational independence to their respective central banks at that time. Further, in case of India, the measurements seemed to reflect the 1948 nationalisation of the RBI. The RBI Act, however, did not change much during the interim period.

It may be noted that the Advisory Group on Transparency in Monetary and Financial Policies (2000) appointed by the RBI, sharply criticized the institutional arrangements on the process of monetary policy formulation in the RBI Act. It went so far as to term the act as "anachronistic" (Para 3.7) and urged the government for an early move to amend the necessary sections that do not provide for a systematic and transparent setting of objectives of monetary policy. The Group, however, observed that the act provided adequate powers to the RBI to use various instruments of monetary policy. Further aspects of the Report of the Group will be covered in Subsection 2.3, when the transparency relating to the institutional arrangements will be discussed with an international perspective.

2.2 Evolution of the Monetary Policy Framework

Though the mandated task to the RBI may be interpreted in several ways, it is important to remember that since the early 1980s, Indian economy experienced modest rate of inflation and a healthy rate of GDP growth. Thus, if one focuses solely on the mandated objectives (even with different interpretations), the need for changes in the monetary policy framework in India will not be clear. To understand the evolution of monetary policy framework in India, a discussion on the problems that India experienced would be useful.

For expository purpose, we divide the period between 1970-71 to 2004-05 into four phases: (i) 1970-71 to 1984-85 (Pre-MT), (ii) 1985-86 to 1992-93 (MT: Phase 1), (iii) 1993-94 to 1997-98 (MT: Phase 2) and (iv) 1998-99 to 2004-05 (MIA).

The plan of Subsection 2.2 is as follows. In Subsection 2.2.1, we discuss the policy framework during the pre-MT period. This part also discusses in detail the motivations that led the RBI to formally adopt MT. Subsection 2.2.2 argues why a bifurcation of the MT period into two phases would be meaningful. Subsections 2.2.3 and 2.2.4 discusses the major changes in the economic environment during these two phases. Subsection 2.2.5

examines the implications of these developments on the stability of demand for money in India. Subsection 2.2.6 analyses the possible motivations that led the RBI to again change its monetary policy framework to that of MIA in 1998-99. This part also attempts to evaluate the relative merits of the other options that were also available to the RBI at that time. Finally, Subsection 2.2.7 lists the major changes that took place during the MIA.

2.2.1 Pre Monetary Targeting (1970-71 to 1984-85)

Till the early 1980s, the Indian economy was virtually a closed one. Prices of a significant number of commodities were administered in India during this period. The administered price mechanism created substantial distortions in relative prices. To sustain these prices at a steady level, Government subsidies were often necessary and this was one of the factors that led to chronic deficit budgets. These deficits were either financed through ad hoc treasury bills[8], or through indirect borrowings, mostly from nationalised banks. The first led to more or less automatic monetisation. Net RBI credit to Government was the dominant factor behind reserve money expansion and the consequent expansion in money supply. To control the money supply, RBI had to increase the cash reserve ratio (CRR) from time to time. So far as the market borrowing is concerned, to facilitate the process, interest rates were administered and were kept at artifically low level. The entire structure of interest rates was complicated and had multiple layers. Thus, the financial markets were highly segmented and lacked depth. Adminstered interest rate regime was an impediment to the use of indirect tools like open market operation (OMO). The only way to finance the borrowing programme of the Government was to increase the Statutory Liquidity Ratio (SLR) from time to time. Exchange rate was not market determined and movements of foreign currency in and out of India were tightly regulated. In short, monetary policy in India during this period was completely subsurvient to the fiscal stance of the Central Government. Apart from the traditional central banking role, during this period the RBI had to perform various developmental roles in tune with the national economic planning as well.

India's formal change to "monetary targeting with feedback" should be understood with this background. The recommendation for the change was made in the *Report of the Committee to Review the Working of the Monetary System* (popularly known as the Chakravarty Committee report) in 1985. This report is often viewed as a benchmark report in India that "set the ball of thinking rolling in the mid-1980s" (Rangarajan, 2001). It is interesting to note that the Chakravarty Committee endorsed the existence of multiplicity of monetary policy objectives in India. However, it came to the conclusion that the objective for which monetary policy could be most properly utilised was price stability.

The economic performance of India preceding the report is interesting. After the second oil shock in 1979-80 (that led to a negative GDP growth rate of –5.2 per cent and a double digit rate of inflation of 17.1 per cent in1979-80), the economy was on the path of recovery. In fact, between 1980-81 and 1984-85, the average annual GDP growth rate

[8] Rangarajan (2001) snidely observed that "Those bills were 'ad hoc' only in name. These treasury bills had to be rolled over indefinitely."

and the rate of inflation in India were 5.6 and 9.2 per cents respectively.[9] It may be noted that given its earlier achievements since its independence (especially with respect to its low GDP growth rate often castigated as "the Hindu growth rate"), these figures should be considered as good.[10] A crucial question then remains: why was it necessary to change the policy stance at that point and that too to MT, when evidences of its failure in the industrial economies were already known?

The traditional way of examination as in Poole (1970) would be to look at the stability of demand for money and also the relative magnitudes of shocks to the financial and the real sector in a country. India's shift to MT appears to be consistent with this theory. Indeed, early literature on demand for money in India generally indicated its stability (Vasudevan, 1977). So far as the relative sizes of shocks were concerned, the administered interest rate structure, the absence of significant innovations in the financial sector and the lack of large cross-border capital flows facilitated the adoption of this approach. Further, studies like Chitre (1986) that appeared approximately at the same time, pointed out that money multiplier in India could be predicted with a fair degree of accuracy. This stable relationship between the operating target of reserve money and the intermediate target of money supply was another crucial piece of evidence that led to the adoption of this approach.

Though MT was either discarded or in the process of being discarded in most of the countries during the early 1980s, a few countries like Germany persisted with that approach. In case of Germany, subsequent studies established that MT could facilitate internal and external coordination problems for the central bank (Hagen, 1999). Interestingly, India's adoption to MT also supports this theory. At the time of the recommendation, monetary policy in India was almost completely subservient to the fiscal policies of the central Government. Figure 1 illustrates this point. In Figure 1, the variable CGRMRAT reflects the ratio of Net RBI credit to Government and Reserve Money, and NFARMRAT reflects that of Net Foreign Assets of RBI and Reserve Money.[11] The variable CGRMRAT displays an increasing trend betweem the years 1978-79 to 1982-83. In 1982-83, its value peaked to near unity (0.99). In 1984-85, CGRMRAT fell marginally to 0.98.

India's shift to monetary targeting with feedback was thus motivated to facilitate the internal coordination problem between the Central Government and the RBI. Even in the past, the RBI repeatedly appealed to the Government to contain its borrowing programme and more particularly, its borrowing from the RBI. So far as political economy of India is concerned, it should be noted that approximately at the same time the policy emphasis of the Government of India also changed and the early attempts of liberalising the economy began. The Parliamentary election campaigns in India in 1984 saw the assassination of Indira Gandhi, the then Indian prime minister. Though the Congress party returned to power with a thumping majority, it was Rajiv Gandhi, the son of Indira Gandhi, who became the new Prime Minister. With the change of the prime minister came the change

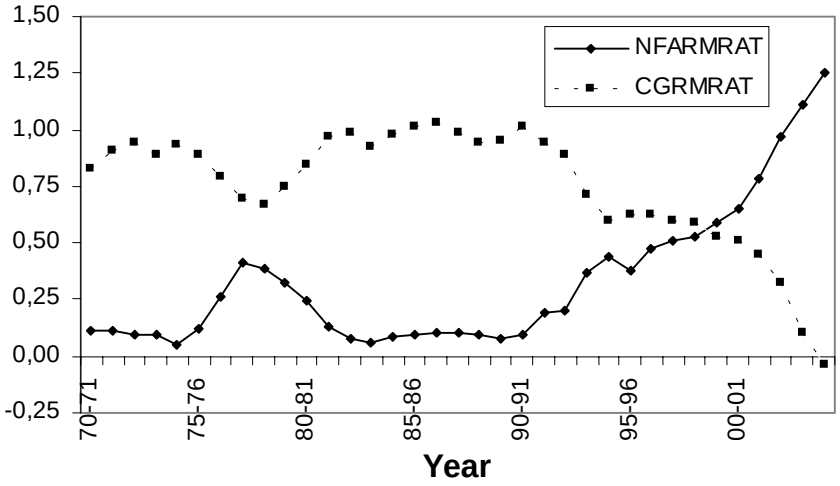
[9] These figures quoted are not "real time" figures, but are based on final data prepared later. In the reported figures, for GDP, the base year is 1993-94. For inflation rates, the figures till 1981-82 are with respect to 1970-71 as base and the same from 1982-83 onwards are with respect to the year 1981-82 as base.

[10] Rather than the 1990s, subsequent studies like Rodrik and Subramanian (2004) found evidence of a productivity surge in the Indian economy approximately during this period and attributed it to the Government's pro-business policies that favoured the incumbent. Rodrik and Subramanian (2004), however, carefully demarcated these policies from pro-market policies.

[11] Both CGRMRAT and NFARMRAT are ratios of levels of the respective variables.

in policy orientation. After the recommendations of the Chakravarty Committee became available, the new Government in power – in tune with its liberalising outlook – realised the necessity of reducing its dependence on RBI.

Figure 1: Movements in Net RBI Credit to Government and Net Foreign Assets of RBI (As Ratio of Reserve Money)



The report of the Chakravarty Committee, however, suggested a formal structure in coordination. Observing the fact that government borrowing from the RBI had been a major factor contributing to the increase in reserve money and therefore, money supply, the Committee wanted an agreement between the central government and the Reserve Bank on the level of monetary expansion and the extent of monetisation of the fiscal deficit. It also observed that without such coordination, Reserve bank's efforts to contain money supply within the limit set by the expected increase in output could become impossible. It is in the lights of these recommendations that budgets since then started specifying net RBI credit to government as a memorandum item (Rangarajan, 2001).

The concept of "monetary targeting with feedback" recommended by the Chakravarty Committee was, however, somewhat different from traditional MT with fixed monetary growth as a rule. The Committee never had a rigid monetary target in mind. It recommended that the targetted monetary growth should be modified based on the information available on expected increase in output and a tolerable rate of inflation. Thus the strategy advocated by the committee was far removed from the standard Friedmanite or any other version of monetarism. The Committee thus advocated a "closed loop" strategy. Thus the monetary policy framework in India between the mid 1980s and mid 1990s could broadly be classified as a "flexible monetary targeting approach", with the M3 growth as a nominal anchor, reserve money as the operating target and bank reserves as the operating instrument (Mohan, 2005c).

2.2.2 Monetary Targeting: The Need for Bifurcation

The entire period of MT in India from 1985-86 to 1997-98 may be bifurcated into two phases. We argue that this bifurcation is not artificial or is done purely for the convenience in exposition; but rather makes strong sense because of at least five different reasons.

First, it is observed that despite the formal acceptance of MT, it took a few more years to operationalise the framework (Mohanty and Mitra, 1999). Second, in the early stage of MT, the exchange rate in India was not market determined. An independent monetary policy with a fixed exchange rate in India was possible due to widespread control on the movements of funds in and out of the country. Third, at least till early 1993, interest rates in India remained largely administered. Although attempts to rationalise and free these rates were continuing, the process gathered momentum only after 1993. Fourth, it can be argued that after the move towards market determined exchange rate and interest rate regime, the implicit objective of monetary policy in India changed. In the new regime, financial stability as a whole became of paramount importance.[12] Fifth, in contrast to Phase 1, Phase 2 of MT pursued "closed loop" policies more vigorously. The new regime of market determined rates required continuous monitoring of the financial markets and intervention if needed. Such interventions had implications for the intermediate target as well.

In short, the economic environment in which MT was pursued is somewhat idiosyncratic and specific to Indian conditions during its first phase. During the second phase, the environment became far more similar to countries that pursued MT earlier.

2.2.3 Monetary Targeting: Phase 1 (1985-86 to 1992-93)

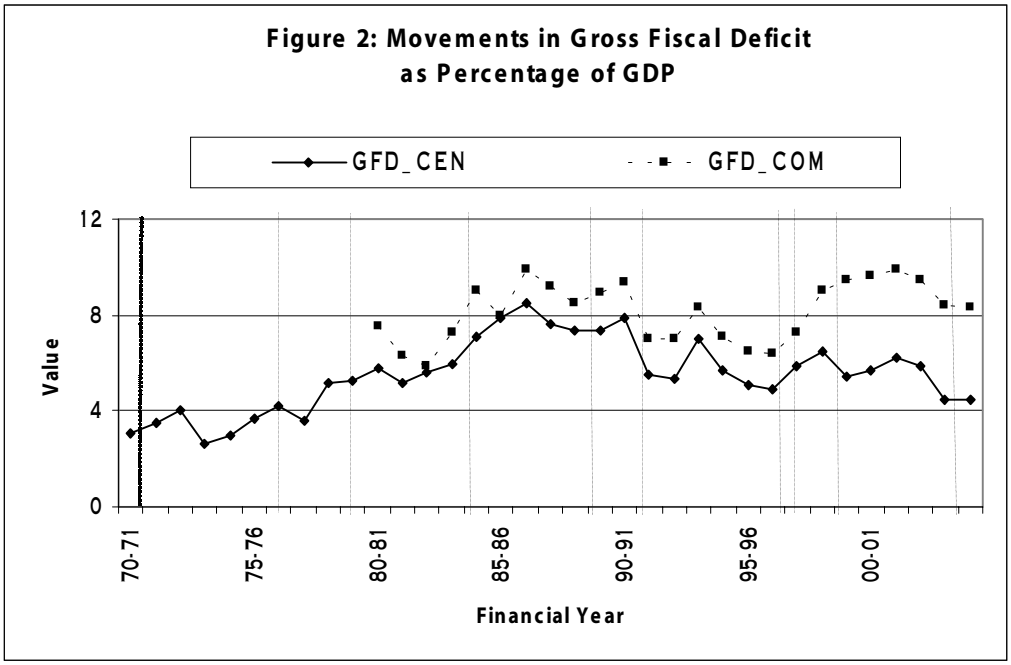
India's approach to MT between 1985-86 to 1992-93 is interesting because it was proposed in an environment where the interest rates were also administered. Theoretically, as in Poole (1970), combinations of controls on prices and quantities can serve as a strategy, but if pursued arbitrarily, such a strategy is fraught with danger. India's initial half-hearted attempt to liberalise the interest rates started approximately during this period. The genesis and the early road map of interest rate reforms in India could also be attributed to the report of the Chakravarty Committee. Chakravarty Committee's recommendations in this context were interesting. It did not recommend scrapping of the administered interest rate scheme, but it felt that interest rates could not be set arbitrarily at any level. It attempted to simplify the entire structure considerably.

Approximately at the same time, freedom was given to banks to fix their own interest rates subject to a minimum of 8.0 per cent of deposits upto one year. This had to be withdrawn, as banks were unable to handle even this very limited degree of deregulation (Rangarajan, 2001). This experience showed that a lot more preparation would be needed by way of counselling the banks to handle a gradual deregulation of interest rates. The early attempts of reforms in this area failed because necessary reforms in other sectors were not carried out simultaneously (Malhotra, 1997).

As argued in Subsection 2.2.2, a major effort during this period was devoted to implement many of the recommendations of the Chakravarty Committe in a phased manner.

[12] Note that this implicit change in orientation needed no change in the RBI Act. Rather, the change was fully consistent with the broader interpretation of the RBI Act.

Consistent with the recommendations of the Report, this part saw movements towards creating an active money market which could serve as a transmission channel for monetary policy. The *Report of the Working Group on Money Market* in 1987 (popularly known as the Vaghul Committee report), prepared the necessary roadmap. To activate the shorter end of the money market, treasury bills of 182 days duration were introduced. This period also saw the introduction of financial instruments such as Certificates of Deposit, Commercial Paper and participation Certificates. Also, Discount and Finance House of India (DFHI) was set up to provide liquidity to these instruments by creating a secondary market. So far as the banking sector reforms are concerned, a health code system was introduced to classify the bank loans.



