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Exchange Rate Management in India : An Empirical Evaluation

Michael Debabrata Patra & Sitikantha Pattanaik*

Drawing from a strand in the literature, this paper develops objective indicators i.e., indices of exchange market pressure, intervention activity and monetary conditions in order to assess the efficacy, in terms of both timing and magnitude, of policy measures in assuaging exchange market pressures. The theoretical underpinning for the indices are drawn from a simple monetary model of exchange rate determination. This indices are found to perform well in tracking exchange market activity and policy action has been successful in relieving exchange market pressure. Simplicity in the computation of these indices and their superiority in terms of quick availability, in encompassing overall developments in the balance of payments and in reflecting market activity recommends their use for operational purposes.

Since March, 1993 i.e., with the institution of the market based exchange rate system the conduct of exchange rate policy in India has attracted close scrutiny and evaluation. In the period from October 1993 to August 1998, the policy stance of ensuring orderly market conditions and allowing the exchange rate to reflect the macro economic fundamentals has been subjected to alternating phases of exchange market pressure, requiring the Reserve Bank of India (RBI) to 'lean against the wind' against speculative attacks and also to 'lean with the wind' in order to ensure soft landings of the exchange rate in the face of the perceived need for correcting overvaluation. The timing and magnitude of the RBI's intervention in the exchange market has been assessed in various forms, ranging from technical charting to mechanistic interpretations of the drift in the real effective exchange rate (REER). A rigorous empirical evaluation of exchange rate management, drawing from theoretical underpinnings has, in general, been lacking.

With the abandonment of the Bretton Woods parities and the failed tryst with freely floating exchange rates indeed, the first ma-

* Shri Michael Debabrata Patra is Director and Shri Sitikantha Pattanaik is Assistant Adviser in the Department of Economic Analysis and Policy in the Reserve Bank of India. The authors are grateful to Shri Satyananda Sahoo for valuable help.

major intervention had occurred by late 1974 and early 1975 to stabilise the US dollar - central banks the world over have chosen to manage exchange rate regimes, the degree of management varying from economy to economy depending on macro economic policy objectives and the state of the development and integration of financial markets. The exchange rate regime in India can best be characterised as 'intermediate' between fully managed and freely floating regimes. Exchange rate policy is generally viewed as subserving the monetary policy stance. Given the evolutionary stage in the development of the foreign exchange market and its fractured linkages with the rest of the market continuum, episodes of exchange market turbulence have essentially been viewed as resulting from developments which do not reflect the underlying fundamentals, amplified by unidirectional expectations in an underdeveloped market. The policy response, however, has generally been crafted in terms of the conventional approach to monetary disequilibrium, reflected in reserve changes, exchange rate adjustments and management of monetary conditions, in general, through the use of instruments of monetary policy. Consequently, an important requirement for the successful conduct of exchange rate policy is a reasonably accurate assessment of pressures in the exchange market and the calibration of policy measures in response to market pressures.

Drawing from a strand in the literature, an attempt is made in this paper to develop objective indicators of exchange market pressure and intervention activity so as to evaluate exchange rate management in the context of the ability to assuage market pressures on the exchange rate of the rupee in the market based exchange rate regime (1993:03 to 1998:03). Although the focus of the paper is on the period 1993-98, analysis is conducted for the period 1990-98 since the institution of the market regime was facilitated through important structural and regime changes in the aftermath of the balance of payments crisis of 1990. An index of Exchange Market Pressure (EMP) and its operational variant, the Monetary Conditions Index (MCI) is proposed for the purpose of policy monitoring. The MCI, which has come to be employed as a monitoring indicator by various central banks who target 'rate' vari-

ables (in preference over quantity variables) in the conduct of monetary policy, helps to evaluate the extent to which monetary conditions contribute or run counter to exchange market pressures. As the EMP and the MCI take into the overall developments in the balance of payments reflected in the money account, they are relatively efficient alternatives to the conventional REER which is centred on the trade account and yields little insights into balance of payments developments in the face of a mobile capital account. An Indicator of Intervention Activity (IIA) is also constructed to assess the monetary authority's efficacy of managing exchange market pressures reflected in movements of the EMP. These indicators draw upon the inter linkages between monetary policy and exchange rate developments which has been recognised by the authorities in India in the recent period. Thus, the paper provides an empirical framework for evaluating monetary policy in terms of its exchange rate objective. In response to the academic debate on the nature of the exchange rate regime in India, the paper offers a methodology for an ordinal measurement of the degree of 'management' in the exchange rate regime.

In the following Section, a brief review of the select contributions in the literature dealing with the development of the indicators proposed here is presented. In Section II, the theoretical model employed in this paper is described. Section III presents the results of the empirical estimation of the model. In Section IV, an evaluation of India's exchange rate policy in the period since March 1993 to March 1998 is made in terms of the behaviour of the indicators developed in this paper. The final Section contains concluding remarks.

Section I Review of Literature

With the integration of financial markets globally, massive volumes of turnover has endowed markets with such might that national authorities seem diminutive in comparison and cannot realistically hope to impose their will on the market. Yet central banks repeatedly intervene in foreign exchange markets, usually contesting

the market view, hoping to nudge the markets in the desired direction. Conventional wisdom embodied in the asset market approach—essentially the flex-price and sticky-price monetary models holds that sterilised intervention, which leaves the volume of money stock unchanged, is largely ineffective in its impact on the exchange rate through monetary channels of transmission although through the expectations channels, even sterilised intervention can alter the current exchange rate by signaling the future course of monetary policy. For this to occur, however, intervention has to be reinforced by monetary policy measures. In portfolio balance models where the assumption of perfect substitutability between domestic and foreign assets is relaxed, sterilised interventions have an impact on the exchange rate; however, the initial change in the exchange rate sets off chain reactions in the current and capital accounts of the balance of payments which, over time, reverse the initial exchange rate change. The effectiveness of unsterilised intervention in affecting the exchange rate is undisputed in the received theories of exchange rate determination. Unsterilised intervention, by causing changes in countries' money supplies, delivers a monetary shock to the exchange rate in much the same manner as monetary policy; in fact, under conditions of perfect substitutability, monetary policy and unsterilised intervention are undistinguishable in their impact on the exchange rate. Unsterilised intervention is to be regarded as an instrument of monetary policy with no independent power over the foreign exchange market. Investigating whether unsterilised intervention to stabilise the exchange rate is compatible with a regime in which monetary aggregates are used as intermediate targets, Genberg and Roth (1979) showed that efforts to moderate movements of the exchange rate in one period by reducing the money supply through unsterilised intervention will be frustrated in the subsequent periods. The commitment to a monetary target and the gradual equalisation of foreign and domestic interest rates will result in a more than average growth in the money supply. Thus, the impact of unsterilised interventions on the exchange rate is not expected to be realised beyond the short run. Since the mid-eighties, however, central bank interventions have caused markets to take note of their visible effects, suggesting the need for a reconsideration of the conventional wisdom.

Girton and Roper (1977) can be regarded as the seminal contribution to the literature on the development of a measure of exchange market pressure. They developed the measure in the framework of the monetary approach to the balance of payments under which money stock disequilibrium (mismatch between demand for and supply of money) is reflected in reserve movements signifying official intervention under a fixed exchange rate regime or in exchange rate changes in a flexible exchange rate regime. In a hybrid regime, money stock disequilibrium is manifested in a combination of official intervention through use of reserves and some amount of exchange rate movements which correspond to the level of the exchange rate considered desirable from the policy point of view. Domestic monetary policy and the extent to which monetary authorities can pursue an independent exchange rate objective within the monetary policy framework are to be assessed against external monetary conditions. They estimated exchange market pressure in a bilateral model comprising Canada and the USA, with the USA representing world monetary conditions. An attempt on the part of the Canadian monetary authorities to increase the growth rate of money supply results in an almost equivalent rate of depreciation in the exchange rate or a loss of reserves at an equivalent rate in relation to a certain base or some combination of the two. Exchange market pressure was found to be impervious to the composition of the authority's intervention i.e., reserve changes and exchange rate adjustments.

Pradhan, Paul and Kulkarni (1989) adapted the Girton and Roper model to Indian conditions over the period 1976 to 1985, using quarterly data to evaluate the relevance of the monetary approach to exchange rate determination. They found reasonably strong evidence for the 'monetarist' hypothesis that increase in money supply leads to reserve losses and exchange rate depreciation. In their view, the monetary authority in India exercises a choice between altering the level of reserves and allowing the exchange rate to adjust to market pressures in response to excess domestic liquidity shocks. Exchange market pressures were, however, reflected more in reserve losses than in exchange rate adjustments giving credence to the view that exchange rate policy in

India is conducted with an exchange rate target in perspective rather than a market approach of ensuring orderly rate determination consistent with the underlying monetary conditions.

Weymark (1995) proposed indices of exchange market pressure and intervention in terms of what may be regarded as a generalised version of the Girton and Roper approach in a small open economy model with perfect asset substitutability but without the rigid monetarist assumption of continuous purchasing power parity. While Girton and Roper merely estimated an equation for exchange market pressure in the context of a money demand function in the tradition of the monetary approach, Weymark developed indicators of exchange market pressure which are observable and therefore, useful for policy analysis. Exchange market pressure was defined as the exchange rate change required to relieve excess demand for a currency in the absence of exchange market intervention by the monetary authority. In a managed floating regime, interventions in the form of reserve changes and monetary policy measures in the form of changes in the cost and availability of domestic liquidity are to be translated into exchange rate equivalents and then combined with the observed changes in the exchange rate to yield a composite indicator of exchange market pressure. Despite the fact that sterilisation segregates the money market and the foreign exchange market and can cause a change in the underlying monetary conditions which can obscure exchange market pressure to a certain extent (Pradhan, *et al* pointed out that the absence of sterilisation in framing the EMP model in Girton and Roper is a limitation since the existence of sterilisation can cause simultaneous equation problems), Weymark showed that the market clearing condition necessary to generate the index of exchange market pressure obtains with or without sterilisation. Weymark also proposed an intervention index, developed on the lines of Frenkel's (1980) index of managed float, with the operational advantage of being computable from observable data. Both bilateral and multilateral indices were calculated to evaluate Canada's exchange rate policy over the period 1975 to 1990 using quarterly data. The behaviour of the indices suggested that the pursuit of an exchange rate target was the core objective of the intervention policy in the sample period in Canada.

Section II The Methodology

In the tradition of the asset market approach to exchange rate determination, the exchange rate is viewed as the relative price of national monies, determined by the relative supplies in relation to demand. Thus, while the demand for exports may be formed by a host of underlying real factors, the timing and magnitude of export proceeds flowing into the foreign exchange market responds to interest rate differentials, exchange rate expectations and exchange market conditions, both spot and forward, with little to do with the real factors that caused the export shipment. Similarly, the decision to contract external commercial borrowing may have been provoked by real developments such as the need for capacity expansion, but the timing of bringing in the funds would depend on interest rate differentials and their movements vis-a-vis the forward premia, current and expected exchange rates and the like.

In any economy, irrespective of the wedges between segments of the financial market spectrum created by exchange controls and other barriers, market agents hold a portfolio comprising, inter alia, stocks of domestic and foreign monies. Given the relative rates of return and the degree of substitutibility between domestic and foreign assets, they strive to achieve portfolio balance. In the face of an exogenous, domestic monetary shock embodied in an excess supply of money, market agents would reduce domestic money balances and seek to acquire foreign money balances. In a freely floating exchange rate regime, the price of the domestic money would fall i.e., domestic interest rates would decline and the exchange rate would depreciate. Given the relationship between money, interest rates and exchange rates, the decline in interest rates and exchange rates would cause the demand for domestic money balances to rise until monetary equilibrium is restored. On the other hand, in a fixed exchange rate regime, domestic money balances would be exchanged for foreign goods, services, financial assets and money balances until portfolio balance is restored through the monetary authority meeting the resultant increase in demand for foreign money by losing reserves until monetary bal-

ance is restored. In the intermediate forms of exchange rate regimes that characterise the real world, a combination of the effects described obtain. Monetary authorities may, in pursuit of a longer term strategy, seek to contest these short run market outcomes. By signaling their stance through various direct policy instruments reflected in changes in the domestic component of base money and in foreign exchange reserves and through indirect instruments such as changes in strategic interest rates, monetary authorities may attempt to induce shifts in the demand for and supply of domestic and foreign money balances, and thereby change or even reinforce the market view on the monetary conditions.

The model developed here draws heavily upon Weymark while taking into account the specific features of the Indian economy. It is drawn up under the assumptions that the demand for money is 'fairly stable', the emerging role of interest rates as an argument in the money demand function-'interest rates too seem to exercise some influence on the decisions to hold money'- the importance of the exchange rate objective of monetary policy in the context of the emerging linkages between money, foreign exchange and capital markets and a loose form of purchasing power parity which links domestic prices to foreign prices in a probabilistic form for an economy with a growing degree of openness (supported by the use of the REER as an information variable for exchange rate policy). The construction of the model draws inspiration from the underscoring of the need for a multiple indicator approach and the perceived utility of a Monetary Conditions Index in a regime where targeting rate variables assumes importance (Annual Reports of the RBI, 1995-96, 1996-97 and 1997-98; Monetary and Credit policy for the Second Half of 1997-98 and for the First Half of 1998-99).

The model is set out as follows :

- (1) $M_t = a_0 + a_1 P_t + a_2 Y_t - a_3 I_t + u_t$
- (2) $P_t = b_0 + b_1 P_t + b_2 E_t$
- (3) $I_t = I_t + E(E_{t+1} - E_t)$
- (4) $M_{st} = M_{s(t-1)} + h(\Delta NDA + \Delta NFA)$
- (5) $\Delta NFA = -u_t * (\Delta E_t)$

where,

- Mdt = Demand for money;
 Pt = Index of wholesale prices (domestic);
 Yt = Income/output, proxied by industrial production;
 It = Nominal interest rate represented by the call money rate, monthly averages;
 Et = Nominal exchange rate expressed in multilateral form i.e., nominal effective exchange rate (NEER) of the rupee, 36 country bilateral weights;
 Ft = Forward exchange rate;
 Mst = Supply of money;
 NDA = Net domestic assets;
 NFA = Net foreign assets;
 ^ = Respective variables for rest of the world;
 u = Policy authorities response coefficient;
 h = money multiplier;
 Δ = changes in stocks or relevant variables;

Equation (1) is the conventional money demand function employed in India augmented to include the interest rate as an argument signifying the opportunity cost of holding money. Output represented by indices of industrial production in the absence of monthly data on GDP is assumed to be exogenous. Equation (2) represents the version of the functional relationship between domestic prices and foreign prices considered in this model: domestic prices are assumed to be responsive to foreign prices in a functional form but purchasing power parity as a rule is not imposed. Equation (2) essentially allows for the estimation of the exchange rate impact on domestic prices. Equation (3) is the uncovered interest rate parity (UCIP) condition which is set out as an underlying assumption relating to the substitutability between domestic and foreign assets rather than a relationship proposed for empirical testing. It is presented as a part of the model specification to allow the model to be identified. Equation (4) describes the standard money supply formation process under the money multiplier approach, implying that any increase in nominal money stock could be on account of the last period's money stock plus the increase in net domestic assets and net foreign assets of the monetary au-

thority accruing to the current period's money stock through the money multiplier. Under the assumption that the money market clears continuously, the equilibrium condition would be reflected in the identity $M_s = M_d$. Equation (5) represents the reaction function of the authorities. Under a freely floating exchange rate, the value of $u_t = 0$. The monetary authority does not intervene in the exchange market and hence there is no change in NFA and money supply. When the authorities, on the contrary, peg the exchange rate at a particular level (i.e. $u_t = \infty$), there is unlimited intervention and hence proportionate changes in NFA and money supply. (Here, the general assumption is that the authorities intervene only by changing NFA and not by changing NDA; as Weymark (op.cit) has shown, compensating variations in NDA due to sterilisation do not affect the monetary equilibrium condition. Furthermore, in India, variations in domestic credit are not systematically used to influence the exchange rate of the rupee). The value of u_t in equation (5) thus gives an idea about the degree to which exchange rate is managed. u_t can assume negative values when interventions are used aggressively to obtain an exchange rate change which is contrary to or significantly larger than market expectations.

Following Weymark, the EMP can be derived as

$$EMP_t = \Delta E_t + n \Delta NFA \quad \text{where } n = -1 / [b_2 + a_3]$$

and IIA as

$$IIA_t = n \Delta NFA / EMP_t$$

The calculation of EMP and IIA thus hinges critically upon the calculation of the elasticity 'n' which, in turn, depends upon estimates of the parameters b_2 and a_3 i.e., the coefficient of the exchange rate as a determinant of the domestic price level and the interest elasticity of the demand for money respectively. These parameters can be obtained by estimating Equations (1) and (2) of the model.

EMP measures the excess demand/supply for/of foreign exchange associated with the exchange rate policy. It does not mea-

sure the actual exchange rate change warranted by conditions of demand and supply but instead the degree of external imbalance and the presence/absence of speculative activity. The critical indicator in the EMP is its sign. Negative values indicate downward pressures on the exchange rate while positive values reflect upward pressures which holds irrespective of the choice of the exchange rate regime. The IIA has a range from $-\infty$ to $+\infty$. Under a freely floating regime, $IIA = 0$ and under a fixed exchange rate regime, $IIA = 1$. Under intermediate regimes IIA assumes values between 0 and 1. When the monetary authority leans with the wind, i.e., amplifies the exchange rate pressures generated by the market, the IIA assumes values greater than 1. On the other hand, when the monetary authority contests the market view, the IIA is less than one.

The Monetary Conditions Index (MCI) which has come to be employed as an operating target or more generally, as an indicator of monetary conditions in countries forced to move away from a monetary aggregates approach by the pace of financial innovations, can easily be seen to be a more readily computable version of the EMP. It is a weighted aggregate of the exchange rate and interest rate channels of monetary policy, providing leading information about the monetary conditions since money stock variations impact upon the exchange rate and interest rate with a much reduced lag than upon prices and output. The manner in which monetary policy should be adjusted to offset the deviation of monetary conditions from the desired levels is addressed through targeting the weighted monetary conditions index within a band, the band limits being enforced by, or by the threat of, monetary policy action. The weights assigned to the exchange rate and interest rate generally depend upon their relative influence on output and prices and are usually derived by estimating a money demand function in which the exchange rate and the interest rate are present as explanatory variables. Adjusting money stock to align the MCI with a desirable level would constitute the appropriate stance of policy.

The EMP would indicate the extent of exchange market pressure on account of monetary disequilibria while MCI would di-

rectly show the monetary conditions prevailing at any point of time in relation to some base level monetary condition and thereby help the authorities in deciding the degree and timing of monetary policy changes that may be necessary to keep the EMP within manageable limits. A decline in the MCI indicates tightening of monetary conditions whereas an increase in the index reflects easing.

In this paper a standard MCI has been constructed representing a linear combination of the interest rate and exchange rate as follows :

$$\text{MCI} = a* (\text{It} - \text{Ib}) + b* (\text{Et} - \text{Eb})$$

It and Et represent interest rate and exchange rate at time t and Ib and Eb represent interest rate and exchange rate as at some point which could be considered as equilibrium (and hence base period E and I). a and b represent the weights which are decided on the basis of the respective influence of interest rate and exchange rate on the goal variable.

Section III

Estimation of EMP, IIA and the MCI for India

For generating estimates of the EMP, the IIA and the MCI under the methodology set out in Section III, the data used are as follows: Month-end nominal money stock (M3), monthly indices of wholesale price indices (WPI) as representative of domestic price movements, monthly indices of industrial production (IIP) as the proxy for scale of economic activities in the absence of monthly data on national income, nominal effective exchange rate (NEER) indices to reflect the movement in the exchange value of the rupee vis-a-vis 36 major trading partners of India, monthly average of inter-bank call money rates (CMR) as representative of the opportunity cost of money, and the weighted average of domestic CPIs of 36 major trading partners of India (WOPI) to reflect the movement of international prices. For countries which do not publish data on intervention purchases and sales, changes in the levels of

foreign exchange assets are considered for empirical analysis. In the case of India, however, monthly data on intervention purchases and sales are published regularly by the RBI since June 1995 and for the purpose of estimating and comparing the estimates, both change in reserve levels and net intervention purchases/sales data have been considered.

All the equations for the basic model were estimated in log-linear form. Before estimating the coefficients of the two relevant equations for EMP and IIA, the stationarity properties of the variables were checked by using the Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) tests.

All the variables considered for estimating the two equations turned out to be integrated of order one, [i.e. I(1)], indicating that some linear combination of these variables may represent a long run equilibrium relationship. (For the DF and ADF test statistics see Table-1). In order to establish the long run relationship among variables in the money demand and PPP equations, Johansen and Juselius (JJ) type of maximum likelihood tests of multiple cointegration were conducted for the sample period April 1990 to March 1998. The eigen values and trace statistics for both money demand and PPP relationships (presented in Table-2) indicate the presence of two cointegrated vectors as reported below.

Money demand function

$$(1) \text{ LM3} = 4.04 + 0.80 \text{ LWPI} + 1.00 \text{ LIIP} - 0.17 \text{ LCMR}$$

Purchasing power parity relationship

$$(2) \text{ LWPI} = -9.04 + 3.43 \text{ LWOPi} - 0.51 \text{ LNEER}$$

The DF and ADF tests for errors (presented in Table-3) indicate the errors to be stationary.

Table-3 : DF and ADF tests for errors.

| | Without trend | | With trend | |
|----------------------------------------|---------------|-------|------------|-------|
| | DF | ADF | DF | ADF |
| Residuals of Money Demand Relationship | -5.71 | -5.33 | -5.77 | -5.39 |
| Residuals of PPP relationship | -2.15 | -3.71 | -2.90 | -4.03 |

Relevant coefficients from the above relationships are used to estimate the exchange market pressure and degree of intervention as follows.

$$EMP_t = \Delta NEER_t + u \times \Delta NFA$$

$$\text{Where } u = 1 / -(-0.51 - 0.17) = 1 / 0.68 = 1.4705882$$

and

$$IIA_t = u \times \Delta NFA / EMP_t$$

The estimates of EMP and IIA for the period April 1990 to March 1998 are presented in Table-4. Estimates of EMPs and IIA generated by using the actual interventions data are also shown in Table 5.

For the MCI, the weights for exchange rates and interest rates were estimated from the reduced form of Equations (1) and (2) i.e.,

$$(6) \text{ LM3} = 3.80 + 0.74 \text{ LWOPI} + 1.38 \text{ LIIP} - 0.05 \text{ LCMR} - 0.35 \text{ LNEER}$$

The eigen values and trace statistics presented in Table-6 suggest the presence of two cointegrating vectors. The residuals of the two vectors were subjected to normality tests; in view of the relatively higher coefficient of variation of the residuals of the second vector, the first vector was chosen for generating the MCI and is reported above [Equation (6)]. The coefficients of LNEER and LCMR suggest that the weights could be as follows: $a = 0.125$,

$b = 0.875$; $a + b = 1$. The MCI is presented in Tables 4 and 5 to compare its movements vis-a-vis the EMP and IIA.

Section IV

Exchange Rate Management in India, March 1993 to March 1998 : An Evaluation

In the aftermath of the unprecedented payments crisis of 1990, the exchange rate of the rupee was considered to be significantly overvalued in relation to competitor countries (Rangarajan, 1991). A sharp downward adjustment of the exchange rate of about 18 per cent undertaken as an element of a package of structural reform measures in July 1991 set the stage for more fundamental changes in the exchange rate regime recommended by the High Level Committee on Balance of Payments (GOI, 1991). The *de facto* administered regime based on a basket of currencies of important trading partners which had been in place since 1975 was replaced in 1992 by a dual exchange rate system under which one leg of the exchange rate, applicable to 40 per cent of all current receipts, essential imports and debt service payments, was determined by the RBI and the other leg, which applied to all other transactions, was determined by the market. For transactions routed through the market, the dual exchange rate system implied a depreciation in the exchange rate of 11 per cent. In March 1993, the dual exchange rate system gave way to a market based system under which the two legs of the exchange rate were unified and were left to be determined entirely by market forces. The RBI indicated its exchange rate stance as allowing the exchange rate to reflect the macro economic fundamentals.

Over the period April 1990 to June 1991 the EMP recorded negative values indicating that downward pressures on the exchange rate had been building up. The downward movement in the MCI during this period suggests that the pressures on the exchange rate were not on account of monetary conditions which were tight reflecting the stance of monetary policy embodied in high interest rates and reserve requirements, import restrictions and penal provi-

sions for delaying export proceeds. The EMP's movements were due to acute excess demand conditions created by the widening of the current account deficit as the terms of trade shock of the Gulf war and the financing gap in the capital account on account of the waning of the international confidence took a vice like grip on the balance of payments. The average IIA for the period at 0.91 indicated the high degree of management of the exchange rate regime essentially through the use of reserves, supported by monetary policy and exchange restrictions.

In July 1991, i.e., the month in which two step downward adjustment in the exchange rate was carried out, the EMP turned positive and remained so for a prolonged period up to July 1992 showing that the devaluation relieved the accumulated exchange market pressure and in fact, resulted in an over correction. This is borne out by the value of IIA which soared to 2.04 in July 1991 suggesting that the value of the exchange rate would have depreciated by less than the extent of devaluation if market forces alone had been in operation. The MCI plunged in July 1991 and continued to exhibit tight monetary conditions up to August 1992, as monetary policy supported the stabilisation measures. The episodes of easing in October 1991 and May 1992 reflected the turnaround in the balance of payments. Inflows under the Foreign Exchange (Immunities) Scheme and the India Development Bonds in October, 1991 combined with some relaxation of cash margin requirements on imports to yield some respite in stringent monetary conditions. By May 1992, further relaxations in margin requirements for imports, interest rate surcharge on import finance, greater access to export refinance, rolling down of punitive rates on post shipment export credit and reductions in primary and secondary reserve requirements announced in April 1992 were reflected in some easing in the MCI.

From August 1992 to February 1993 the EMP turned negative again indicating the return of downward pressures on the exchange rate. The dual exchange rate imposed an implicit tax on export proceeds and remittances which hindered supplies in the foreign exchange market. Consequently, prior to the abolition of the dual

exchange rate system in March 1993, downward pressures had been building up and a regime change was overdue. During this period, the MCI edged upwards and thus, the slackening of monetary conditions contributed to exchange market pressure. Throughout this period the IIA remained above 1 and contrary to the general perception arising from the partial influence of the market on the exchange rate, there seems to have been an increase in the degree of management of the regime in relation to the preceding period.

The unification of the exchange rates and the market based system corrected the misalignment of the exchange rate. The speculative attacks on the exchange rates in the period leading up to the presentation of the Union Budget, 1993-94 ebbed away and a remarkable stability set in. As capital flows built up into a surge, excess supply conditions in the foreign exchange market resulted in a continuous upward pressure on the exchange rate up to March 1995. The EMP remained positive throughout this period except for aberrations in May 1993 and December 1994 when despite purchases from the market by the RBI, the exchange rate appreciated in nominal effective terms. There was also a bunching of debt service payments in December 1994 which in an exception to the general trend of that period, caused a loss of reserves. Throughout the period from March 1993 to March 1995 there were net purchases by the RBI from the market reflecting an effort to prevent nominal appreciation from eroding export competitiveness. The IIA averaged 0.98 during the period, capturing the continuous interventions by the RBI in the market. The MCI eased between June 1993 and April 1994 due to their expansionary effects of capital flows which were only partially sterilised. Although buoyant domestic activity created the conditions for the absorption of the capital flows, the monetary aggregates kept well above their targetted trajectories.

By April 1995 the easy money conditions fed through into the foreign exchange market and the EMP turned negative. Excess demand for foreign exchange was met through reserve depletion instead of being allowed to influence the exchange rate. A marginal

weakening of the exchange rate was allowed in August 1995, which was also accompanied by large intervention sales by the RBI. Nevertheless, market conditions embodied in an upward drift in the forward premia and widening spread between buying and selling rates in the spot market indicated sentiments which were contrary to the authorities' view. Downward pressures intensified building up into the first major speculative attack on the exchange rate in the post unification period during the period September 1995 to February 1996. The EMP remained negative throughout except for a brief respite in December 1995. The authorities leaned with the wind in September 1995 by halting intervention sales and allowing market forces relative freedom to depreciate the exchange rate. As a consequence, the IIA fell below 1 and even turned negative. The nominal exchange rate plunged in October 1995 as speculation lengthened the normal leads and lags in receipts and payments. Panic demand for cover and cancellations of forward contracts created persistent mismatches of supply and demand both in the spot and forward segments of the market.

Intervention sales were initially supported by a withdrawal of liquidity from the money market and interest rates were raised. The IIA turned positive in October 1995 as the authorities switched to leaning against the wind. The MCI indicated a tightening of monetary conditions since the announcement of the monetary and credit policy for the first half of the year with a strong decline in the MCI in October 1995. Monetary policy attacked speculative sentiment ruling in the exchange market. Although the stance was eased transiently in November 1995 through reductions in cash reserve requirements, the EMP continued to indicate downward pressure in the exchange market and as such, the easing of monetary conditions in November 1995 though unavoidable, was contrary to the requirements of exchange rate management. There was a brief respite in December 1995 as resumption of capital flows absorbed exchange market pressure. The EMP turned positive in that month. The capital flows enabled purchases by the RBI which resulted in an increase in the IIA. Nominal appreciation in the exchange rate suggested a tightening of monetary conditions. In January and February 1996 the EMP turned negative as exchange mar-

ket pressures flared up and the exchange rate touched a record low. Monetary policy measures were undertaken along with intervention sales. The MCI tightened but the IIA declined as interventions were of a lower order than in the preceding months, being replaced by monetary policy measures.

Normalcy was restored in the foreign exchange market in March 1996. The EMP turned positive and remained so up to August 1997. The MCI showed continued tight monetary conditions and the average IIA for the period March 1996 to July 1997 was at about 0.74 indicating a lower degree of management of the exchange rate than in a comparable period of exchange rate stability during March 1993 to August 1995. In fact in the months of April, May and August 1996 and again in January 1997 the management of the exchange rate was in alignment with the market forces. On the other hand, in June, July, and November 1996 and in February, March, May and June 1997 the RBI contested the market view by effecting large intervention purchases and preventing the exchange rate from appreciating.

Downward exchange market pressures began again in September 1997, captured in the negative sign of the EMP. Exchange market pressures became intense in November and December 1997. Alongside a marginal easing of the MCI in September and October 1997 (reflecting the large interventions rather than any relaxation in the policy stance), the EMP which had turned positive in October 1997 when exchange market pressures had eased, became negative again. In January 1998, monetary policy measures eased the MCI. The EMP turned positive reflecting the ebbing of market pressures. After a long hiatus the RBI purchased foreign currencies from the market in that month. The easing of monetary conditions in January 1998 brought about the return of exchange market pressure on the exchange rate as reflected in the sign of the EMP in February, 1998. By March 1998, however, the easy monetary conditions had been reversed and as a result the EMP eased. In comparison with the previous episode of exchange rate volatility during August 1995 to February 1996 there was a relatively greater degree of management in the exchange rate regime during September

1997 to March 1998 (the average IIAs were 0.72 and 0.91 respectively).

Estimates of EMP and IIA generated by using actual net intervention data corroborate the pattern of movement of these indicators based on changes in foreign currency assets. The IIAs were either less than one but very close to one or were greater than one signifying that not only was the exchange rate regime highly managed but also that the actual exchange rates prevailing in the system (in terms of their movements) were mostly in the opposite direction to what would have prevailed in the absence of intervention. The results of the study indicate that the exchange rate policy in India has been actively supportive of the external sector target in terms of a sustainable level of current account deficit.

Section V Conclusion

The paper demonstrates the use of indicators of exchange market pressures, monetary conditions and intervention activity as contemporaneous 'real-time' tools for the evaluation of exchange rate policy as a subset of monetary policy. While interventions have been the principal operating variable they have been reinforced by monetary policy measures when the exchange market has been driven by speculative activity. In this sense interventions have provided leading indications about the future course of monetary policy. A comparison of the two episodes of exchange market pressures in India in the second halves of 1995-96 and 1997-98 shows that the RBI's response to speculative attacks has followed a common pattern. While the exchange rate regime in India can be characterised as highly managed, this needs to be viewed against the transitional phase in the evolution of the regime and the development of the markets.

Simplicity in the computation of the indicators proposed in this paper recommends their use for operational purposes. The model specified in Section II is general and specification changes can easily be incorporated to accommodate particular policy requirements.

The performance of these indicators could be considered as superior to alternatives such as the real effective exchange rate since they are based on market activity, they draw from overall developments in the balance of payments and monetary conditions in the economy and can be computed with relatively shorter time lags. Policy scenario simulations can be employed to develop forward looking indicators of the type proposed here. Operationalisation of these indicators would involve setting up of bands around thresholds which would trigger policy defence.

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**Table 1 : Unit Root Tests with Trend and a Constant
(Sample period : April 1990 to March 1998)**

| Variables | DF | ADF |
|-----------|--------|-------|
| LM3 | -3.84 | -2.39 |
| LWPI | -1.32 | -1.87 |
| LIIP | -6.16 | -2.73 |
| LCMR | -4.64 | -2.96 |
| LWOPI | -3.97 | -2.41 |
| LNEER | -2.09 | -2.17 |
| DLM3 | -9.16 | -7.38 |
| SLWPI | -6.52 | -6.28 |
| DLIIP | -14.87 | -9.22 |
| DLCMR | -11.88 | -9.72 |
| DLWOPI | -10.06 | -9.26 |
| DLNEER | -9.61 | -6.98 |

Note : DF values for LM3, LIIP, LCMR and LWOPI indicate that these variables may be integrated of order zero and can be considered as stationary in their levels. DF equations for these variables, however, do not pass the tests of residual serial correlation (LM statistics) and the heteroscedasticity tests (Engle's ARCH test). Therefore, stationarity properties of the above variables have been tested through ADF test statistics, with appropriate lags for the corresponding ADF equations.

**Table 2 : Cointegration Test Statistics (JJ Method)
of Money Demand Function**

| Null : Alternative Hypothesis | Trace Statistics | 5% critical value | Null : Alternative Hypothesis | Maximum Eigen value Statistics | 5% critical value |
|----------------------------------------------------------------------|---------------------|----------------------|-------------------------------------|--------------------------------------|----------------------|
| $r = 0 : r \geq 1$ | 73.5 | 53.12 | $r = 0 : r = 1$ | 32.91 | 28.14 |
| $r < 1 : r \geq 2$ | 40.6 | 34.91 | $r < 1 : r = 2$ | 20.81 | 22.01 |
| $r < 2 : r \geq 3$ | 19.79 | 19.96 | $r < 2 : r = 3$ | 13.46 | 15.67 |
| $r < 3 : r = 4$ | 6.32 | 9.24 | $r < 3 : r = 4$ | 6.32 | 9.24 |
| Cointegrated Test Statistics (JJ Method) for the PPP equation | | | | | |
| Null : Alternative Hypothesis | Trace Statistics | 5% critical value | Null : Alternative Hypothesis | Maximum Eigen value Statistics | 5% critical value |
| $r = 0 : r \geq 1$ | 38.81 | 34.91 | $r = 0 : r = 1$ | 25.51 | 22.01 |
| $r < 1 : r \geq 2$ | 13.31 | 19.96 | $r < 1 : r = 2$ | 7.62 | 15.67 |
| $r < 2 : r = 3$ | 5.68 | 9.24 | $r < 2 : r = 3$ | 5.68 | 9.24 |

Table 4 : EMP, IIA and MCI for India

| Year/ Month | MCI | EMP | IIA | | Year/ Month | MCI | EMP | IIA |
|----------------|--------|-------|--------|--|----------------|-------|-------|-------|
| 90m4 | 100.00 | | | | 93m1 | 74.26 | -0.06 | 1.08 |
| 90m5 | 98.25 | 0.06 | 1.14 | | 93m2 | 72.47 | -0.02 | -0.19 |
| 90m6 | 97.46 | -0.01 | 0.83 | | 93m3 | 74.12 | 0.35 | 0.95 |
| 90m7 | 95.93 | -0.08 | 0.87 | | 93m4 | 73.47 | 0.10 | 1.10 |
| 90m8 | 94.76 | 0.08 | 1.14 | | 93m5 | 72.90 | -0.08 | 1.00 |
| 90m9 | 93.37 | -0.30 | 0.92 | | 93m6 | 72.93 | 0.01 | 0.68 |
| 90m10 | 93.77 | -0.26 | 0.99 | | 93m7 | 73.34 | 0.05 | 0.88 |
| 90m11 | 92.20 | -0.26 | 0.99 | | 93m8 | 73.12 | 0.11 | 0.01 |
| 90m12 | 91.98 | -0.44 | 1.02 | | 93m9 | 72.64 | 0.06 | 1.07 |
| 91m1 | 91.91 | 1.63 | 1.00 | | 93m10 | 73.03 | 0.06 | 0.94 |
| 91m2 | 89.89 | -0.15 | 0.84 | | 93m11 | 73.58 | 0.06 | 0.91 |
| 91m3 | 91.76 | -0.05 | 1.28 | | 93m12 | 73.57 | 0.29 | 1.00 |
| 91m4 | 91.52 | -0.64 | 0.99 | | 94m1 | 74.03 | 0.10 | 0.95 |
| 91m5 | 91.85 | -0.02 | -0.15 | | 94m2 | 73.69 | 0.37 | 1.01 |
| 91m6 | 90.40 | -0.17 | 0.99 | | 94m3 | 73.26 | 0.22 | 1.02 |
| 91m7 | 80.24 | 0.10 | 2.04 | | 94m4 | 73.32 | 0.00 | 0.98 |
| 91m8 | 78.82 | -0.17 | 0.95 | | 94m5 | 73.08 | 0.04 | 1.10 |
| 91m9 | 77.87 | 0.74 | 1.01 | | 94m6 | 72.87 | 0.08 | 1.05 |
| 91m10 | 79.07 | 0.52 | 1.00 | | 94m7 | 72.12 | 0.10 | 1.08 |
| 91m11 | 78.45 | 0.23 | 1.03 | | 94m8 | 72.12 | 0.01 | 0.98 |
| 91m12 | 76.22 | 0.46 | 1.02 | | 94m9 | 73.05 | 0.09 | 1.03 |
| 92m1 | 76.62 | 0.08 | 0.95 | | 94m10 | 71.76 | 0.07 | 1.06 |
| 92m2 | 76.97 | 0.16 | 0.96 | | 94m11 | 71.96 | 0.01 | 0.89 |
| 92m3 | 72.93 | 0.47 | 1.10 | | 94m12 | 72.55 | -0.04 | 1.14 |
| 92m4 | 72.85 | -0.06 | 0.68 | | 95m1 | 73.03 | 0.02 | 1.12 |
| 92m5 | 74.41 | 0.00 | -10.37 | | 95m2 | 72.56 | 0.02 | 1.15 |
| 92m6 | 71.64 | 0.20 | 1.03 | | 95m3 | 71.32 | 0.05 | 1.30 |
| 92m7 | 71.82 | 0.06 | 0.90 | | 95m4 | 70.58 | -0.03 | 0.85 |
| 92m8 | 71.67 | -0.03 | 1.03 | | 95m5 | 71.17 | -0.01 | 1.31 |
| 92m9 | 72.01 | -0.12 | 1.02 | | 95m6 | 71.21 | -0.05 | 0.98 |
| 92m10 | 72.98 | -0.07 | 1.16 | | 95m7 | 70.88 | 0.02 | 0.96 |
| 92m11 | 74.33 | -0.15 | 1.11 | | 95m8 | 71.30 | -0.06 | 1.11 |
| 92m12 | 73.66 | 0.18 | 1.04 | | 95m9 | 70.25 | -0.01 | -0.63 |

(Contd.)

| Year/ Month | MCI | EMP | IIA | | Year/ Month | MCI | EMP | IIA |
|----------------|-------|-------|-------|--|----------------|-------|--------|------|
| 95m10 | 69.63 | -0.12 | 0.84 | | 97m1 | 68.11 | 0.01 | 0.59 |
| 95m11 | 71.33 | -0.04 | 0.98 | | 97m2 | 68.86 | 0.00 | 3.61 |
| 95m12 | 69.08 | 0.01 | 0.99 | | 97m3 | 68.98 | 0.20 | 0.99 |
| 96m1 | 68.39 | -0.10 | 0.95 | | 97m4 | 68.78 | 0.02 | 0.90 |
| 96m2 | 67.89 | -0.04 | 0.78 | | 97m5 | 69.07 | 0.09 | 1.04 |
| 96m3 | 71.51 | 0.13 | 0.80 | | 97m6 | 68.40 | 0.08 | 1.01 |
| 96m4 | 69.72 | 0.01 | 0.46 | | 97m7 | 69.26 | 0.04 | 0.86 |
| 96m5 | 68.99 | -0.01 | -0.23 | | 97m8 | 70.08 | 0.03 | 0.79 |
| 96m6 | 69.06 | 0.04 | 0.98 | | 97m9 | 69.74 | -0.005 | 0.89 |
| 96m7 | 67.53 | 0.03 | 1.26 | | 97m10 | 69.83 | 0.03 | 0.95 |
| 96m8 | 67.49 | 0.00 | -2.81 | | 97m11 | 68.91 | --0.11 | 0.91 |
| 96m9 | 67.94 | 0.04 | 0.95 | | 97m12 | 68.35 | --0.03 | 0.73 |
| 96m10 | 68.35 | 0.06 | 0.95 | | 98m1 | 71.57 | 0.04 | 0.80 |
| 96m11 | 67.60 | 0.01 | 1.32 | | 98m2 | 69.23 | --0.02 | 1.02 |
| 96m12 | 68.03 | 0.03 | 0.92 | | 98m3 | 68.62 | 0.11 | 1.05 |

Note : EMP and IIA are generated by using variations in levels of foreign currency assets.

Table 5 : EMP, IIA and MCI for India

| Year/ Month | MCI | INTVN (\$mn.) | EMP | IIA |
|----------------|-------|------------------|-------|------|
| 95m6 | 71.21 | 36 | 0.00 | 1.62 |
| 95m7 | 70.88 | 338 | 0.03 | 0.97 |
| 95m8 | 7.30 | 0 | 0.01 | 0.00 |
| 95m9 | 70.25 | 0 | -0.01 | 0.00 |
| 95m10 | 69.63 | -785 | -0.08 | 0.76 |
| 95m11 | 71.33 | -110 | -0.01 | 0.92 |
| 95m12 | 69.08 | -56 | 0.00 | 1.02 |
| 96m1 | 68.39 | -402 | -0.04 | 0.88 |
| 96m2 | 67.89 | -328 | -0.04 | 8.76 |
| 96m3 | 71.51 | 960 | 0.11 | 0.78 |
| 96m4 | 69.72 | 368 | 0.04 | 0.88 |
| 96m5 | 68.99 | 101 | 0.00 | 8.78 |
| 96m6 | 69.06 | 785 | 0.07 | 0.99 |
| 96m7 | 67.53 | 294 | 0.02 | 1.40 |
| 96m8 | 67.49 | 247 | 0.02 | 1.25 |
| 96m9 | 67.94 | 672 | 0.06 | 0.97 |
| 96m10 | 68.35 | 840 | 0.07 | 0.96 |
| 96m11 | 67.60 | 132 | 0.01 | 1.63 |
| 96m12 | 68.03 | 551 | 0.04 | 0.95 |
| 97m1 | 68.11 | 550 | 0.05 | 0.88 |
| 97m2 | 68.86 | 925 | 0.08 | 0.89 |
| 97m3 | 68.98 | 2329 | 0.18 | 0.99 |
| 97m4 | 68.78 | 641 | 0.04 | 0.95 |
| 97m5 | 69.07 | 1393 | 0.09 | 1.04 |
| 97m6 | 68.40 | 1335 | 0.08 | 1.01 |
| 97m7 | 69.26 | 1185 | 0.07 | 0.92 |
| 97m8 | 70.08 | 872 | 0.06 | 0.89 |
| 97m9 | 69.74 | -978 | -0.06 | 0.91 |
| 97m10 | 69.83 | 189 | 0.01 | 0.86 |
| 97m11 | 68.91 | -1590 | -0.10 | 0.90 |
| 97m12 | 68.35 | -407 | -0.03 | 0.72 |
| 98m1 | 71.57 | 422 | 0.03 | 0.78 |
| 98m2 | 69.23 | -681 | -0.04 | 1.01 |
| 98m3 | 68.62 | 1449 | 0.08 | 1.07 |

INTVN : Monthly net interventions by the RBI in the forex market.

EMP and IIA are generated by using intervention sales/purchases of the RBI.

Note : 1. EMP +ve \Rightarrow Market pressure on the rupee to appreciate

2. EMP -ve \Rightarrow Market pressure on the rupee to depreciate

3. IIA = 0 \Rightarrow Free float

4. IIA = 1 \Rightarrow Completely managed exchange rate.

5. IIA with -ve values \Rightarrow Authorities actively appreciate/depreciate with respect to the free market value (say an official devaluation)

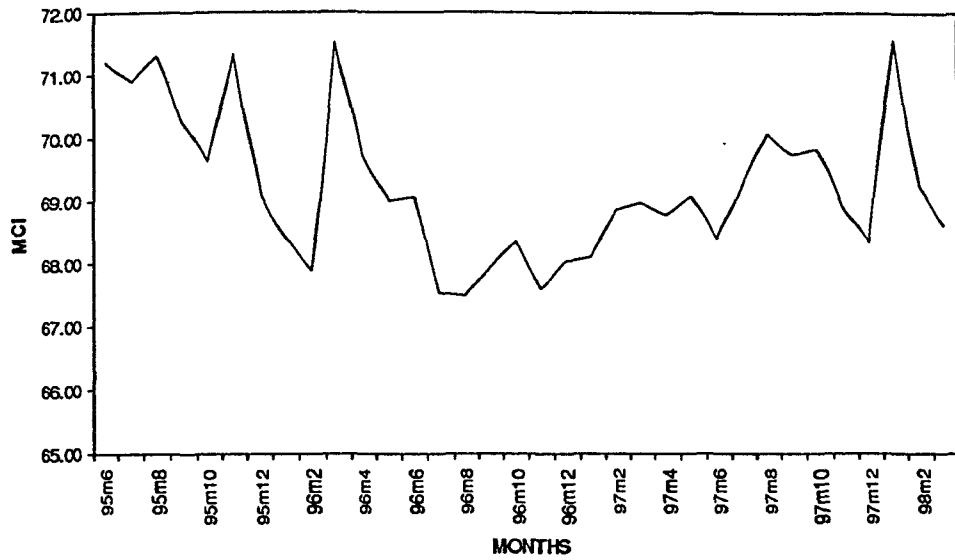
6. IIA with values greater than one \Rightarrow Exchange rate moves in the opposite direction to what would have prevailed in the absence of intervention.

7. Declining MCI indicates tighter monetary conditions and rising MCI represents easy monetary condition.

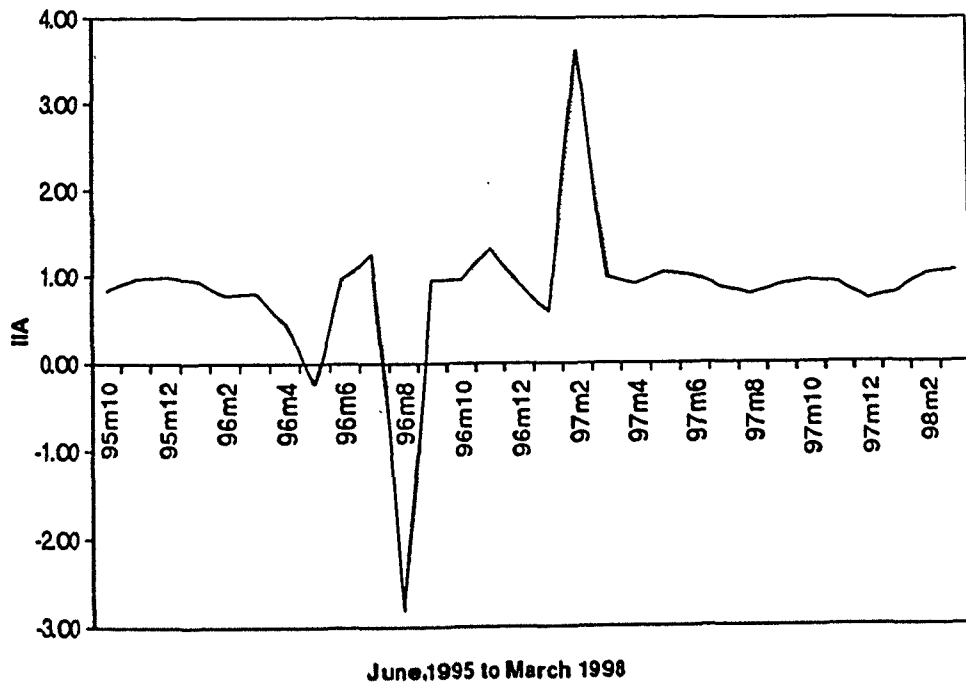
**Table 6 : Cointegration Test Statistics (JJ Method)
of Money Demand Function for Estimating MCI**

| Based on Trace Statistics | | | | |
|------------------------------|-------------|-----------|--------------------|--------------------|
| Null | Alternative | Statistic | 95% Critical Value | 90% Critical Value |
| $r = 0$ | $r = 1$ | 52.0567 | 34.4000 | 31.6640 |
| $r < = 1$ | $r = 2$ | 33.8465 | 28.1380 | 25.5590 |
| $r < = 2$ | $r = 3$ | 15.0778 | 22.0020 | 19.7660 |
| $r < = 3$ | $r = 4$ | 10.9274 | 15.6720 | 13.7520 |
| $r < = 4$ | $r = 5$ | 8.0874 | 9.2430 | 7.5250 |
| Based on Maximum Eigen Value | | | | |
| $r = 0$ | $r = 1$ | 119.9957 | 76.0690 | 71.8620 |
| $r < = 1$ | $r = 2$ | 67.9390 | 53.1160 | 49.6480 |
| $r < = 2$ | $r = 3$ | 34.0926 | 34.9100 | 32.0030 |
| $r < = 3$ | $r = 4$ | 19.0147 | 19.9640 | 17.8520 |
| $r < = 4$ | $r = 5$ | 8.0874 | 9.2430 | 7.5250 |

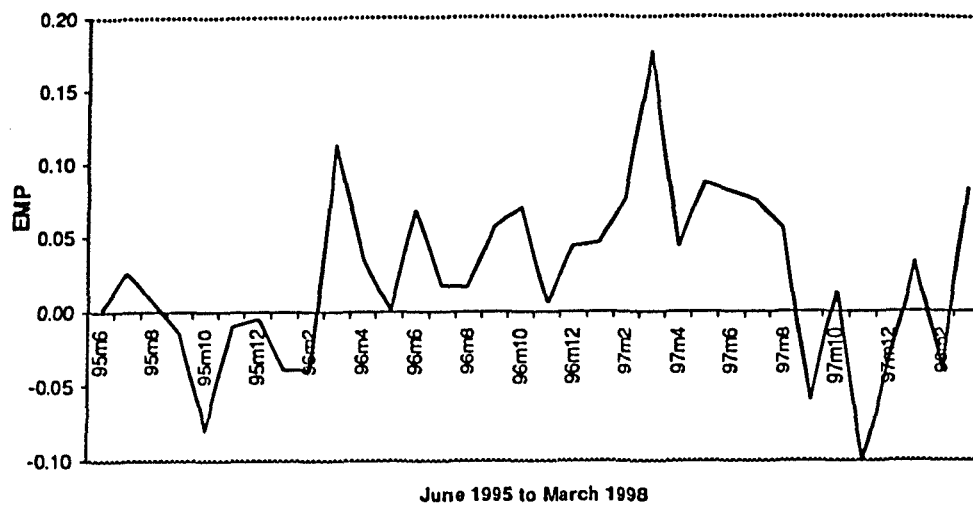
Monetary Conditions Index (MCI) for India



Indicator of Intervention Activity (IIA)



Index of Exchange Market Pressure (EMP)



A Case for Risk Based Deposit Insurance System in India

D. Ajit*

The deposit and credit insurance system in India is examined in the light of experiences of other countries - both developed and developing. The study examines important issues such as flat fee, risk-based insurance system for banks/non-banks, ownership of deposit insurance agency, continuation of credit guarantee scheme, etc. As regards deposit insurance scheme for NBFCs the study cautions its introduction at this stage as it could amplify the regulatory divergence and moral hazard problems. It makes the case for introduction of a risk based deposit insurance scheme for NBFCs only after putting in place an effective regulatory and supervisory system for them.

Most countries have safety net system in the form of deposit insurance - both explicit and implicit - to protect the depositors and ensure stability of the financial system.¹ Most of the industrialised countries have explicit deposit insurance schemes and these were largely in response to emerging problems in the financial system. The Savings and Loan crisis in United States in the 1980s and early 1990s and consequent liability on federal taxpayer to the tune of over US \$150 billion brought into focus what economists call the moral hazard problem. In fact there are a number of countries like New Zealand and Singapore which have successfully managed their financial system without any deposit insurance. Both theoretical and empirical literature in recent times favour a market based approach like that is prevalent in New Zealand. However, the South East Asian crisis has again swung the public opinion increasingly in favour of safety nets like deposit insurance.² Argentina which had abolished deposit insurance a few years back, reinstated it in 1995 due to 'overwhelming political forces'.

Among the developing countries, India has an explicit deposit insurance for bank deposits and small loans since 1962 through a

* D. Ajit is Director in the Department of Economic Analysis and Policy of the Bank. The author is grateful to Dr. Y.V. Reddy for initiating my interest in this area and valuable comments on an earlier draft of this paper. The author is also grateful to Dr. A. Vasudevan and Dr. R. Kannan for their valuable comments. However, the errors that remain are the sole responsibility of the author.

subsidiary of the Reserve Bank of India viz., the Deposit Insurance and Credit Guarantee Corporation (DICGC). Although the issue of safety nets like deposit insurance has not been controversial in India, the recent massive recapitalisation of weak public sector banks and the exit of a number of leading banks, both public and private, from credit guarantee cover of DICGC has rekindled a fresh debate. The recent collapse of a non-bank finance company has raised questions regarding the appropriateness of deposit insurance cover for banks and whether such a cover needs to be extended to non-banking firms. The on-going South-East Asian crisis and the fragility of finance companies in these countries (especially in Thailand) have exposed the problems of financial panics for economies and have strengthened the case for safety nets like deposit insurance. While there has been a large growth of empirical literature on deposit insurance in the context of developed countries, it is relatively less focussed in the case of developing economies, including India. This paper is an attempt towards filling this gap. The paper is organised as follows: Section I examines the historical evolution of deposit insurance scheme and examines the various types of deposit insurance schemes – explicit and implicit – in both developed and developing countries. Section II, based on deposit insurance scheme in U.S. as a case study, evaluates the nature of recent reforms towards risk-based deposit insurance scheme and draws lessons for developing countries like India. Section III discusses the working of deposit insurance scheme in India and examines the case for extending it to the non-banking sector. Section IV presents the concluding observations.