While these changes were going on, the deficit situation did not improve. In Figure 2, GFD_CEN presents the gross fiscal deficit of the central government, while GFD_COM presents the combined figure for the central and the state governments. The broken vertical lines indicate the time points of parliamentary elections in India. Figure 2 reveals an increasing trend in GFD_CEN at least till 1986-87, when GFD_CEN became as high as 8.47 per cent. Although, both the series display a slight downward trend after that period, they remained consitently high during the second half of the 1980s. The chronically high fiscal deficit was one of the major causes that led to the balance of payments crisis of the Indian economy in 1990-91.

It is interesting to note that despite the move towards MT, no specific monetary target in India was set during the second half of the 1980s, except for fixing a ceiling linked to the average growth of broad money in the previous years (Mohanty and Mitra, 1999). The rationale for fixing a ceiling was the continued overhang of excess liquidity prompted by sharp increase in primary money creation and the continuing pressures on prices. To help government's borrowing programme, RBI had to increase SLR while to mitigate the deleterious effect on the prices, the only effective tool it had in its possession was CRR. By the time monetary targeting with feedback was operationalised, successive increases in CRR, SLR and other control measures were affecting the efficiency of the banking

system severely. By the end of the year 1990-91, the CRR and the SLR were 15.0 per cent and 38.50 per cent respectively.[13]

The balance of payments crisis in 1990-91 shook the Indian economy. The economic reforms after the balance of payments crisis in India in 1990-91 accelerated. The history of this crisis and the stabilisation measures that were adopted have been discussed by several authors in detail and there is no point to repeat them in this paper. Suffice it to say that during the first half of the 1990s, RBI had to reorient and reinvent itself. Besides, the mandated objectives as interpreted by it, the major challenges were to restore stability as quickly as possible and once that was achieved, to develop and integrate different financial markets and increase the competitiveness and efficiency of the financial system. For stabilization, coordination of monetary and fiscal policy was absolutely necessary. Figure 2 reveals a sharp fall in gross fiscal deficit (as percentage of GDP) immediately after the crisis. So far as the long-run structural changes were concerned, a major guidepost in these endeavour was the *Report of the Committee on the Financial System* in 1991 (popularly known as the Narasimham Committe Report: I).

One of the first important financial reforms that India had after the balance of payments crisis in 1990-91 was to change to a market determined exchange rate system. The exchange rate was made flexible in a phased manner and current account convertibility was also attained. This change was one of the striking successes of the early years of economic reforms. The balance of payments crisis was also largely mitigated by the end of 1992-93. The phase from 1993-94 to 1997-98, therefore, is the phase where MT was attempted in a comparatibly stable environment.

So far as the failures during the early years were concerned, a major one was the stock market scam in the year 1992. Till the early 90's, there were significant inefficiencies at the Indian capital market (Barman and Madhusoodhan, 1993; Reddy, 1997). The capital market in India was segmented across cities. Trading hours were short and there used to be significant amount of *kerb trading* outside the domain of stock exchanges (Krishnan and Narta, 1997). The scam that resulted was a learning experience. It exposed the technological limitations of the Indian banking system. At the same time, it also highlighted the important roles of institutions that play a peripherial role in the monetary policy framework in a market determined economy. One major challenge of the reform process during the subsequent period was to put a further coordinated effort to develop these institutions.

In this background, the explicit term 'monetary target' in monetary policy formulation first found mention in the Bank's Annual Report in 1991-92[14] (Mohanty and Mitra, 1999).

2.2.4 Monetary Targeting: Phase 2 (1993-94 to 1997-98)

After stabilization of the balance of payments crisis, liberalisation of interest rates gathered momentum. Drawing lessons from the previous experience, the liberalization measures in India were adopted slowly but steadily. On the lending side, the deregulation began in 1994 and was carried out through various policy announcements. The emphasis was

[13] The figure corresponding to CRR excludes additional reserve requirements or release/exemption on incremental Net Demand and Time Liabilities (NDTL).

[14] The RBI's Annual Report for the year X-(X+1) pertains to July of year X to June of year (X+1), e.g., the year 1991-92 is to be interpreted as the period from July 1991 to June 1992.

placed on the development of money, government securities and forex markets and an effort was made to move away from the use of direct instruments of monetary control to indirect measures such as open market operations and market related interest rates. Banks were given the freedom to set their own Prime Lending Rates and to devise their own lending policies. On the liabilities side, the entire gamut of deposit rates – except on savings deposits – were deregulated and the banks were given the freedom to offer different interest rates for different maturities/size-groups. The interest rates on government paper were made market related. The Reserve Bank's refinance facility was rationalized and the sector specific refinance facilities were also de-emphasized. These developments enabled RBI to start conducting repo and reverse repo transactions in order to ensure a reasonable corridor for money market rates of interest. A significant development in this area with far reaching implications was, however, the reactivation of the Bank Rate that was linked to all other interest rates including the Reserve Bank's refinance rate. Thus within a span of approximately twelve years following the publication of the Chakravarty Committe report, most of the major rates in India were made market determined.

These reforms in the interest rate structure were undertaken with a view that the changes in the short term official interest rates would translate towards the longer end through the yield curve and spread towards the deposit and the lending rates of the banking sector, facilitating their emergence as effective policy instruments. It was expected that changes in the short-term interest rate could be modulated though the changes in the official interest rate (say Bank Rate) that would lead to necessary changes in prices and output through changes in aggregate demand. This line of thought appeared to be in tune with the international experience during the 1990s.

Three other relating changes should also be highlighted in this context. First, significant changes took place in the Indian capital market during this period. These include the emergence of the Securities and Exchange Board of India (SEBI) as the statutory regulator of the Indian capital market, the birth of the National Stock Exchange (NSE) as a competitor of the Bombay Stock Exchange (BSE), the computerized screen based trading at both the BSE and the NSE linking the capital markets of different cities in India, increase in trading hour, dematerialization of shares and introduction of derivatives. All these changes led to substantial improvement in market capitalization, liquidity and efficiency of the Indian capital market (Misra, 1997; Endo, 1998).

Second, the agreement between RBI and the Government of India to curb monetisation was signed during this period. It was decided to implement the agreement in a phased manner in a period of three years.

Third, as Subsection 2.2.2 mentioned, policies began to be more and more closed loop in nature. This was imperative because of the flexible exchange rate regime that required continuous monitoring. A major consequence of this change was on transparency and communication strategy, and also data dissemination. The market determined system required transparency and clarity of policy objectives. As India’s monetary policy objectives were manifold and largely discretionary, policy communication was also not an easy task. With increasing importance of financial stability, clear communication was also necessary to demarcate policies that aimed to stabilise the financial markets and that aimed for longer-term aims. RBI’s published reports began to change qualitatively around this period, often focusing more on cross-country experiences on specific aspects. At the same time, there was significant change in collection and dissemination in financial data. As a consequence, when India became an early signatory to the SDDS, it was already

almost fully compliant with respect to the requirements pertaining to the financial sector.

MT was actively and vigorously pursued during this period. MT, even in this period, was, however, constrained by the fiscal stance of the Government. Further, with the opening up of the economy, increasing capital flows compounded the constraints. During 1993-94 and 1994-95, the growth in M3 was wide-off the target. In 1995-96, it was deemed possible to contain M3 growth within the projected increase. RBI was, however, sharply criticised for "a restrictive monetary policy which gave primacy to price stability" (Mohanty and Mitra, 1999). We shall discuss this episode in more detail in Section 3.

2.2.5 Implications of the Reforms on Stability of Demand for Money

By the end of the first half of the 1990s, the Indian economy was back on track. Inflation fell to single digit level and GDP growth rates were more than 7.0% per annum for three successive years in 1994-95, 1995-96 and 1996-97. However, the strains in the MT framework was already visible. Successful stabilisation policy and gradual opening up of the economy with a market determined exchange rate led to huge capital flows. To maintain monetary target, it was necessary to sterilise these flows. This led to the change in the structure of the RBI balance sheet. Figure 1 depicts these changes. From 1990-91, NFARMRAT – except during the year 1995-96 – increased continuously. In Figure 1, the movement of CGRMRAT is also noteworthy. It experiences a sharp fall immediately after 1990-91, but plateaued around 1994-95. Incidentally, this was just before the parliamentary election in India. Interestingly, in a recent study using a regime switching model, Jadhav et al (2005) find an evidence of an endogenous break point in the composition of the RBI balance sheet approximately around this period.

Concurrently, with the changes in the administered interest rate regime and other consequent financial innovations, the stability of money demand in India became a matter of concern. Some of the studies that attempted to examine this aspect during the 1990s were Nag and Upadhyay (1993), Jadhav (1994), Arif (1996) and Mohanty and Mitra (1999). The *Report of the Working Group on Money Supply : Analytics and Methodology of Compilation* (popularly known as Reddy Committe Report) in June 1998 also examined this aspect. The evidences from these studies were, at best, mixed. It may be noted that the number of observations in all these studies during the post-reform period were limited. Lack of stability during the 1990s, therefore, might not indicate instability in money demand function itself. Rather, it could have indicated the process of convergence of certain parameters towards new values. From the practical point of view, however, what concerned most was predictive stability. Economic reforms and financial innovations that followed rendered this task difficult.

2.2.6 Why the Shift to the Multiple Indicator Approach?

In their review article of India's experience with MT, Mohanty and Mitra (1999) observed that in the 13 years (1985-98) of its existence, only on 4 occasions the target could actually be achieved. The average rate of growth of broad money during this period was also close to that between 1970-71 to 1984-85. India's experience with MT was, thus, not very dissimilar to that of other economies.

The economic performance during the period immediately preceding the change to the MIA was not bad. After the effective handling of the balance of payments crisis, the economy was recovering. During Phase 2 of MT, the average annual rate of inflation and

GDP growth were 7.6 and 6.6 per cent respectively. Given that the rate of inflation was moderate, the central bank credibility in maintaining monetary target was, arguably, not a serious issue ("Who bothers about monetary targets if inflation is in check?"). Once again, an interesting question that occurs is: why did India change its monetary policy framework in 1998-99?

It may be noted that as in the earlier case, stability of demand for money (or lack of it) was once again an issue. It is interesting to note that the *Report of the Working Group on Money Supply : Analytics and Methodology of Compilation* proposed a set of broader monetary measures that were supposed to capture the effects of new financial innovations better. However, unlike the US case, no attempt was made to shift to alternative monetary measures as targets.

So far as relative sizes of shocks were concerned, in contrast to the early 1980s, market friendly policies during the 1990s warranted that compared to the earlier periods, the sizes and the frequencies of shocks to the financial system would increase compared to the shocks in real sector. However, a debate on the relative sizes of financial and real sector shocks was largely absent during this period. The traditional theory of Poole (1970) could, therefore, offer a partial answer to this question.

So far as the coordination aspect of MT is concerned, it is interesting to note that India's tryst with MT ended almost immediately after the agreement between the Government and the RBI (to check automatic monetisation within a defined limit) was operationalised. It could be argued that major need was not the monetary target *per se*, but the need for coordination. When the required coordination was achieved, which was earlier considered a necessary precondition for MT, a change to other framework became affordable. Figure 1 reveals a clear decreasing trend in CGRMRAT approximately from this time. Thus the internal coordination theory also could offer a partial answer to the change in strategy.

Rather than predictability of money growth or coordination problems with the Central Government, the key to understand the change in framework perhaps lies in the signalling aspect of policy. The RBI wanted to communicate a strong signal to the market regarding the changed way it would implement monetary policy. The signal was to prepare the market for a gradual move from quantity based signals to price based signals. The change in the framework was, in fact, a move to communicate the process of policy signalling. The implicit message that the change in framework conveyed to the market was to attach more meaning to the changes in the policy rates.

The change in framework was thus an official recognition of a phase in which monetary authorities were constrained to work both at the quantities (money) and the prices (interest rates) front, despite its well known limitations. To increase the efficiency of the banking sector, further reductions in CRR was necessary. This itself was a major constraint that prevented a full fledged change to signal solely through interest rates. Yet, cross-country experiences revealed distinct advantages of interest rate signals. It may be noted that while many of the necessary reforms in the financial sector were complete or near completion at that stage, the necessary operational infrastructure (i.e., existence of clear corridors for short-term interest rates) to impart clear interest rate signals were not fully ready at that time. Due to short history, the precise relationships between the short-term and the long-term interest rates and the role of market determined interest rates on the real sector was also far less understood. The move towards price based signals was, therefore, primarily motivated by cross-country experience and judgment.

The RBI, on its part, was transparent about the evolving nature of relationships among variables. As late as in 2000, in a discussion on applicability of Taylor rule in the Indian context, it stated that the positions regarding a clear policy reaction function of the RBI and evidences of the efficiency of the interest rate channel of transmission mechanism are "not very clear". Citing some other problems, it concluded,

> "Hence, the stance of policy in recent times has been to draw policy perspectives by continuously monitoring a host of quantum and rate variables, commonly known as the "multiple indicator approach"."
>
> (Box III.2, RBI Annual Report, 1999-00)

It may be noted that subsequent studies like Sastry et al (2001) found some signs of stickiness in the long-term interest rates in India approximately at that time. Some of the factors identified were (i) lack of sufficient competition in the banking sector, (ii) lack of sufficient development of the financial markets, (iii) ownership structure of the banks, (iv) downward rigidity of the deposit rates and the resultant pressure on the spread and profitability of the banking sector and, (v) inelastic credit demand. Sastry et al (2001) discussed the relative importance of these factors in the Indian context in detail. They, however, observed improvements in some of these factors during the first half of the 1990s.

Abandonment of the MT framework, however, required an alternative. India adopted the multiple indicator framework. The possible other candidates were exchange rate targeting, interest rate targeting and IT. In the Indian context, exchange rate targeting was not appropriate due to the relatively closed nature and large size of the economy. Similarly, stickiness in the long-term rates was a major impediment to consider an interest rate targeting framework seriously. IT, in contrast, was a serious option. It is, therefore, relevant to discuss why India did not adopt IT at that time.

The success of many developed and emerging market economies under IT framework was keenly followed in India and a debate on its relevance in the Indian context was shaping up. While appreciating many advantages of the IT framework, its critics raised three major concerns in the Indian context. First, fiscal dominance was considered a serious problem. Although the agreement between the RBI and the Government to curb automatic monetisation took place by that time, this did not totally obviate fiscal indiscipline. The second problem was the importance of supply shocks and the important role prices of a few crucial administered commodities played in overall price formation. As monetary policy could not control these prices, lack of knowledge of their precise role in the overall price formation was thought to be a serious lacuna. Lack of an official core inflation measure further compounded the problem. The third and the final concern was that a move to IT might be too early. Most of the countries that had formally adopted IT approach did not complete a full business cycle by that time. Summarizing these concerns, Kannan (1999), in one such article, suggested a "wait and watch" policy

> "Regarding the relevance for India, perhaps we have to wait for another four to five years so that the financial sector reform agenda is accomplished, reasonably complemented by real sector reform. In the meantime we should also enhance our capacity not only in inflation forecasting but also in adopting various analytical means of controlling the inflationary expectations in the event of various shocks."

It may be noted that the problems identified were not insurmountable. Fiscal dominance,

for example, was also an important factor behind failures to meet monetary targets.[15] Even though it could have created problems in controlling inflation within desired limits, it should be understood that one of the main advantages of the IT framework was the flexibility in the type of contract between the Government and the central bank. For example, in the Indian case, the problem could have been solved by clearly mentioning in the contract that if the Government's budget exceeded a certain limit, then the RBI would not be held responsible if inflation overshot the target within a stated time period. Similarly, the problem of supply shock could also have been tackled – at least initially – by adopting a broader range for acceptable rate of inflation than that practiced by the developed countries.

Interestingly, the Advisory Group on Transparency in Monetary and Financial Policy suggested formal acceptance of the IT framework approximately at the same time.