Section I

Evolution of Deposit Insurance Scheme

A History of Origin

The history of deposit insurance dates back to 1933 when in U.S. following the worst bank runs³, the Congress created the Federal Deposit Insurance Corporation (FDIC) to provide deposit insurance for commercial banks.⁴ In 1934, the Congress authorised the formation of the Federal Savings and Loan Insurance Corpora-

tion (FSLIC) to insure deposits in savings and loan association and mutual savings bank. In U.K. deposit insurance began with an implicit guarantee in 1973 under the 'lifeboat' fund arrangement following widespread banking distress. Explicit protection began in the U.K. only in 1982 as part of a broad based banking system reform under the Banking Act of 1979.

Under a system of deposit insurance, there is a guarantee by the government that all (or limited amount) of the principal and interest accrued on deposits will be paid to the depositors. The guarantee could be explicit as in the case of U.S. where there exists a formal arrangement for financial deposit protections. A recent survey by Kyei (1995) on deposit insurance practices around the world shows that more than 56 per cent of the schemes studied (102) were implicit schemes and the remaining 44 per cent were explicit. In developing countries implicit deposit insurance schemes are widely prevalent as the public sector banks dominate the banking system (see Appendix Table-1). Under the implicit system, both small and large depositors may be protected.

In Asia, 12 out of 20 countries mentioned in Appendix 1 have implicit schemes, while in the industrialised countries only Australia has an implicit system. A new approach has been adopted by Argentina and New Zealand which explicitly states the absence of government guarantee of deposits. Following the Mexican crisis, banks faced massive deposit withdrawals in Argentina and the Government set up US \$ 2.5 billion funds to help the distressed banks and later on reintroduced an explicit deposit guarantee in 1995.

Deposit Insurance Systems in Various Countries

Under explicit deposit protection, the arrangement is normally explicitly stated in a statute. Typically the statute would specify the types of institutions and deposits covered, coverage limits, management and membership, funding arrangements and procedures for the resolution of bank failures (See Table 2A and 2B).

In the survey by Kyei (1995) four main administrative types of explicit deposit protection arrangements are mentioned: (1) Purely

government-owned and officially administered, which is funded by the government. These tend to have the highest potential for moral hazard, because banks have no share in the cost of resolving failed banks; (2) Officially-administered by a public corporation and partially funded by banks; (3) Jointly-administered by representatives from banks and the government and funded by banks; and (4) Privately-administered, where depositories self-insure each other (mutual insurance scheme) without government involvement. The fourth arrangement puts part of the burden of bank failures on banks themselves and, therefore, forces them to regulate, supervise, and examine themselves although this would require government assistance if the resolution cost was so high as to affect the entire system; thus it could imply some form of implicit government guarantee. Kyei (1995) shows that 21 arrangements are officially-administered, 9 privately-administered, and 11 jointly-administered. These are distributed as follows: all the 4 arrangements in Africa are officially-administered; Asia has 4 official, 1 private and 2 joint; Europe has one private 5 joint and 7 each official and private; Middle East has 1 private; and Western Hemisphere has 6 official and 4 jointly-administered funds.

Financing Deposit Insurance

As regards financing of deposit insurance, there are two major issues: who should bear the cost? and how should the financing be arranged? In answering these questions, there are basically two models or practices: allocate the costs among insured banks, and create a fund.

As regards allocation of cost among insured banks, while the method is preferable, there are however, two major problems. First, in the case of large losses by banks, the absorption of costs could seriously erode capital and push them into insolvency. Second, if the cost of deposit insurance exceeds the benefits, the system would impose a 'tax' on banks. On the creation of a fund an important question relates to how should a fund be established? There are two basic ways in which deposit insurance is financed. The most popular way is to set up a fund and require banks to

make periodic premium payment to the fund. The other is to levy premium assessment on banks. One of the crucial issue is to determine the appropriate size of deposit insurance fund. Traditionally, policy makers have used the ratio of capital and reserves to insured deposits to judge the adequacy of the fund.

Section II

Deposit Insurance in United States: A Critical Evaluation

Following the Great Depression and stock market crash of 1929, over 9,000 banks failed in the United States. Federal deposit insurance was created when President Franklin Roosevelt signed the Banking Act of 1933⁵ to help restore the stability of the financial system (See Annexure I). The United States, has both explicit and implicit deposit insurance guarantees. All member banks of the Federal Reserve System are required to join FDIC; non-members may join if they meet the FDIC admission criteria. Ninety seven per cent of the U.S. banks representing 99.8 per cent of deposits are insured by the FDIC. FDIC member banks pay an insurance premium to the FDIC which is used to purchase securities and provide a stream of revenue. Initially, the FDIC was allowed to borrow \$3 billion from the Treasury. The FDIC insures only some deposit claims; the deposits excluded are foreign deposits, claims owned by other banks (most of the federal funds) and portions of deposits above US \$40,000⁶ for single private account and above US \$100,000 for single government account. However, the Federal Reserve System often provides de facto insurance for its member banks by furnishing liquidity to a troubled bank so that uninsured depositors can be paid off before the bank is closed. In 1980 the per account limit was raised from US \$40,000 to US \$100,000.

When Congress enacted federal deposit insurance in U.S in 1933, it was intended as a tool for helping small banks and lower-income individuals and for restoring the liquidity of bank deposits [Calamoris and White (1994)]. Even during that time some had pointed out that deposit insurance could have incentive effects. For example, Emerson (1934), and Scott and Mayer (1971) argued that deposit insurance would intensify risk-taking incentives for banks

unless it was properly priced. But it was not until the massive failure in U.S. of thrifts (Savings and Loan Association and Savings bank) in the 1980s and 1990s that the debate on the moral hazard costs of deposit insurance came to the forefront.⁷

At the end of 1990, there were approximately 900 out of 41,000 thrifts which collapsed costing the insurer US \$ 300 billion and the taxpayer US \$150 billion [Benston and Kaufman (1997)]. Bank failures which averaged six (mostly small banks) per year from 1946 to 1980, also rose exponentially, averaging 104 per year during 1980s [Gorton and Rosen (1995)]. It has been argued that bank failures as opposed to S&L failures was mainly due to regional recessions magnified by restrictions that prevented banks from operating across state lines (Glass - Steagall Act of 1933) thereby limiting their ability to reduce risk through geographical diversification [Benston and Kaufman (1997)]. The FDIC tried to reduce demands on its insurance funds by merging problem banks with healthy banks. The Federal Savings and Loan Insurance Corporation (FSLIC), which is the insurance fund for the thrift industry, was declared insolvent in early 1987, as was its regulator, the Federal Home Loan Bank Board (FHLBB). Instead, two new deposit funds were created, the Bank Insurance Fund (BIF) and Savings Association Insurance Fund (SAIF) to replace the dissolved FSLIC.

A number of studies have identified federal deposit insurance as the primary cause of thrift and banking crisis, resulting into several proposals for reform of deposit insurance. Some proposals called for termination of deposit insurance, reducing its coverage to small individual accounts or replacing it with private insurance. Another proposal for reform of deposit insurance was the system of risk based insurance premiums. Besides, there were also proposals for 'narrow' or 'fail-safe' banking [Litan (1987), Bryan (1991)].

It was in this background that in early 1991 the U.S. Senate and the House Banking Committee introduced bills calling for major deposit insurance reform. The reforms proposed had three basic elements: (a) strengthen bank capital standards and regulators' en-

forcement of them, (b) reduce the risk-taking incentives inherent in deposit insurance and (c) allow banks and their holding companies to operate in all states to permit well capitalised bank holding companies to engage in a wide range of financial services and to permit nonfinancial firms to own bank holding companies. In so far as banks capital standards are concerned, the reforms were based on the internationally recognised norms. The reforms with regard to deposit insurance especially those relating to risk based deposit insurance premium and capital-based system of early regulatory intervention (to reduce the cost of bank failures to FDIC) stand out as the single most important reform in the last fifty years of banking history of US.

The deposit insurance reform consisted of the following components: (i) higher capital ratios, (ii) timely, pre-specified, and structured corrective actions by regulators in the affairs of financially troubled institutions, (iii) prompt resolution of failing institutions before their capital becomes negative (closure rule), and (iv) risk based deposit premiums. Besides these the reforms included re-capitalisation of insolvent Federal Savings and Loan Insurance Corporation (FSLIC).⁸ In response, the Congress created the FDIC Improvement Act (FDICIA) of 1991. The two innovative features of the deposit insurance reform in U.S. were (a) the Structured Early Intervention and Resolution (SEIR) and (b) the risk-based deposit insurance premium.⁹

Structured Early Intervention and Resolution (SEIR)

Timely intervention has always been the responsibility of the regulators or supervisors. It has been argued that the provision of deposit insurance reduced the fear of bank runs and thereby reduced market discipline. This could lead to regulators being slack in monitoring and ineffective in intervention [Kaufman and Benston (1993)]. Previously, regulators had the authority to close down weak institutions, but adopted 'wait and see' attitude and did not take immediate action. Failures mounted and a taxpayer bailout became necessary. In order to overcome such delays the new regulatory framework provided by FDICIA called for 'Structured Early

Intervention and Resolution'.¹⁰ This approach requires bank regulators to impose stiffer curbs on banks as their regulatory capital ratios decline and close promptly those institutions with capital below critical triggers or tripwires. Under the FDICIA 1991, regulators must initiate the re-organisation of an ailing bank if its risk-adjusted asset to capital ratio drops below 2 per cent¹¹ (see Table 1). The major virtue of this exit policy mandate is that it subjects a weakening firm to the same sort of discipline that its creditors would impose if they are not insured against loss by FDIC.

**Table 1 : Framework for Prompt Corrective Action
by FDIC in United States**

| | |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <i>well capitalised</i> | total risk assets ratio \geq 10% AND tier one risk assets ratio: \geq 6% AND tier one leverage: \geq 5% |
| <i>adequately capitalised</i> | total risk assets ratio \geq 9% AND tier one risk assets ratio: \geq 4% AND tier one leverage: \geq 4% |
| <i>under-capitalised</i> | total risk assets ratio $<$ 6% OR tier one risk assets ratio: $<$ 4% OR tier one leverage: $<$ 4% |
| <i>significantly under-capitalised</i> | total risk assets ratio $<$ 6% OR tier one risk assets ratio: $<$ 3% OR tier one leverage: $<$ 3% |
| <i>critically under-capitalised</i> | equity: assets $<$ 2% |

Banks wishing to be in one of the first two categories will have to conform to more stringent requirements than the 8 per cent risk assets ratio laid down in the Basle accord. Under the Act, it is mandatory to appoint a receiver if the tier one leverage ratio is \leq 2 per cent. The benefits of such mandated legislation is that it not only prevent large losses to taxpayers (costly regulation hypothesis) and restore public confidence in the financial system but also reduce long-run costs to the industry and the risk carved by the subsidy of insolvent competitors (i.e., the decreased subsidies hypothesis).

Risk-based Deposit Premium

It has also been argued that the federal deposit insurance agencies based on flat premium system had underpriced their insurance and permitted banks to operate with lower capital ratios and riskier asset and liability portfolios and led to moral hazard problems. As Merton (1977) and others show a fixed rate insurance system provides incentives to shareholders/managers to maximise the value of the (fixed rate) deposit insurance subsidy by taking on risk inefficiently, the so-called "moral hazard risk". Following Jensen and Meckling (1976), the literature on the agency relationship between managers and outside shareholders show how managers who benefit from control of the firm, in order to protect their private interest indulge in excessive risk-taking. According to Timmer (1993) "...there were several forms of moral hazard. Regulators couldn't be tough; bankers didn't have anything to lose..." Consequently, banks could not absorb large adverse shocks without depleting their capital. As a result, some economically insolvent or weak institutions were provided with both incentive to take undue risk and time to gamble for resurrection. The result was that low-risk banks effectively subsidised insurance premiums for high-risk banks. This often created losses for the insurer and the taxpayer. It should be stressed that empirical research has not reached a consensus on whether deposits insurance in U.S. is underpriced.¹² Second, although the apparent beneficiaries of deposit insurance are deposit holders, in effect the true beneficiaries are the shareholders, managers of the bank. Flat fee based deposit insurance actually generates more subsidies to these parties (Kane, 1986).

Under section 302 of the FDICIA of 1991, the FDIC was required to increase premium income and develop and implement a system of risk-related insurance assessment by January 1, 1994. The higher premium income was intended to raise the reserves of the Bank Insurance Fund (BIF) and ensure the solvency of FSLIC's successor fund, the Savings Association Insurance Fund. Under the current statutory framework governing insurance fund in U.S., both the Bank Insurance Fund (BIF) and Savings Association Insurance Fund (SAIF) must maintain the *fund reserve ratio* - the ratio of

the fund balance to estimated insurance fund - as 1.25 per cent. When the target '*designated reserve ratio*' (DRR) is below 1.25 per cent¹³, FDIC is required to raise premiums sufficiently to achieve the target within one year, or establish a recapitalisation schedule, not to exceed fifteen years, under which the average annual premium charged must be 23-basis points of assessable deposits. If in a particular year, FDIC finds a 'significant risk of substantial future losses' in respect of an insurance fund, it is required not to lower DRR but raise it above 1.25 per cent. Whenever the actual reserve ratio exceeds DRR, FDIC has to refund to BIF-insured institutions; the refund is limited by the amount of the assessment paid by that institution for the current semi-annual assessment period and is only available to the lowest risk category of the premium schedule. There is no similar refund clause for SAIF premiums.

On September 14, 1992, the FDIC put in place its new system of risk-based deposit insurance premiums projecting an increase in the average risk premium to 25.4 cents (as against the earlier flat premium of 23 cents) per US \$ 100 of domestic deposits. The strongest bank would pay 23 cents per US \$ 100 and the weakest 31 cents. The 8 cents differential marked an important step in removing a long-standing moral hazard opportunity available to bank managers. In fact the schedule approved in September 1992 was transitional and FDIC recommended that a permanent risk-based premium schedule be implemented by January 1, 1994.

Table 2 presents the FDIC's premium structure and the number of banks in each risk class as reported by the FDIC in September 1992. As can be seen in table 4, each FDIC insured bank is assigned to one of three capital groups or "zones" (well-capitalised, adequately capitalised or undercapitalised). Within the capital groups, the FDIC subclassifies each bank into three groups based on its evaluation of the risk posed by the institution.

The three supervisory subgroups have been defined as follows: 'Healthy banks' consist of financially sound banks, that at worst, have few minor weaknesses. 'Supervisory concern banks' consist of

institutions that demonstrate weakness that, if not corrected, could result in significant deterioration of the bank. 'Substantial supervisory concern banks' consist of banks for which there is a substantial probability that the FDIC will suffer a loss in respect to the bank unless effective action is taken to correct the areas of weakness. Under the risk-based premium system, weaker institutions are subject to increased insurance premiums.

Table 2: FDIC Premium Structure and Number of Banks in Each Category in United States

| Capitalisation/overall risk | Healthy | Supervisory concern | Substantial supervisory concern |
|-----------------------------|---------|---------------------|---------------------------------|
| 1 | 2 | 3 | 4 |
| Well-capitalised | (1) | (2) | (3) |
| Premium | 23% | 26% | 29% |
| Number of banks | 9,115 | 1,766 | 363 |
| Adequately capitalised | (4) | (5) | (6) |
| Premium | 26% | 29% | 30% |
| Number of banks | 192 | 164 | 174 |
| Undercapitalised | (7) | (8) | (9) |
| Premium | 29% | 30% | 31% |
| Number of banks | 18 | 26 | 222 |

Notes: Premiums are listed per \$100 of domestic deposits. Number of banks are as estimated by the FDIC and reported in the Wall Street Journal on September 16, 1992, p.A4.

2. Well-capitalised (Tier-I capital >5% or Total capital >10%). Adequately capitalised (Tier-I capital between 4% and 5% or total capital between 8% and 10%) and Undercapitalised (Tier-I capital <4% or Total capital <8%).

Source : Cornett, Mehram and Tehranian (1998) (p.156)

The FDIC's risk-based premium system assesses different rates on insured institutions depending upon (i) their capital levels¹⁴ and (ii) CAMEL¹⁵ rating. Since the financial institutions are classified into risk categories based on their capital and CAMEL ratings, the current risk-based premium focuses primarily on 'solvency risk' of institutions. But recently (i.e. in 1997), the FDIC has voted to reduce insurance premiums for the best rated banks to 0 cents per

US \$100 (from 23 cents earlier) of deposits, while decreasing for the weakest banks to 27 cents (from 31 cents) per US \$100. This change increases the premium differential between the safest and riskiest banks from 8 cents to 27 cents per US \$100 of deposits. According to current risk ratings, more than 95 per cent of the 9,000 institutions are classified into the lowest risk category and pay nothing for deposit insurance.

Criticism of Risk-based Premium

One of the main criticism of FDIC's risk-based premium based on institutions capital levels and CAMEL(S) rating is that it does not price risk effectively as it is not forward looking¹⁶. In fact a number of authors have suggested the need to look at additional factors as a supplement to capital and CAMEL(S) to differentiate among institutions according to risk profiles. One suggestion has been to include in the premium system an explicit rating for compliance with "best practices" or similar standards for establishing effective internal controls. Such an approach has been suggested by Canada Deposit Insurance Corporation (CDIC). The standards cover areas such as credit risk management, capital management, internal control, real estate appraisal, interest rate and foreign exchange risk management and liquidity management. Another suggestion is to incorporate reported market information or its surrogates into premium determination. For example, measures of stock market volatility, debt ratings, net income volatility are possible additional source of information regarding risk exposure. The rapid pace of financial engineering suggests the potential feasibility of such "market guided" approach to deposit insurance pricing.

The Merger of Deposit Insurance Funds - SAIF and BIF

One of the issues that emerged out of the deposit insurance debate in U.S. in the 1990s was the proposal to merge Savings Association Insurance Fund (SAIF) and Bank Insurance Fund (BIF) and the thrift and commercial bank charters. The existence of the two funds is tied historically to the existence of two separate charters for banks and thrifts. It may be recalled that the savings and

loan crisis in the 1980s and 1990s made SAIF insolvent and had to be recapitalised. It has been argued that difference between premiums in SAIF and BIF could lead to depositories being able to 'game' the system. In fact one of the advocates of merger of these funds was Alan Greenspan (1995) Chairman of the Fed who testified before the Congress in the in the following words:

"... two insurance funds with sharply differentiated funds cannot be sustained. Competitive depository institutions cannot differentiate themselves by quality of the deposit insurance that is offered because it is the same insurance, regardless of whether it is from BIF or SAIF..."

Besides, Alan Greenspan, the FDIC has also testified before the Congress that the merger of two insurance funds should be an element of financial modernisation plan. But the question of merger is delayed due to failure in reaching an agreement on charter unification.

Section III

Deposit Insurance Scheme in India: Is There a Need for Reform and for Extending it to Non-Banks?

In this section we examine the nature of safety nets in the form of deposit and credit guarantees in India, drawing on lessons from U.S. and chart out possible areas of reforms. Besides, we also examine the issues involved in extending deposit insurance to non-bank financial companies (NBFCs) in India.

Deposit Insurance in India - Its Origin

The question of introducing deposit insurance in India came up first in 1948 after the banking crisis in Bengal. But it was after the failure of the Palai Central Bank Ltd. and Lakshmi Bank Ltd. in the early 1960s that the need for deposit insurance on the lines of U.S. (Federal Deposit Insurance Corporation) was felt. Hence on August 21, 1961 a Deposit Insurance Corporation Bill was passed which led to the creation (from January 1, 1962) of Deposit Insur-

ance Corporation as a subsidiary of the Reserve Bank of India.¹⁷ The introduction of Credit Guarantee Schemes by the erstwhile Credit Guarantee Corporation of India Ltd., was part of measures taken in the late sixties aimed at encouraging banks to extend credit to priority sector. In July 1978 DIC assumed also the function of credit guarantee and hence was renamed as Deposit Insurance and Credit Guarantee Corporation (DICGC). Thus, unlike its counterpart in other countries, the deposit insurance agency in India provides insurance to both deposits and bank credits to risky borrowers like small borrowers and small-scale industries.

The Deposit Insurance Scheme provides automatic coverage for deposits (current, savings and fixed) with all commercial banks (including regional rural banks), co-operative banks¹⁸ resident in India. In India deposit insurance is compulsory; in terms of geographical coverage, the benefit of deposit insurance now stands extended to the entire banking system leaving uncovered only 10 co-operative banks as they are yet to pass the necessary legislation. Under the Scheme, in the event of liquidation, reconstruction or amalgamation of an insured bank, every depositor of that bank is entitled to repayment of his deposits held by him in the same right and capacity in all branches of that bank upto a monetary ceiling of Rs. 1,00,000. A depositor can obtain more coverage by opening deposit accounts in different insured banks but not at different branches of the same insured bank. The insured bank has to pay premium at the rate of 5 paise per annum per hundred rupees, which is collected at half yearly intervals. The banks are required to bear this fee so that the protection of insurance is available to the depositors free of cost. Penal interest @8% above Bank Rate is charged on overdue premium. The bank cannot levy charge to the depositors on account of payment of premium to the Corporation. The number of banks covered under the deposit insurance scheme increased from 276 in 1962 to 2,438 in End-March 1998. Out of 2,438 insured banks, 108 were scheduled commercial banks, 196 RRBs and the remaining 2,134 Co-operative Banks. The proportion of insured deposit accounts increased from 78 per cent in 1962 to 90.4 per cent in 1998 although in terms of percentage of deposit accounts the corresponding figure was 25 per cent in 1962

and increased to 75 per cent by 1998.

Due to the compulsory nature of deposit insurance scheme in India and the policy of not allowing weak financial intermediaries to exit, the claims on deposit insurance has been meagre and hence the fund has been in surplus (See Table 3). However, there are overdues from banks especially from Regional Rural Banks on account of deposit insurance premium but this has been on the decline over the last few years; deposit insurance premium overdues declined from Rs. 659 lakhs in 1994-95 to Rs. 38 lakhs in 1997-98. Out of the overdues on account of deposit insurance premium of Rs. 38 lakhs in 1997-98, Rs. 2.5 lakhs was on account of Scheduled Commercial Banks, while RRBs owed Rs. 35 lakhs. During 1997-98, 131 out of 196 RRBs defaulted in payment of deposit insurance premium.

Table 3 : Surplus/Deficit of Deposit Insurance Fund in India - 1995 to 1998

(Rs. Crore)

| Year | Deposit Insurance Premium Received | Deposit Insurance Claims Settled | Surplus(+)/ Deficit(-) (2-3) |
|---------|------------------------------------|----------------------------------|------------------------------|
| 1 | 2 | 3 | 4 |
| 1994-95 | 193.28 | 2.20 | 191.08 |
| 1995-96 | 226.43 | 8.75 | 217.68 |
| 1996-97 | 253.67 | 3.91 | 249.96 |
| 1997-98 | 319.27 | 2.26 | 317.01 |

Source: Deposit Insurance and Credit Guarantee Corporation, *Annual Report* (Various issues)

The deposit insurance fund as a percentage of insured deposits in India is a measly 0.05 in the last few years and compares unfavourably with the figure of 1.25 mandated by FDIC in U.S. The poor fund reserve ratio in India has to be seen against the background of the practice of deposit insurance fund cross subsidising the ailing credit guarantee fund.

Credit guarantee schemes – Nature of Coverage

The three credit guarantee schemes which were formulated by the Credit Guarantee Corporation (CGC) of India Ltd., and continued by DICGC were intended to provide the necessary incentive to banks for extending credit to small borrowers (including farmers) engaged in the non-industrial activities. A credit guarantee scheme for small-scale industries sponsored and formulated by the Government of India and administered by the Credit Guarantee Corporation (Reserve Bank of India) had been in operations since July 1960. In pursuance of the recommendations of a Working Group constituted by the Government in 1979, all credit guarantee schemes were integrated under one organisation.

Effective from 1 April 1989 and based on the recommendations of the Expert Committee, 1987 the scope of the credit guarantee schemes was enlarged to cover the entire gamut of priority sector advances. However, at the request of some credit institutions, DICGC has allowed exclusion of certain categories of advances guaranteed by Central/State Governments, ECGC etc., from total priority sector advances for the purpose of payment of guarantee fee and consequently these advances do not get DICGC guarantee cover. The schemes covered under the credit guarantee scheme are: (i) Small Loans Guarantee Scheme 1971;¹⁹ (ii) Small Loans (Financial Corporations) Guarantee Scheme, 1971; (iii) Service Co-operative Societies Guarantee Scheme, 1971; (iv) Small Loans (Small Scale Industries) Guarantee Scheme, 1981;²⁰ (v) Small Loans (Co-operative Credit Societies) Guarantee Scheme, 1982; (vi) Small Loans (Co-operative Banks) Guarantee Scheme, 1984.²¹ With effect from April 1, 1992 with the termination of the schemes (ii), (iii) and (v), the Corporation presently operates only schemes (i), (iv) and (vi). Initially guarantee was extended to 100 per cent of the total outstanding (loan including interest) which was reduced over a period of time to 50 per cent. Kave and Kaufman (1992) has described credit enhancements as 'implicit deposit insurance'.

The consideration for extension of the guarantee cover is the payment of guarantee fee at the stipulated rates calculated on the

balances outstanding under the priority sector advances (except certain specified categories) and paid yearly in advance by the credit institutions. The fee rate is 2.50 per cent per annum for the Small Loans Guarantee Scheme, 1971 only. The Regional Rural Banks are however, allowed to pay the fee at half the normal rate (i.e. @ 1.25 per cent per annum) for first five years from the date of their joining the Scheme. The guarantee fee rate for two other schemes viz. Small Loans (Co-operative Banks) Guarantee Scheme, 1984 and Small Loans (SSI) Guarantee Scheme 1981, is 1.50 per cent per annum. The fee is required to be paid regularly and in advance on an annual basis in order to keep the guarantee in force. Penal interest @ 8% above Bank Rate is charged on overdue guarantee fee.

The credit guarantee scheme of DICGC has not been viable and has been in deficit except for the year 1989-90 resulting in huge losses for the insurance agency (Table 4). A major attraction of credit guarantee scheme for banks apart from guarantee was that the guarantee fee paid to DICGC was tax-deductible. Hence DICGC has been forced to cross subsidise the credit guarantee fund by transferring fund from deposit insurance fund and subsidy from the Reserve Bank². To overcome deficits in guarantee funds, the guarantee fee was enhanced in April 1989 and then in 1995 guarantee claims were confined to principal loan rather than outstanding loan as was the practice earlier. This change made credit guarantee scheme an unattractive proposition for banks. Consequently a majority of banks opted out of the scheme. At present only two scheduled commercial banks viz., Central Bank of India and Union Bank of India are in the credit guarantee scheme apart from four RRBs and eleven co-operative banks.

The banks' feel that with an in-house corpus (Fund created out of credit guarantee fee paid to DICGC) they can manage the overdue problem of priority sector loans. In this connection it may be noted that under the prudential regulations of income recognition and asset classification, for calculation of net NPAs, DICGC credit guarantee is netted out. Nearly one-half of NPA's (gross) in India is accounted for by priority sector, out of which nearly three-fourth

is accounted by agriculture and SSI advances. Given the high incidence of NPAs among agricultural and SSI advances, the viability of the credit guarantee scheme of DICGC is open to question.

**Table 4 : Surplus/Deficit of Credit Guarantee Schemes
in India - 1990-98**

(Amt.in Rs.Crore)

| Year | Guarantee fee receipts | Guarantee claims receipts | Claims paid | Gap (2) - (3) | Gap (2) - (4) |
|---------|---------------------------|---------------------------------|----------------|------------------|------------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1989-90 | 593.83 | 548.33 | 508.54 | (+) 45.50 | (+) 85.29 |
| 1990-91 | 524.72 | 748.76 | 547.16 | (-) 224.04 | (-) 22.44 |
| 1991-92 | 565.88 | 627.23 | 462.29 | (-) 61.35 | (+) 103.59 |
| 1992-93 | 702.78 | 1143.27 | 633.55 | (-) 440.49 | (+) 69.23 |
| 1993-94 | 846.09 | 1490.76 | 889.99 | (-) 644.67 | (-) 43.90 |
| 1994-95 | 829.13 | 1726.82 | 1179.01 | (-) 897.69 | (-) 349.88 |
| 1995-96 | 704.64 | 2365.23 | 1042.27 | (-) 1660.59 | (-) 337.63 |
| 1996-97 | 564.02 | 2112.37 | 378.64 | (-) 1548.35 | (+) 185.38 |
| 1997-98 | 164.91 | 303.96 | 371.40 | (-) 139.05 | (-) 206.49 |

Source: Deposit Insurance and Credit Guarantee Corporation, Annual Report (Various Issues).