> "The Advisory Group recommends that the Government of India should consider setting out to the RBI a single objective for monetary policy viz. the inflation rate, as has been done by a number of governments abroad. The inflation rate target could be defined, illustratively, as an average over say a three year period starting from a back year. The inflation target should be a range, say an average over a stipulated period and with tolerance limits and when the inflation rate is outside the tolerance limits it should warrant a tightening or relaxation of monetary policy as appropriate. While setting the inflation target it would be best to use the inflation rate as reflected in, say the Wholesale Price Index (WPI) the terms of which are widely understood. The principal objective should be clearly set out to the RBI by way of a public statement as to the responsibility of the RBI. While doing so, the government could also make public its other objectives which have been taken into account while setting out the principal objective of monetary policy."
>
> (Para 5.3)

Rather than the concerns for fiscal dominance or supply shock, India's decision to not to adopt IT at this period could perhaps be explained from the political economy angle. It may be noted that to incorporate the radical changes that the IT framework demanded, a fair degree of political consensus in India was necessary. In many inflation targeting economies, people were fed up with chronically and persistently high rate of inflation and this created an environment that facilitated formal acceptance of that framework, especially after its startling success in the first few economies that adopted the framework. In contrast, as inflation in India was all along moderate, the political desire for a major change in the framework was conspicuously absent during the late 1990s. The late 1990s was a politically volatile period in India with successive unstable governments. As Figure 2 demonstrates, three Parliamentary elections were quickly held during this period. To make radical changes in the framework without spreading the necessary awareness about the framework among people could have led to serious loss of credibility of RBI if inflation shot over the mandated level due to either supply shock or fiscal profligacy.

The Advisory Group on Transparency in Monetary and Financial Policies was aware of this lack of awareness and it pithily observed

[15] Failure to meet monetary target and failure to meet inflation target would perhaps have different type of credibility problems. For example, internationally, Bundesbank's reputation was in controlling inflation and not necessarily that of maintaining its monetary targets.

> "… the Advisory Group recommends that, apart from erudite analysis, which is incomprehensible to the public at large, there is much merit in the authorities clarifying issues in monetary and financial policies in simple language intelligible to the general public"
>
> (Para 4.8)

The transition to MIA was thus arguably a compromise outcome of monetary policy reforms. This approach has been followed since April 1998. In this approach, besides monetary aggregates, information pertaining to a range of rates of return in different financial market segments along with the movements in currency, credit, the fiscal position, merchandise trade, capital flows, the inflation rate, the exchange rate, refinancing and transactions in foreign exchange – which are available on a high frequency basis – is juxtaposed with data on output and the real sector activity for drawing policy perspectives. In a medium-to long-term perspective, the impact of money supply on inflation, however, cannot be ignored and for the purposes of policy, the Reserve Bank still continues to announce projections of money supply compatible with the outlook on GDP growth and expected inflation.

It may be noted that though India did not formally adopt IT framework and practiced monetary policies in subsequent period that are by and large discretionary in nature, it attempted to assimilate many of its desirable features (especially with respect to transparency) in the MIA. This aspect will be reviewed further in Subsection 2.3.

2.2.7 Important Changes during Multiple Indicator Approach (1998-99 –)

Since the adoption of the MIA, there had been five marked changes. The first relate to the signalling aspect of monetary policy. While the activation of the Bank Rate as a policy tool was done in 1997, the necessary infrastructure for intervening at the shorter end of the money market was not in place. The RBI proceeded to that task in a step by step manner. The Liquidity Adjustment Facility (LAF), introduced in June 2000, enabled the Reserve Bank to modulate short-term liquidity, of a temporary nature, under varied financial market conditions in order to ensure stable conditions in the overnight (call) money market. The LAF operated through reverse repo and repo auctions, thereby setting a corridor for the short-term interest rate consistent with the policy objectives. The LAF operations, combined with strategic OMO consistent with market liquidity conditions, evolved as the principal operating procedure of the monetary policy of the Reserve Bank. Currently, liquidity management in India is carried out through open market operations (OMO) in the form of outright purchases/sales of government securities and reverse repo/repo operations, supplemented by the newly introduced Market Stabilisation Scheme (MSS).

The second major change was in the evolution of policy coordination. While the agreement between the RBI and the Government facilitated the process, further improvements were needed. The RBI also received clear signal from the Government, when in the budget speech in February 2000 the need for greater operational flexibility to the RBI for the conduct of monetary policy and regulation of the financial system was stressed. A major consequence of this coordination was the Fiscal Responsibility and Budget Management Legislation, which aimed at the medium-term management of the fiscal deficit. The objective of the legislation was to impose fiscal discipline on Government spending and ensure a transparent and accountable fiscal system.

The third major change is in clearer demarcation of stabilization policies from structural

policies during this period. To some extent, signals for that emerged even before the formal adoption of the MIA. After the change of framework, this policy gathered momentum. Earlier, major monetary policy announcements used to take place twice a year. With a move towards market economy, it was imperative that policies should be revised on continuous basis. As stabilisation of financial markets often needed quick and immediate action, it was repeatedly articulated by the RBI management that policies aimed for that purpose will come whenever felt necessary and certainly not after a long wait of six months. This, however, did not apply to policies that had long-run structural implications.

The fourth major change was the result of the changed approach regarding the second and the third. It occurred in the way these long-run structural aspects were handled. Coordinated efforts were necessary to examine and implement international best practices. Both the Government of India and the RBI jointly attempted to implement the International Financial Standards and Codes, alongwith other significant market players.

To obtain unfiltered views in implementing the codes, ten advisory groups were created to examine different aspects relating to the policies and operating areas in the financial sector in India. These committees were headed by non-central bank experts. RBI's consultative process with non-central bank experts, therefore, gathered a new momentum with this change. The groups often had exhaustive discussions with the Government and the RBI staff and also with other players in the Indian financial sector. Among the ten Advisory Groups, the Advisory Group on Fiscal Transparency (Chairman : Mr. M.S. Ahluwalia) and the Advisory Group on Transparency in Monetary and Financial Policies (Chairman : Shri M. Narasimham) suggested some important changes in the operational conduct of monetary and fiscal policies and highlighted the need for better coordination between them. Advisory Group on Data Dissemination examined India's compliance to the requirements of SDDS. In fact, reports of all the groups became important guideposts for subsequent policy changes.

The fifth major change is not directly related to monetary policy framework, but a consequence of the changes that the reform process ushered. The increasing focus on the external sector prompted many Indian companies, especially those in the area of information technology, to list at the foreign stock exchanges (in particular, the US stock exchanges). These changes significantly affected the intra-day pattern of price discovery and price formation at the Indian capital market (Bhattacharya and Das, 2002; Bhattacharya and Samanta, 2003).

2.3 Multiple Indicator Approach: The Current Monetary Policy Framework

Although the RBI calls its current monetary policy framework as the MIA, internationally the more familiar term would perhaps be an implicit nominal anchor approach. Abandonment of MT framework implied the loss of broad money (M_3) as the nominal anchor. Since changing the policy framework, the RBI did not categorically mention its nominal anchor. Its Annual Report for the year 1999-00, however, prepared a box item (Box III.1) entitled "Inflation Rate as Nominal Anchor for Monetary Policy". The box item summarized the approach practiced by the inflation targeting economies. Regarding the Indian condition, it only observed that "…the ideal measure of core inflation is yet to emerge in the Indian context".

Internationally, the limitations of the implicit nominal anchor approach are well known. The two central banks that often are benchmarks for the rest of the world, the Federal Reserve (Fed) and the ECB, both seem to follow this approach. In both cases, there is overriding concern for inflation, though there appears to be no explicit public commitment in the case of the US.[16] In both the US and the EU, the rate of inflation thus works like an implicit, but not formally declared nominal anchor. Further, especially in case of the US, its careful monitoring of signs of inflation and forward looking actions under the leadership of Alan Greenspan appeared to have yielded excellent results.

In his review of international experiences with different monetary policy regimes, Mishkin (1999) has observed similarity in the forward looking strategic actions of Fed with inflation targeting economies. Mishkin (1999), however, has severely criticised this approach for its lack of transparency, categorizing it as "just do it" approach. He further observed that the success in this approach would strongly depend on the preferences, skills and trustworthiness of the individuals in charge of the central bank.[17]

The current Indian monetary policy framework looks remarkably similar to the frameworks of both the Fed and the ECB regarding this aspect. In the Indian case, though the relative emphasis between price stability and growth depends on the underlying macroeconomic conditions, the RBI management has publicly acknowledged price stability being the overriding concern. In fact, Reddy (2005b) has acknowledged price stability as a kind of "informal mandate".

In the MIA framework, the RBI mentions its own projections with respect to the mandated tasks (as understood by it) in any given year.[18] *None of these projections, including that on inflation are worded as "targets", although that pertaining to the rate of inflation could be interpreted so by the economic agents.* Apparently, these "projections" are self-imposed and informal. However, given the power of the Central Government in India, it is imperative that they are set after consultations with the elected representatives.

It may be noted that this form of soft wordings that make the target implicit is not uncommon. In its gradual shift towards IT, Chile had followed this approach. Initially, inflation targets were announced and worded as official projections, rather than hard targets. However, over time as inflation fell, the procedure was changed and inflation targets came to be viewed by the central bank and the markets as hard targets. Mishkin (1999) observed a similar approach in case of industrial countries as well. Formal commitment to IT in most cases was not made until after substantial disinflation had previously been achieved. The so called MIA has thus provided the RBI a flexibility to respond to the changes in domestic and international conditions. Given that it now follows a closed loop policy and monitors all relevant information pertaining to inflation, its current approach looks similar to a soft and a flexible version of IT.

---

[16] The ECB has clarified that its long-term price stability goal should be interpreted as a range for inflation of 0-2%, but is not willing to call its framework as an IT framework. This approach has drawn flak from certain quarters. For example, Mishkin (2001) comments "The ECB seems to have decided to try to have its cake and eat it too by not committing too strongly to either a monetary or an inflation targeting strategy" (Box 2, p.518, Sixth Edition)

[17] Mishkin (2000) wryly observes that "I think it is fair to say that right now the nominal anchor in the United States is Alan Greenspan".

[18] It may be noted that RBI projections include both GDP growth rate and growth in Non-Bank Credit. Thus, its projections encompass the various ways the mandated task to it can be interpreted. It also generally declares in a routine fashion its stand that the projected credit growth would be "adequate" for the productive sectors of the economy. Deposit growths and M_3 growths are also projected.

An interesting question that occurs here is: how are these projections made in India? Central bank projections, in most cases, are initially carried out by the staff members, using different statistical or econometric techniques. Results of these models are then superimposed with the judgments of the policymakers. It is, therefore, difficult to judge from the predicted figures to what extent a particular projection has been influenced by the "superiority" of judgment.[19]

The models in central banks, however, could serve an alternative purpose. These models – especially the macroeconometric ones – serve as communication channels to explain to the economic agents the official views on transmission of monetary policy. So far as India is concerned, among the four traditional channels of monetary policy transmission, common sense suggests that the exchange rate channel and the asset prices channel would play a limited role. The role of the exchange rate channel is limited because of India's relatively closed nature. Though the degree of openness of the Indian economy has increased substantially compared to the 1980s, the big size of the domestic market compared to the total export or import suggests that exchange rate channel may not be an influential channel. So far as asset price channel is concerned, compared to the developed economies, the financial system in India has a relatively low vulnerability to asset bubbles. There is limited exposure of bank lending to the sensitive sectors, including real estate. While the demand for housing is strong, overall exposure is moderated by assigning higher risk weights to housing loans than required under the Basel norm (Reddy, 2005b). The share of housing loans in the overall loan portfolio stood at about 10 per cent in March 2004 and net non-performing assets were 1.4 per cent of the net outstanding loans as compared with 2.8 per cent of the aggregate portfolio. This suggests a limited role for the asset price channel as well.

The major uncertainty on monetary policy transmission in India is, therefore, on the relative roles of the quantum channel (especially relating to money supply or credit) and the interest rate channel. Earlier, the approach to monetary targeting implicitly took into account the transmission mechanism through the credit channel as well. Since the target was M_3, monetary expansion in a sense also meant expansion to credit both for the government and commercial sectors. Implicit in the targeted monetary growth was also a credit growth target (Rangarajan, 2001).

The many macroeconometric models prepared before the adoption of the MIA in India (e.g., Pani, 1984; Bhattacharya et al, 1994; Rao and Singh, 1995) attempted to study the relationships among money, price and output with the implicit recognition of the dominance of credit channel in India. Alternative policy simulations were also tuned to find out the optimal rate of money or credit growth in specific circumstances and to what extent the changes in CRR would lead the economy to the desired trajectory. This trend was continued during the late 1990s as well (Rangarajan and Mohanty, 1997; Palanivel and Klein, 1999).[20] The so called atheoretical vector autoregressive models specified during this period were also not exceptions. In the Indian context, Srimany and Samanta (1998) attempted to study the interrelationship among money, price and output by specifying a three variable structural VAR model. Their basic goal was to identify monetary policy shocks in the Indian economy. However, major conspicuous omissions in their specification were interest rates and exchange rates.

[19] Blinder (1997), in this context, observes "I think it is safe to say that few, if any, central banks rely heavily on macroeconometric models to do forecasting". So far as the Fed is concerned, in the same paper he comments "The fed's own model is not just a trade secret; in a very real sense, it does not even exist".

[20] Krishnamurty (2002) provides a detailed review of the history of macroeconometric modelling in India at least till the end of the 1990s.

It may be noted that despite serious attempts, the model based exercises – especially those of macroeconometric types – were often severely constrained in India by the lack of comprehensive and timely information in some areas. To examine the process of monetary policy transmission in detail, a necessary precondition was to have GDP data at quarterly interval. Till the mid-1990s at least, such data in India were unavailable.

Financial innovations in the Indian economy increased the importance of the interest rate channel. As discussed earlier, at first the importance was manifested in the lack of stability in the money demand equations. However, the limited period for which the data on the new regime were available was a serious impediment to examine the efficacy of the interest rate channel.

Conceptually, the entire process of monetary policy transmission through interest rate channel can be divided into four phases. In the first phase, central bank policy rates affect the explicit or the implicit operating target, often the overnight rate. In the next stage, the short-term rates lead to changes in the long-term rates through the yield curve. In the third stage, these long-term rates lead to changes in the aggregate demand. In the fourth stage, interactions of aggregate demand and aggregate supply lead to the determination of prices and output.

In the Indian case, clear evidences are, at least available for the first three phases. Successful implementation of the corridor for the overnight rates has enabled the RBI to give policy signals through official interest rates that form the bounds of the corridor (e.g., repo rate). The adjustments in the short-term money market rates in response to the policy rates are quick and generally take place within a single reserve maintenance period (i.e., a fortnight). So far as the second phase is concerned, studies like Sastry et al (2001) have found evidence that despite the stickiness, the long-term interest rates (e.g., the lending rates) also begin to change, often after a lag of one month. The evidence on the third phase is comparatively recent. Panel studies of Prasad and Ghosh (2005a) on corporate behaviour confirms the importance of the interest rate channel in case of India. Further, it highlights that the interest rate channel has strengthened considerably post-1998.

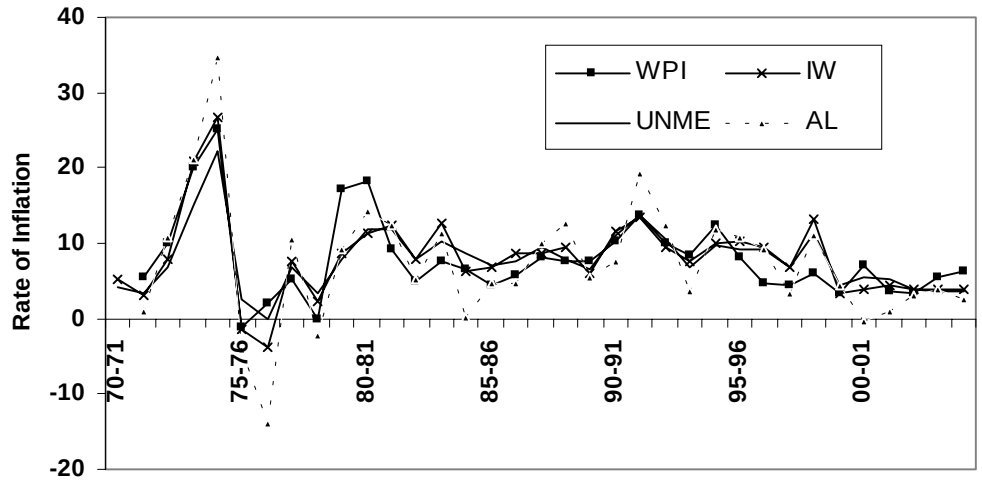
Despite progress in understanding, it may be noted that it is the fourth stage in the transmission channel that still leaves many questions unanswered. For example, estimation of the crucial measures such as potential output is not easy in the Indian case notwithstanding some recent efforts. The empirical robustness of potential output could improve if more data and quality information are available on the size of the unorganised sector, employment and capacity utilisation in various sectors of the economy. In this context, a major lacuna in India is the absence of credible data on the labour market. Employment data essentially pertain to the organised sector which constitutes less than 10 per cent of the total labour force. There is also considerable ambiguity about the very definition of 'employment' given the prevalence of under-employment and disguised unemployment in India. In the absence of data on the natural rate of unemployment, it is difficult to assess with reasonable level of confidence the underlying supply conditions. It is important to stress that this is a severe constraint under which monetary policy in India is still being carried out.[21] Further, lack of reliable wage data is an impediment in determining the relative roles of cost-push and demand-pull factors in specific situations.