Should Deposit Insurance Be Extended to NBFCs in India?

Non-Banking Financial Companies (NBFCs) occupy an important place in the financial architecture in India, deposits of NBFCs contribute nearly 15 per cent of gross financial savings of households in the 1990s. NBFCs play a vital role in the saving-investment process particularly in areas where established financial entities are still not accessible to borrowers at large. NBFCs undertake a wide spectrum of financial activities ranging from hire purchase and leasing to pave investments.²² Considering the growing importance of NBFCs in the Indian economy the recent Report of the Working Group on Money Supply (1998) (Chairman: Y.V. Reddy) has recommended a liquidity measure called L3 which includes public deposits of NBFCs. Table 5 presents growth of public deposits with NBFCs in relation to deposits with Scheduled Commercial Banks in India.

Table 5 : Growth of Public Deposits with Non-Banking Financial Companies in Relation to Deposits with Scheduled Commercial Banks in India - 1990-91 to 1995-96

(Amount in Rs. Crore)

| Financial Year | Deposits with SCB | Growth rate of Col. 2 | Public Deposits with NBFCs* | Deposits with RNBCs** & Chit Fund Cos. | Public Deposits with NBFC sector (4+5) | Growth rate of Col. 6 | Ratio of column 6 to 2 |
|----------------|-------------------|-----------------------|-----------------------------|----------------------------------------|----------------------------------------|-----------------------|------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1990-91 | 204,773.9 | 16.7 | 1,894.5 | 1,166.7 | 3,061.2 | | 1.5 |
| 1991-92 | 230,758.0 | 12.7 | 2,647.5 | 1,738.6 | 4,386.1 | 43.3 | 1.9 |
| 1992-93 | 274,562.3 | 19.0 | 3,387.5 | 2,124.8 | 5,512.3 | 25.7 | 2.0 |
| 1993-94 | 324,720.7 | 18.3 | 5,912.4 | 3,376.1 | 9,288.5 | 68.5 | 2.9 |
| 1994-95 | 376,011.0 | 15.8 | 8,616.6 | 4,608.2 | 13,224.8 | 42.4 | 3.5 |
| 1995-96 | 420,449.0 | 11.8 | 14,050.3 | 6,741.8 | 20,792.1 | 57.2 | 4.9 |

Note : * NBFCs include Equipment Leasing Companies, Hire Purchase Finance Companies, Loan Companies, Investment Companies, Housing Finance Companies and Mutual Benefit Financial Companies (Nidhis).

** RNBCs: Residuary Non-Banking Companies i.e. other than the aforesaid companies.

In India, various committees have gone into the role of NBFCs and have looked at different facets of its functioning and made recommendations, the latest being the Khanna Committee (1995) for designing the supervisory framework for NBFCs. But the question of extending deposit insurance to NBFCs in India became more vocal with the ever increasing fatality of NBFCs and the 1996 Supreme Court judgement (dated January 4) suggesting to the Reserve Bank to examine whether Deposit Protection Scheme on the lines of U.K. could be implemented for NBFCs in India. The Reserve Bank has constituted a Committee under the Chairpersonship of Smt. K.S. Shere to look into this aspect.

Appendix Table 3 lists details of deposit insurance scheme for non-banks in various developing countries. In most of the countries

surveyed (in Appendix Table 3) there is no full comprehensive deposit insurance scheme for NBFCs although following the recent crisis in Asia, countries like Thailand have initiated action to institute deposit insurance for non-banks as well.

In U.K., non-banks include building societies²³, credit unions²⁴, insurance companies, securities houses, investment management firms and friendly societies. Apart from banks, only building societies and credit unions are able to take deposits from the public without first establishing a banking subsidiary or acquiring a bank (in both the cases authorisation of the Bank of England would be required). The Bank of England is not responsible for the supervision of either the building societies or the credit unions which are covered under separate status. The Building Societies Act, 1986 provides for the establishment of Building Societies Investor Protection Fund which is distinct from 'Deposit Protection Fund' meant for bank depositors. The fund is financed by contributions levied on each society. Under the Investor Protection Scheme, investors are able to receive 90 per cent of the value of their deposits up to a limit of £20,000 which is equal to the provisions under the similar scheme for banks - the Deposit Protection Scheme. There is currently no statutory or voluntary share protection scheme covering credit unions in U.K.

The regulation of NBFCs in India was introduced in 1966 mainly as an adjunct to the monetary and credit policy. RBI was vested with certain limited powers to regulate only the deposit taking activities of the NBIs. Depositors protection was only an indirect objective for which certain restrictions on deposit taking were introduced by issue of directions. In India in terms of the new amendments made in 1997, prior registration with RBI has been made compulsory for commencement of financial business by a new NBFC with an entry point norm of Rs.25 lakh. The existing NBFCs with Net Owned Funds (NOF) of less than Rs. 25 lakh have been given three years time to attain the requisite level of NOF. This period can be further extended by another three years. It means that it may take six years for weeding out the weak and unsound NBFCs and thereby consolidating this sector.

The NBFCs are rated by credit rating agencies on the basis of the amount that is proposed to be mobilised by NBFCs from the public and hence was amount specific. The Khanna Committee (1995) which went into the regulatory and supervisory aspects of NBFCs had recommended a system of supervisory rating of NBFCs based on (a) regulatory/supervisory compliance, (b) capital adequacy and (c) rating assigned by the credit rating agencies. Based on the ratings, NBFCs were to be placed in three supervisory watch-lists of low, medium and high risks.²⁵ But the system of registration and rating of NBFCs are yet to stabilise in India. Till the rating system of NBFCs stabilise it would be imprudent to introduce deposit insurance scheme as it is likely to yield in moral hazard problems. In fact the Narasimham Committee Report (1998) on Banking Sector Reforms had strongly come against introducing deposit insurance for NBFCs in the following words:

“Deposit insurance for NBFCs could blur the distinction between banks which are much more closely regulated, and the non-banks as far as safety of deposit is concerned and consequently lead to serious moral hazard problem and adverse portfolio selection. The Committee would advice against any insurance of deposits with NBFCs” (p.55).

Once the rating, regulatory and supervisory system stabilise for NBFCs in India, there could be a case for introducing a risk-based insurance scheme as prevalent in U.S. for banks. For this to happen one of the first pre-condition is to create a fund - may be partially through a regulatory levy on NBFCs and/or through funds from the central budget. Secondly, the risk-based deposit insurance scheme should be carefully devised so that incentives on the part of riskier NBFCs to take undue risks are removed. Thirdly, the scheme should be ideally operated by an agency outside the government and central bank. So far the existing public sector insurance agencies in India (like GIC) were reluctant to provide insurance to NBFCs due to lack of re-insurance from other agencies. With the opening of insurance sector in India to private sector the chances of private insurers coming into this field may not be far away. The key to success of a deposit insurance scheme for NBFCs depends on how risk is priced and how moral hazard problems are avoided.

Section IV Concluding Observations

The study of deposit insurance practices in India and abroad particularly in U.S. brings to fore the issue of whether there is a need to move towards market oriented regime with no deposit insurance (as in New Zealand) or to a flat fee based insurance system for banks and whether the system of deposit insurance itself should be extended to non-banks. In India, in recent period, the credit guarantee scheme of DICGC has been consistently running at a loss necessitating cross-subsidisation from deposit insurance fund. The reform in the credit guarantee since 1995 by confining insurance to principal amount has led to mass exodus of banks from the scheme thus bringing down deficits of credit guarantee funds. In the process the deposit insurance funds constituted only 0.06 per cent of total insured deposits. The emerging scenario may be one of credit insurance being availed only by weak banks and the burden of any such cost devolving on the government. This can raise several potential problems and presents challenges such as exploring alternative ownership schemes through which this function could be discharged and whether a private insurance agency could help taking up this task. The present structure of DICGC may be retained but its ownership could be transferred to insured institutions. The case for private insurance is weak as the ability of private insurance to guarantee enough resources in times of financial stress is limited.

In recent times, there has been considerable overlap in the functions and convergence in the asset-liability matrix of banks, NBFCs and FIs in India. But there exists considerable divergence in the regulatory framework for these institutions. For example, NBFCs and FIs are not subject to reserve requirements against their liabilities as the other counterpart such as banks. Moreover, the assets of NBFCs and FIs are relatively unfettered. Introduction of deposit insurance for NBFCs could aggravate the regulatory divergence and moral hazard problem. Such a measure for NBFCs should ideally be considered only when a sound regulatory and supervisory system for NBFCs has been put in place and the regula-

tory divergence between banks, FIs and NBFCs are lowered to a substantial extent.

Against the backdrop of US experience an important issue in the Indian context relates to the question of introducing a risk based deposit insurance system among banks and non-banks. The flat based insurance system promotes the moral hazard problem as the strong banks in effect are made to pay for the misdeeds of the weak ones. The risk based insurance system is intended to make deposit insurance fairer to well-run institutions and to encourage weak institutions to improve their conditions. Given the fact that a nascent rating system similar to CAMELS approach has emerged in India, the case for moving towards risk-based insurance premium seems to have strengthened. Rating helps the insurer to identify higher risks and allocate appropriate resources to manage risk. Such a framework is possible even for NBFCs - at least for registered NBFCs if proper rating system is introduced for them. But this would require steps in creating a Deposit Insurance Fund or finding out a sound reinsurer.

An alternative deposit insurance system could be along the line of 'narrow banking' concept. The narrow banking concept generally requires banks to invest in low risk instruments and lending to be conducted in a separately capitalised affiliates funded by uninsured liabilities. Although narrow banking merits attention as a restructuring strategy with high NPAs, this may not provide a sound institutional arrangement for deposit insurance. Another set of deposit insurance reform proposal is to limit the activities of banks to a set of "core" banking activities which are essentially activities traditionally performed by banks while other activities could be taken beyond the purview of deposit insurance safety net. But to the extent that financial innovation has blurred the distinction between traditional and non-traditional banking in recent times the effectiveness of this system is not assured. Besides it would imply replacing a formal deposit insurance structure with an artificial imposed structure.

Notes

1. In most discussions, three types of safety nets are mentioned. They are (i) deposit insurance, lender of last resort facility from the central bank and (iii) daylight overdraft loans from the central bank (to meet payment and settlement requirements). See, for example, Furlong (1997) and Helfer (1997).
2. In fact Argentina abolished its system of deposit insurance in 1992 but was forced by the Mexican crisis and consequent runs to announce a new system of (private) deposit insurance in April 1995.
3. In U.S. in 1930, out of the 11,777 Savings and Loan Societies (at that time called building and loans), 526 failed (4.5 per cent). These failed associations held \$410.6 million of the industries' US \$8,828.6 million total assets (4.7 per cent) [See, Benston and Kaufman (1990)].
4. The first study providing theoretical justification for deposit insurance came from Diamond and Dybvig (1983). Using a single-bank economy, Diamond and Dybvig (1983) presented a model of a banking system which enabled depositors to invest in production while still remaining liquid but which was subject to damaging 'bank run' if too many of them wanted to withdraw from production when it was still in progress. They went on to show how deposit insurance could eliminate these runs.
5. The Banking Act of 1933 separated commercial and investment banking limited bank securities activities, expanded the branching privileges of the Federal Reserve member banks, regulated the payment of interest on deposits etc. For details See, Flood, M. (1994).
6. The initial legislation limited the amount of deposit insurance to US \$2,500 in 1934 and US \$5,000 in 1935.
7. For a review of these developments, See Barth (1991), Benston and Kaufman (1990), Kane (1985,1989), Mayer (1990).
8. The FSLIC was abolished by Financial Institutions Reform, Recovery and Enforcement Act (FIRREA) of 1989. FIRREA created the Resolution Trust Corporation (RTC) and Savings Association Insurance Fund (SAIF) to assume the functions of FSLIC.
9. One of the significant changes initially proposed but finally omitted from the final law refers to the Treasury recommendation that deposit insurance coverage be limited to no more than \$100,000 per individual per institution. Many small banks opposed this proposal as they feared that funds would flee to banks thought "too big to fail".
10. The question whether an ailing bank should be closed has been examined by several authors. Following the Savings and Loans debacle, Kane (1985) argued strongly that early closure is desirable. In a theoretical study, Acharya and Dreyfus (1989) argue for closure of banks even when they still have positive net worth. In contrast, Allen and Saunders (1993) argue that forbearance by banking regulators

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may be sensible in some cases. In a recent theoretical study Dreyfus et al (1994) argue that, if there are significant bankruptcy costs, forbearance may actually reduce the regulator's liability.

11. In Canada, insurance agencies like Deposit Insurance Corporation of Ontario (DICO) uses a higher risk-adjusted asset to capital ratio of 4 per cent.
12. In the pre-1991 period, a number of studies have been conducted to evaluate whether the fixed price deposit insurance has led to subsidy. Most of these studies have used the Black Scholes formula for option pricing to determine the actuarial fair price premium for deposit insurance. Marcus and Shaked (1984) using 1979 and 1980 bank accounting and stock price data for U.S. found that the FDIC deposit premium greatly exceed the estimate of fair price. With 1983 data, Rom and Verma (1986) found the FDIC premium close to the fair premium. Pennachi (1987) in his study found that banks are overcharged by considerable margin by FDIC. Epps, Pulley and Humphrey (1996) using data for 1989 also found that deposit insurance premia to be more than the fair price. On the other hand, in the post 1991 period, the study by Whalen (1997) using data for 1996 found that the subsidy is small.
13. The 1.25 per cent target was established following the banking and thrift crisis of the 1980s, and was adapted from the Depository Institution Deregulation and Monetary Control Act of 1980 which specified a 30-basis-point. This mid-point of 1.25 is the historical average reserve ratio for the FDIC fund prior to 1980. The DRR at 1.25 was found to be sufficient to finance all actual losses during the crisis in 1980s.
14. Going by the experience of U.S. it has been found that capital is a very poor indicator of bank safety. For example, many of the large Texas banks were well capitalised when they failed.
15. CAMEL refers to capital adequacy, asset quality, management, earnings and liquidity. The CAMEL rating is now CAMELS, with the additional "S" standing for sensitivity to market risk. This change underscores the importance to management of adequately measuring and controlling market risk factors.
16. One of the most popular ways to estimate value of deposit insurance is based on option pricing theory. It follows the approach of Merton (1977) who viewed deposit insurance as essentially a put option on the value of bank assets.
17. The authorised capital of the Corporation was initially fixed at Rs. 1 crore which has been gradually raised to Rs. 50 crore from May 1, 1984.
18. Following an amendment to the Deposit Insurance and Credit Guarantee Corporation Act in 1968, similar coverage was also extended in respect of deposits with co-operative banks in such of the States/Union Territories as have passed the necessary enabling legislation amending their local Co-operative Societies Acts.
19. The Small Loans Guarantee Scheme, 1971, which came into force on 1 April 1971, covers credit facilities granted by commercial banks including regional rural banks to the priority sector (other than small scale industries) as defined by Re-

serve Bank and this includes farmers and agriculturists, small road and water transport operators, retail traders, small business enterprises, professional and self-employed persons and educational, housing and consumption loans.

20. The Small Loans (Small-Scale Industries) Guarantee Scheme, 1981 was introduced from 1 April 1981 and it covers credit facilities granted by commercial banks including regional rural banks, co-operative banks, State Financial Corporations and State Development Agencies to small-scale industries units for acquisition of or repairs to or replacement of fixed assets or equipment and for working capital requirements for production and marketing of products.
21. The Small Loans (Co-operative Banks) Guarantee Scheme, 1984 covers credit facilities granted by eligible primary (urban) co-operative banks to the priority sector as defined by Reserve Bank, including activities allied to agriculture, road and water transport operators, retail traders, small business enterprises, professional and self-employed persons and educational, housing and consumption loans. All eligible licensed primary (urban) co-operative banks are as defined in clause (gg) of Section 2 of the DICGC Act, 1961 as well as eligible unlicensed primary (urban) co-operative banks recommended by the Reserve Bank of India as eligible, can participate in the Scheme.
22. There are broadly, light types of NBFCs: (i) equipment leasing companies, (ii) hire purchase companies, (iii) loan companies, (iv) investment companies, (v) mutual benefit financial companies (Nidhis), (vi) miscellaneous non-banking companies (chit funds), (vii) residuary non-banking companies and (viii) housing finance companies.
23. Building societies are regulated by the Building Societies Commission under the Building Societies Act, 1986. Building societies are mutual organisations with the principal purpose of raising funds from members in order to lend to the members sums of money for the purchase of houses. However, the Act allows building societies to carry out banking services and insurance as well.
24. Credit Unions are regulated by the Registry of Friendly Societies under the Industrial and Provident Societies Act, 1965 and the Credit Unions Act, 1979. Credit unions are mutual savings and loan societies whose members 'save' with their credit union by investing in its 'shares'. There are stipulations regarding the amount of shares a member can hold, amount a member can borrow, repayment period of loans (maximum) and number of members in a credit union (maximum).
25. The on-site supervisory mechanism suggested by the Khanna Committee include proposals to bring larger NBFCs with assets size over Rs.50 crore and above under annual inspection. Companies with asset size between Rs.5 crore and Rs.50 crore is proposed to be inspected bi-annually and smaller companies on the basis of off-site returns besides conducting on-site inspections on a selective basis.

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Table 1 : Types of Deposit Protection Systems in Different Countries

| Explicit Deposit Scheme | | Implicit Deposit Scheme | | None |
|-------------------------|---------------------------|-------------------------|--------------------|-------------|
| <u>Africa</u> | <u>Middle East</u> | <u>Africa</u> | <u>Europe II</u> | <u>Asia</u> |
| Kenya | Kuwait | Benin | Estonia | New Zealand |
| Nigeria | Lebanon | Burkina Faso | Kazakhstan | |
| Tanzania | | Cameroon | Kyrgyz | |
| Uganda | <u>Western Hemisphere</u> | Central | Republic | |
| | Argentina | African | Latvia | |
| <u>Asia</u> | Canada | Republic | Lithuania | |
| Bangladesh | Chile | Chad | Russia | |
| India | Colombia | Côte d'Ivoire | Ukraine | |
| Japan | Dominican | Equatorial | | |
| Marshall Islands | Republic | Guinea | <u>Middle East</u> | |
| Micronesia | El Salvador | Gabon | Egypt | |
| Philippines | Mexico | Ghana | Iran | |
| Taiwan | Peru | Guinea | Iraq | |
| | Trinidad & | South Africa | Israel | |
| <u>Europe I</u> | Tobago | Togo | Jordan | |
| Austria | United States | Zaire | Libya | |
| Bengium | Venezuela | Zambia | Oman | |
| Czech Republic | | Zimbabwe | Saudi Arabia | |
| Denmark | | <u>Asia</u> | Syria | |
| Finland | | Australia | UAE | |
| France | | China | <u>Western</u> | |
| Germany | | Hong Kong | <u>Hemesphere</u> | |
| Greece | | Indonesia | Brazil | |
| Hungary | | Kiribati | Bolivia | |
| Iceland | | Korea | Costa Rica | |
| Ireland | | Malaysia | Ecuador | |
| Italy | | Pakistan | Guatemala | |
| Luxembourg | | Singapore | Honduras | |
| Netherlands | | Sri Lanka | Jamaica | |
| Norway | | Thailand | Paraguay | |
| Poland | | Vietnam | Uruguay | |
| Portugal | | | | |
| Slovak Republic | | <u>Europe I</u> | | |
| Spain | | Bulgeria | | |
| Sweden | | Romania | | |
| Switzerland | | | | |
| Turkey | | | | |
| United Kingdom | | | | |

Note : n.a. means either not applicable or not available..

Sources : Source: Kyei (1995),p.3.

**Table 2 : Explicit Deposit Protection Arrangements —
Agency, Statute, Management, and Membership**

| Country | Date Establi- shed | Name of Agency | Statute | Manage- ment | Membership |
|---------------------------|--------------------------|------------------------------------------------------------------------------------|------------------------------------------------------|----------------------|--------------------------|
| <i>Europe I</i> | | | | | |
| Austria | 1979 | Deposit Guarantee Fund | Credit System Act | Private | Compulsory |
| Belgium | 1985 | Rediscount and Guarantee Institute | Royal Order 175 and March 1982 legislation | Joint | Voluntary |
| Czech Republic | 1994 | Deposit Insurance Fund | The Act of July 8, 1994 | Official | Compulsory |
| Denmark | 1988 | Deposit Insurance Fund | Act 850, 1987; Order 118, 1988 | Private | Compulsory |
| Finland | 1969 | Deposit Guarantee Fund | n.a. | n.a. | Compulsory |
| France | 1980 | Deposit Guarantee Fund | Banking Act of 1984 | Private | Voluntary |
| Germany | 1966 | Deposit Security Fund, Savings Bank Security Fund and Credit Coop. Security Scheme | German Bank Association Deposit Protection Fund Law | Private | Voluntary/ Compulsory |
| Hungary | 1993 | National Deposit Insurance Fund | Act on Natl. Dep. Ins.Fund | Official | Compulsory |
| Iceland | 1985 | DIF for Savings Banks; DIF for Commercial Banks | Acts 86 and 87/1985 | Private/ Official | Voluntary |
| Ireland | 1989 | Deposit Protection Account (Central Bank) | Central Bank Act, 1989; Building Societies Act, 1989 | Official | Compulsory |
| Italy | 1987 | Interbank Deposit Protection Fund | n.a. | Private | Compulsory |
| Luxembourg | 1989 | Association Guarantee Deposits | n.a. | Private | Voluntary |
| Netherlands | 1979 | Collective Guarantee Scheme | n.a. | Joint | n.a. |
| Norway | 1961 | Deposit Guarantee Fund | n.a. | Joint | n.a. |
| Poland | 1995 | Deposit Guarantee Fund | Law on Banking Guarantee Fund, 1994 | n.a. | Voluntary |
| Portugal | 1992 | Deposit Guarantee Fund | n.a. | Joint | Voluntary |
| Spain | 1977 | Deposit Guarantee Fund | Royal Decree Law 4 & 18 | Official | Compulsory |
| Switzerland | 1984 | Deposit Guarantee Fund | n.a. | Official | Compulsory |
| Turkey | 1983 | Turkish Deposit Insurance Fund | n.a. | Joint | n.a. |
| United Kingdom | 1982 | Deposit Protection Fund | Banking Act of 1979 and 1987 | Official | Compulsory |
| <i>Western Hemisphere</i> | | | | | |
| Argentina | 1979 (1995) | SEDESA | Law 24, 485 | Joint | Voluntary |
| Canada | 1967 | Canada Deposit Insurance Corporation | Deposit Insurance Corporation Act of Canada | Official | n.a. |

(Contd.)

| Country | Date Established | Name of Agency | Statute | Management | Membership |
|--------------------|------------------|------------------------------------------------------|-------------------------------------------------------|------------|------------|
| Chile | 1986 | Superintendent of Banks | Banking Law | Official | Compulsory |
| Colombia | 1985 | Financial Institution Guarantee Fund | Banking Law 1985 | Official | Voluntary |
| Dominican Republic | 1962 | Savings Account Insurance | National Housing Bank Law | Joint | Compulsory |
| El Salvador | 1991 | n.a. | Law on Financial Institutions 1991 | n.a. | Voluntary |
| Mexico | 1986 | Bank Savings Protection Fund | Credit Institutions Law | Official | Compulsory |
| Peru | 1993 | Deposit Insurance Fund | Banking Law 1991 | Joint | Voluntary |
| Trinidad & Tobago | 1986 | Deposit Insurance Corporation | Financial Institutions Act 1986 | Official | Compulsory |
| United States | 1934 | Federal Deposit Insurance Corp. (FDIC) | Federal Reserve Act | Official | Voluntary |
| Venezuela | 1985 | FOGADE/BANAP | Charter of Deposit Guarantee and Bank Protection Fund | Joint | Compulsory |
| <i>Asia</i> | | | | | |
| Bangladesh | 1984 | Deposit Insurance Fund | Deposit Insurance Ordinance 1984 | Official | Compulsory |
| India | 1962 | Deposit Insurance and Credit Guarantee Corp. (DICGC) | DICGC Act 1961 | Private | Compulsory |
| Japan | 1971 | Deposit Insurance Corporation (DIC) | Deposit Insurance Law | Joint | Compulsory |
| Marshall Islands | 1975 | Federal Deposit Insurance Corp. (FDIC) | Banking Act | Official | Voluntary |
| Micronesia | 1963 | Federal Deposit Insurance Corp. (FDIC) | Banking Act | Official | Voluntary |
| Philippines | 1963 | Philippine Deposit Insurance Corp. (PDIC) | Republic Act 3591/7800 | Joint | Compulsory |
| Taiwan | 1985 | Central Deposit Insurance Corporation | Deposit Insurance Act, 1985 | Official | Voluntary |
| Vietnam | 1998 | Vietnam Bankers' Association | | Official | Voluntary |
| <i>Middle East</i> | | | | | |
| Kuwait | n.a. | n.a. | n.a. | n.a. | n.a. |
| Lebanon | 1967 | National Deposit Guarantee Company | n.a. | private | Compulsory |
| <i>Africa</i> | | | | | |
| Kenya | 1985 | Deposit Protection Fund Board | Banking Act No. 17, 1985 | Official | Compulsory |
| Nigeria | 1988 | Nigerian Deposit Insurance Corp. (NDIC) | NDIC Decree No. 22 | Official | Compulsory |
| Tanzania | 1993 | Deposit Insurance Fund (DIF) | Financial Inst. Act. 1991 | Official | Compulsory |
| Uganda | 1995 | Deposit Insurance Fund | Financial Inst. Act 1993 | Official | Compulsory |

Note : n.a. means either not applicable or not available. Source: Kyei. (1995), p.6-7.

**Table 3 : Deposit Insurance Scheme for
Non-Banks in Various Countries**

| S.No. | Countries | Nature of Deposit Cover/Insurance/Protection |
|-------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Australia | <p>There is no direct deposit insurance scheme for the deposits of Non-Banking Financial Institution in Australia. However, a different type of scheme viz. Emergency Liquidity Support Scheme (ELSS) is in operation. Under the Scheme, a society may be required on advice from Australian Financial Institutions Commission (AFIC) to provide liquidity support to another society upto an amount not exceeding 50 per cent of the value of certain specified unencumbered assets. A particular society may face a short term liquidity crisis or a long term solvency crisis. This ELSS helps the society in crisis meeting its immediate obligations. Emergency liquidity support is provided only against acceptable securities, the value of which should not be less than 10 per cent of the society's total assets and these assets should either be held by Special Service Providers (SSP) or any other manner acceptable to AFIC or State Supervisory Authority (SSA).</p> <p>Societies are to provide AFIC with reports of compliance from their external auditors, at six-monthly intervals, certifying that security is being held in the appropriate form, that loan balances are updated regularly and that where land and buildings are identified as security, valuations are updated at the latest, at three-yearly intervals. AFIC may delegate to the SSAs responsibility for verifying the holdings of such security during regular on-site inspections.</p> |
| 2. | Hong Kong | <p>Hong Kong does not have any Deposit Insurance Scheme. However, amendments were introduced to the Companies Ordinance in 1995 to enable priority payment to be made for the first \$100,000 deposit of each eligible depositor by the liquidator in the event of a bank liquidation. This priority payment scheme applies only to banks but not other non-bank deposit-taking institutions.</p> |
| 3. | Singapore | <p>There is no deposit insurance scheme in Singapore.</p> |
| 4. | Thailand | <p>There is no formal deposit insurance scheme in Thailand. However, there exists a Financial Institutions Development Fund which is a separate legal entity, managed by the Bank of Thailand. The Fund collects yearly contributions from all financial institutions under the supervision of the Bank of Thailand at the ratio of 0.1 per cent of deposits. Under certain circumstances, the Fund may borrow from the Bank of Thailand when necessary.</p> <p>The fund may step in to lend money, take equities in certain institutions or bail out troubled institutions by purchasing their non-performing assets when it deems appropriate. Even though it is under no definite legal obligation as such, the Fund has done so on a few occasions in the past. In more than one instance, the Fund was able to dispose equities after the acquisition at substantial profits. The Fund Management Committee consists of high ranking officials from the Ministry of Finance, Bank of Thailand, Judicial Council and some other public entities.</p> <p>In 1997 a proposal was floated to set up bank deposit insurance scheme and to guarantee the debt and deposits of finance companies. The corpus of the insurance would be funded from budget surplus and contributions by the banks to the Financial Institutions Development Fund (FIDF).</p> |

Repo Auction Formats, Bidders' Behaviour and Money Market Response in India

Bhupal Singh and Sarat C. Dhal*

The treasury securities repo-auction is an important instrument for central banks in managing liquidity and sending interest rate signal to the money market. In the Indian context, the repo-auctions have been used actively in the post-reform period. The present study illustrates the money market reaction to repo-auctions and points out whether such reaction is consistent with applied auction rules. The policy implications are analysed in the light of alternative rules pertaining to discriminatory price auctions and fixed rate repos.

Introduction

The treasury securities repurchase agreement (repos) has evolved over a period as an important instrument for conducting the monetary policy by central banks. Repo auctions are undertaken with three broad objectives in view. First, repos facilitate liquidity management in the short run. Secondly, monetary authorities can transmit policy signals through repos to the money market, which has crucial influence on other segments of the financial market such as gilt-edged and foreign exchange market. Thirdly, repo operations provide liquidity and depth to the underlying treasury securities market. The reaction of money market to repo auctions, however, depends upon the market structure, liquidity conditions and auction rules encompassing the auctioneer's objectives and bidders' behaviour. This paper is an attempt to study the money market reaction to repo auctions in the Indian context. The organisation of the paper is as follows.

Section I briefly discusses the theory of auctions particularly auction formats, objectives of the auctioneer and bidders behaviour constituting what is called auction rule, followed by an outline of

* Bhupal Singh and Sarat C. Dhal are Research Officers in the Department of Economic Analysis and Policy of the Bank. The authors deeply acknowledge with thanks the efforts of Mrs R.G. Dalvi and Mrs S.M Kambli in collection of data. The views expressed in the paper are those of authors only.

the trends and developments in repo auctions in India during the process of financial liberalisation in the 1990s. Section II provides the analytics of auction rules and develops a framework for empirical analysis. The empirical findings are discussed in Section III, while Section IV concludes.

Section I Treasury Auction Formats and Bidders' Behaviour

Treasury auctions play an important role in the price discovery process, especially in situations involving some degree of information and cost asymmetries in the money market. Auction designs have varying implications for the bidding behaviour of market agents. The choice of a particular auction technique by the monetary authorities is guided by the objectives of minimising the borrowing cost to the treasury, the financial market impacts of such operations and the stage of development of money market. On occasions, treasury auctions may be conducted purely with the debt management objective in view and at times, primarily as an instrument of central bank intervention in the money market.

The theoretical debate on auction practices has revolved around the choice between alternative auction rules *viz.*, the uniform and the multiple price auctions¹. Under first-price sealed-bid/discriminatory auction, awards are made at the highest bid prices until the supply is exhausted. A high bid lowers profit but raises the possibility of winning the auction and *vice-versa*. Thus, the bidder faces a trade-off between lowering bid relative to common valuation in order to maximise profit and the risk of lowering the probability of winning. Since all bidders have valuation about price, a high bid exposes the bidders to *winner's curse*. Price discrimination strengthens *winner's curse*, by charging the full extent of the bidder's overvaluation of true market price (Bartolini and Cottarelli, 1994). Thus, allowing for the bidders' risk aversion, it leads to downward bid shading. In other words, the bidders would have a tendency to understate the bid in comparison to their assessment of its market price (Milgrom, 1989, Feldman and Mehra, 1993, Bartolini and Cottarelli, 1994). In the second-price/uniform auction system also

referred to as Dutch auction in the financial community, the bidder does not pay his bid but the second-best bid. An aggressive bidder having high probability of winning has to bid a price closer to the market rate, thus reducing the possibility of bid shading resulting from *winner's curse*. Since the successful bidders pay a uniform market clearing stop-out rate, bidders would have tendency to offer higher bids than the first-price auction bid.

Repo Auctions in India

The monetary policy of April 1992 heralded a new approach to internal debt management by switching over to auction mechanism for sale of government securities. The objectives were primarily to develop a voluntary securities market and reduce reliance on quantity variables of monetary control and activate the rate variables through government securities market. An important feature of a well-developed securities market is that the central bank should be able to buy and sell securities as part of its open market operations, depending on its assessment of liquidity in the system. The Reserve Bank has been varying its price in tandem with this objective in view.

Sale of government securities from the Reserve Bank's portfolio through repo auctions captures the liquidity impact in the short run. The Reserve Bank conducts repos auctions in Government of India securities from time to time to even out short-term liquidity fluctuations in the money market, to provide the banking system with an outlet for efficient short-term liquidity management and to optimise return on short-term surplus liquid funds. The repos auctions in government securities were introduced in December 1992. Initially the repos auctions were for a very short period of one or two days and, thereafter increased up to fourteen days. The cut-off rate generally tended to move in tandem with other short-term rates including the 91-day Treasury bill rate. The repo auctions came into prominence in 1993-94 against the backdrop of a sharp increase in the primary liquidity triggered by large capital inflows. The average value of bids accepted in this year rose to Rs. 2,729 crores. Stringent liquidity conditions stemming from decline in capi-

tal inflows and sharp expansion in non-food credit during the second half of 1994-95 led to suspension of repo auctions in February 1995. As a policy response, the reverse repos facility in government dated securities was extended to Securities Trading Corporation of India (STCI) and Discount and Finance House of India (DFHI) with a view to injecting liquidity into the system. Consequently, the upward pressure on call money rates was arrested. The repos transactions were resumed in November 1996 and in the wake of continued strong pressure on liquidity at the short end of the market; repos of 3-4 days duration have been conducted on a regular basis since January 1997. For facilitating better treasury management by participants, a system of announcing a calendar of repos auctions on a monthly basis was introduced in January 1997.

During 1992-93 (December to March) the total face value of bids accepted amounted to Rs. 68,636 crores i.e., 68 per cent of bids received at Rs. 100,994 crores. The cut-off rate ranged between 5 per cent to 19.5 per cent for duration of 1 to 2 days. The repo turnover i.e., bids accepted, increased to Rs. 98,239 crores during 1993-94 with cut-off repo rate ranging between 5.75 to 11.5 per cent for a period of 1 to 17 days. The success ratio in auctions i.e., proportion of bids accepted to bids received, remained steady at 66 per cent. During 1994-95 due to tight liquidity conditions in money market the repo transactions remained subdued with total turnover aggregating Rs. 6,428 crores. The success ratio declined substantially to 47 per cent. The repo rate varied between 5.75 to 7 per cent for a repo period mostly for 14 days. With the surge in liquidity during the second half of 1996-97, repo auctions were resumed in November 1996. Between November 1996 and March 1997, bids accepted in repo auctions ranged between Rs. 300 crore and Rs. 4194 crore, with cut-off repo rate emerging in a narrow range of 4 to 5.48 per cent for generally 3 to 4 days duration. During 1997-98, the repo auctions were actively used to manage short-term liquidity in the system. The average volume of repos outstanding stayed high on an average at Rs. 3,194 crore aggregating to about Rs. 165,000 crores. The repo rate varied between 2.9 per cent and 5 per cent between April and November 1997.

Since November 1997, the fixed rate repos system has been introduced. The turnover ranged between Rs. 3,465 crores and Rs. 10,000 crores on daily basis for a repo duration of mostly 3 days. The repo rate, initially fixed at 4.5 per cent, was gradually raised to 7 per cent by December 1997 and further to 9 per cent in January 1998 in order to bring stability in both the domestic money market and forex markets. However, as the forex market stabilised, the repo rate was brought down to 8 per cent by mid-March 1998, 6 per cent by the end of April 1998 and 5 per cent by mid-June 1998.

As an indicator of volatility, the standard deviation of call rate before auctions (on 14 days basis) was estimated at 9.22 per cent which declined to 6.64 per cent after auctions against the standard deviation of 2.51 per cent in repo rates during the discriminatory auction system². In case of fixed rate repos period, the standard deviation of call rate declined sharply as compared to discriminatory auctions. The standard deviation of call rate estimated at 5.04 per cent before the repo operations declined to 3.29 per cent after repo operations. The standard deviation of repos declined to 1.40 per cent, nearly the half of its volatility in the discriminatory auction system. Thus, the switchover from discriminatory auctions to fixed rate repos has resulted in low volatility in domestic money market.

Section II The Analytics of Repo Operations

Initially, a system of discriminatory-price auctions was introduced for repos operations in government securities. Under this system bidders submit multiple price-quantity sealed-bids. The Reserve Bank enters into repos auctions in Government of India dated securities with the banks/financial institutions holding Subsidiary General Ledger (SGL) and current account with the Reserve Bank. The auction results are announced on the same day and the payment by the successful bidders awarded bids at or below the cut-off repo rate is made on the next day. Since November 1997, the Bank moved over to a fixed rate repos system, under which

the rates are pre-announced and banks/financial institutions are required to submit bids indicating the volume of repos. The results of fixed rate repos are announced on the date of submitting the bids.

The developments since January 1998 show that the Bank Rate and repo rate are emerging as key indicators of movements of interest rates in the money and credit markets. Recently, the repos have been used as a fine tuning instrument of the money market and for transmitting signals of monetary policy. The effectiveness of repos, however, depends on the assumption that there is no unrealistic bidding behaviour by the investors which may provide unreliable information to the money market and its expected future movement. Thus, the objective has been to use an appropriate method of conducting repos operations, which persuades banks/ financial institutions to bid in conformity with actual demand. In view of this, initially a discriminatory pricing auction practice was introduced. Under such a system, the tendency on the part of the bidders to earn a positive pay-off induces them to understate the bids below their valuation, giving rise to the dilemma of going empty handed. Under discriminatory price auction, inexperienced bidders profit less than expected since they are more likely to place higher bids on account of adverse selection. This forces bidders to be conservative in their bids and discourages large market participation.

The recent move from discriminatory auction to fixed rate repo operations has the advantage of eliminating *winners' curse* and entailing equal cost to all bidders, as is the case with uniform price auction also. Under uniform price auction the bidders are awarded the bids at uniform market clearing stop out rate. The uniform price auction, however, induces the bidders to bid aggressively thus exaggerating their true valuation of the price. Fixed rate repos in government securities were introduced with the objective of attaining greater maneuverability in short-term liquidity management through absorption of surplus liquidity at such volumes as necessary to bring orderly conditions in money and foreign exchange markets. The fixed rate repos provide flexibility to monetary authorities in

sending correct policy signals to the market in situations where the markets become highly volatile and behave in an erratic manner.

The Framework for Empirical Analysis

What has been the money market response to repo auctions? This issue can be examined separately for the discriminatory auction system and fixed rate system. In what follows we provide an empirical examination of this aspect in India. The first part analyses money market response to discriminatory auction system undertaken in the post-reform period i.e., December 1992 to November 1997. The second part analyses the fixed rate repos covering the period November 1997 to July 1998. The empirical literature on auctions mainly address issues relating to the bidding behaviour of various market players and the effectiveness of alternative auction formats. The empirical efforts in studying the auction formats against the backdrop of monetary and debt management policies are rather scarce in the sense that the reaction of money and debt markets to the outcome of repos auctions have been scantily explored.

In the beginning, the repo auctions were not undertaken on a regular basis i.e., daily basis. As such a continuous time series data on repo auctions is not available. On the other hand, money market rates are available on a daily basis. In order to analyse the money market reaction to repo auctions, Nautz (1995 and 1997) has suggested that the data on money market need to be defined over the time domain pertaining to the repo auctions. In what follows, we draw from Nautz (1997) and present an empirical framework for analysing money market response to repo auctions.

Let repo auctions are undertaken in the time period t when bids are asked by the central bank. The results of the repo auctions are usually published on the next day i.e., $t+1$. The results of repo auctions shall be reflected in the money market on the day $t+1$. The money market absorbs the information content resulting from the spread (∂r) between the repo rate (r_r) and money market rate (r_m) prevailing on the auction day. The changes in money market (∂r_m) between the rate prevailing on the day before and the day

after the auction day will react to the information content of spread ∂r i.e., $(r_r - r_c)$. If money market is efficient and well integrated, the response of ∂r_c to spread ∂r shall be close to unity. In this context, information content of repo auctions fully captures the market participant's expectations about the state of the economy, particularly the liquidity condition.

$$\partial r_c = a + b (r_r - r_c) \quad (1)$$

Further, it has been argued that the reaction of money market to repo auctions could not be symmetrical at high and low rates. The theoretical line of argument on asymmetrical response owing to the original work of Wilson (1977) has guided several empirical works including Hendricks and Porter (1988). It is the degree of this asymmetry in the adjustment of money market to high and low Repo rates which reflects the maturity of markets. The reaction of money market could then be formalised as

$$\partial r_c = a + b_H (r_r - r_c)_H + b_L (r_r - r_c)_L \quad (2)$$

If $b_H = b_L$, then money market reaction is symmetrical, otherwise, it is asymmetrical. The high and low repo rates are defined on the basis of median rate giving rise to the following formulation.

$$\begin{aligned} (r_r - r_c)_H &= (r_r - r_c) \geq \text{median } (r_r - r_c) \\ &= 0, \text{ otherwise} \end{aligned}$$

and

$$\begin{aligned} (r_r - r_c)_L &= (r_r - r_c) < \text{median } (r_r - r_c) \\ &= 0, \text{ otherwise} \end{aligned}$$

In essence, the asymmetrical response model such as equation 2 implies that the reaction of money market depends on its preceding deviation from the long run equilibrium path that can be distinguished between high and low repo rates. In terms of continuous time series characterisation, the equation 1 is an error correction model and equation 2 a non-symmetrical error correction model of

Granger and Lee (1989) type. However, for the error correction model to be valid, r_r and r_c should be integrated of order one i.e., I(1) series and $(r_r - r_c)$ stationary i.e., I(0) series.

Another important information available from repo auctions relates to the concentration of bidders influencing the behaviour of the money market. Usually, the share of successful bidders i.e., the proportion of bids accepted to bids received in value terms, denoted as BS, is considered in such cases. The share of a successful bidder has several implications. First, a high value of such an indicator reflects the convergence of expectations of the auctioneer as well as the bidders. Second, as the bidders have a natural tendency to exaggerate (understate) the bids, the proportion of successful bids indicates to what extent the central bank would agree with market expectation. Thus, the coefficient of successful bids would have negative sign indicating some correction that central bank desires over the expectation about the money market movement.

Section III

Money Market Reaction to Discriminatory - Price Auction

The most sensitive money market rate in India is the daily call rate (i.e. inter-bank borrowing/lending rate). The repo auctions in Government of India securities are conducted by the Reserve Bank through sealed-bid discriminatory-price auctions. In repos auctions, while the Bundesbank and Federal Reserve Bank buy securities from credit institutions on the condition that the seller simultaneously repurchases the securities forward, the Reserve Bank sells securities with the undertaking to repurchase at a specified date in the future. However, reverse-repos operations are carried out with Primary Dealers (PDs) to facilitate liquidity in the system.

The observed auction rules and money market behaviour suggest that in case of discriminatory-price auction money market rates react particularly strongly to a relatively high repo rate. This inference is drawn from the observed behaviour of markets in developed money markets where the term repos implies purchase of

securities by the central bank i.e., operations involving supply of liquidity to the system. Since the repo operations in our case mainly involve selling operations, under a discriminatory price auction regime, the bidders will exhibit a tendency to bid for a higher repo rate than the true valuations about the market price with inherent motive to minimise relative loss from winning the auction.

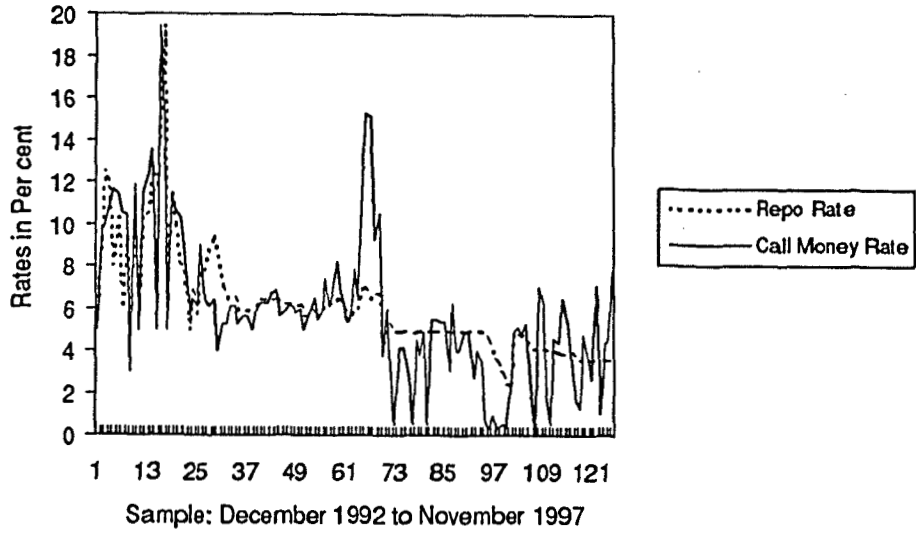
The movements of repo rate and call money rate are depicted in Graph 1 and the proportion of successful bids in Graph 2. The plots of these two variables indicate the tendency of their strong co-movement. The movement of repo rate, call rate and foreign exchange market as represented by three months forward premia is depicted in Graph 3. The graph indicates a high degree of co-movement in the rates and repo rate providing a floor to the call money rate and forward premia. Table 1 reports the results of unit root test. The unit root tests were conducted in terms of ADF(1) regression model and the test statistics reported were arrived after correcting for heteroscedasticity variance. The call money rate and repo rate have unit roots and their difference (∂r) is stationary, thus indicating the existence of long run relationship between the two variables.

Table 1 : Unit Root Test

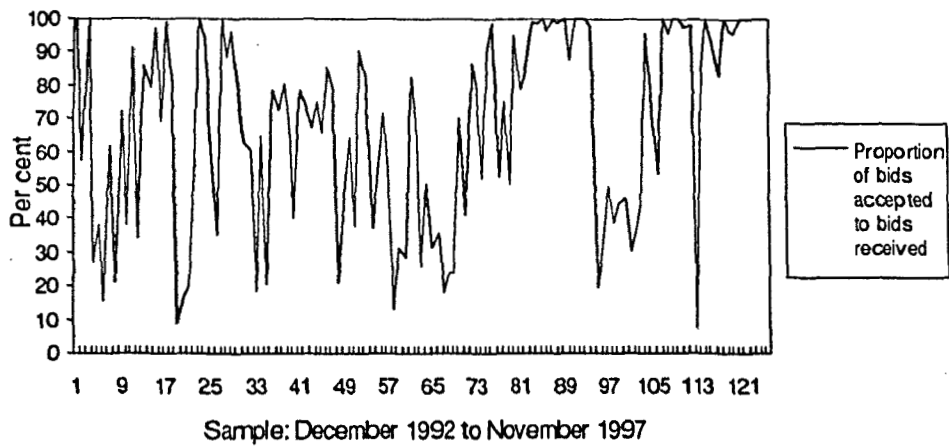
| Variable | ADF (1) |
|----------------------------|--------------|
| Call Rate (r_c) | -2.37(-2.86) |
| Repo Rate(r_r) | -0.83(-2.86) |
| ∂r_c | -3.96(-2.88) |
| $\partial r = (r_r - r_c)$ | -3.55(-2.88) |

Figures in the bracket indicate 95% critical value

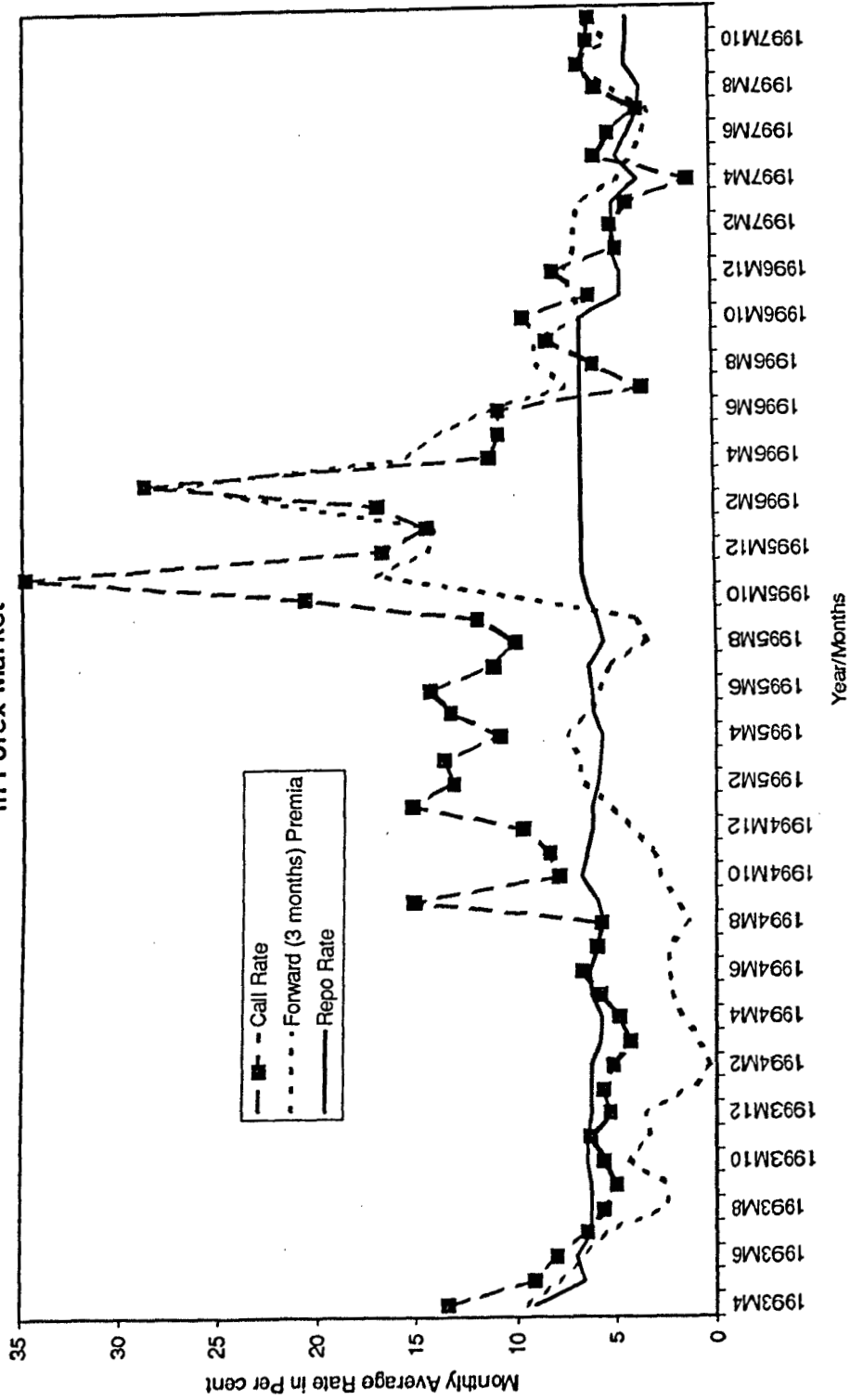
**Graph 1: Movement in Repo Rate and Call Money Rate
(Period of Discriminatory Price Auctions)**



**Graph 2: Proportion of Successful Bids
(Period of Discriminatory Price Auctions)**



Graph 3: Movement of Call Money Rate, Repo Rate and Forward Premia (3 months) in Forex Market



The empirical estimates of symmetric and asymmetric models corresponding to equations 1 and 2, respectively, are presented in Table 2. In general, the coefficients have correct signs and they are significant at 5 per cent level³. The coefficient of BS (proportion of successful bids) variable is more or less same in magnitude in both the models and has negative sign as expected, indicating some degree of correction over market expectation. In the symmetric model, the estimated coefficient of (∂r) term is high at 0.79. Although it seems close to unity, the Wald test of unity restriction on this coefficient, yielding χ^2 statistic at 8.83 rejects such hypothesis at 5 per cent level of significance. In case of asymmetric model, the coefficient of high repo rate $(\partial r)_H$ i.e., 0.66 is about 50 per cent lower than the low rate $(\partial r)_L$ at 0.97. Interestingly, the joint hypothesis in terms of linear restriction that both the coefficients are not different from one another i.e., $H_0: a_H = a_L = a$ could not be rejected as the estimated χ^2 statistics at 2.24 turned insignificant at 5 per cent level. On the contrary, a non-linear restriction i.e., the percentage difference between the two could be zero [$((a_H / a_L) - 1) = 0$] could be rejected at 7 per cent level of significance. Similarly, the unit restriction on the coefficients was also rejected. The results enumerated above provide the basis for the following observations on the money market.

The response of the money market to repos auction is high although it is not complete in a strict statistical sense. The estimates from non-symmetric error correction model do not show a significant difference between the adjustment parameters, suggesting weak asymmetry in money market response to high and low repo rates. Notwithstanding this, it is observed that the call rates adjust freely to low repo rate i.e. $(\partial r)_L$, thus confirming the theoretical hypothesis on discriminatory auction formats. The presence of very weak asymmetry in the reaction of money market to repo rates explains the inability of money market to react differentially to rate variations. There may be several explanations underlying such a phenomenon. Money market in India has grown only in the post-reform period. The market still lacks adequate depth and market players do not usually react differently to relatively high and low repo rates unlike the case with developed money markets.

Table 2: Money Market Reaction to Discriminatory Repos Auctions

| Dependent Variable: ∂r_c | | |
|--------------------------------------|-------------------|-------------------|
| Regressors | OLS Symmetric | OLS Asymmetric |
| Constant | 1.422 (2.81) | 1.826 (3.20) |
| BS | -0.021 (-3.11) | -0.022 (-3.29) |
| $(\partial r) = a$ | 0.79 (11.4) | |
| $(\partial r)_H = a_H$ | | 0.659 (5.82) |
| $(\partial r)_L = a_L$ | | 0.969 (7.10) |
| R ² /DW | 0.54, 1.50 | 0.57, 2.08 |
| U(-1) | | |
| H ₀ : a = 1 | 8.83 | |
| H ₀ : $a_H = a_L = a$ | | 2.24** |
| H ₀ : $a_H = a_L = 1$ | | 11.18 |
| H ₀ : $((a_H/a_L)-1) = 0$ | | 3.30* |

Note : * Significant at 10 per cent level of significance.

** Not significant.

The remaining coefficients are significant at 5 per cent level of significance.