[21] In RBI official publications discussions on labour market are generally conspicuous only by their absence.

Additionally, an assessment of the inflationary conditions in the economy is constrained by the lack of a comprehensive measure of consumer price inflation. The multiple consumer price indices in India, on the basis of occupational classification and residence (rural/urban), compound the problem, especially when differences in weighting diagrams of the commodity baskets lead to differences in inflation numbers.

To illustrate this aspect, Figure 3 reveals the movements of different price indices in India.[22] In Figure 3, WPI is the annual rate of inflations based on WPI. AL, UNME and IW, are all CPI based measures, respectively for agricultural labourers, urban non-manual employees and industrial workers. A casual glance in Figure 3 conveys that in any given year, the rates could be sharply different. However, Figure 3 suggests that their long-term relationships are unlikely to be seriously affected, despite findings to the contrary (Samanta and Mitra, 1998). In fact, Figure 3 also suggests that the three or five year moving averages of these rate of inflations are likely to be closer, as shocks to specific commodity groups are averaged out in this process.

Figure 3 : Different Measures of Rate of Inflation in India



So far as other informational requirements are concerned, it may also be noted that India, even at this stage, also lacks a comprehensive service price index. Expectation or outlook surveys are also nascent. As a consequence the time series properties of different series from these surveys cannot be estimated well.

Besides measurement problems and lack of precise understanding of the transmission channels, a major limitation in the Indian context should also be highlighted. Our discussion of the evolution of the monetary policy framework revealed that during much of the 1990s, despite the well known limitations, Indian policymakers were constrained to work with both at the quantities and at the price front. As increased CRR was affecting the efficiency of the banking system, a major challenge after the balance of payments crisis

[22] Even the determination of real equilibrium interest rates for India may not be easy because of the absence of agreement on the price measures to be utilised.

was to reduce CRR in appropriate time.[23] At the same time, gradual moves were initiated to move away from quantity based signals to price based signals. The result was that during much of the 1990s, both the CRR and the official interest rates were often changed simultaneously. Rangarajan (2001) justified this approach in the following way

> "It must be noted at the equilibrium both quantity and price are determined. Changes in interest rates cannot be ordained. The appropriate quantitative changes in money will have to be brought about even though the signal for change may be given by the price variable like interest rate. That is why in the Indian context a downward adjustment in signal rate like Bank Rate becomes more effective, when accompanied by reduction in cash reserve ratio or actions through open market operations."

Figure 4: Movements in Inflation and Output and the RBI Policy Signals

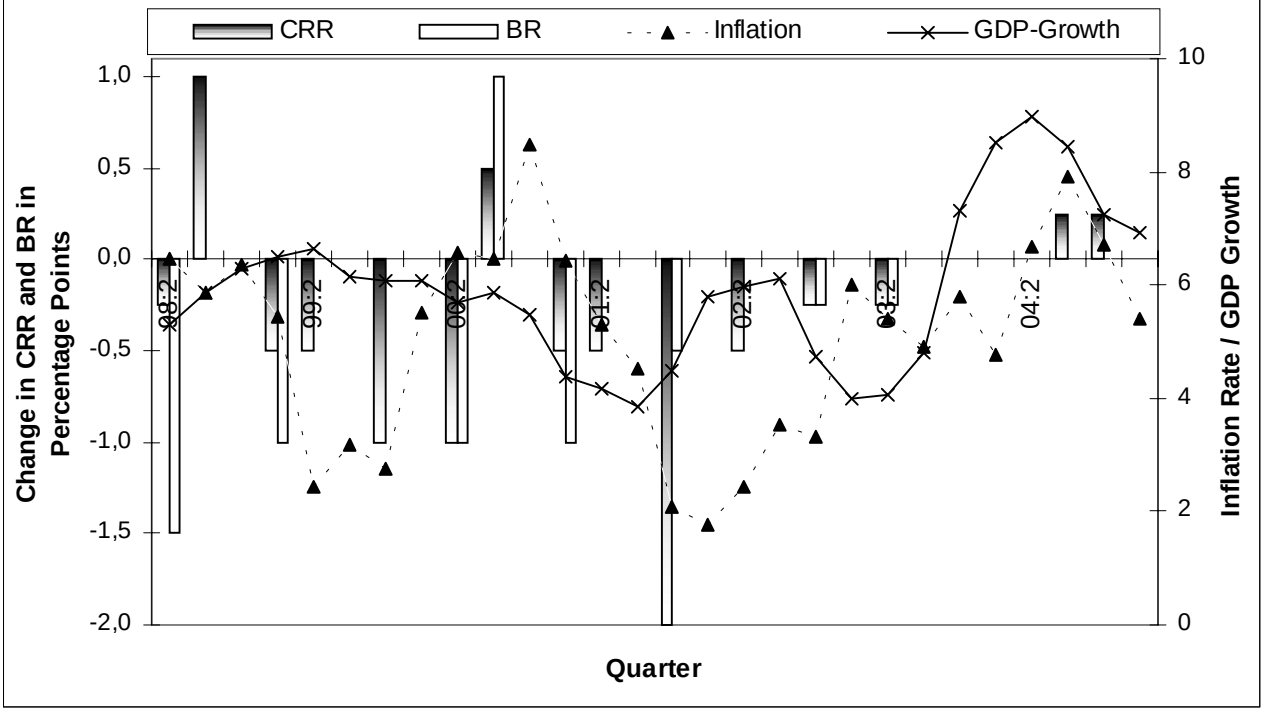


Figure 4 presents the quarterly changes in Bank Rate (BR) and the CRR since the adoption of the MIA and juxtaposes these changes with the rate of inflation and GDP growth. Figure 4 reveals a few important features of the Indian economy. First, it establishes the "efficiency" compulsion of the Indian policymakers: a typical reduction in the BR or the CRR, even during the late 1990s, may not necessarily reflect "easy" monetary policy. In fact, there appears to be an asymmetry in the impacts of a CRR (or BR) rise and that of a CRR reduction. Given the constraints of the policy authorities, an increase in CRR or BR would indicate the monetary authority's signal of tightening, but relaxing them may not be necessarily so. Three instances of increase in either CRR or BR are present in Figure 3, among which the first, during 1998, was a signal of tightening in the context of the South-East Asian financial crisis. It may be noted that in each case, the

[23] The agenda is as yet unfinished. The RBI had repeatedly stressed its long-run commitment of reducing the CRR to the statutory minimum level of 3.0 per cent. The value of CRR as on October 31, 2005 is, however, 5.0 per cent.

rate of inflation started to change course after about another quarter, despite relaxations of these measures afterwards. Given that CRR or Bank Rate changes were often initiated at the beginning of a quarter (i.e., in April or October), Figure 3 seems to suggest that monetary policy measures in India typically begin to affect the real sector with a lag of about six months, a lag that is generally in tune with cross-country findings.[24]

The working with both CRR and BR is a major impediment to have a clear policy reaction function in India. In fact, as late as in the year 2000, RBI (2000b) suggested that a consequence of the lack of a clear policy reaction function in India could be that policy rules (e.g., Taylor rule) that could guide discretionary policy of the authorities in stabilising business cycles had not emerged in India. Interestingly, RBI (2002) attempted to rectify this problem by specifying a policy reaction function in its macroeconometric model for the Indian economy.

So far as individual attempts of finding policy rules are concerned, in an interesting study Rao (2003) attempted an innovative solution. Generalising the concept of a monetary condition index, Rao (2003) developed a macroeconomic condition index comprising of ten macroeconomic indicators. Rao (2003) normalised each indicator on a scale of 0 to 1 and took a weighted average of these indicators, the weights accorded to each normalised variable was the inverse of its standard deviation over the sample period of 1990-91 to 2001-02. Rao's technique, therefore, looks similar to that of the principal component analysis (PCA) in multivariate statistics. Rao (2003) used this indicator to explain changes in the official interest rates, and thus obtained a policy rule for the Indian economy. Given that this rule was based on most of the indicators listed by the RBI in the MIA, this is probably the only unofficial attempt to extract rules out of apparently discretionary policies that characterized the 1990s.

Given the limitations in understanding the transmission channels and limitations in macroeconometric models in a radically changing environment, research, both within and out of RBI, often focussed on single equation techniques, especially in case of inflation.[25] Among studies in this category, Callen and Chang (1999) attempted to explain and forecast the rate of inflation in India by alternative techniques. Their study revealed that among alternative indicators, M_3 remained an important determinant of inflation. In fact, they observed an increase in the information content of the monetary aggregates since the financial deregulations. Callen and Chang (1999), however, found that an output gap specification did not work well on Indian data.

Besides limitations in the statistical infrastructure that put severe constraints on modelling exercises, three other major differences distinguish the Indian monetary policy framework from that of the developed economies. The first difference is the importance of fiscal dominance in the Indian context. Figure 2 reveals that in many instances earlier, the variable GFD_CEN (gross fiscal deficit of the central government as percentage of GDP) either peaked or displayed an increasing trend near Parliamentary elections, highlighting the existence of the classical time-inconsistency problem. Although numerical values of GFD_CEN have come down sharply from 1998-99 onwards, its value still hovers around 4.0 per cent. The deficits and the consequent borrowing programmes of the Government puts serious constraints on RBI's monetary management. This is because being the debt manager of the Government, its monetary and debt management activities could

[24] Interstingly, Rangarajan (2001) suggests that the lags in case of India may be less, although he does not provide explanations in that article.
[25] Barman (2002) provides a review of the forecasting approach within RBI.

sometimes be in conflict. Two recent developments in this respect could perhaps usher a positive and a welcome change. First, the Fiscal Responsibility and Budget Management Act of 2003 which envisages a vacation of primary financing of the fiscal deficit by the Reserve Bank from 2006-07 would enhance the flexibility for monetary management. Second, there is a strong signal from the Government that in the long run RBI would be freed from the debt management task.

The second difference is the predominance of publicly-owned financial intermediaries in India. Cross holdings and inter-relationships in the financial sector emphasised in planned development were to achieve the social goals headed by the Government. In the context of central bank independence, Reddy (2001c) had sharply criticised this approach what he termed as the "joint family" approach,

> "The approach ignores basic tenets of accounting principles in regard to transactions between RBI and Government. It gives satisfaction to all participants that all of them are working together for growth and stability. In the process, however, the integrity of the respective balance sheets of Government and RBI gets eroded making both autonomy and accountability difficult to assess."

It may however be noted that though this is a problem, important signals have emanated that this approach will be gradually revamped (Reddy, 2005b).

The third difference is that in the operating target. So far as the tactical aspect of monetary policy is concerned, operating target in India is – till now – not clearly mentioned. However, observers of Indian market would readily verify the more and more inclination of the Indian monetary authorities to keep the short-term interest rate within a given corridor, which suggests that the call money rate in the Indian market could be taken as an informal operating target.[26]

An important question is: with all the implicit similarities in objectives but crucial differences in the environment to attain them, how has the Indian framework performed in terms of transparency and communication of policy?

So far as transparency is concerned, the international benchmark document is the Code of Good Practices on Transparency in Monetary and Financial Policies prepared by the International Monetary Fund (IMF). This document is a development of the late 1990s and was accepted by the Interim Committee as late as September 1999. The Indian observance of these codes, in this context, was reviewed by the Advisory Group on Transparency in Monetary and Financial Policies. The Group took a holistic approach and other than a few lacuna already mentioned in this paper, found India to be compliant with most of these codes.

The Advisory Group's major concern was about the apparent lack of transparency in the setting of monetary policy objectives. In this context, it must be stressed that on its part, the RBI had clearly mentioned its projections of a few crucial macroeconomic indicators in its policy statements. It can be argued that these projections also reflect the policy priorities at a certain point of time.

[26] For example, Hawkins (2005, Table 1, p. 60) has characterised the overnight rate in the money market as India's operating target.

In a typical financial year (from April to March), these projections first appear in the annual policy statement. Generally these statements are given by the second half of April or first half of May. The projections may be revised in the Mid-Term Review, which typically occurs in the second half of October or the first half of November. These reports are lengthy and often consist of about 60 pages. As there are no sections devoted to these projections alone, a search for them could be tedious unless the concerned person reads at least a few of these reports to understand the way they are organised.[27] The projections are made available in the part devoted to the monetary policy stance for the coming year. This part (often about 2 to 3 pages) not only provides the projections but also attempts to explain the rationale behind the projections. To examine the "judicious balance" between the mandated objectives to RBI, one must, therefore, read the part of these reports carefully. It can be argued that the complex mandate given to the RBI has led to such a complex communication strategy with elaborate explanations.

So far as communication is concerned, the long lists of its official publications, frequency of the speeches of its top management and its data dissemination, appear to be consistent with the international standards in general (Appendix A lists a few specific suggestions). The RBI website also appears to be in tune with the international benchmark.

Given all these, an important question is to what extent the RBI had been able to establish credibility? As policies during the 1990s were often discretionary and based on judgment, this question becomes crucial in understanding its role in guiding market expectations, a crucial feature in an IT framework. The question is also important in the Indian context, because if in future the RBI changes its framework to IT, the quality of its own assessments would play a significant role.

In this paper, we attempt to answer this question by examining to what extent the RBI outlook had actually materialised. It may be noted that the quality of assessments of RBI during the MT period has already been examined by Mohanty and Mitra (1999). So far as the post-MT period is concerned, Barman (2002) has reviewed the quality of RBI projections corresponding to the rate of inflation and GDP growth rates from 1998-99 to 2001-02. It may be noted that as the MIA approach works with several indicators, it is important to review all RBI projections. In this paper, we examine the RBI projections on five variables, viz., the annual rate of inflation and annual growth rates of GDP, M3, bank deposit and non-food bank credit from the years 1999-00 to 2004-05. Table 1 reports the performance of RBI projections for these five variables.

Table 1 reveals a few important aspects regarding credibility. First, the quality of RBI projections had generally been very good. If we allow a 2.0 percentage point band on either side, the major divergence in case of inflation has occurred only once, in the year 2000-01 when the expected outlook was about 4.5 per cent whereas the actual unfolded to be 7.2 per cent. Its outlook regarding the other variables also reflects a moderate to good performance.

A few general aspects, however, are important to note. First, the projections came at different time points within a year. Although sufficient advance notices are given to the general public for the date of the annual policy statements and also for the mid-term review, so far these dates do not follow a clear pattern. For example, in case of annual policy statements, differences in these dates could be as high as one full month (April 20

[27] Appendix A offers some additional suggestions to the RBI to improve its presentation style.

in 1999-00 and May 18 in 2004-05). Hence, the information content that went in these projections and the time horizons of these projections were also different for different years.

Table 1: RBI Projections of Indicators and Actuals

Financial Year (Date and Paragraph)	Variable	Outlook of the RBI: Value / Range (%)	Actual (%)
1999-00 (April 20, 1999; Para 35 and 36)	Real GDP Growth	6 to 7	6.1
	Rate of Inflation	about 5	3.3
	M3 Growth	15.5 to 16.0	14.6
	Growth in Aggregate Deposit	16.5	13.9
	Non-Food Bank Credit Growth	about 18	16.6
2000-01 (May 03, 2000; Para 31)	Real GDP Growth	6.5 to 7.0	4.4
	Rate of Inflation	4.5	7.2
	M3 Growth	about 15.0	16.8
	Growth in Aggregate Deposit	about 15.5	18.4
	Non-Food Bank Credit Growth	around 16	14.9
2001-02 (April 19, 2001; Para 45)	Real GDP Growth	6.0 to 6.5	5.8
	Rate of Inflation	within 5.0	3.6
	M3 Growth	about 14.5	14.1
	Growth in Aggregate Deposit	about 14.5	14.6
	Non-Food Bank Credit Growth	16.0 to 17.0	13.6
2002-03 (April 29, 2002; Para 42)	Real GDP Growth	6.0 to 6.5	4.0
	Rate of Inflation	Assumed to be slightly lower than 4.0	3.4
	M3 Growth	about 14.0	14.7
	Growth in Aggregate Deposit	about 14.0	16.1
	Non-Food Bank Credit Growth	15.0 to 15.5	26.9
2003-04 (April 29, 2003; Paras 59-61)	Real GDP Growth	about 6.0	8.5
	Rate of Inflation	5.0 to 5.5	5.4
	M3 Growth	at 14.0	16.7
	Growth in Aggregate Deposit	at 14.0	17.5
	Non-Food Bank Credit Growth	15.5 to 16.0	18.4
2004-05 (May 18, 2004; Paras 57-60)	Real GDP Growth	6.5 to 7.0	6.9
	Rate of Inflation	around 5	6.4
	M3 Growth	at 14.0	12.4
	Growth in Aggregate Deposit	at 14.5	13.0
	Non-Food Bank Credit Growth	16.0 to 16.5	31.6

Note: The actual figures of non-food bank credit growth for the years 2002-03 and 2004-05 includes the impact of merges and conversion of a non-banking entity to a bank. Hence, they are not comparable to the projections.