Money Market Reaction to Fixed Rate Repos

Repos operations initially developed as instruments to absorb excess liquidity have emerged as a major instrument of monetary control. It is also used as a signaling mechanism for short-term interest rates. In a major policy switch, the Reserve Bank moved over to fixed rate repos on November 29, 1997. Since then repos of varying maturities have been conducted along with periodical revision in repo rates to absorb liquidity from the system. Fixed rate repos could have certain implications for the market behaviour. Unlike the auction mechanism, it may imply some loss of information regarding the perception of the bidders on price and liquidity

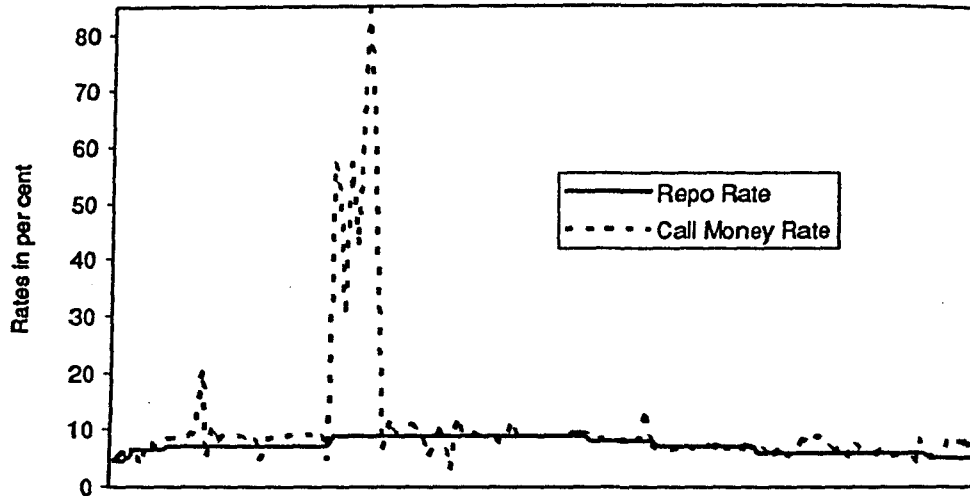
conditions. Since under the fixed rate repos the rates are pre-announced, the bidders submit tenders on quantity only. At the empirical level, an attempt has been made to measure the reaction of money market to fixed rate repos and the effectiveness of repos in transmitting interest rate signal to the short end of the money market i.e., the inter-bank call market.

The data on the fixed rate repo auctions are available almost on a daily basis. Unlike the discriminatory auctions, the analysis of fixed rate repo auctions can be carried out on a continuous time basis as the repo auctions are conducted on day-to-day basis. The sample data covers the period from November to July 1998, representing 156 sample points. On the first trial, the sample did not reveal much information on the money market adjustment to repo rates⁴. There are instances of the call rate substantially deviating from the repo rate during this period (Graph 4). The reason was that the proportion of bids accepted was much lower for a period of about 2 months (Graph 5). However, from March 1998 to July 1998, the call rate has closely followed the repo rate. Thus, for dealing with this problem the sample period has been broken at March 1998, yielding a sample of 87 observations up to July 1998 for the empirical exercise⁵.

The empirical estimates of symmetric and asymmetric models on the money market response to fixed rate repo auctions are shown in Table 3. In the case of symmetric model, the coefficient (∂r) term turned out to be positive (0.59) and statistically significant at 5 per cent level. However, the unity restriction on the coefficient can be rejected as the estimated χ^2 statistic at 3.55 is highly significant at 5 per cent level. The coefficient of successful bidders turned out to be marginally negative (0.01) but significant at 5 per cent level.

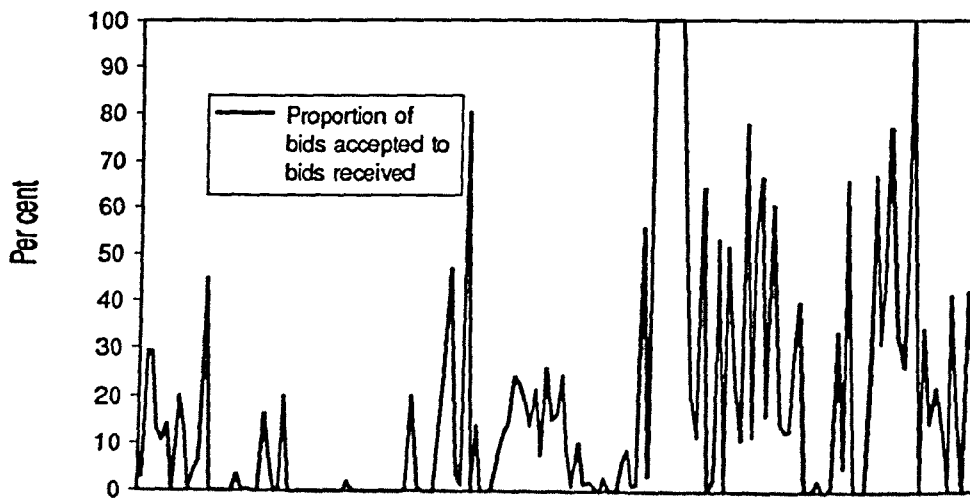
The results in case of asymmetric models are quite interesting. The estimated coefficient of high repo rate (∂r)_H at 1.70 is about 5 times larger than the coefficient of low repo rate (∂r)_L at 0.37. The joint hypothesis that $a_H = a_L$ can be rejected as the estimated χ^2 statistic at 6.05 is highly significant. Similarly, the difference between these coefficients in percentage term is not zero⁶.

Graph 4: Daily Movement of Repo Rate and Call Money Rate (Period of Fixed Rate Repos)



Sample: November 1997 to June 1998 on a daily basis

Graph 5: Proportion of Bids Accepted to Bids Received (Period of Fixed Rate Repos)



Sample: November 1997 to June 1998 on a daily basis

Table 3 : Money Market and Fixed Rate Repos

| Dependent Variable: ∂r_t | | |
|------------------------------------|--------------------|--------------------|
| Regressors | OLS Symmetric | OLS Asymmetric |
| Constant | 0.6235 (3.88) | 0.2602 (1.42)** |
| BS | -0.0135 (-3.54) | -0.0122 (-3.37) |
| $(\partial r) = a$ | 0.5924 (6.04) | |
| $(\partial r)_H = a_H$ | | 1.7006 (5.12) |
| $(\partial r)_L = a_L$ | | 0.3723 (3.30) |
| R ² /DW | 0.36, 2.08 | 0.43, 2.18 |
| U(-1) | | |
| Ho:a = 1 | 17.26 | |
| HO : $a_H = a_L = a$ | | 6.05 |
| HO : $a_H = a_L = 1$ | | 15.82 |
| HO : $((a_H/a_L)-1) = 0$ | | 12.09 |

The results of the sub-sample provide useful insights for understanding the money market behaviour. A high degree of asymmetry is reflected in adjustment of call money rates to relatively high and low repo rates. Surprisingly this sort of behaviour is also exhibited in the case of discriminatory-price auctions in developed and matured markets. A possible explanation is as follows. Under such a system, the behaviour of bidders is reflected on the changes in bids tendered in response to pre-announced rates. Since the central bank is offering a flat rate, which is pre-announced, the possibility of *winners' curse* is completely eliminated. In this situation, expectations play an important role. As evident from the striking differences between adjustment parameters, money market reacts strongly to any upward revision in repo rates. Introducing an additional variable on proportion of successful bids demonstrates the fair degree of convergence between the perception of the auctioneer and

the market players. A significant parameter on bidding substantiates the effectiveness of policy signals.

Section IV Conclusion

The study analysed the response of the money market to repo auctions in India. The study demonstrates that under discriminatory price repo auctions, call money rates respond significantly to both low and high repo rates, abstracting from the strict theoretical auction hypotheses. The results also reveal that the money market rates adjust to both a relatively low and high repo rate; the degree of adjustment being higher in case of the former than the latter. The lack of high degree of asymmetry as evidenced in well developed money markets could arise from various market imperfections. The empirical experiment with the fixed rate repo system also reveals a robust relationship between repo and money market rates. In this case, there is a high degree of asymmetry in the response of money market to high and low repo rates. This could indicate the effectiveness of repo system as a signaling mechanism for the money market rates. The results suggest that fixed rate repos provided a floor rate for money market and proved effective in stabilising the money market rates around this level in comparison to discriminatory price auctions.

The present study was confined to analysis of money market response to one-way repo operations. However, the reverse repo operations involving liquidity support to the system may shed additional lights on the behaviour of market agents, which has not been investigated in the study due to lack of adequate information.

Notes

1. Milgrom (1989) provides a detailed theoretical discussion on several aspects of auction formats and bidders behaviour. Other issues in this debate are discussed in Cammack (1991) and Reinhart (1992).
2. An analysis on volatility of repo rates and call money rates in the Indian money market is also provided by Kanagasabapathy (1994).
3. Although the regression model could involve some degree of auto-correlation of residuals, it was not very high for the first order autocorrelation coefficient was low at 0.22. Since the Durbin-Watson statistics is reasonably high (1.50) and the data are discrete series, the problem could be safely ignored.
4. The regression model based on the entire sample including 156 data points yielded low estimates on the coefficient of the (∂r) term at 0.21 and R^2 at 0.19 i.e., 2 times lower than estimates based on the 87 sample observations.
5. The rates r_f and r_g for the sample period of fixed rate repos had unit roots indicated by the estimated ADF(1) test statistic at -1.55 and -1.36, respectively.
6. The median of (∂r) in fixed rate repo case turned negative at -0.10. However, even after classifying the high and low rates on the basis of 90 per cent trimmed mean with a positive estimate could lead to very marginal changes in the estimated coefficients with the sign remaining unchanged as compared to estimates based on median rate.

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NOTES

Effective Cost of Small Savings

M.S. Mohanty & Nishita Raje*

Small saving schemes involve both an explicit and implicit cost to the government. The implicit cost, which arises from several tax concessions offered on these investments not only introduces distortion to the relative return of various assets in the financial market but also gives rise to high effective cost of borrowing for the government. This paper examines the nature and extent of hidden cost of small savings and explores the possibility of reducing these costs in India.

Introduction

Over the years, small savings have emerged as an important source of borrowing for the government. Two decades ago their contribution to the centre's gross fiscal deficit was about 13 per cent. Today they constitute about 20 per cent of the borrowing requirement of the central government. Given the present scheme of devolution, 75 per cent of net small saving collections are transferred to the states as part of their loans from the centre. Resource mobilisation from small savings witnessed a steady growth in 1980s with the growing need to finance a large part of the fiscal deficit through issue of non-marketable bonds in the face of limited possibility in accessing funds from the market. The outstanding liabilities of the central government on account of small savings stood at 8.8 per cent of GDP at end March 1998, which is only second to government dated securities at 15.4 per cent of GDP. So, the small saving instruments have acquired a prominent place in public finance. Interest rates offered on them are as competitive as those on market loans. There is, however, more to

* M.S. Mohanty is Director in the Department of Economic Analysis and Policy and Smt. Nishita Raje is Assistant Adviser in the Monetary Policy Department of the Bank. They are extremely grateful to Prof. M.J.M. Rao who helped and guided them in developing the formula for estimating the cost and benefit of small saving schemes. The views expressed in the paper are authors' own and the responsibility of errors, if any, are those of the authors only.

what small savings can offer to investors. These instruments enjoy an enviable position as far as their attractiveness to investors is concerned. They combine competitive nominal returns with several tax saving features. What implication does this have for the government budget and the financial market? This question needs to be addressed from two specific viewpoints : First, small savings imply a hidden cost to the government. The effective cost of borrowing to government from small savings is far higher than their interest cost. Second, these saving schemes have certain implications for the market since the effective return on them is higher than that on the marketable debt of the government. Thus, they pose a market distortion problem.

Keeping the above objectives in view, this note examines the nature and extent of the hidden cost of small savings and explores the possibility of reducing the implicit costs without adversely affecting their position in the budget. The note is organised into three sections viz., tax status, estimates of effective cost and linking return on small savings to market interest rate.

I. Tax Status

Most small savings instruments passing through the budget viz., post office deposit schemes, National Saving Schemes (NSS) and National Savings Certificate (NSC) involve substantial hidden cost to the budget compared to other borrowing instruments. These hidden costs represent the foregone revenue that would have normally accrued to the budget had these borrowings been contracted without conferring fiscal privilege to their investors. Under the current provisions of income tax, investment in small savings enjoys two types of tax concessions; first, the interest income from these instruments along with many other saving schemes are exempt from tax upto a maximum limit of Rs. 12,000 in one financial year (U/S 80L) and second, investment in some of these instruments also qualify for tax rebate at the rate of 20%, upto a maximum rebate amount of Rs. 12,000 in a financial year (U/S 88).

Between these two forms of tax concessions, Section 80L ap-

plies equally to certain other debt instruments passing through the budget, viz, government dated securities, treasury bills and bank deposits; while the benefit of Section 88 has been an exclusive privilege of post office cumulative time deposits, NSS and NSCs and provident funds, among the government debt instruments. Consequently, the implicit cost of borrowing through small saving schemes is higher than that of dated securities and treasury bills.

II. Estimates of Effective Cost

The effective cost of small savings (excluding the administrative cost) should therefore comprise two elements; the nominal interest cost and the implicit cost on account of fiscal concessions. While small savings imply hidden costs to the budget, they also benefit government budget by way of easy borrowing from the households. Effective cost should, therefore, represent the net additional cost i.e. the discounted value of the costs net of discounted value of benefits over the maturity period of bonds. Assuming that government borrows Re. 1 through small savings with tax rebate to the investors (as under Section 88), the cost to the budget in the initial period equals the tax rebate (d) while the benefit is represented by the amount of borrowed fund i.e. Re. 1. In the second period, government pays back to investors the borrowed amount with interest of Re. $1(1+i)$, which constitutes the cost in this period. The benefit in this period equals the tax collected by the government on interest income (it), where 't' is the marginal tax rate. The discounted net additional cost for a one-year maturity bond therefore equals :

$$(d-1) + \frac{i(1-t)}{1+r} + \frac{1}{1+r} \quad \dots (1)$$

where 'r' is the discount rate representing the time preference of the government.

This simple one period model can be generalised for more than one period case by the following formula :

$$(d-1) + \frac{i(1-t)}{(1-r)} + \frac{i(1+i)(1-t)}{(1+r)^2} + \frac{i(1+i)^2(1-t)}{(1+r)^3} + \dots + \frac{i(1+i)^{n-1}(1-t)}{(1-r)^n} + \frac{1}{(1-r)^n} \quad (2)$$

or

$$(d-1) + \frac{i(1-t)}{(1-r)} \left[1 + \frac{(1+i)}{(1+r)} + \frac{(1+i)^2}{(1+r)^2} + \dots + \frac{i(1+i)^{n-1}}{(1-r)^{n-1}} \right] + \frac{1}{(1-t)^n} \quad (3)$$

Now let $\frac{1+i}{1+r} = K < 1$

that is, the case where the discount rate exceeds the interest rate, ($r > i$). The formula can be then reduced to :

$$(d-1) + \frac{i(1-t)}{(1+r)} \frac{(1-k)^n}{(1-k)} + \frac{1}{(1+r)^n}$$

where $K = \frac{1+i}{1+r} < 1$... (4)

Given the values for tax rebate (d), interest rate (i), maturity period (n), the marginal tax rate for interest income (t) and some assumed value of discount rate (r), equation (4) can be applied to generate estimates of effective cost of various borrowing instruments. In principle, discount rate should represent the market interest rate and should be kept constant over the range of instruments. A constant discount rate should not affect the comparability of costs across the borrowing instruments. For the purpose of generating estimates in this paper we assume the value of 'r' at 12.15 per cent which was the yield at cut-off price for 10-year government bonds issued at auction in March 1998. Alternative estimates are also generated for lower discount rates by tapering off the rate by one percentage point i.e., to 11.15 per cent and 10.15 per

cent. Presently, a majority of the active borrowing instruments of Government of India enjoy tax benefits under Section 80L of IT Act. Therefore, 't' could be assumed zero, although with a caveat that the interest income of tax payers remains within the limit of Rs. 12,000 in a financial year and that this income is solely derived from the saving instrument under consideration. We also generate the estimates of effective cost for three values of marginal tax rates, i.e. 10%, 20%, 30%, to get an idea about the variability of effective cost across the tax rates.

The estimates of effective cost generated for various borrowing instruments of the government are presented in Table 1. It may be observed from the table that effective costs of NSS and NSCs are higher than those of other instruments for any values of 't'. When 't' is zero, that is for full tax exemption of interest income, the effective cost is as high as 34.24 per cent for NSC and 20.02 per cent for NSS, respectively, for 'r' values of 12.15 per cent. Compared to these, the effective cost of dated securities is placed at 10.9 per cent, lower than the actual nominal interest rate. For the 364-day treasury bills the cost is negative at (-)3.29 per cent even with tax exemption on interest income. This primarily shows the impact of discount rate, which exceeds the interest rate on the instrument. Table 1 also shows that the effective cost is sensitive to tax rate for interest income. For the tax rate of 10 per cent for interest income, the effective cost for NSCs declines to 27.84 per cent and tapers off with successively higher tax rates, reaching 15.05 per cent for 30 per cent tax rate. The position remains more or less similar for NSS. In the case of other small saving schemes, such as Post Office Recurring Deposits and Post Office Monthly Income Schemes, the effective cost turns to benefit, as the marginal tax rate reaches the maximum. The effective cost of Kisan Vikas Patra (KVP) and Indira Vikas Patra, which enjoy no tax concession but offer higher nominal rate of interest, is almost identical to the interest cost at the marginal tax rate of 20 per cent. For higher tax rates, effective cost is lower than the nominal interest rate and vice-versa. The effective cost is only 7.14 per cent in the case of KVP for the tax rate of 30 per cent, which rises to 22.54 per cent for tax rate of 10 per cent. If the interest income

of dated securities is brought under progressive marginal taxation, government stands to gain in the long run. The analysis showed that effective costs can be brought down substantially if the interest income is brought under the tax net even when allowing for one-time tax rebate on investment. From this view point, a flat tax rate of, say, 20 per cent on interest income should look attractive to bring down the presently high effective cost of small savings in the budget. The two other scenarios with alternative discount rates of 11.15 per cent and 10.15 per cent go to reinforce the results obtained above. A low discount rate increases the absolute value of effective costs for all instruments without a substantial change in the dispersion of costs across various instruments. The effective cost of NSCs (VIIIth issue) increases to 39.06 per cent and 44.16 per cent, respectively, with 'r' value of 11.15 per cent and 10.15 per cent. Under the assumption of a low discount rate, the effective costs of dated securities go up to 15.60 per cent for the discount rate of 11.15 per cent and 20.58 per cent for the discount rate of 10.15 per cent. 364-day treasury bills still emerge as a net gainer for the budget.

Essentially, two major points emerge from the analysis:

- (1) Effective cost of borrowing instruments is very sensitive to tax rate on interest income. For a fixed value of tax rebate, the lower the tax rate on interest income the higher is the effective cost. For the zero value of tax rate effective cost reaches the maximum. This underlines the importance of bringing interest income under taxation for any strategy to reduce the effective cost of borrowing for the budget.
- (2) Tax rebates on small savings schemes, such as NSC and NSS, create a large difference in costs compared to unrebated borrowing instruments such as dated securities and treasury bills. The cost difference between 6 year NSC and 6 year dated securities is as much as 23 per cent. This is a major source of distortion in yields from financial instruments.

The analysis presented above provided an idea about the mag-

nitude of effective cost involved in small saving schemes without accounting for the administrative costs of management of small savings. A rough estimate of administrative cost for small savings can be generated from the available information in the Union Budget. The cost on account of management of small savings in 1997-98 was placed at Rs. 996.5 crore. Assuming that cost across the various small saving instruments is uniformly distributed, the unit cost of management may be estimated at 4.16 paise on gross small saving collection of Rs. 23,975 crore in 1997-98. This is an additional cost for small savings over the effective cost estimated above. The relative position of dated securities is far different. Government pays a commission charge of Rs. 2,000 to Reserve Bank towards the management of every crore of dated securities. The unit cost of management of dated securities therefore works out very low, i.e. 1/50th paise for every rupee of borrowing.

III. Linking Interest Rate Changes in Small Savings Instruments to Market Interest Rate

Small savings constitute a part of the non-marketable debt of the government, primarily because there is hardly any secondary market activities for these instruments. Consequently, they are less liquid compared to dated securities or bank deposits. Nonetheless, these instruments are sovereign debts, free from default risk, unlike non-government debt instruments, which are not completely risk free. Further, small savings cater to the tastes and needs of certain target groups, mainly dominated by salaried class, who have used them as a tax saving device. In a market related interest rate system, the tax wedge on saving instruments - if it is not uniformly distributed - adds to imperfections in the market, giving rise to problems of market segmentation. Currently, the tax rebates conferred on small saving schemes are the major source of variation of yield across financial instruments, as these concessions create a large wedge between the pre-tax and post-tax return on the financial savings. If tax benefits for small saving instruments are sufficiently brought down, investor's preference for these instruments would purely depend on their nominal pre-tax yield, relative to other competing instruments. In this situation interest rate changes

on small saving instruments should be linked to some market determined 'reference rate'. The choice of 'reference rate' should base on the market-representative nature of the instrument. With the introduction of auction system and consequent freeing of interest rates on government securities, the gilt-edged market has been largely led by demand and supply conditions. The cut-off yields at auctions for dated securities and treasury bills are, therefore now market related. The choice of a 'reference rate' for linking the small savings rate to market rate would, therefore have to be with reference to the yield rate of government securities, as these two forms of borrowings constitute a part of the same sovereign debt.

While the interest rate on small savings could be related to the yield rate on gilt, the preference for either dated security or 364-day treasury bills is not very clear. Benchmarking the small saving rate to the yield rate on 364-day treasury bills would amount to frequent changes in the interest rate. Small savings are long-term instruments and their interest rate should correspond to the rate on marketable bonds with comparable maturity. This could be more appropriately achieved if the changes in interest rate on small savings are linked to the cut-off yield on Government of India dated securities of comparable maturity. The estimated implicit cost of various small saving instruments showed that the government could make substantial budgetary savings by eliminating tax incentives, even if it pays higher nominal interest rate than the market rate.

The implications of offering market related interest rate on small savings could be several. The return on small savings would become sensitive to the expectation about the future changes in interest rate and thereby inflation rate. The impact of this on the market for small savings would depend on many factors. Small savings are generally attractive when the interest rate is low and tax rates are high. To put it differently, investor's interest in them tend to decline when interest rates are high and taxes rates are low. As a part of the tax reform process initiated since 1991-92, both the average and marginal tax rates for personal income tax payers have been brought down substantially by now. Some

rationalisation of tax benefits for small savers have also been attempted in the form of merger of Sections 80C and 80CC with Section 88 and reduction of disparity of 80L benefits across various financial instruments. The interest rate on savings in the economy has been relatively high. With these changes in place the attractiveness of small saving instruments which enjoyed Section 88 tax benefits, viz., NSS, NSCs etc. has seen some decline, compared to others such as Kisan Vikas Patras (KVP) which offered higher nominal return but no tax saving incentives. While, the outstanding amounts under NSS and NSC VIIIth issue as on March 31, 1997 are estimated at Rs. 768 crore and Rs. 18,478 crore, respectively, those under KVPs are placed at Rs. 46,296 crore. This shows that even without tax benefits, small savings could be made attractive through provision of higher nominal return. Nevertheless given the fact that market for small savings stand highly segmented - tax saving schemes, such as NSS and NSCs being more popular with salaried class than rural investors who prefer higher interest earning KVP - some adverse impact on small saving collection, particularly from NSCs cannot be avoided. This loss in collection can be compensated, if small investors shift their preference in favour of government securities which give promise of interest income and capital gains. But, to the extent that interest rates on small savings have to be kept higher than the government security rate, primarily to compensate their less liquid character, they would still be preferred in the investor's portfolio because of their promise of a relatively stable high nominal return. Perhaps the attractiveness of small savings instruments to households, pensioners and institutional investors such as provident funds and trusts could be enhanced, if such instruments could be made to provide a guaranteed real return to investors. This would be possible if interest rates on small savings are indexed to some measure of inflation, providing the possibility of hedge against future price rises to their investors. This may emerge as an attractive way to promote savings and nurse the social objectives, without introducing tax induced distortions to the financial market in the nature of tax rebates and exemptions. Moreover, index-linking of small saving instruments, with appropriate benchmarking of real return, might be expected to impart efficiency to the existing market conditions, to the extent that

it would reflect the market perception on inflation expectations and the extent of hedge. At the same time, this would have protected the interests of the small investors who tend to have a long planning horizon and a saving target in real term.

Table 1 : Estimated Effective Cost on major Borrowing Instruments of Government of India

| Borrowing Instrument | Maturity Period | Nominal Interest Rate (%) | Tax Concessions | | Estimated Effective Cost Based on Tax Concessions (%) | | | Tax Brackets |
|------------------------------------------|------------------------------------------------------------------------|---------------------------|-----------------------|------------------------------------------|-------------------------------------------------------|-------|-------|---------------------------------------|
| | | | Tax Rebate U/S 88 (%) | Tax Exemption on Interest Income U/S 80L | r = | r = | r = | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| National Saving Certificate (VIII Issue) | 6 Years | 12 | 20 | Upto Rs. 12,000 | 34.24 | 39.06 | 44.16 | Full tax exemption of interest income |
| | | | | | 27.84 | 32.46 | 37.34 | 10% |
| | | | | | 21.45 | 25.86 | 30.53 | 20% |
| | | | | | 15.05 | 19.25 | 23.71 | 30% |
| National Saving Scheme | Assumed as 6 year (no definite maturity period. 3 year lock-in period) | 11 | 20 | Upto Rs. 12,000 | 20.02 | 22.47 | 25.02 | Full tax exemption of interest income |
| | | | | | 17.10 | 19.51 | 22.00 | 10% |
| | | | | | 14.19 | 16.54 | 18.98 | 20% |
| | | | | | 11.28 | 13.58 | 15.96 | 30% |
| Kisan Vikas Patra/Indira Vikas Patra | 5½ Years | 14.87 | Nil | Nil | 22.54 | 27.32 | 32.36 | 10% |
| | | | | | 14.84 | 19.39 | 24.18 | 20% |
| | | | | | 7.14 | 11.45 | 16.00 | 30% |

(Contd.)

Table 1 : Estimated Effective Cost on major Borrowing Instruments of Government of India (Contd.)

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|------------------------------------------------|---------|----------------------------------------------------------------------------|-----|--------------------|----------------|----------------|----------------|------------------------------------------------------------------|
| Post Office Recurring Deposit Account | 5 Years | 12.5 | Nil | Upto Rs. 12,000 | 12.44 | 16.56 | 20.88 | Full tax exemption of interest income 10% 20% 30% |
| | | | | | 6.83 | 10.80 | 14.96 | |
| | | | | | 1.23 -4.38 | 5.04 -0.73 | 9.04 3.12 | |
| Post Office Monthly Income Scheme | 6 Years | 13 | Nil | Upto Rs. 12,000 | 21.14 | 26.19 | 31.54 | Full tax exemption of interest income 10% 20% 30% |
| | | | | | 14.05 | 18.88 | 23.99 | |
| | | | | | 6.96 -0.13 | 11.56 4.25 | 16.43 8.88 | |
| Government of India Dated Security | 6 Years | 11.5 (cut-off yield at auc- tion during 1997-98) | Nil | Upto Rs.15,000 | 10.90 | 15.60 | 20.58 | Full tax exemption of interest income 10% 20% 30% |
| | | | | | 4.83 | 9.34 | 14.12 | |
| | | | | | -1.23 -7.29 | 3.09 -3.17 | 7.66 1.20 | |
| 364-day Treasury Bills | 1 Year | 8.46 (weighted average cut off yield so far during 1994-95) | Nil | Upto Rs. 15,000 | -3.29 | -2.42 | -1.53 | Full tax exemption of interest income 10% 20% 30% |
| | | | | | -4.04 | -3.18 | -2.30 | |
| | | | | | -4.80 -5.55 | -3.94 -4.70 | -3.07 -3.84 | |

NOTES

Financing of Power Projects in India: Problems and Prospects — A Note

R.K. Jain*

Since 1991, the Government has opened the power sector to private sector and undertook various policy initiatives to reform its working and attract private investment. The liberalisation of power sector has, however, raised many pertinent issues, especially relating to financing of private power projects. This note presents some issues regarding private sector power projects and analyses alternative financing options.