Second, the wordings of the outlooks also do not follow any clear pattern. Sometimes, they are point projections, sometimes expressed with clear upper and lower bounds, sometimes with only one-sided bounds and sometimes with fuzzy words like “about” or “around”. So far as the international standard is concerned, the projections that provide clear lower and upper bounds appear to be too narrow. For example, the range in one-year-ahead forecasts in a fan chart provided by many central banks could be higher than the range provided by the RBI, despite inflation rates in some of these countries being lower and less volatile. The thin range in some of these projections, therefore, could usher unwarranted credibility problems.

Third, despite moving away from monetary targets, the projections for M3 during the MIA appear to be good.

Fourth, the apparently high forecast errors in case of Non-Food Bank Credit growth in the years 2002-03 and 2004-05 are due to mergers as well as conversion of a non-banking entity to a bank. In this paper, the figures for that variable corresponding to the "Actual" column in Table 1 have been taken from Table 230 of the *Handbook of Statistics on Indian Economy (September 13, 2005)* disseminated by the RBI. The notes at the end of the table explain why the growth rates in Non-Food Bank Credit have suddenly jumped in those years, but unfortunately do not mention the comparable figures.

3 Performance under Different Monetary Policy Frameworks

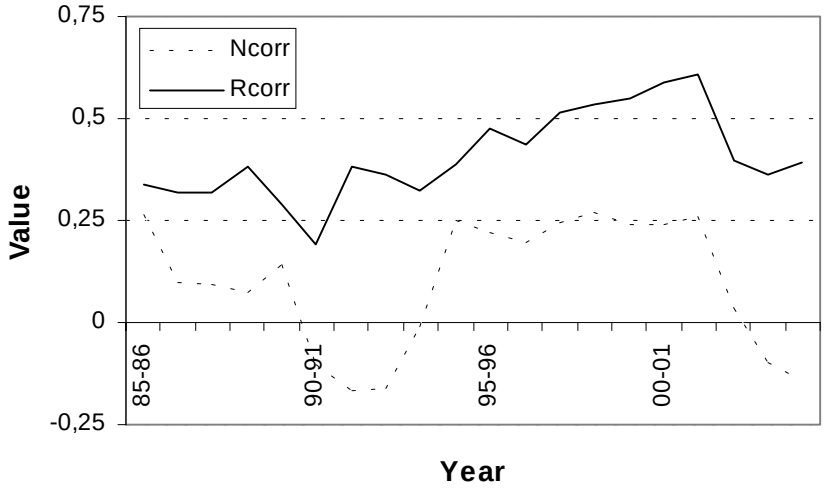
This section examines the performance of the Indian economy under different monetary policy frameworks. Earlier, Mohanty and Mitra (1999)'s review covered this aspect till the end of the MT period and compared the performance of MT (with respect to both the rate of inflation and GDP growth) to that in earlier framework. However, being an early study, it could not include observations after the adoption of MIA. Further, Mohanty and Mitra (1999) did not distinguish the performance by breaking the entire MT period into subperiods. In this section, we attempt to extend their findings by focussing on these two tasks. We also attempt to assess the role of monetary policy in these changes. Subsection 3.1 examines the performance, while Subsection 3.2 is devoted to the second objective.

3.1 Performance of the Indian Economy under Different Monetary Policy Framework

In Section 2 it was discussed that the way RBI words its monetary policy objectives makes it difficult to judge its performance against a well defined benchmark. This is because of at least three reasons. First, to arrive at the benchmark for "adequate" credit, one would require an accurate estimation of demand for credit in the economy. Second, even if this demand is correctly estimated, the cut-off line for "adequate" may still change depending upon one's perception of and aversion to risk. This is because any sanction of credit involves risk and the assessments of risk may be different to the lender and the borrower[28] Third, credit extended "to support growth" may have a time-varying relationship with GDP growth. The strength of association between the two would depend on the efficiency of the banking system, availability of funds from non-bank sources, as well as corporate behaviour in raising finances for projects. Gauging the "adequate" level of credit is, therefore, not an easy task.

[28] For example, results in Banerjee and Duffo (2004) suggest that during the second half of the 1990s, many small firms in India were severely credit constrained. While credit extended in the economy may not be "adequate" from these firms' perspective, the same may not hold from the point of view of the banking sector or the central bank.

Figure 5: Time-Varying Correlation between Growth Rates of GDP and Non-Food Credit



To illustrate the third point, the time-varying correlation coefficient between GDP growth and non-food credit growth is plotted in Figure 5.[29] In Figure 5, NCORR (RCORR) denotes the correlation between nominal (real) credit growth and growth in nominal (real) GDP at factor cost. The time varying correlation coefficients have been calculated with a moving window of 15 years. Thus, the figures pertaining to 1985-86 correspond correlations between variables from 1971-72 to 1985-86.

Figure 5 reveals considerable variations in the strength of association between credit growth and GDP growth over time in India. Several aspects of the relationship could be gleaned from Figure 5. First, there appears to be two periods that experienced sharp fall in both NCORR and RCORR, the first during 1990–92, and the second in 2002–04. Interestingly, the first drop is due to the existence of crisis periods in both ends of the moving window. As our moving window consists of 15 years, the fall of correlation during 1990–92 is due to the first oil shock during 1973–75 and the balance of payments crisis in 1990–92. This suggests that the strength of association between credit and growth may alter drastically during crisis periods. While due to directed lending programs, credit growth did not suffer earlier, other factors led to a sharp fall in GDP growth. For example, in the years 1974-75 and 1975-76, credit grew by 15.9 and 14.8 per cent in nominal terms; the rate of growth in nominal GDP, however, fell sharply from 17.7 to 6.2 per cent. Second, between 1994-95 and 2001-02, NCORR in Figure 5 is fairly stable, while RCORR displays a clear trend. Interestingly, the moving windows during this period do not contain any data points from the volatile 1970s. The trend in RCORR during this period seems to be consistent with the findings of Rodrik and Subramanian (2004). The pro-business policies pursued by the Government since the early 1980s led to more productive use of credit. Third, the sharp fall in NCORR and RCORR after 2001-02 reflects measurement problem. During the years 2002-03 and 2004-05, the RBI data on credit growth included the impact of merger as well as conversion of a non-banking entity into a banking entity. While ideally one should use data excluding the impact of the merger and the conversion to obtain comparable figures for these years, the point that we want to establish is the importance of non-banking sources in demand for funds. Worldwide the difference

[29] The choice of non-food credit growth is made because it is quoted by RBI in its different policy statements.

between banks and non-banking financial companies became thinner during the 1990s. Indian experience is also consistent with this trend. Due to economic reforms, the importance of these other sources in ushering economic growth may no longer be negligible. Fourth, the trend in RCORR reflects a paradox. While during the 1970s and 1980s credit channel was thought to be the only effective channel for monetary policy transmission, the inefficiency in the directed lending programmes did not necessarily lead to growth. While economic reforms opened up other channels, the increased efficiency in the banking sector led to higher association between credit growth and GDP growth. Fifth, despite the increase in the strength of association, the correlation figures are still moderate. Interestingly, if one considers the period of 1985-86 to 2004-05, the correlation coefficient between nominal GDP growth at factor cost and nominal credit growth in India is -0.02. In real terms, the correlation however increases to 0.38.[30] The above observations appear to be consistent with the findings of Misra (2003), who analysed the relationship between credit off-take and growth in 25 states in India from 1980-81 to 2000 and concluded that lack of credit off-take should not be seen as a problem in itself, but should be seen in conjunction with what is happening at the growth front.

A broader interpretation of the objectives of monetary policy in India is, however, price stability and GDP growth. We, therefore, examine the performance with respect to these two variables. Table 2 presents the summary statistics corresponding to performance in specific periods from 1970-71 to 2004-05.

Table 2: Performance under Different Monetary Policy Framework

Period	Annual Average		Standard Deviation	
	Inflation	GDP Growth	Inflation	GDP Growth
Pre-MT (1970-71 – 1984-85)	**8.4**	**3.8**	**8.0**	**3.8**
MT (1985-86 – 1997-98)	**8.1**	**5.7**	**3.0**	**2.3**
Phase 1 (1985-86 – 1992-93)	8.4	5.2	2.9	2.6
Phase 2 (1993-94 – 1997-98)	7.6	6.6	3.3	1.2
MIA (1998-99 – 2004-05)	**5.0**	**6.0**	**1.6**	**1.5**

Framework-wise, there appears to be a clear picture. Inflation in India has reduced gradually. GDP growth rate has increased and volatilities in both the variables have demonstratably reduced under the MIA. The performance with respect to inflation is all the more creditable because during the pre-reform period, prices of a lot of commodities were administered. As these prices were not market determined and were often kept steady artificially with budget support, the problem of controlling their price rise was not relevant.
Thus, apparently, the MIA in India has served its purpose well. However, before jumping to this conclusion, two caveats should be remembered. First, a better performance under the later framework does not prove that it is the change of the framework or monetary policy alone that has *caused* the better performance. In a way, performance with respect to both inflation and growth during a particular framework is the result of many other policies. As monetary policy affects the real sector with a long and variable lag, any assessment of a particular policy on this performance is likely to suffer from the classical post hoc fallacy. Second, the performance comparison should ideally take place in a cereis paribus condition. For example, a major change that could have affected the

[30] These figures use credit growth data that include the impact of merger as well as conversion of a non-banking entity into a banking entity. Comparable credit growth data would probably increase these correlations substantially.

performance during MT period is the agreement between the Central Government and the RBI on curbing monetaisation. That agreement was signed only during 1997, during the last days of MT in India. Similarly, comparisons would be meanigful only if supply shocks are comparable across periods. Subsection 3.2 examines the role of monetary policy in ushering these changes further.

The relative efficacy of frameworks can also be questioned if we break the MT period into two phases. During the phase 2 of MT approach, GDP growth had been about 0.6 percentage point per annum more than that in the MIA. Its volatility is also slightly less than that observed in the MIA. Inflation rate, in contrast, is markedly less during MIA. It has fallen 2.6 percentage point per annum more and its volatility (measured in terms of standard deviation) had also nearly halved compared to the second phase of MT.

Interestingly, a major contrast in performance also becomes visible if we compare the period of 1970-93 to1994-2005, i.e., comparison in performance between open-loop and closed loop policies. The closed loop policies were more actively followed since 1993-94 and more actively encouraged during MIA. It can also be argued that this is what that led to the improvement in economic performance.

3.2 Role of Monetary Policy in the Observed Performance

We now attempt to assess the role of monetary policy in India in ushering the changes in economic performance. The first question before us is: to what extent is monetary policy responsible for the improvement in economic performance? We attempt to answer this question by assessing the contribution of shocks other than monetary policy shocks to inflation in India.

Indian monetary authorities have repeatedly stressed the importance of supply shocks in the Indian context. In fact, the perceived dominance of supply shocks was one factor besides fiscal dominance that led India not to opt for IT. Among other determinants, the role of supply shocks in inflation in India, therefore, needs a careful scrutiny.

The annual rates of inflation observed from 1970-71 onwards seem to confirm the important role of supply shocks. From 1970-71, Indian economy experienced three high inflation episodes, viz., 1972–1975, 1979–1981 and 1990–1995, leading to double digit inflation rates.[31] The first two episodes were clearly due to the increase in international oil prices that had devastating consequences for the Indian economy. Even in the last episode during 1990-95, the role of the supply factor cannot be ignored. Though fiscal profligacy and the balance of payments crisis were responsible for the higher rate of inflation during this episode, one incident that triggered the crisis was the Gulf war.

One way to examine the role of monetary policy would be to examine the core inflation rates. In the Indian context, though official estimates are not available, core inflation measures have been estimated by Samanta (1999) and Mohanty et al (2000) based on different principles. These studies, once again confirm the importance of supply shocks in India. Core inflation estimated by these studies tended to be lower, especially during high inflation episodes. For example, during the high inflation episode of 1990–1995, while the average annual rate of inflation based on WPI was 10.7 per cent, core inflation measures

[31] The rate of inflation (based on WPI) in the year 1993-94 was 8.4 per cent.

based on trimmed mean approach was 9.9 per cent (Mohanty et al, 2000). So far as the contribution of oil shock is concerned, Bhattacharya and Bhattacharyya (2001) examined the role of oil prices on other commodities in a VAR framework. Their results, largely pertaining to the data on the second-half of the 1990s, revealed that a 20 percentage point shock in oil prices lead to about 1.3 percentage point price increase in other commodities at its peak, which typically occurred after five to seven months after the shock.

Unfortunately, the reference periods in these studies either do not include or include only a few observations after the adoption of MIA. However, the performance of inflation in India during the current period seems to further corroborate the importance of supply shocks. If, as per Rangarajan (2001), one considers 5.0– 6.0 per cent as the tolerable range for inflation in the Indian context, there had been two instances where the rate had overshot, e.g. 7.2 per cent in 2000-01 and 6.4 in 2004-05. In each case, the increase was due to that in the fuel, power, light and lubricants (FPLL) group (28.5 per cent and 10.1 per cent respectively). The average rate of annual inflation in manufactured commodities, a very crude estimate of core inflation based on exclusion principles, had been only 3.8 per cent per annum since 1998-99.

These observations are generally supportive of the importance of supply shocks. Their implications being that even if the monetary policy framework in India is changed to formal IT, the band of tolerable range – at least during the initial years – need to be higher than that in the developed countries.

It may, however, be noted that supply shocks may not necessarily lead to high inflation, they can reduce the rate of inflation as well. Inflation reducing supply shocks occur when technological progress makes the economy more efficient, or when competitive pressure in the economy increases. These changes are generally slow, so the fall in inflation is also likely to be slow.

The Indian experience seems to be supportive of the existence of positive supply shocks as well. There is a strong temptation in central bank circle to attribute the entire credit of reduction in inflation to monetary policy alone. Such an attempt would at best be partially true in case of India. One of the major factors behind low inflation in India is the increase in competitiveness and efficiency that the reform process unleashed. Such increase was achieved by combinations of monetary, fiscal, competition and administrative policies. For example, studies like Poddar (2004) have found evidence that the liberalisation process in India had led to greater domestic competition, increasing firm efficiency and India's ability to export in international markets. One can argue that some of these policies initiated during the economic reforms led to a shift in the aggregate supply curve. If the aggregate supply curve shifts, estimating the likely contribution of monetary policy in the reduction of inflation becomes difficult.

Although the precise contribution of monetary policy is difficult to arrive at, it cannot be denied that monetary policy in India facilitated the process of increase in competitiveness and efficiency. There is evidence that policies adopted by the RBI led to increase in efficiency and competitiveness of the financial sector. For example, Bhattacharya and Das (2003) have observed a clear downward trend in the HHI of bank assets during the 1990s. So far as competitive pressure is concerned, different measures of spreads of banking sector also show a clear decreasing trend in the 1990s. Further, results in Prasad and Ghosh (2005b) pertaining to the period 1996–2004 suggest that the Indian banks had operated during that period under competitive conditions. The banking market structure

identified in this study resembles monopolistic competition. It is likely that the increase in competitiveness in the financial sector, *inter alia*, created the background for the increase in competition in other sectors by reducing entry and exit barriers. Thus, though the entire credit of low inflation due to changes in supply situation is not due to RBI action, it should at least have a fair share of credit for that too.

The next question that we ask is: whether the rate of inflation in India has fallen to the desired level? Arriving at a socially optimal rate of inflation is not an easy task. Interestingly, Chakravarty Committee, while highlighting the importance of price stability as the dominant objective of monetary policy, considered the desirable rate of inflation in India to be about 4.0 per cent. It may be noted that this suggestion was made during the late 1980s, when inflation was still a serious problem in many countries. At that time, the figure reflected the international best practices. Rangarajan (2001), in case of India, suggested an alternative acceptable range as 5.0 to 6.0 per cent. Both the figures in the Chakravarty Committee and Rangarajan (2001) are based on judgments, as it was felt that econometric models could not clearly indicate all the costs of inflation. Rangarajan (2001), however, observed that

> "In a globalised economic system, Indian prices cannot remain too much out of alignment with prices in other countries because this has implications for the exchange rate"

Interestingly, in case of India, empirical estimates of the threshold rate of inflation – beyond which it has a negative effect on growth – generally vary between 3 to 7 per cent, although the official estimate is about 5 per cent (Reserve Bank of India, 2002).[32]

In the developed countries, the current desirable rate typically considered is around 1.0–2.0 per cent. If we allow a 2.0 percentage point band on either side, 0.0-4.0% seems to be the general tolerable range. Thus, since 1998-99 the average annual rate of inflation in India (measured in terms of WPI) is not too much out of alignment with that in developed countries. It may be noted that in the Indian context, the rates of inflation based on WPI and CPI had sometimes yielded significantly different estimates and even their long-term relationships had been found to be susceptible (Samanta and Mitra, 1998). Incidentally, the rate of inflation in India based on CPI had been 5.1 during the same period, not much different from the estimates based on WPI.

The next question that we ask is: had monetary policy in India been too tight in ushering these changes? After all, there seemed to be a view as told in Brash (1999) that " …any fool could get inflation below 2 per cent by simply keeping monetary policy tight all times". Measuring monetary policy, despite fundamental contributions of Bernanke and Mihov (1998), is not an easy task. This is especially difficult in the Indian context due to the interim shifts from quantity based to price based signals. Innovative surveys that could provide quick answers relevant to this aspect (by getting feedbacks from the corporate sector) were also conspicuously absent in India during most of the 1990s.

The history of the 1990s, at least indicate one episode where the criticism of "too tight" monetary policy merits a scrutiny. The episode occurred during the year 1995-96, when the flexible exchange rate regime adopted during the early 1990s met its first test. The RBI was not committed to any specific values of the exchange rate, but consistently

[32] One of the latest estimates of the threshold rate of inflation is about 3.5 per cent (Rao, 2003).

maintained its stand on fighting volatilities. A major test came when after a long period of remarkable stability the INR-USD rate depreciated substantially.

During the first half of 1993, Rupee experienced some minor fluctuations against the US Dollar. However, throughout the second half of 1993 and for the almost entire 1994-95, Rupee remained stable at 31.37.From September 1995 onwards, the INR-USD market in India experienced wide volatility. Such wide fluctuations continued till February 1996 and the value of the Rupee against the US Dollar fell as low as to 37.40. However, the RBI intervention to stabilize the market was successful. By April 1996, Rupee stabilized at around 34.23.

The RBI intervention at the foreign exchange market was one reason behind the so called liquidity crunch. Monetary tightening increased real PLR substantially (Balakrishnan, 2005). This was also a year when there was a strong demand for funds both from the government and the commercial sector. The raising of funds through the capital market dropped substantially in 1995-96, while investment demand continued to remain high. This "liquidity crunch" might have choked GDP growth in the 1997-98 to 4.8 per cent from 7.8 per cent in the year 1996-97.

Some researchers like Balakrishnan (2005) held RBI responsible for the liquidity crunch, accusing it as a "bizarre case of no monetary policy". Though questions may be raised whether RBI had acted too cautiously, it may be noted that it occurred during comparatively early years of economic reform. In a nascent market determined economy, unwarranted volatility in the foreign exchange market could have created havoc. The Mexican crisis was still fresh in everybody's mind and the RBI certainly needed to invest on credibility. It can be argued that though GDP growth for one single year suffered, successful management of the volatility in the foreign exchange market helped to establish credibility of RBI. This credibility enhanced substantially after the successful handling of the South-East Asian financial crisis. Thus, even if monetary policy had been "too tight", the RBI action revealed a marked preference in favour of financial stability. Incidentally, 1995-96 is the year when the rate of inflation, after the high inflation episode of 1990-95, began to fall.

The next question that occurs is: how can the rate of inflation in India be reduced further and brought completely in line with that of the developed economies? And has monetary policy any role in bringing down the rate further? An examination of the figures relating to core inflation suggests that other than ensuring financial stability, monetary policy will have a limited *additional* role in this process. The task for aligning the rate of inflation further primarily rests on fiscal, administrative and competition policies that should orient more and more towards the micro-level.

The paper, in this context, highlights a specific aspect of inflation that has so far been ignored by the literature that addressed structural aspects of inflation formation in India. India being a large country, shocks to prices in a particular area could be local. Unfortunately, the WPI data that are used by Indian monetary authorities for policy purpose cannot be used to examine this aspect. However, CPI data that are available for separate cities in India helps us to assess the importance of this problem. The data on CPI for the industrial workers (CPIIW for short) are collected by the Indian Labour Bureau (ILB) from 76 different cities/towns or regions, which appear to be more or less uniformly distributed across 24 States or Union Territories (UTs) in India. The large number of centres available in India enables one to observe the nature of the spatial distribution of the prices.

In a recent study, Das and Bhattacharya (2005) have estimated the first four moments of the spatial distribution, juxtaposing them with the minimum and the maximum rate of inflation observed among these 76 centres from the year 1996 to 2004. Some of the results that emerge from this study are startling. Results revealed that the range over which regional inflation rates vary could be as high as about 20.0 percentage points in a single year, as in the calendar year 1998. It may be noted that during the same year the average rate of inflation based on CPI was 13.4 per cent. The standard deviations of the rate of inflation across regions generally varied between 2.0 to 2.5 percentage points. Further, though in general the spatial distribution were found to be close to the normal distribution, in high inflation years, they tended to become skewed and leptokurtic, with increase in standard deviation as well.

The high spatial variation of inflation in India, despite a common monetary policy, highlights the importance of local supply shocks. Das and Bhattacharya (2005) decomposed each regional series into a common factor and an idiosyncratic component. Idiosyncratic price shocks were found to be more persistent as compared to the common factor. The results also indicated that transportation costs proxied by distance could explain only small a part of the variation in prices between two locations. These results suggest existence of considerable supply bottlenecks at the micro-level. Monetary policy cannot address this problem. Rather, if India opts for formal IT in near future, the existence of significant local shocks in prices is one aspect that should also need a further careful scrutiny. The key is to remove local monopolies and facilitate inter-regional trade. It would be interesting to observe how the distribution would unfold after the incorporation of value added tax (VAT) throughout India.

It may be noted that local shocks could play similar roles in all large countries like China, Brazil, the US, or in countries where regions are separated by geographical barriers (e.g., Indonesia). This problem is also pertinent in supra-national regions like the European Union.

4 How Relevant is the Indian Experience for Other Countries?

To what extent is the Indian experience relevant for other economies, especially the emerging market economies? At the outset, it is stressed that lessons learnt from cross-country studies can only be of general nature. In this section, four such lessons are discussed. These lessons are intertwined and each being dependent on the other, cannot be applied in isolation.

First, the Indian experience seems to suggest that policy packages have to be comprehensive and should have a bird’s eye view on all the sectors and markets as a whole. The half-hearted attempts to liberalise the administrative interest rates in India during the 1980s did not succeed because necessary reforms on other areas were not carried out. The reforms initiated during the early 1990s, in contrast, were decisive and comprehensive. These reforms were joint efforts of both the government and the central bank. The Indian experience, therefore, confirms one of the seven guiding principles of Mishkin (2000) that fiscal policy should be coordinated with monetary policy.

In the context of an economy in transition, one would perhaps need a stronger version of this principle. This is because pursuing market friendly policies in a liberalising economy would tend to increase inter-linkage across sectors. The coordination of policies,

therefore, not only applies to monetary policy and fiscal policy (and thus the central bank and the respective government), it also applies to policies of other organisations in charge of market discipline in their respective domains. These organisations often play a peripheral role in the monetary policy framework. Coordination becomes important because the central bank (and sometimes the government in the economy) may not have full control over these organisations. A successful example of this coordinated approach in India is the creation of the NSE.

The second lesson begins with the general observation that it is extremely difficult to assess the impact of a typical policy measure on real sector in changing circumstances. Cross-country experiences in similar situations can perhaps indicate the broad direction of changes in specific variables, but would fail to give quantitative answers. So far as rigorous analysis is concerned, econometric models that examine time series relationships among macro-variables would also be of limited use in such periods. The best answer, in a few cases in such situations, can perhaps come from panel data analysis. However, in many emerging markets, such databases on specific areas are either not available or if available, are constructed in a cavalier manner. Therefore, when the need arises, it is not uncommon to discover limitations in the existing statistical infrastructure in the economy.

The second important lesson from the Indian experience is that policymakers not only need to be forward looking in terms of monetary policy as suggested by Mishkin (2000), they also need to be forward looking in terms of the statistical infrastructure. In fact, being forward looking in terms of statistical infrastructure is a necessary precondition for the first. This is important because unless data on the relevant variables are available for at least a few years, it is not possible to study interrelationships among them that a forward looking monetary policy would demand.

In the context of emerging market economies, accurate data collection is all the more important because of the existence of a vast unorganized sector. In the developed economies, collection of data from corporate sources can provide a fair picture on lot of issues. However, in an emerging market economy, such data may not reveal the accurate picture, policymakers may typically need complimentary information from surveys of individuals or households. Speedy and accurate data collection, while in emergency, could also be costly in terms of resources. It is, therefore, necessary to devote serious thoughts on this subject. In many cases, the responsibility of data collection or dissemination may belong to organisations on which monetary authorities would have limited control. Coordination of policies, thus also involves data collection.

It may be noted that among emerging markets at least, India has a good statistical infrastructure. India was one of the earliest signatories to the Special Data Dissemination Standard (SDDS) of the International Monetary Fund (IMF). Since the 1990s, the volumes and the quality of statistics collected in India have improved vastly and RBI's contribution in this endeavour had been significant. Yet, as highlighted by Reddy (2005b), this infrastructure, to this date, is not sound enough to have a speedy judgment on labour market situations in India. Indian failure to anticipate this need should serve a lesson to all countries.

The Indian way of dealing with the limitations in the statistical infrastructure can perhaps offer the third important lesson. The limitations are partially offset by initiating formal and informal communication channels with non-central-bank experts. Besides numerous specific problems for which they are consulted, some regular channels for discussions have also been created. A significant step in this direction is the formation of various

Technical Advisory Committees (TACs) in the RBI with representatives from market participants, other regulators (e.g., SEBI) and experts from the academic community.[33] Besides these, the Resource Management Discussion (RMD) before the annual policy is another forum where the views of the management of the commercial banks are listened to.

It may be noted that Blinder (1997) has sarcastically castigated this approach to policy as "ask your uncle" approach, which in his opinion provides a "subterfuge for escaping the discipline of the data" and allows one's "priors to run rampant".[34] Further, so far as the markets are concerned, Blinder (1997) observes that "central banks can create a dog-chasing-its-tail phenomenon by following the markets too closely" by delivering the policy that the markets expect or demand. Blinder (1997) argues that markets tend to get hyper-excited by any stimulus, getting the sign right but exaggerating the magnitude "by a factor between three and 10". He cautions that a central banker who follows the markets too assiduously would be liable to overreact to the current data and tacitly adopt the market's short time horizons as his own. He further urges that "…it is just as important for a central banker to be independent of markets as it is to be independent of politics".

While Blinder's warning is extremely relevant in the Indian context, two aspects that balance this risk in case of India need to be mentioned. First, it can be argued that involvement of members from the academic community in India (as in the case of Blinder himself in the Fed) in the policymaking process often provided an alternative balancing perspective. Even in the 1980s, the RBI had governors and deputy governors who had an academic background. Further, it was Professor Sukhamoy Chakravarty who headed the committee that suggested formal adoption of monetary targeting in case of India during the 1980s. This brings us to the second aspect: the "ask-your-uncle" approach in India has been primarily followed to address long-run structural issues and also to study and to implement international best practices. It can be argued that to settle many of these issues, one needs the element of human judgment. Alternative policy simulations from econometric models, while useful in many cases, may not provide answers to many finer structural problems, especially when there are gaps in the statistical infrastructure. Active cultivation of expert opinion in case of India, on balance, is likely to be a boon rather than a bane. The RBI's actions in this regard also highlight one important aspect of central bank communication that has not yet been forcefully articulated but could serve as a third lesson: central bank communication does not necessarily mean preparing erudite studies or giving sanctimonious lectures, it also means patient listening to non-central bank experts in different markets as well as in academia.

These three lessons, taken together, lead to the fourth one, which concerns the pacing of economic reforms. The choice here is between shock therapy and gradualism.

An important lesson in the Indian context is the careful demarcation between stabilization policies and policies that attempt to address structural issues to make the economy more efficient and competitive. Typical monetary policy measures (e.g., an open market operation, intervention in the foreign exchange market, a change in the central bank interest rate etc.) are often initiated to stabilize specific markets, though in the long-run each of these measures affect aggregate demand. However, when a paradigmatic shift in an economy takes place, many of the policies taken by the central bank not only affect aggregate demand, but in the long-run can also affect competitiveness in that economy,

[33] Mohan (2005b) articulates this strategy and lists the committees in detail.

[34] Blinder (1997)'s criticism is not necessarily restricted to emerging market economies: "…I believe there is too much uncle-asking in government circles in general and in central banking circles in particular".

thus affecting aggregate supply. Some of these policies (e.g., liberalisation of capital account, liberalisation of directed lending, creation of specific financial markets, bank-merger policy) are initiated by central banks themselves, but some (e.g., privatisation of public sector enterprises, guidelines for entries and exits of new firms in specific sectors, labour market reforms) are done by other policymaking bodies. It may be noted that in the developed economies, structural changes in such large scale are generally not needed.

The paper argues that quick and speedy actions on these structural aspects, as suggested by the shock-therapy approach, are not necessarily bad, but are risky. While economic theory and experiences of developed countries prove the usefulness of many of these policies, economic history of the last two decades tell us that if pursued with haste, these policies may go horribly wrong. Pedagogically, undue haste in initiating reforms in these areas without understanding the transmission mechanism in detail is like venturing out to conquer a peak of a mountain in a dark night on a path full of crevasses. The fact that others have conquered similar peaks earlier does not reduce the risk. To expand the analogy, the others who were successful possessed night vision goggles (i.e., a good statistical infrastructure) and detailed maps (i.e., transmission mechanism) and these helped to reveal the way ahead.

Central banks in emerging markets should, therefore, keep a watchful eye on policies that could change competitiveness and efficiency in the economy. As discussed earlier, central banks in many emerging markets may not have the statistical infrastructure to make a quick assessment of how these changes would affect aggregate supply, both in the short and in the long run. The paper argues that in its absence, the discretionary and experimental policymaking that is castigated by Blinder (1997) as "looking out the window" approach carries some rational appeal.[35]

In India, policymakers generally took speedy and decisive actions when it was perceived that condition in a specific market could lead to serious systemic trouble. An interesting development during the 1990s in India was the gradual de-linking of stabilization measures from the annual policy statement or the mid-term review. Till the early 1990s, most of the major monetary policy decisions in India used to be announced only twice in a year with an approximate gap of six moths. However, during the late 1990s, it was stressed repeatedly that the new milieu could demand immediate action from the central bank and policies that dealt with stability of financial markets could not wait for six months. Hence, even measures that conveyed central bank policy signals (e.g., changes in the CRR or the Bank Rate) were carried out whenever it was considered necessary (with press release to explain their necessities). In fact, sometimes policies just involved immediate proactive articulation or clarification, e.g., when it was felt that panic situations like stock market crash or bank runs could lead to systemic trouble. [36]

At the same time, when it came to long-run structural issues, changes were initiated in India in a much more cautious manner. For example, in the context of the debt market reform process in India during the 1990s, Mohan (2005a) observes:

[35] Blinder (1997) compares this strategy to fixing an unfamiliar thermostat in a hotel room and articulates: "At each decision point, the central bank takes the economy's temperature and, if it is still too hot (or too cold), proceeds to tighten (or to ease) monetary policy another notch. With long lags, you can easily see how such myopic decision making can lead a central bank to overstay its policy stance, that is, to continue tightening or easing for too long". This criticism, once again, is a general one and not necessarily restricted to central banks in emerging markets.