Introduction

Infrastructure and in particular power plays a crucial role in economic development. Recognising this fact, high priority has been accorded to the power sector in the allocation of funds in successive plans. However, power sector still remains a financially weak sector with daunting requirements for improvement. In the recent restructuring exercise, the Government opened the power sector for private participation. But power projects, being capital-intensive, long-gestation and risky ventures, require competent promoters, congenial investment climate and huge funds for financing. How has the private sector responded to this policy initiative? What will be the sources of funds? To what extent the Indian banks and financial institutions (FIs) will be able to cope with the financial demands of the power sector? What will be the cost of funds raised from various sources? What risks will be involved in financing these projects and how these risks can be mitigated? What further policy changes will be required to make the power sector vibrant? This note attempts to address some of these questions.

The note is organised in five sections. Section I discusses the

* R.K. Jain is Assistant Adviser in the Department of Economic Analysis and Policy of the Bank.

structure of the power sector, Section II deals with the financing issues, while Section III presents issues involving institutional approach and major risks in financing power projects. Section IV examines the problems and prospects relating to restructuring of the power sector and some concluding remarks are presented in Section V.

Section I Structure of India's Power Sector

Historically, India's power sector has been rooted in the public sector. In India, the legal framework provided for three types of utilities *viz.*, State Electricity Boards (SEBs), licensees and fully government-owned generating companies. SEBs generate, supply and distribute electricity within a State. About 65 per cent of the total generation and the bulk of transmission and distribution now takes place through SEB route. Licensees supply electricity (generated from their own stations or bought) only to specified areas within a State, having total generation capacity of about 2,969 MW in 1995. Government-owned generating companies, promoted by Central or State Governments, supply power to grids without specific responsibility for retail distribution. National Thermal Power Corporation (NTPC) and National Hydro-electric Power Corporation (NHPC) are prominent among government-owned power generating companies. In addition, there are also captive power plants operated by companies or organisations for their own use whose total generating capacity is estimated at 6,250 MW (Jain, 1995). While the Central Government has regulatory powers *vis-a-vis* bulk generators as well as distribution licensees with regard to important elements in the permitted tariff, the Central Electricity Authority (CEA) is responsible for regulation of the entry of new bulk-generating units and providing Central clearance to all major projects of SEBs, licensees and generating companies. SEBs remain within the purview of State Governments for all purposes, with some degree of autonomy in their functions. SEBs, apart from being in a position to exercise monopoly power as the sole agency controlling State-level transmission, also exercise regulatory functions in relation to distribution licensees including control

over operations and reserve power in the tariff area (The India Infrastructure Report, 1996).

Till 1991, development of power sector had been primarily the responsibility of the State and Central Governments. In 1991, with the introduction of new economic reforms, it was realised that given the various constraints, the Government could at best provide only 30,538 MW of capacity addition during the Eighth Plan period as against the requirement of 35,153 MW. This would result in acute energy shortage. To meet the emerging demand and supply gap, the strategies adopted in the short run included efficiency improvements and demand management. In the long-run, the Government resolved to mobilise additional resources to augment supply by encouraging greater participation by the private sector in electricity generation, transmission and distribution (Eighth Five Year Plan, 1992-97). In October 1991, the Government of India (GOI) formulated a scheme to encourage private enterprises both Indian and foreign to put up power generation projects. Accordingly, the Indian Electricity Act, 1910 and the Indian Electricity (Supply) Act, 1948, were amended to allow entry of private enterprises into power sector. The assortment of incentives in the policy comprehensively cover the legal, administrative and financial environment to make private investments in the power sector attractive (Jain, 1995). As a result, a number of proposals have been received for setting up new power projects. While most of the prospective entrants have been examining the feasibility of setting up new projects, their main concern has been the problems related to transmission and distribution (T&D).

Since the T&D network is owned by the SEBs, the private power generating companies will also be selling power generated by them to the SEBs. In view of the poor financial performance of SEBs in the recent past in terms of irrational tariff, low plant load factor (PLF), high T&D losses, high level of receivables, etc., the prospective promoters have been insisting upon guarantees from the State Government and counter-guarantees from the Government of India for the settlement of their dues for sale of electricity to SEBs. In response to their demands, the Central Government, in

November 1994, approved the general parameters for counter-guarantee. As a follow up, the Central Government agreed to issue counter-guarantees in respect of eight fast track power projects. This arrangement was, however, discontinued to contain its external exposure. Instead, alternative arrangements for counter-guarantees have been mooted (Jain, 1997). A process of mutual dialogue between the promoters and the regulators have begun in order to resolve the problems of generation, transmission and distribution satisfactorily. The financing of power projects, however, poses a daunting task and this is where a long-term solution has become quite expedient.

Section II Financing of Private Power Projects

Financing Requirements

At present, developing countries spend over \$200 billion a year on infrastructure development. About 90 per cent of this is sourced from Government tax revenues or funds intermediated by Governments, which bear almost all project risks. On an average, half of Government investment spending is accounted for by the infrastructure sectors. In addition, maintenance and operating expenses command a high share of current expenditures. However, Governments' ability to spend on infrastructure has been severely constrained, partly due to poor performance and pricing and partly because Government budgets have come under tightness due to macroeconomic reasons. In the Philippines, for example, public investment in infrastructure fell from 5 per cent of GDP between 1979 and 1983 to less than 2 per cent during the remainder of 1980s. But renewal of economic growth requires accompanying investments in infrastructure. Private financing of infrastructure is, therefore, needed to ease the burden on Government finances. More importantly, it will encourage better risk sharing, accountability, monitoring and management in infrastructure provision. In some sectors, such as power the scope for private financing is enormous. The challenge for the future is to route private savings directly to private risk bearers who make long-term investments in infrastructure projects.

Doing so will require institutions and financing instruments adapted to the varying needs of investors in different types of projects (World Development Report, 1994).

Accelerating India's growth rate calls for a matching rate of growth of the power infrastructure. The electricity - GDP elasticity for the Indian economy is estimated at about 1.5. In order to support a sustained GDP growth rate of around 7 per cent per annum, demand for power can be expected to rise at the rate of around 10.5 per cent annually for the next decade. Based on the 14th Electric Power Survey findings, the Central Electricity Authority (CEA) prepared a National Power Development Plan in 1991, covering the period upto 2006-07. According to this, the requirement of additional generating capacity to provide target levels of reliability in power supply is about 1,42,000 MW, reflecting an annual capacity growth rate of 9 per cent as against the demand growth rate of 7.5 per cent. Capacity addition needed for the next 10 years (from 1996-97 onwards) is thus calculated at 1,11,500 MW (44,000 MW during 1996-2001 and 67,500 MW during 2001-06). Total investment required for this could be of the order of Rs. 6,24,400 crore at fixed prices (Rs. 2,46,400 crore between 1996-2001 and Rs. 3,78,000 crore between 2001-06). This includes investment in transmission and distribution (T&D) and assumes an average price of US \$1 million per MW of generation capacity and dollar to rupee conversion rate of Rs.35. There are, however, measures through which investment in capacity addition could be reduced. The measures include removal of current inefficiencies, improvement in capacity utilisation, raising end-use efficiency through targeted programmes to effect industrial, agricultural and lighting efficiencies and cogeneration and captive generation of electricity.

An alternative capacity scenario has been developed taking into consideration the above measures to reduce investment requirements. This projection assesses the capacity saving potential at 25 per cent of the estimated additional requirement of 1,11,500 MW, reducing the needed additional capacity over the next decade to 83,625 MW (32,750 MW during 1996-2001 and 50,875 MW dur-

ing 2001-06) and lowering the investment requirement from Rs. 6,24,400 crore to Rs. 4,68,300 crore (Rs. 1,83,400 crore during 1996-2001 and Rs. 2,84,900 crore during 2001-06). An additional investment of Rs. 31,200 crore would be needed during the next 10 years for plant renovation and cogeneration. Overall investment requirement is thus estimated to be Rs. 4,99,500 crore. The total investment requirements are envisaged to be shared by both the public and private sectors depending on the extent to which the private sector is involved in the generation, transmission and distribution. The shares of public and private sectors have been estimated at Rs. 2,07,000 crore and Rs. 2,92,500 crore, respectively. Clearly, the private sector will have a massive role to play (The India Infrastructure Report, 1996).

Sources of Finance

As per the new guidelines, the promoter's share must be at least 11 per cent of the total outlay and the company will be allowed a debt equity ratio of upto 4:1. Further, 40 per cent of the total outlay can be raised from Indian financial institutions and banks. However, the maximum quantum of term finance that a bank or FI can sanction is restricted to the prudential exposure norms i.e. 25% of its net worth for an individual company or project and 60% of net worth for a corporate group. Also, the total exposure of a bank or FI to a single industry cannot exceed 15% of its total outstanding loan and guarantee portfolio. Funds can also be raised from Indian and foreign capital markets, multilateral institutions (World Bank, IFC, ADB, etc.), export credit agencies (U.S. Exim Bank, Japan Exim, etc.), bilateral agencies (FIIs, equipment suppliers, foreign banks, etc.) and specialised infrastructure funds (Global Power Investment of GE, Asian Infrastructure Fund, etc.). However, large scale foreign financing of power projects can create its own balance of payments problems. Therefore, under the current policy, foreign funding through debt is limited to two times the foreign equity (Jain, 1997). But, the question is whether the existing sources will be sufficient to meet the financial requirements of the power sector.

In developed countries, power projects raise finances from institutional investors (insurance companies, pension funds, endowments, etc.) either through bonds markets, or through direct private placements. In India, the contractual savings institutions (LIC, GIC, PFs, EPF) that have long-term liabilities make natural investors in private power projects. Apart from these institutions, other institutional investors such as charitable and religious trusts can also be a source of substantial funds. With the development of an active and liquid market for securitised corporate debt, mutual funds, commercial banks and financial institutions could also emerge as potentially large investors. However, all this calls for substantial reform in the debt market (The India Infrastructure Report, 1996).

At present, contractual savings institutions mostly keep their investment portfolio heavily loaded with Government papers. If power projects have to be financed through the capital markets, it is necessary to initiate major reform in the area of contractual savings institutions allowing for the entry of private companies and institutions in each of these areas and encouraging them to develop interests in power sector investment, where returns from a long term view are high. The more widespread availability of contractual savings instruments which provide good returns can be expected to lead to increasing financial savings rates of households. To leverage their core competence of project appraisal, the FIs would need to adopt a number of strategies, such as taking of loans on to their books and then syndicating them, or lending to projects during the construction and start-up stages, and securitising the loans or selling down the bonds, once operations have begun and the project is investment grade. FIs would thus bring to bear their risk assessment capabilities during the riskier pre-operative phase. Such turnover of portfolio would have a salutary effect on the quantum of funds mobilised. However, securitisation as a financing mechanism would require a fair amount of reform in the legal framework.

In case of foreign sources, in addition to the standard sources of foreign funds like the multilateral agencies, much greater effort will have to be made to tap commercial sources. This will be increasingly necessary in the context of declining importance of offi-

cial debt flows. Similarly, syndicated loans and direct borrowing routes will have to be explored in foreign markets, along with increased openness to foreign investment. Borrowing in foreign markets could be helped by sovereign benchmark issues of Government debt instruments. Infrastructure funds provide a new important source of equity finance for power projects in developing countries, particularly in Asia. At present, each equity investment sought to be made from these funds has to be routed through the foreign direct investment approval route of Foreign Investment Promotion Board (FIPB). Equity investment from such funds could be put on a special footing, allowing them ease of investment in eligible infrastructure projects (The India Infrastructure Report, 1996).

Availability of Funds

As mentioned earlier, the investment requirements of the private sector in power industry have been estimated at Rs. 2,92,500 crore for the next decade. The maximum amount that the private power projects can borrow from Indian FIs and banks is pegged at 40% of total outlay which would mean that an assistance of Rs. 1,17,000 crore is required from Indian FIs/banks over a period of 10 years. In other words, FIs and banks are required to generate on an average about Rs. 12,000 crore per annum for deployment in the private power projects. Some of the recent estimates made by FIs and the World Bank, however, indicate that FIs and banks can provide about Rs. 6,000 crore per annum against the yearly average commitment of about Rs. 3,000 crore since 1991. Thus funds required are quite sizeable as compared to availability which require special initiative to bridge the financing gap.

International experience suggests that the traditional approaches to financing that involve term loans from FIs and banks and equity offerings in the domestic capital markets are inadequate to match the risk-return profile and payback periods of power projects. FIs and banks are constrained by the time profile of their own liabilities and may not prudently lend large volumes of debt. Hence special intermediaries would be needed to provide credit enhancements and to extend the maturity of funds raised for power projects. In

many countries, Governments have made special arrangements for power companies for raising resources from the capital market at the lowest possible cost and with the longest possible debt maturities. For example, in the U.S. much of urban infrastructure is financed through the sale of municipal bonds which have been given tax-free status by the federal Government. In Germany, much of infrastructure financing is done through the sale of mortgage bonds called *pfandbriefs* which are backed either by state guarantees or mortgages that can be conveyed. In Japan, the widespread postal savings system provides funds to different infrastructure financing institutions such as Japan Development Bank and the Long Term Credit Bank (The India Infrastructure Report, 1996).

In India, some of the recent initiatives have been along these lines. These include setting up of the Infrastructure Development Finance Company Limited (IDFC), broadening the scope of the public sector Power Finance Corporation (PFC), allowing an active role for PFC in negotiating loans from international banks and foreign capital markets, constitution of a Power Development Fund by the Power Ministry for speedy implementation and execution of power projects as also to finance feasibility and pre-feasibility studies for setting up power projects, mooted a Power Trading Corporation to purchase power from power-surplus regions and to sell it to power-deficient regions, launching of 'Infrastructure Bonds' to channelise household savings to power sector, and involving Provident funds as potentially important source of funding. The Government has also evolved a guarantee scheme to cover dues from SEBs by the major public sector power generating companies. On the strength of such guarantees, the PSUs concerned will be able to raise resources either by securitising these debts or directly entering the market for tapping resources (Union Budget, 1998). These measures by being very essential need to be supplemented with an overhaul of the working of SEBs and developing a separate market for power sector bonds, with inbuilt features for improving marketability of these bonds. What is important in this connection is creating a liquid secondary market for power bonds, once these bonds are issued through primary issues. Given that an active market would provide a proper evaluation of the commercial

status of the power infrastructure and the long-term profitability of these instruments to the savers, mobilising substantial household savings through capital market route would not be difficult. The future financing challenges, therefore, rest heavily on developing a long-term debt market for infrastructure financing.

Cost of Capital

The minimum returns in the power sector is around 16 per cent now, if we go by the trends in assured returns. The cost of term loans from FIs and banks is, however, above 16 per cent. The bond and debenture market is also ruling firm with an effective cost of capital higher than the minimum return. The depressed capital market conditions at present do not provide much scope for raising funds from this comparatively cheaper equity route. The cost of raising capital from foreign markets though lower in the range of 8 to 12 per cent than the domestic rate, the effective cost of capital may not be very favourable taking into account exchange risk. Thus the cost of raising funds before tax and with exchange risk seems to be on the high side *vis-a-vis* the assured minimum rate of return. But, if we consider interest as tax-deductible and cost of raising foreign currency funds as insulated from exchange rate fluctuations as provided in the cost plus return on equity formula of the current power policy, the scenario changes dramatically. For example, consider corporate tax rate at 35% and cost of raising rupee funds at 16 to 18 per cent, then the effective cost of raising rupee funds will be $16(1-35\%) = 10.4\%$ to $18(1-35\%) = 11.7\%$, which is much lower than the assured minimum rate of return of 16%. Similarly, in case of foreign investments, the promoters have been insulated from exchange risk and therefore, the cost of raising foreign currency funds would not be affected by fluctuations in the exchange rate. The cost of raising capital from foreign markets will, therefore, be much lower at 8 to 12 per cent than the assured minimum rate of return of 16 per cent (Jain, 1997).

It can, therefore, be inferred that the cost of raising funds before tax and with exchange risk is higher than the assured minimum rate of return, but it is much lower when we consider inter-

est as tax-deductible and foreign currency funds as insulated from exchange rate fluctuations as provided in the present cost plus return on equity formula. Therefore, there seems to be reasonable incentives to induce private investment in the power sector.

Section III **Institutional Approach and Major Risks in** **Financing Power Projects**

The financial institutions and banks have always been the main habitats of the market for power sector financing. But their main focus has been the public sector projects till the opening of the power sector for private participation. Besides, IDBI has also been financing purchase of indigenous equipment by various state electricity boards through its Bills Rediscounting Scheme. In private sector, FIs assistance has been limited to financing some reputed companies like Tata Electric Companies, CESC Ltd., Ahmedabad Electric Company Ltd., etc. and a number of captive power plants (Gupta, 1995). Banks have been meeting the working capital needs of both public and private sector units. Consequent upon the opening up of the power sector, FIs interest in private sector power projects has seen improvement. FIs have already committed assistance to the tune of Rs. 17,000 crore to the power sector till November 1997.

Major Risks in Financing Power Projects

To raise debt successfully, the lenders have to be convinced about the regular cash flow from the project. The risks which could jeopardise the cash flow, therefore need to be identified and allocated to third parties. The major risks which can be expected from such projects and the means of their mitigation need pointed attention for mobilising funds for private power projects.

Construction risk is a major risk as construction consists of a major component of a power project. It refers to whether the project can be completed in time and within budget. Provisions for liquidated damages, adequate to cover costs arising on account of the delay, are incorporated in the engineering procurement construc-

tion (EPC) contract (which is usually a fixed time frame, fixed price contract). Sponsor support in the form of completion guarantee is also used to mitigate this risk. Further, the equipment supplier also guarantees performance of the plant and machinery (Mitter, 1994).

Market risk is another major risk and consists of demand risk and price risk. The demand risk is virtually non-existent in private power projects, not because of the large deficit in the demand-supply scenario, but because of the "take or pay" nature of the power purchase agreements (PPAs). The PPA is essentially a long term sales contract between the State Electricity Board (SEB) and the private power project, wherein the SEB agrees to pay the private power project the "availability charge" (regardless of usage). This implies that the SEB is obliged to pay for a negotiated minimum level whether it accepts delivery of power or not, known as "deemed availability." The other aspect of market risk is price risk. Price risk is also covered in the PPA by way of the tariff structure which is essentially a cost plus return on equity (ROE) formula. All costs of producing power, fixed (interest, depreciation, O & M costs, insurance and taxes) and variable (fuel), along with the return on equity for the achieved PLF are charged to the SEB in the tariff. Since transmission and distribution continues to be controlled by the SEB, most private power projects have no option but to sell their entire output to the concerned SEB. Most SEBs are not considered bankable due to poor financial health and therefore pose credit risk for recovery of dues. To mitigate credit risk, State Government guarantees are to be insisted upon for the SEBs dues. Developers and lenders have not found sufficient comfort even in this arrangement and have thus sought a counter-guarantee from the Government of India (GOI). Alternatives to the guarantees involve escrow accounts and revolving letters of credit, used either on stand alone basis or in tandem (Mitter, 1994).

Lenders are also concerned about the timely availability of sufficient quantity of appropriate quality fuel. In coal-based projects, fuel supply risk is mitigated by offering captive mines to the private power projects. The reserves as well as quality of the fuel in

such cases are ascertainable. Gas-based projects sign long term supply contracts with the public sector monopoly, Gas Authority of India Ltd. (GAIL). Since the assurance of gas supply, despite the contracts, is uncertain, most gas-based power projects are built with dual fuel capability. It is, therefore, essential to select an alternative fuel which allow quick switching, easy storage and local availability (Mitter, 1994).

An additional risk is that of fuel transportation. Where coal linkage is with mines located several hundred kilometers away, dependence on the railways is unavoidable. While the "own-your-wagon scheme" of the railways alleviates the problem of wagon availability to some extent, the project is still dependent on railways for haulage. Maintaining larger stocks at the plant site could also mitigate the problem to some extent (Mitter, 1994).

Usually environmental clearances are taken care of *ab initio* and is a condition precedent to the operation of the PPA (Gupta, 1995). There could, however, be risks associated with social response to such projects on grounds of damage to ecology, loss of means of livelihood and inadequate compensation for rehabilitation leading to legal entangles (Jain, 1997). These risk perceptions have a significant adverse effect on investors commitment to a long-term investment project such as power projects.

Once a project is closed financially, the developer has direct access to the funds committed by the lender to the project. A project, therefore, reaches financial closure when the financing agreements related to the project have been executed and delivered. Normally, financial closure risk should be borne by the sponsors as its achievement mainly depend on the capability of the promoters. But consequences of delay may concern the lenders as well. Therefore, their commitment should be subject to achieving financial closure within the fixed time frame (Jain, 1997).

Banks source their funds primarily from deposits which are not very long-term in nature i.e. their liabilities are of short-term nature. They consequently also lend, or acquire assets which are

likely to be liquidated within a similar time frame. But, power projects generally involve long payback periods. By investing in power projects, they take the risk of aggravating mismatches in their assets and liabilities. To circumvent this risk, banks should plan their assets and liabilities prudently and review the position periodically to prevent any deviation. The involvement of a specialised institution for credit enhancement can also help in mitigating this risk.

Since power generated by private power projects (PPPs) is not meant for exporting, the promoters of PPPs can not directly generate foreign exchange earnings to repay their borrowings abroad. This problem of lacking a natural hedge is likely to affect the project viability in a large way. In order to overcome the foreign exchange risk, most international power projects set their charges in US dollar. One of the ways by which foreign exchange risk can be handled is by ensuring forex payments through payments into an international escrow account maintained with an international bank in terms of currency of payment. Further, a reasonably high level of foreign exchange reserves have to be maintained by the country to enable the promoters to enjoy this type of facility. Risk perceptions are also influenced by the image of the country relating to political stability, administrative effectiveness, hassle-free dealings and continuity of policy. This is a dominant factor, in so far as attracting foreign investment to power sector is concerned.

Section IV **Power Sector Restructuring**

Since the transmission and distribution (T&D) network in India is presently owned by the State Electricity Boards (SEBs), the financial health of the SEBs, therefore, assumes utmost importance for development of power sector. The financial performances of most of the SEBs, have been poor in terms of irrational tariffs, low plant load factor (PLF), high T&D losses, high level of receivables, inadequate investments, etc. resulting in rising level of commercial losses. While State government guarantee and counter-guarantee from the Central government is one way out to resolve this

issue, exclusive use of this measure can lead to a strain on government finances and undue exposure of the Government to external liabilities which can ultimately impact the overall sovereign rating. An improved version of this type of arrangement is the Thai Guaranty Facility initiated by the Thailand Government to guarantee recovery of loans made by private financial institutions to municipalities and private operators of urban infrastructure. The facility is planned as a public-private corporation with private sector management. Moreover, government guarantees are not always necessary, as demonstrated by the financing of Pro-Elctrica, the Colombian power plant. A significant part of the foreign direct investment and portfolio flows to developing countries has not been guaranteed - the underlying economic environment is what drives the flows. Thus, when offering guarantees to private lenders, government need to determine whether such guarantees are truly required, what form the guarantee should take, and how they should be accounted for in government accounts (WDR, 1994). The other alternative is the special reserve account or escrow account. But, SEBs are finding it difficult to agree for opening of escrow accounts in all cases because (i) the limited escrow-capacity is not enough to accommodate the projects which are being currently negotiated; (ii) the "cherry picking" of escrow regions leaves the SEB with the unremunerative distribution regions to service its loan commitments, etc; and (iii) the existing stakeholders in the cash flows of SEBs are objecting for any such arrangement. To sort out the matter, the Centre formed an Inter-Institutional Committee on Infrastructure Financing in 1997. The Committee suggested that over the long term, there is no easy way out for ensuring settlement of dues of SEBs and thereby attracting private investment in private power projects other than immediate restructuring of SEBs on commercial lines.

In this context, the Standing Independent Group (SIG) set up by the Ministry of Power to oversee the setting up of mega power projects has also mooted a financing structure in which the ultimate security for continuous payments does not rest on escrow account, in turn, on an earmarked distribution region, in a SEB default situation. From the power producer's end, the contractual interface is

not the SEB but a power trading company. The Power Trading Company (PTC) would be set up by a consortium of National Thermal Power Corporation, Power Grid Corporation of India, Power Finance Corporation and other financial institutions. The PTC would, in turn, enter into contracts with States which want to purchase power. Apart from providing a guarantee through mandatory LCs, which would have to be opened with SEBs, PTC would also have a right on the devolution fund of the States if the SEBs fail to meet their energy payment obligations. These proposals even when acted upon may not provide a long-term solution. It is only by improving the financial health of SEBs which can form the anchor for long-term development of power sector.

Thus, if private investment in power sector in needed volumes is to materialise, the basic pre-requisite will be to provide the degree of security that private promoters would need concerning their expected cash flows. Of equal importance is the need to upgrade the public sector to promote healthy partnership with the private sector. These objectives call for a whole set of policy inputs covering pricing, structural and regulatory reforms including restructuring of SEBs (The India Infrastructure Report, 1996).

Awareness of past mistakes, together with new opportunities, demands that a fresh look be taken at the roles that governments or other public agencies and the private sector should play in providing a more efficient and more responsive power infrastructure. The challenge is to determine those areas in which competitive market conditions can work and those that require public action. Within these broad parameters, there is a menu of institutional options that allows governments, public sector agencies and private groups (both for profit and non-profit) to assume responsibility for different aspects of service provision. The spectrum of options is broad, but four main approaches can be identified:

- Option A : Public ownership and operation, through a public enterprise or government department;
- Option B : Public ownership but with private responsibility for all operations (and for financial risk);

Option C : Private ownership and operation; and

Option D : Community and user provision.

In Option A, ways are devised to create accountability in a public agency or government department by establishing commercial principles and through organisational restructuring (corporatisation). Under this arrangement, contracting instruments are also reviewed to permit better monitoring and performance of operations, and appropriate mechanisms are devised for achieving financial autonomy. Option B, provides for entering into lease contracts for full operation and maintenance of publicly owned infrastructure facilities. Arrangements between the owner (Government) and the operator (firm) are set out in a contract that includes any regulatory provisions. In Option C, the private ownership and operation of power infrastructure facilities are envisaged both through new entry by private firms and through divestiture of public ownership of entire system. The main objective is to provide services competitively. Option D examines issues that neither commercialisation nor competition alone can address problems of externalities, distributional equity and the need for coordination of investments. It addresses approaches for assessing and creating accountability to social and environmental concerns through decentralisation of governmental responsibilities, participation by users and stakeholders, including self-help groups (WDR, 1994).

Far from exhaustive, these four options merely illustrate possible points in a broader array of alternatives. Much depends on the strength of the private sector, the administrative capability of the government to regulate private suppliers, the performance of the public sector providers, and the political consensus for private provision. In this context, the Orissa model of power sector reform based on options A, B and C fits well in Indian conditions for restructuring SEBs. The Model suggests the setting up of a State-level Electricity Regulatory Commission, corporatisation of the SEB with transmission responsibility being retained by a state-owned grid corporation, and provisions that would facilitate the transfer of State/SEB assets to new licensees and privatised entities for distri-

bution. However, public accountability and transparency in the functioning of the regulatory authority need to be ensured through mandatory provisions in the Act (Sant et al, 1998). The reform programme can be realised to the fullest degree if measures are taken to restructure the SEBs into compact, viable and corporatised units that separate to a feasible degree the generation, transmission and distribution functions and ensure that these units are run according to commercial principles.