[36] While articulating the power of central bank communication, Mohan (2005b) discusses one such speedy action in case of the stock market in India on May 17, 2004, when in the wake of change of Government, stock markets in India witnessed a record fall in price, triggering the index-based circuit-breaker twice during the early hours of the day. The RBI assurance of ensuring the necessary steps was arguably one of the factors that restored stability.

> "The key lesson learned through this debt market reform process is that setting up such a market is not easy and needs a great deal of proactive work by the relevant authorities. An appropriate institutional framework has to be created for such a market to be built and operated in a sustained manner. Legislative provisions, technology development, market infrastructure such as settlement systems, trading systems, and the like have all to be developed"

In sharp contrast to stabilization measures, policies that could have long-run structural significance were mostly taken in India after an interval of six months, i.e., at the time of annual policy statements or the mid-term review. These policies were often adopted after exhaustive consultations with non-central bank experts. Once a suggestion was accepted, the implementation generally followed a specific road map and was often carried out in phases. A few failures during 1980s and early 1990s on specific areas were one possible reason that perhaps led to the adoption of this strategy. The slow and cautious approach was also an implicit recognition of a possible trade-off between high growth and financial stability, and the limitations under which monetary policy in India operated. The actions, on the part of Indian monetary authorities, revealed a marked preference in favour of the second.

5 Conclusion

The paper reviewed the evolution of monetary policy approaches in India with an aim to identify new lessons such evolution could offer. So far as economic theory is concerned, it was observed that the Indian experience could be relevant in two areas, e.g., (i) in understanding the choice of a monetary policy strategy by a central bank in radically different situations and, (ii) in understanding the role monetary policy and the overall policy framework plays in economic performance. So far as the practical angle is concerned, one additional motivation was to examine to what extent the Indian experience, with all its successes and failures could enhance or modify some existing guiding principles for central banks, especially in a rapidly changing situation on which a central bank has limited control.

So far as change in framework is concerned, it is observed that both the traditional theory of Poole (1970) and the coordination theory of Hagen (1999) are relevant to explain India's first change of strategy to MT in the mid-1980s. To the second change to MIA during 1998-99, however, both these theories offer only partial explanations, as this change may also be interpreted as a signal to the market to attach more meaning in official interest rate changes.

In our endeavour to understand the role of monetary policy and monetary framework in the light of Indian experience, it is observed that monetary policy in India so far had largely been discretionary. The discretionary policies, at least during the 1990s, were unavoidable due to the immense structural changes that were required to transform a command and control economy to a market based one. However, consistent with international trends during the 1990s, the motivations that led to such discretionary practices in India had been explained to the economic agents in detail. Despite crucial differences in a few areas, the monetary policy framework in India assimilated many of the best international practices. The RBI's overall performance in transparency and data dissemination were satisfactory. Its performance in assessing the outlook – in full view of public knowledge – had also

been good and this perhaps helped to guide expectations of economic agents along the desired trajectory. Together these features indicate the adoption of a soft, informal and a flexible version of IT framework that had been practiced by many economies before their formal jump to IT. The Indian experience, therefore, further strengthens the observation of Mishkin (1999) that rather than the formal adoption of a target, "the devil is in the details in achieving transparency and accountability".

While monetary policy played an important role in reducing the rate of inflation in India, the paper argues that this achievement was due to combinations of monetary, fiscal, competition and administrative policies. It may be noted that some of these policies, by enhancing efficiency and competition, usher shifts in the aggregate supply curve. As a result, to isolate the likely contribution of monetary policy in reducing the rate of inflation becomes a difficult task, especially in a situation where the relevant statistics pertaining to aggregate supply situations are unavailable. The paper, however, observes that even on this area, monetary policy in India played an important role. It facilitated the increase in efficiency and competitiveness in the overall economy by sharply focusing its attention on the efficiency and the competitiveness in the financial sector.

So far as the relevance of the Indian experience to other countries is concerned, the paper highlights the importance of comprehensiveness of policy measures and coordination of policy-making bodies in an economy, including those that play a peripheral role in the monetary policy framework and those that are involved in data collection. Our discussion revealed that despite improvement in data collection and dissemination, lack of quick information on labour market seriously constrains monetary policymaking in India. The paper observes that in the absence of such information, two-way communications with non central bank experts could be one possible way to partially solve this problem, despite its well known limitations. Another important lesson from the Indian experience is that a careful demarcation of structural policy measures from typical stabilization measures could be helpful. Common sense suggests that for financial stability, the second set of measures should be speedy. It is, however, argued that undue haste in initiating measures falling in the first category – while not necessarily bad – could be risky.

It is this last observation that highlights the importance of perspectives in reviewing the Indian performance. So far, the paper has consciously attempted to avoid the use of normative words like "good", "bad", "sound" or "desirable" in reviewing the actions of Indian monetary policymakers.[37] It is stressed that when one uses any of these words, one immediately takes a normative position. The normative words as mentioned above could only tell us the preferences of that particular person or organisation between high-growth and financial stability. One defining feature of the Indian approach is gradualism. This is in sharp contrast to some of the emerging market economies that adopted shock therapy. To quote Reddy (2005b), policymakers in India had been engaged "in the development of sound and efficient financial intermediaries and markets so as to provide solid foundations for effective transmission of monetary policy". In the short-run at least, the slow approach might have cost India in terms of growth, but the undeniable fact is that India had been relatively free from financial crises in a turbulent world.

The paper ends by highlighting one striking contrast in perspectives in the Indian context. In describing the Indian experience, Reddy (2005b) does not rule out "an element of luck", but opines that investment on institution building was an "exercise of sound judgment and enhancement of skills at all levels". At the other extreme, Balakrishnan (2005) perceives

[37] An exception would be made in Appendix A.

the same experience as a “less than imaginative support to growth”, “a failure to show acceleration” and a “bizarre case of a missing monetary policy”, with a grudging approval that “this does not warrant the conclusion that the reforms failed”. Thus, like the proverbial story of the Indian elephant which would look different to different people, the actions of Indian policymakers would perhaps have different adjectives from different persons or organisations.

Appendix A: Some Suggestions for the RBI

1. Monetary Policy Framework

- The RBI should deemphasize “provision of adequate credit to the productive sectors in the economy” as an objective. The objective may simply be restated as “to support GDP growth” or “to facilitate GDP growth”.
- Many central banks have their own official views on monetary policy transmission process, e.g., Bank of England (1999). The RBI should prepare an official document on monetary policy transmission in India.
- Reviews like Barman (2002) summarise the forecast efforts of the RBI staff. In this context, it would be nice to expand this effort and prepare a document entitled “Economic Models at the Reserve Bank of India” in the line of Bank of England (2000). At this moment, most of the efforts have been restricted either at the individual or at the departmental level and these efforts remain scattered in different RBI publications. For example, the macroeconomic model in RBI (2002) is one such effort in this direction. It is important to integrate these efforts and place them at a prominent place in the RBI website.
- A soft version of “Functions and Workings of the Reserve Bank of India” may be put in a prominent place of the RBI website.
- Arguably, the best place to put these publications would be the “Publications” page of the RBI website (http://www.rbi.org.in/scripts/publications.aspx). At this moment, the break-up of the publications in this page is done on the basis of their periodicity. As these documents would be of permanent nature, a category entitled “Permanent” may be needed at that page, preferably at the top of the page.
- All the above documents may be updated once in a few years (say, five years). Therefore, it is important to attach version numbers or edition numbers to them. To keep track of the changes, all old versions may also be made available at the website.

2. General Infrastructure for Research

- The RBI should improve its web-archive further. Apparently, all the official reports after the adoption of the MIA are available in the website. However, it would be good if this is continued further backwards. Scanned copies of them (in case soft versions are not available) may be loaded at the website. One can of course argue that these types of suggestions are not related to monetary policy framework at al. However, it should be remembered that a general finding from cross-country studies is that history is an important ingredient in the determination of monetary policy framework (Mishkin, 1999). Loading these documents, therefore, is an effort to improve the infrastructure for quality research on many areas, including that on monetary policy framework.
- RBI should prepare a “timeline” in its website.

Statistics

- The RBI should prepare a few "official" measures of core inflation. Efforts in this direction so far have come at individual staff initiative. While the appropriateness of a specific core inflation measure in the Indian context may always be questioned, there is no harm in providing more than a single measure as official measures. The debate on appropriateness of a core inflation measure is primarily an empirical one in nature. Unless and until at least a few such measures are made available, the problem cannot be resolved satisfactorily.
- The RBI should disseminate more and more micro-level banking data. For example, regular dissemination of banking data at district level is possible. This is important in view of the recent findings of persistence of local shocks as in Das and Bhattacharya (2005). Also, Nachane et al have suggested that monetary policy in India may have differential impacts in different areas of India due to differences in financial deepening and industry mix.
- In the *Handbook of Statistics on Indian Economy (September 13, 2005)*, Table 45 (p.96) for Bank Rate, CRR and SLR mentions only the effective date of change. It does not give the date of announcement of the policy. It is important to have these dates to study the announcement effect of RBI policies on financial markets.
- RBI should prepare a permanent document as a guide to monetary, banking and financial statistics. This document may also be categorized as a "Permanent" document and changed after a few years (say five years).

Presentation Style, Transparency and Communication Strategy

- RBI reports and reviews are often too large. With such plethora of information dissemination, the very purpose of information dissemination may be lost. While an executive summary (or a press note) may be too brief for serious researchers, a too big and bulky report, in contrast, carries the risk of verbosity. It can be argued that there is no need to prepare a 95 page quarterly report (Macroeconomic and Monetary Development 2004-05), when other central banks can manage that task within about 60 pages (e.g, the Inflation Report, August 2005 of Bank of England consists of 59 pages, all inclusive).
- One way to make a brief report is to make available a few background or survey papers on specific areas by individual staff members. The Bank's report may either refer these papers or quote from them liberally.
- In Inflation Reports of many central banks, outlooks or projections get a prominent place. They are generally presented either at the beginning or at the end of the report. In case of the RBI, however, the outlook remains hidden within a particular section of the main report. It is perhaps desirable to change to the international presentation style.
- As argued in Section 2.3, the statements pertaining to outlook in the policy documents do not carry any fixed quantitative pattern. One consequence of having no consistent structure is: if one wants to examine whether RBI's projections of specific variables are improving or deteriorating over time, there is no easy quantitative measure (e.g., average absolute error in projection) to summarise the performance.
- The RBI receives many suggestions before policy decisions. To stimulate the policy debate, as well as for the sake of transparency, it is desirable to make these suggestions available in the public domain before policy. Similarly, for greater debate in the public domain, the minutes of the RMD discussions may also be made public.
- At this moment, there is a lack of quick information on outlook or expectation formation in India. Given the nature of the policy formulation process in India, the

paper suggests a scheme that may be implemented quickly. The RBI meets and discusses with the banks on regular basis (e.g., RMD is one channel). Heads of select banks are also invited on the days of monetary and credit policy statement (twice a year) and their views are heard after the articulation of the policy. It would be nice if the banks are given a simple one page form that would convey their outlook on GDP growth and inflation under alternative scenarios, preferably just before policy. A similar form may be given to them immediately after the policy, where they may articulate within a given date (say seven days) what the effect of the policy in their view could be on GDP growth and inflation. While there are specific merits in informal communication, this process of interaction gives it a formal and quantitative structure that might be useful for a very quick evaluation of expectation formation and feel up a gap in the RBI's informational requirement in quantitative terms.

References

Ahluwalia MS, 2002: 'Economic Reforms in India since 1991: Has Gradualism Worked?', *Journal of Economic Perspectives*, **16**, 67–88.

Alexander WE, TJT Balino and C Enoch, 1995: 'The Adoption of Indirect Instruments of Monetary Policy', *International Monetary Fund Occasional Paper No. 126.*

Arif RR, 1996: *Money Demand Stability: Myth or Reality – An Econometric Analysis,* Development Research Group Study No. 13, Reserve Bank of India.

Balakrishnan P, 2005: 'Macroeconomic Policy and Economic Growth in the 1990s', Economic and Political Weekly, XXXX, 3969–3977.

Banerjee AV and E Duffo, 2004: 'Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program', *Mimeo, Department of Economics, MIT.*

Bank for International Settlements, 1997 [Ed.]: *Implementation and Tactics of Monetary Policy,* BIS Conference Papers, No. 3.

Bank for International Settlements, 1998 [Ed.]: *The Transmission Mechanism of Monetary Policy in Emerging Market Economies,* BIS Policy Papers, No. 3.

Bank for International Settlements, 1999 [Ed.]: *Monetary Policy Operating Procedures in Emerging Market Economies*, BIS Policy Papers, No. 5.

Bank for International Settlements, 2005 [Ed.]: *Globalisation and Monetary Policy in Emerging Markets,* BIS Papers No. 23.

Bank of England, 1999: 'The Transmission Mechanism of Monetary Policy, *Bank of England Quarterly Bulletin*, 39, 161–170.

Bank of England, 2000: *Economic Models at the Bank of England*, Bank of England.

Barman RB, 2002: 'Forecasts of Economic Indicators for Monetary Policy in India: An Assessment', IFC Bulletin, 13, 80–93.

Barman RB and TP Madhusoodhan, 1993 : 'Permanent and Transitory Components of Indian Stock Market Returns', *Reserve Bank of India Occasional Papers*, **14**, 81–132.

Bartolini L, G Bertola and A Prati, 2000: 'Day-to-Day Monetary Policy and the Volatility of the Federal Funds Interest Rate', *International Monetary Fund Working Paper No. WP/00/206.*

Bernanke B, 1986: 'Alternative Explanations of the Money-Income Correlation' in *Carnegie-Rochester Conference on Public Policy,Real Business Cycles, Real Exchange Rates, and Actual Policies* by Brunner, K. and A. Meltzer [Ed.] **25,** 49 – 100.

Bernanke B, and A Blinder, 1992: 'The Federal Funds Rate and the Channels of

Monetary Policy Transmission', *American Economic Review,* **82,** 901 – 921.
Bernanke B and M Gertler, 1995: 'Inside the Black Box : the Credit Channel of Monetary Policy Transmission', *Journal of Economic Perspectives*, **9**, 27–48.
Bernanke B and I Mihov, 1997: 'What Does the Bundesbank Target?', *European Economic Review,* **41**, 1025–1054.
Bernanke B and I Mihov, 1998: 'Measuring Monetary Policy', *Quarterly Journal of Economics*, **113**, 869–902.
Bhattacharya BB, RB Barman and AK Nag, 1994: 'Stabilisation Policy Options: A Macroeconometric Analysis', *Development Research Group Study No. 8, Reserve Bank of India.*
Bhattacharya K and A Das, 2003: 'Dynamics of Market Structure and Competitiveness of the Banking Sector in India and Its Impact on Output and Prices of Banking Services', *Reserve Bank of India Occasional Papers*, **24**, 123–159.
Bhattacharya K and GP Samanta, 2003: 'A Tale of Two Indices: The Story of the NASDAQ and the SENSEX', *Journal of Quantitative Economics*, **1 (New Series)**, 89–102.
Bhattacharya K and S Das, 2002: 'Price Discovery at the Beginning of a Trading Day: An Error-Correction Model of the Indian Capital Market', *Applied Economics Letters*, **9**, 529–535.
Bhattacharya K and I Bhattacharyya, 2001: 'Impact of Increase in Oil Prices on Inflation and Output in India', *Economic and Political Weekly,* **XXXVI**, 4735–4741.
Blanchard OJ and D Quah, 1989: 'The Dynamic Effects of Aggregate Demand and Supply Disturbances', *American Economic Review*, **79**, 655 – 673.
Blinder AS, 1997: 'What Central Bankers Could Learn from Academics – and Vice Versa', *Journal of Economic Perspectives*, **11**, 3–19.
Borio CEV, 1997: 'The Implementation of Monetary Policy in Industrial Countries : A Survey', *BIS Economic Papers, No. 47.*
Brash DT, 1999: 'Inflation Targeting: Is New Zealand's Experience Relevant to Developing Countries', *The Sixth L. K. Jha Memorial Lecture, Reserve Bank of India, Mumbai, 17 June.*
Buiter WH, 2000: 'Targets, Instruments and Institutional Arrangements for an Effective Monetary Authority', *Seventh L. K. Jha Memorial Lecture, Reserve Bank of India.*
Callen T and D Chang, 1999: 'Modeling and Forecasting Inflation in India', *International Monetary Fund Working Paper No. WP/99/119.*
Chitre VS, 1986: 'Quarterly Prediction of Reserve Money Multiplier and Money Stock in India', *Artha Vijnana*, **XXVIII**, No. 1 (Artha Vijnana Reprint Series No. 10).
Chitre VS, 1997: 'Foreign Capital Flows and Financial Markets in India', *Journal of Foreign Exchange and International Finance*, **10**, 275 – 282.
Christiano LJ and M Eichenbaum, 1992: 'Liquidity Effects, Monetary Policy and the Business Cycle', *American Economic Review*, **82**, 346 – 353.
Clarida R and M Gertler, 1996: 'How the Bundesbank Conducts Monetary Policy', *NBER Working Paper, No. 5581.*
Clinton K, 1997: 'Implementation of Monetary Policy in a Regime with Zero Reserve Requirements', *Bank of Canada Working Paper 97-8*.
Cottarelli C and A Koourelis, 1994: 'Financial Structure, Bank Lending Rates and the Transmission Mechanism of Monetary Policy', *IMF Staff Papers*, **41**, 585–623.
Cukierman A, 1992: *Central Bank Strategy, Credibility and Independence: Theory and Evidence,* MIT Press.
Das S and K Bhattacharya, 2005: 'Price Convergence across Regions in India', *Bonn Graduate School Economics Discussion Paper No. 1/2005.*
Endo T, 1998: *The Indian Securities Market : A Guide for Foreign and Domestic Investors*, Vision Books, New Delhi.

Feinman J, 1993: 'Estimating the Open Market Desk's Daily Reaction Function', *Journal of Money, Credit, and Banking*, **25**, 231–247.
Fry MJ and DM Lilien, 1986: 'Monetary Policy Responses to Exogenous Shocks', *American Economic Review*, **76**, 79–83.
Goodhart C, 1989: 'The Conduct of Monetary Policy', *The Economic Journal*, **99**, 239–346.
Gupta S, 1977 : *Monetary Planning for India*, Oxford University Press, Delhi..
Hagen JV, 1999: 'Money Growth Targeting by the Bundesbank', *Journal of Monetary Economics,* **43**, 681–701.
Haldane A and V Read, 2000: 'Monetary Policy Surprises and the Yield Curve', *Bank of England Working Paper 106.*
Hamilton JD, 1996: 'The Daily Market for Federal Funds', *Journal of Political Economy*, **104**, 26–56.
Hamilton JD, 1998: 'The Supply and the Demand for Federal Reserve Deposit', *Carnegie-Rochester Conference Series on Public Policy*, **49**, 1–44.
Hawkins J, 2005: 'Globalisation and Monetary Operations in Emerging Economies', *BIS Papers No. 23*, 59–80.
Heffernan SA, 1997: 'Modelling British Interest Rate Adjustment : An Error Correction Approach', *Economica*, **64**, 211–231.
Ho TSY and A Saunders, 1985: 'A Micro Model of the Federal Funds Market', *Journal of Finance*, **40**, 977–988.
Jadhav N, 1990: 'Monetary Modelling of the Indian Economy: A Survey', *Reserve Bank of India Occasional Papers*, **11**, No. 2, June.
Jadhav N, 1994 : *Monetary Economics for India*, Macmillan India, New Delhi.
Jadhav N, 2003: 'Central Bank Strategies, Credibility and Independence: Global Evolution and the Indian Experience', *Reserve Bank of India Occasional Papers*, **24**, 1–104.
Jadhav N, P Ray, D Bose and I Sengupta, 2005: 'Financial Sector Reforms and the Balance Sheet of the RBI', *Economic and Political Weekly*, **XXXX**,1142–1149.
Joshi V and IMD Little, 1996: *India's Economic Reforms, 1991-2001,* Clarendon Press, Oxford.
Kanagasabapathy K, 2000 : 'Monetary Policy and Role of Central Bank : Indian Experience', *Mimeo, Reserve Bank of India.*
Kannan R, 1999: 'Inflation Targeting : Issues and Relevance for India', *Economic and Political Weekly*, **XXXIV**, 115–122.
King M, 1999: 'Challenges for Monetary Policy : New and Old', *Symposium on "New Challenges for Monetary Policy" sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 27 August, 1999.*
Krishnan B and SS Narta, 1997 : *Security Markets in India*, Kanishka Publishers, New Delhi.
Krishnamurty K, 2002: 'Macroeconomic Models for India: Past, Present and Prospects', *Economic and Political Weekly*, **XXXVII**, No.42, (October 19).
Laurens B, 1994: 'Refinance Instruments : Lessons from their Use in Some Industrialised Countries', *International Monetary Fund Working Paper 51.*
Leeper EM and DB Gordon, 1992: 'In Search of the Liquidity Effect', *Journal of Monetary Economics*, **29**, 341 – 369.
Mahadeva L and P Sinclair, 2001 [Ed.]: *The Transmission Mechanism of Monetary Policy*, Mimeo, Centre for Central Banking Studies, Bank of England.
Malhotra RN, 1997: 'Liberalising Interest Rates' in *Banking & Financial Sector Reforms in India* by R. Kapila and U. Kapila (Ed.), Vol-2, Academic Foundation, 45–49.
McKibbin WJ and K Singh, 2000: 'Issues in the Choice of a Monetary Regime for India', Mimeo, Australian National University.

Mishkin FS, 1999: 'International Experiences with Different Monetary Policy Regimes', *NBER Working Paper 7044.*
Mishkin FS, 2000: 'What Should Central Banks Do?', *Federal Reserve Bank of St. Louis Review*, **November/December**, 1–13.
Mishkin FS, 2001: *The Economics of Money, Banking and Financial Markets*, Addison Wesley.
Misra BM, 1997: 'Fifty Years of the Indian Capital Market', *Reserve Bank of India Occasional Papers*, **18**, 351 – 384.
Misra BS, 2003: 'Analytics of Credit-Output Nexus in India', Reserve Bank of India Occasional Papers, 24, 145–171.
Moazzami B, 1999: 'Lending Rate Stickiness and Monetary Transmission Mechanism : The Case of Canada and the United States', *Applied Financial Economics*, **9**, 533–538.
Mohan R, 2005a: 'Financial Sector Reforms in India: Policies and Performance Analysis', *Economic and Political Weekly*, **XXXX**, March 19, 1106–1119.
Mohan R, 2005b: *Communications in Central Banks: A Perspective,* Speech given at the SAARC FINANCE Governors' Symposium, Mumbai, September 9, 2005.
Mohan, 2005c: 'Globalisation, Financial Markets and the Operation of Monetary Policy in India'in Bank for International Settlements Papers No. 23, 161–170.
Mohanty D and AK Mitra, 1999: 'Experience with Monetary Targeting in India', *Economic and Political Weekly*, **XXXIV**, 123–132.
Mohanty D AK Mitra and M Ramaiah, 2000: 'Measures of Core Inflation for India', *Economic and Political Weekly*, **XXXV (Special Issue: January 29)**, 273–282.
Muller P and M Zelmer, 1999: 'Greater Transparency in Monetary Policy : Impact on Financial Markets', *Bank of Canada Technical Report No. 86.*
Nachane DM, P Ray and S Ghosh, 2002: 'Does Monetary Policy Has Differential State-Level Effects? An Empirical Evaluation', *Economic and Political Weekly*, **November 23**.
Nag AK and GP Samanta, 1994: 'Inflation in India During the 80s : An Analytical Review', *Economic and Political Weekly*, **XXIX**, 431–439.
Nag AK and G Upadhyay, 1993: 'Estimating Money Demand Function : A Cointegration Approach', *Reserve Bank of India Occasional Papers*, **14**, 47–66.
National Stock Exchange of India Limited, 1998: "Indian Securities Market : A Review", *National Stock Exchange of India Limited.*
Palanivel T and LR Klein, 1999: 'An Econometric Model for India with Emphasis on the Monetary Sector', *The Developing Economies*, **37**, 275–336.
Pani PK, 1984: 'A Macromodel of Indian Economy with Special Reference to Output, Demand and Prices (1969-70 to 1981-82)', *Reserve Bank of India Occasional Papers*, **5,** No. 2, December.
Pangaraiya A, 2004: 'Growth and Reforms during 1980s and 1990s', Economic and Political Weekly, 36, 2581–2594.
Poddar T, 2004: 'Domestic Competition Spurs Exports: The Indian Example', *International Monetray Fund Working Paper No. WP/04/173.*
Poole W, 1970: 'Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macro Model', *Quarterly Journal of Economics*, **84**, 197–216.
Prasad A and S Ghosh, 2005a: 'Monetary Policy and Corporate Behavior in India', *International Monetary Fund Working Paper No. WP/05/25.*
Prasad A and S Ghosh, 2005b: 'Competition in Indian Banking', *International Monetary Fund Working Paper No. WP/05/141.*
Price L, 1996: 'Economic Analysis in a Central Bank – Models Versus Judgment', *Mimeo, Centre for Central Banking Studies, Bank of England.*
Raju MT, 2000: 'Transaction Cost for Equity Shares in India', *Securities and Exchange Board of India Working Paper Series No. 3.*

Rakshit M, 2001: 'Restoring Fiscal Balance through Legislative Fiat : The Indian Experiment', *Economic and Political Weekly*, **XXXVI**, 2053–2062.
Rangarajan C., 2001: 'Some Critical Issues in Monetary Policy', *Economic and Political Weekly*, **XXXVI**, 2139–2146.
Rangarajan C and A Singh, 1984: 'Reserve Money : Concepts and Policy Implications for India', *Reserve Bank of India Occasional Papers*, **5**, 1–26.
Rangarajan C and MS Mohanty, 1997: 'Fiscal Deficit, External Balance and Monetary Growth – A Study of Indian Economy', *Reserve Bank of India Occasional Papers*, **18**, No. 14, December.
Rao DC, TR Venkatachalam and A Vasudevan, 1981: 'A Short Term Model to Forecast Monetary Aggregates : Some Interim Results', *RBI Occasional Papers,* **2**, 113–140.
Rao MJM and B Singh, 1995: 'Analytical Foundations of Financial Programming and Growth Oriented Adjustment', *Development Research Group Study No. 11, Reserve Bank of India.*
Rao MJM, 2003: 'Science of Monetary Policy: Some Perspectives on the Indian Economy', *Economic and Political Weekly*, **XXXVIII**, 809–818.
Reddy YS, 1997: 'Efficiency of Indian Stock Markets : An Empirical Analysis of Weak Form EMH of the BSE', *Proceedings at the Capital Markets Conference, UTI Institute of Capital Markets, December 26-27.*
Reddy YV, 1999: 'Monetary Policy Operating Procedures in India', in *Monetary Policy Operating Procedures in Emerging Market Economies* by the Bank for International Settlements [Ed.], pp. 99–109.
Reddy YV, 2001a: Parameters of Monetary Policy in India**,** *Speech at the 88th Annual Conference of the Indian Econometric Society at Madras School of Economics, Chennai on January 15, 2002.*
Reddy YV, 2001b: 'Developments in Monetary Policy and Financial Markets', *Reserve Bank of India Bulletin*, **LV**, 599–614.
Reddy YV, 2001c: 'Autonomy of the Central Bank : Changing Contours in India', *Speech at Indian Institute of Management at Indore on October 3, 2001.*
Reddy YV, 2001d: 'Communications Policy of the Reserve Bank of India', Speech delivered at the 150th anniversary of the Reuters Group at Mumbai on August 28, 2001.
Reddy YV, 2002: Monetary and Financial Sector Reforms in India: A Practitioner's Perspective, *Speech at the Indian Economy Conference, Program on Comparative Economic Development (PCED) at Cornell University, USA, on April 19-20, 2002.*
Reddy YV, 2005a: Monetary Policy: An Outline, *Speech at the Annual Conference of Andhra Pradesh Economic Association, at Visakhapatnam on February 12, 2005.*
Reddy YV, 2005b: Globalisation of Monetary Policy and Indian Experience, Speech at the *Eighth Meeting of the BIS Working Party on Monetary Policy in Asia, held at the RBI, Mumbai on June 6-7, 2005.*
Reseve Bank of India : Annual Reports of Different Years.
Reserve Bank of India, 1985 : Report of the Committee to Review the Working of the Monetary System, (Popularly known as Chakravarty Committee).
Reserve Bank of India, 1987 : Report of the Working Group on the Money Market, (Popularly known as Vaghul Committee).
Reserve Bank of India, 1991 : Report of the Committee on the Financial System, (Popularly known as Narasimham Committee I).
Reserve Bank of India, 1997 : *Report of the Committee on Banking Sector Reforms*, [Popularly known as the Narasimham Committee Report II, and referred as Narasimham(1997) in the main document].
Reserve Bank of India, 1998: *Report of the Working Group on Money Supply : Analytics and Methodology of Compilation*, (Popularly known as Reddy Committee).

Reserve Bank of India, 1998: *Report of the Committee on Banking Sector Reforms*, (Popularly known as Narasimham Committee II).
Reserve Bank of India, 2000a: *Report of the Advisory Group on Transparency in Monetary and Financial Policies.*
Reserve Bank of India, 2000b: Annual Report for the Year 1999-00.
Reserve Bank of India, 2001a: *Report of the Advisory Group on Data Dissemination.*
Reserve Bank of India, 2001b: *Report of the Advisory Group on Fiscal Transparency.*
Reserve Bank of India, 2002: *Report on Currency and Finance 2000-01.*
Rodrik D and A Subramanian, 2004: 'From "Hindu Growth" to Productivity Surge: The Mystery of the Indian Growth Transition', *NBER Working Paper No. 10376.*
Samanta GP, 1999: 'Core Inflation in India: Measurement and Policy Perspectives', *Reserve Bank of India Occasional Papers*, **20**, 23–53.
Samanta GP and S Mitra, 1998: 'Recent Divergence Between Wholesale and Consumer Prices in India – A Statistical Exploration', *Reserve bank of India Occasional Papers*, **19**, 329–344.
Sastry DVS, B Singh and K Bhattacharya, 2001: 'Monetary Policy Transmission from Official Interest Rates to Lending Rates in India', *Mimeo, Reserve Bank of India.*
Sims C, 1986: 'Are Forecasting Models Usable for Policy Analysis', *Federal Reserve Bank of Minneapolis Quarterly Review*, **10**, 2 – 16.
Srimany AK and GP Samanta, 1998: 'Identification of Monetary Policy Shock and Its Effects on Output and Price : A Structural VAR Approach', *Reserve Bank of India Occasional Papers*, **19**, 109 – 128.
Strongin S, 1995: 'The Identification of Monetary Policy Disturbances : Examining the Liquidity Effect', *Journal of Monetary Economics*, **35**, 463 – 497.
Swank J and van Velden L, 1997: 'Instruments, Procedures and Strategies of Monetary Policy : An Assessment of Possible Relationships for 21 OECD Countries' in *Implementation and Tactics of Monetary Policy*, by the Bank for International Settlements [Ed.] (Conference Papers, Vol. 3).
Van't dack J, 1999: 'Implementing Monetary Policy in Emerging Market Economies: An Overview of Issues' in *Monetary Policy Operating Procedures in Emerging Market Economies* by the Bank for International Settlements [Ed.], pp. 3–73.
Vasudevan A, 1977: 'Demand for Money in India – A Survey of Literature', *Reserve Bank of India Occassional Papers*, **2**, 58–83.
Vasudevan A, 2001: 'International Standards and Codes and Financial Stability', *Economic and Political Weekly*, **XXXVI**, 1733–1737.
Whitley JD, 1997: 'Economic Models and Policy-Making', *Bank of England Quarterly Bulletin*, **37**, May.
Woodford M, 2000: 'Pitfalls of Forward-Looking Monetary Policy', *American Economic Review*, **90**, 100–104.