Option D can also be considered in certain cases. In India, cooperatives have been playing an important role in rural banking, supply of agricultural inputs, production of fertilisers, milk processing, etc. But these have never been tried in the power sector, perhaps because the power sector had been reserved for the public sector till 1991. Even after its opening to the private sector, no worthwhile effort has been made for the involvement of cooperatives in it. Setting up of power projects under cooperatives can be a viable proposition in the case of industrial parks, industrial estates, free trade zones, etc. Power Cooperatives can also be set up by farmers on the lines of milk and fertilisers cooperatives. The Krishak Bharati Cooperative (Kribhco) is reported to be making a foray in power generation in collaboration with the state-owned Gujarat State Petroleum Company (GSPC). Moreover, co-operatives exclusively for distribution of power to the households and farms can be formed region-wise to take care of the problems associated with distribution to these sectors.

Reforming the present practice of uneconomic consumer pricing constitutes an essential element of the power sector restructuring programme. It has to be implemented at the State level. Price reform must aim at (a) reaching cost-based pricing for each consumer segment in a phased manner through a gradual increase in average tariff per annum net of inflation; (b) replacing unmetered supply by providing metering at the consumer end or at an intermediate distribution point; (c) identifying institutional means to administer subsidies to target consumer groups; (d) independent regulation of prices with provision for price reform to be balanced by improvement in quality of service, technical as well as commercial;

and (e) reform of pricing for agricultural consumers. Pricing reforms can be made even politically popular by providing adequate and uninterrupted power supply to farmers (Parikh, 1996).

Regulatory reforms should aim at autonomy of regulatory agencies both at the State level and at the Centre. State-level regulation would cover, in its scope, consumer tariffs, overseeing undertakings within the State, both public and private, in equitable terms, monitoring service standards and approving projects below the threshold specified for Central clearance. Central regulation must focus on bulk generation and inter-state transmission tariffs, approvals for larger projects and enforcing the right of access to the inter-state and inter-region network. The country experience also reinforces the need for regulatory reforms. For example, Argentina which adopted the most far-reaching privatisation programme by privatising all major infrastructure providers and unbundling their activities to foster competition between 1989 and 1993 lagged behind in the capacity for regulatory oversight and where market forces did not provide adequate discipline, the need for regulation was felt. In the Philippines power sector, private provision was based entirely on the entry of new generators. The urgency of reforms was so great that new entry had to be based on contractual agreements between the government and private generators, since reform of the Electricity Regulation Board would have taken too long. Although regulation through individual contracts has attracted new investment to the power sector, further development will require sectoral rules and overall regulation to ensure fair competition. Malaysia's approach put it somewhere between that of Argentina and Philippines. Though utilities have been gradually privatised and new entry has been allowed, statutory regulatory efforts have lagged, and discipline on operations is imposed through contractual agreements. The government has also maintained direct regulatory supervision of large utilities through continued share holding or through "golden shares" that give the government veto rights, especially on matters relating to the social obligation of the utilities. Among the developed countries, the U.S., relying on federal and state commissions, has developed a significant capacity for autonomous regulation. The U.K. has also recently moved towards privatisation and inde-

pendent regulation, and similar reforms are taking place elsewhere in Europe. Developing countries, however, have no experience with regulation of private providers, except Hong Kong, which has a regulatory system that protects consumer interests (WDR, 1994).

The suggestions relating to replacement of the PLF yardstick by plant availability (Parikh, 1995), adoption of 'time-of-day' pricing and introduction of 'power pooling' arrangements (Parikh, 1996) which have been aired in several studies are also reiterated, basically to bring the power sector in step with concepts proved useful in advanced systems. The need to evolve a medium-term fuel policy has also been recognised. This is necessary for speediest implementation of the process of commercialisation.

Recently several state governments have initiated power sector reforms along these lines. Orissa was the first State to introduce major reforms in power sector through enactment of Orissa Reforms Act, 1995 which came into effect from 1st April, 1996. The Haryana State Restructuring Bill, 1997 has been adopted by the State Assembly and has received Presidential assent. Rajasthan, A.P., and Gujarat are also following a similar course. Assam, Karnataka, Bihar, M.P., Maharashtra, Punjab, T.N., Kerala and J&K have also initiated action for undertaking reforms and restructuring of the power sector. In order to break the impasse with regard to making power sector commercially viable, a major initiative has been taken for setting up of Central Electricity Regulatory Commission (CERC) at the Centre and State Electricity Regulatory Commissions (SERCs) in the States for rationalisation of tariffs and resolving other allied issues (Economic Survey, 1998).

Section V Conclusion

Moving from today's still heavy dependence on public financing to tomorrow's system of more private sponsorship is likely to be a long and painful process. In many respects, the traditional style of infrastructure financing has been too easy. Money has flowed through channels where scrutiny has often been limited. The move

to a more open and transparent system implies greater scrutiny and the need for more resources to coordinate many diverse interests. In return, it offers the promise of greater accountability and reliability.

With the opening of the power sector for private participation in 1991, a beginning has been made. There has been an encouraging response from the private enterprises since then. Legal and regulatory reforms are already under way. Flows of foreign direct investment (FDI) are on the rise and the growth of domestic FIs and capital market is a source of optimism. The government has also given top priority for creating congenial conditions to attract funds for power financing and a number of measures have been initiated in this regard. As a result, at present 125 private power projects (PPP) having an installed capacity of 67,221 MW are under Government of India (GOI) monitoring. Of this, 95 proposals are based on MOU route (each costing more than Rs.100 crore) and 30 proposals are based on competitive bidding route (each costing more than Rs. 1,000 crore). But, Central Electricity Authority (CEA) has given clearance to only 42 projects having a total installed capacity of 20,282 MW. Currently, 19 projects with a generating capacity of 4099.5 MW, including those not requiring CEA's clearance, are under construction. Of this, five projects with a capacity of 748 MW have been partially commissioned. In last five years, 12 projects with a capacity of 2276.4 MW have been fully commissioned and are in operation.

A lot more needs to be done, particularly on the policy front to address the basic issues in power sector financing. For example, pricing of electricity is still an unresolved issue, T&D network is almost fully under the public sector control with high T&D losses continuing and the cumulative commercial losses of SEBs are on the rise. Until these issues are resolved amicably power situation may not improve substantially. Difficulties may also arise in external financing. In order to keep the debt-service requirements at a manageable level, the debt-equity ratio of net capital inflows should be maintained in the region of unity. Moreover exports should grow at 15% and a stable macro-economic environment and a high sov-

oreign credit rating should be maintained over the next decade to meet the resultant debt-service requirements.

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REVIEW ARTICLE

Money and Finance Through the Looking Glass*

Y.V. Reddy**

Monetary economics has seen perhaps more controversies than any other branch of economics since the `twenties. The fall of the gold and gold exchange standard, the decline of classicism leading to the dominance of fiscal economics in the wake of the Great Depression, the Fisherian elegant exposition of the quantity theory of money in terms of the world-renowned equation, $MV = PT$, followed by the Cambridge version and the Keynesian attempt to provide 'fundamental equations', Milton Friedman's restatement of the quantity theory of money in the `fifties together with the emergence of what has come to be known as 'monetarism', the burst of the Phillip's curve, and the subsequent disproof of it, the emergence of the rational expectations school, new classicism, post- and new as also neo-Keynesian economics — all these to put in a summary form, are a part of the story of what monetary economics is all about. The amount of research efforts that has gone in to prove/disprove the basic premises of monetary economics, depending on one's predilections, is phenomenal. Fortunately, it gave rise to rich, innovative ideas, and influenced the thinking of those who wielded considerable power in policy-making and decision-taking. In the process, it enriched the Keynesian logic and framework and brought about a sharp change in the processes that form part of the operating procedures of central banking.

Dr. C. Rangarajan, the author of the essays of the book under review was a unique central banker. His academic pursuits in

* This is a review article of the book, *Indian Economy : Essays on Money and Finance*, by C. Rangarajan, UBS Publishers' Distribution, New Delhi, 1998. The *Essays* are essentially the author's lectures' and addresses delivered during the period 1988 to 1997, when he was holding the positions of Deputy Governor (upto 1991) and Governor (1992-97) of the Reserve Bank of India.

** Dr. Y.V. Reddy is Deputy Governor of the Bank. This effort received intellectual support from Dr. A. Vasudevan to whom the author expresses gratitude.

money, banking and finance and his long stint as a teacher at the higher schools of learning in India and abroad, provided him with a rich haul of building blocks to mould the edifice of monetary policy making from the early 'eighties when he took a proactive position as Deputy Governor until he laid down office as Governor of the Reserve Bank of India at the end of 1997. He was a key member of the Chakravarty Committee to review the working of the monetary system in India in the 'eighties. The imprint of this association was clearly visible in his Presidential Address to the Indian Economic Association in 1988, which is the very starting point of the *Essays*. He nurtured young research workers in the Reserve Bank, to keep pace with the latest theoretical developments, and left the windows of his thinking open to new ideas. Being an econometrician by training, he could view both theory and applications as inseparable twins and his policy-oriented examination of the live issues of the day had sound analytical underpinning. If Lord Keynes was a great pamphleteer, Dr. Rangarajan can be truly regarded as an articulate artist extraordinaire of the economics profession. In this review article, a few of Dr. Rangarajan's ideas are highlighted with a view to understanding the mind of the person who dominated monetary policy thinking in India for nearly two decades.

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First, and foremost, is the proposition that 'money matters' which runs through the book. For Dr. Rangarajan, credit expansion will *ipso facto* lead to increase in money supply (MS), and therefore the 'credit view' gets subsumed under the 'money matters' argument (see p.23). While in a balance sheet sense, this is very correct, it is important for monetary policy makers to provide adequate credit supplies to match credit demands. Given the indefiniteness of credit demand function, the perception that 'credit view' has not been appropriately tested in the Indian context has gained ground, especially among those who have been tracking the record of the impact of financial innovations on money supply determination. Dr. Rangarajan would contend that so long as the relationship among money, output and prices is explained, and if that relationship is found to be stable over time, MS is a critical element of monetary management. In a typical policy economics mode *a la*

Tinbergen, MS becomes an intermediate target to achieve the ultimate objective(s).

So long as the money demand function is stable and provides a predictable relationship among money, output and prices, it will serve as a sound foundation stone for monetary targeting (p.53, p.64 for example). To him, clearly MS has to be broad money and cannot be narrow money as some economists in the classical tradition e.g. Professor P.R. Brahmananda would argue (see the very first essay). Almost all economists in India have been using broad money concept ever since the early 'eighties, even though some writings on money demand still test the function with respect to narrow money. In an important sense, the definitional issue was settled. The Reserve Bank which, till the very early 'eighties, used to give the sources of money stock in terms of narrow money (M_1) switched over to broad money (M_3) as the reference for data dissemination and monetary analysis.

The stability of money demand does not, however, mean, as Dr. Rangarajan shows, that there has to be contemporaneousness in the money-output-prices relationship or in the money-prices relationship, given the evolution on the output front. Dr. Rangarajan in fact comes out with a three to five-year averaging method, to illustrate the positive relationship between MS expansion and price increase (p.10, p.64). The 5-year time horizon is merely an indicative or illustrative way of substantiating the point. The averaging could well be for a shorter or longer period or it could even be a moving average.

Monetary targeting, in the face of financial innovations and the consequential adverse effect on the stability of money demand, has been echoed in the *Essays*. But so long as money demand is stable, how could one completely ignore monetary targeting is the issue that Dr. Rangarajan would take upto with his critics. For policy formulation, he would, however, be prepared to take a close look at a number of other variables viz., real sector developments, credit, fiscal deficit, prices, balance of payments position while re-

taining the monetary targeting framework. (He calls it 'menu' or 'checklist' approach. See p.64).

The alternative to monetary targeting would be, as Dr. Rangarajan has pointed out, interest rate or exchange rate targeting, as is done in many industrialised countries. While exchange rate targeting binds you to stricter conditions such as *low inflation rate* in line with the partner countries' inflation rate and a defined anchor, interest rate targeting is relatively easy, provided, as Dr. Rangarajan observes, the financial markets are well integrated (p.64) and interest rates by and large move in a moderate range. While logically this argument is appealing, one needs to closely examine the question of having an intermediate target in the event of uncertainty emerging in the stability in money demand in near future in an environment of continued market segmentation. Although there is increasing evidence of integration of money and foreign exchange markets, segmentation exists in most markets owing to lack of depth in the market and absence of well developed secondary market operations.

Dr. Rangarajan's faith in monetary targeting should be seen not as a simple calculus of real money demand determination on the basis of elasticity of demand with respect to projected income growth, but as one that has a 'feedback' rule (p.11). The 'feedback' here would effectively imply ranges of estimates, and revisions in estimations of MS growth, based on availability of recent data on the evolving output situation.

Dr. Rangarajan is clearly aware of the pitfalls in monetary modelling when there are severe constraints to optimal deployment of instruments to get at the 'intermediate target'. The Kutty Memorial lecture on the autonomy of central banking (Essay 3) provided the opportunity to reduce, if not eliminate the severe constraint as well as to devise a more meaningful and forward-looking monetary-fiscal policy coordination. This lecture is not, therefore, a plea for 'autonomy' in the narrow sense but an advocacy for improved maneuverability in monetary policy actions. Out would go automatic

monetisation that has grown out of the system of issue of *ad hoc* treasury bills. The autonomy that Dr. Rangarajan considered meaningful was headroom to efficient conduct of monetary policy.

This maneuverability is crucial since it provides a larger space — the NDC (net domestic credit) as a whole for the play of monetary policy. With NFA (net foreign assets) being no longer exogenously given, at least since 1993-94, the central bank will have larger area of responsibility in the conduct of its policy.

Dr. Rangarajan has been a sceptic of the validity of the Phillips curve in developing countries, even before he joined the Reserve Bank (see his contribution on the subject to the International Economic Association's Conference held in Pune in 1980; see also p.61). He sees inflation control as vital, and as the best anti-poverty programme. He would also regard inflation control as a means to optimise growth (see p. 73).

It is against this backdrop that one needs to view Dr. Rangarajan's contribution to financial sector reforms. Since growth maximisation by definition depends upon productivity factor, efficiency in the financial sector is critical for investments to be productive. Issues of financial prudence, which would provide the foundation for financial soundness, came to the fore during Dr. Rangarajan's period of Governorship of the Reserve Bank. The mechanisms brought about in respect of asset classification, capital adequacy ratio and income recognition, and supervision of banking entities and non-bank financial companies are well documented in the *Essays* and in various Reserve Bank publications during the said period. It was also during his tenure as Governor that India moved towards external current account convertibility through acceptance of Article VIII obligations of the International Monetary Fund and considerable relaxations on external capital account. To facilitate implementation of prudential norms, care was taken to reduce reserve requirements, develop Government securities and money markets and improve the rural credit delivery system.

One important issue that came to the fore in most discussions in the first half of the `nineties related to the introduction of interest rate flexibility as part of financial liberalisation. Here Dr. Rangarajan's caution in gradual liberalisation of interest rates is noteworthy. Analytically speaking, one could defend the cautious approach on the ground that complete interest rate deregulation, in the absence of well developed financial markets and regulatory framework, and in the absence of subdued inflationary tendencies could lead to systemic problems (p.85, p.86 and p.115). This is an important insight that one gains on sequencing of reforms from the Indian experience, and as Dr. Rangarajan has put it, 'cautious sequencing of reforms' coupled with 'consistent and mutually reinforcing character of the measures taken' would give a boost to financial sector efficiency.

The external sector management issues centre on, according to Dr. Rangarajan, the sustainable level of current account deficit (CAD) relative to GDP. In his view, a 2 per cent CAD ratio, sharp containment of debt creating flows, especially relating to short-term, market related exchange rates, and gradual relaxation of capital account correlated with improvement in financial position of banks, are the necessary ingredients of external sector management (Essays 19 to 21). It must be recognised that when faced with exchange market pressures in 1995-96, he did not hesitate to adopt unconventional methods.

It must be noted that it was during his Governorship, net foreign exchange asset accretion by the banking system became for the first time in *effective* sense, a major source of expansion of money supply. The idea of sterilisation owing to sharp capital inflows became a part of the monetary history of India ever since then. Most importantly, the idea of the need to accumulate foreign exchange reserves to give boost to confidence in policy making and to markets, was sown during his Governorship. This approach has paid good dividends, as one can see in retrospect, given the markets viewing the level of reserves as one of the important components of 'economic fundamentals'.

While many monetary economists often show their preference for dominance of markets over the state, Dr. Rangarajan clearly believes that 'the debate between the state and the pure market is a sterile one and no serious thinker has ever disputed the role of state intervention'. In his view, there is a strong case for state intervention in social and physical infrastructure, whereas in other sectors, state can gradually make the way for markets if markets are able to function in an efficient manner. Complementarity of state and market, with state minimalism is perhaps the key to improving the economic performance of the country. The historical experiences show that while market failures exist, they can be regulated or rather, reregulated, whereas state failures cannot be rectified except through a strong social and political action which can often turn out to be costly.

The *Essays* also contain a section on science and technology issues related to the financial sector. The use of technology in Indian banking industry has got delayed because of labour resistance and unwillingness of bank managements to be forward-looking. Dr. Rangarajan played an important role in bringing about awareness in banks about the need to improving the financial sector efficiency through IT adaptations and upgradations. It, however, took long time for banks to accept this proposition. It is *now* time that banks focus on adaptations of right technologies in quick time, as Dr. Rangarajan reminds us. Fortunately, all the banks have now been investing large amounts in new technologies and providing training to their employees, and the labour has now come to accept the IT as an essential part for the banking industry to grow.

Finally, the *Essays* is extraordinary in several respects. First, it contains analytics of monetary and financial economics to help us understand the rationale of policy actions. Secondly, the *Essays* show that while policies need to be based on the available data and the circumstances of the living present, they would have to be forward looking. Thirdly, the volume shows that while there are some sound fundamental principles, they need to be applied with flexibility, irrespective of the dynamic inconsistency problem that such applications may entail. Fourthly, the *Essays* have a great

educative content for the enlightened public which through articulation of its opinion could influence the processes and the essence of policy thinking in future. It would therefore be no exaggeration to say that when the definitive monetary history of the past two decades is written, Dr. Rangarajan's *Essays* will be considered as the *locus classicus* on the subject.

BOOK REVIEWS

Private Capital Flows to Developing Countries - The Road to Financial Integration, World Bank, Oxford University Press, New York, 1997, pages xvii + 406.

Capital flows to developing countries has become a serious topic for debate and discussion, particularly after the Mexican crisis in 1995 and the East Asian crisis in 1997. Various publications on different aspects of capital flows have originated from several quarters. Mention may be made of IMF Occasional Paper No. 108 (1993) on "Recent Experiences with Surging in Capital Inflows", IMF Occasional Paper No. 122 (1995) on Capital Flows in APEC Region, World Bank Discussion paper No. 228 (1993) on "Portfolio Investment in Developing Countries" and the World Bank Publication on "Managing Capital Flows in East Asia" (1996). The Per Jacobson Lecture on "The Recent Surge in Private Capital Flows to Developing Countries" is also worth citing. However, the book under review is unique in nature. It is a well documented report of the World Bank on private capital flows to the developing countries based on extensive research and empirical findings. The Report not only discusses in detail the nature, pattern and causes of the private capital flows to developing countries but also analyses the impact that this surge would have on economic activity, the banking system and the stock market.

The main findings of the Report indicate the fact of manifold increase in private capital flows to the developing countries in the recent years reflecting the progressive financial integration of the developing countries into world financial markets. This can be inferred from the following statistical facts cited in the report.

- Net private capital flows to developing countries exceeded US\$ 240 billion in 1996, nearly six times greater than they were in 1990.

- Private capital flows to developing countries in 1996 were five times the size of official flows. In contrast official flows in 1990 were larger than private flows.
- The share of the developing countries in global foreign direct investment (FDI) flows has gone up from 12 per cent (US\$ 25 billion) in 1990 to 38 per cent (US\$ 95 billion) in 1995. Their share of global portfolio equity flows has gone up sharply to 30 per cent in 1996 from 2 per cent in 1990.
- The importance of private flows has also increased markedly in the economies of developing countries, from about 4 per cent of domestic investment in 1990 to almost 20 per cent in 1996.
- The composition of private capital flows has undergone significant changes - more towards FDI and portfolio flows to bank lending.

For the purpose of measuring the extent of financial integration, an index has been constructed based on several measures. According to the report, the developing countries as a group have become more integrated since the mid-1980s. The number of countries that are classified as highly integrated increased from 2 in 1985-87 to 13 in 1992-94 whereas the number of countries classified as moderately integrated increased from 24 to 26. India's level of financial integration has been revised from "medium" to "medium +".

The Report extensively deals with the structural forces leading to integration of world financial markets into a single global market place. The driving forces of capital flows have been put forth in terms of push and pull factors. The trend now evident in private capital flows to developing countries is being driven by two primary forces, i.e., higher long term expected return in developing countries and the opportunity for risk diversification. Competition and rising costs in domestic markets of industrial countries encouraged firms to look for opportunities in developing countries leading

to progressive globalisation of production. Underpinning the improvements in economic performance of developing countries has been the systematic adoption of macro-economic stabilisation programmes and structural reform by a growing number of developing countries in terms of sustained fiscal adjustments, trade liberalisation, investment deregulation, financial sector liberalisation and privatisation. The Report argues that although the risk of investing in emerging markets remain relatively high, the policy reforms are resulting in a progressive decline in these risks and in improvement in expected rates of return. Investors of the developed markets have thus begun to respond to the relatively higher expected rates of return in developing countries. The second force behind the trend in private capital flows is investors' desire for portfolio risk diversification. Investors can benefit from holding emerging market equities because returns in emerging markets tend to exhibit low correlation with industrial country returns. The opportunity for portfolio diversification offered by emerging markets is a relatively recent phenomenon as the capital markets in these countries have deepened and broadened during the 1990s.

The strong response of private capital flows to the two primary forces described above has in large part, stemmed from changes in enabling environment in both industrial and developing countries. The Report discusses changes in two broad areas experienced by the industrial countries. First, in the real sector, increasing competition and rising costs at home, combined with falling transport and communications costs, have heightened firms' responsiveness to opportunities to increase efficiency and reduce costs by locating investments abroad. Secondly, a self-reinforcing process of competition, deregulation and technological advancement has substantially enhanced the responsiveness of investors to international investment opportunities. Particularly, financial innovations during the 1980s and 1990s have played a key role in the internationalisation of financial markets. These innovations have made it more attractive for borrowers to raise capital in foreign markets and for investors to make cross-border investments.

Developing countries on their part have created an enabling en-

vironment to improve their creditworthiness. This has generally taken the form of dismantling of barrier to capital movement, trade liberalisation, flexible policies for foreign investment. In addition to the easing of regulations pertaining to the movement of capital, structural changes in developing countries have meant a significant expansion of areas for potential foreign investor involvement. Many developing countries have deregulated their investment regimes and reduced the role of the public sector in directly productive sectors with a view to allowing greater participation of private investors. Privatisation of State owned enterprises has further boosted foreign investor involvement in developing countries.

The Report devotes a full chapter to analyse the benefits of financial integration. On the production side, integration permits greater international specialization and facilitates allocation of scarce resources to their most productive uses. On the consumption side, integration allows economic agents to insure themselves against adverse developments in their home economy through international portfolio diversification. Following integration, investment is reallocated towards the most rewarding projects (on a risk adjusted basis), regardless of their location, financed by corresponding capital flows seeking the highest risk adjusted return. For the growing number of developing countries already offering attractive investment opportunities, integration permits an acceleration of investment by augmenting domestic savings with foreign investments. However, permanent gains from integration may emanate from the quality rather than the quantity of investment, i.e., through productivity growth. Further, integration provides more immediate benefits through knowledge spillovers, particularly in financial markets and via FDI. It enhances the depth and efficiency of the domestic financial system, with important feedback effects to investment and growth. The production-side integration has a mirror image on the consumption side as the individuals in the newly integrated economies can stabilize their income and consumption by holding foreign assets and by using international capital markets to buffer consumption against temporary swings in the domestic economy.

However, private capital flows to developing countries are not

unmixed blessings. They also impact upon the domestic financial systems and pose challenges for macroeconomic management. Increasing economic dependence has brought with it the problems of greater instability and uncertainty resulting from contagion effects of external shocks, exchange rate misalignments and volatility, episode of inflation and balance of payments disequilibria. Sudden reversal of flows have subjected lost economies to severe contractionary effects. The Report has very candidly discussed these issues and has suggested that suitable checks and balances have to be put in place at the incipient stage in order to avoid any potential damage to the recipient developing economies. One important issue is that volatility of private capital flows can have serious repercussions on the domestic economy. Private capital flows to emerging markets, particularly in terms of portfolio investments are quite sensitive to changes in international interest rates. FDI's are, however, not much affected. A second phenomenon which may cause volatility is that of investor herding which is generally attributed to problems of asymmetric information in the early stages of integration. Another source of volatility is that of cross-country contagion. Conceptually two types of contagion can be distinguished. The first is fundamental contagion, in which a shock in one country can affect investments in other countries because they share similar fundamentals. Secondly, it is possible that the shocks in one country are transmitted through trade or financial channels and thereby affect the economic fundamentals of other countries. This second type of contagion is termed as 'pure' contagion which occurs when shocks in one country affect investments in other countries, even if the economic fundamentals of the latter have not changed. Investors' initial reactions in the wake of the Mexican crisis, which erupted in the last quarter of 1994, were an example of pure contagion. Because investors were not sufficiently discriminating among emerging markets, portfolio flows to almost all emerging markets declined very sharply in the first quarters of 1995.

The financial integration and associated capital flows pose a variety of problems for the policymakers of the developing countries. Empirical evidences cited in the Report indicate that a number of countries experienced macro-economic overheating in terms

of acceleration of economic growth, large current account deficits, accelerating inflation and appreciation of the real exchange rate following large capital flows after financial integration. The transmission mostly works through higher money supply due to rise in net foreign exchange assets of the Central Bank authorities leading to lower interest rates, expansion of demand and acceleration in domestic inflation.

The Report has stressed that the developing countries need to effectively manage their economy through various policy tools while confronted with the challenges associated with financial integration. The most direct response to external financial volatility has been imposition of capital controls. The magnitude of gross capital inflows can be reduced by imposing a variety of direct or indirect controls on inflows, liberalization of capital outflows, accelerated repayment of public debt, trade liberalisation and floating of the exchange rate. Except for floating the exchange rate, all of these instruments were used by policymakers in recipient developing countries. The report discusses the use of other policy options such as intervention in the forex market and money market, increasing reserve requirements on domestic banks and financial institutions, tighter fiscal policies in dealing with capital inflows. There is also a need for adopting an effective exchange rate policy. In recent years an increasing number of economies have adopted 'flexibly managed' exchange rate systems, which give them the option of effectively using monetary policy. Empirical evidences cited in the Report suggest that crawling pegs remain a viable exchange rate option for developing countries. However, under such a system, the central parity should be managed so as to track, to the extent possible, the underlying long-run equilibrium real exchange rate. Large and persistent temporary misalignments should be avoided, as they threaten the sustainability of the regime and make speculative attacks more likely.

One Chapter of the Report is devoted to effects of integration on domestic financial institutions. The banking systems of the developing countries play a leading role in the process of financial integration. However, the transition towards greater financial integration

also involves some risks for the banking sector as the banks may be adversely affected by increased macroeconomic volatility and by structural changes in banking sector. The main structural changes affecting the banking sector that result from integration are an increase in competition and exposure to new sources of risk that banks may not be prepared to manage properly. The mechanism generally involves a surge in capital flow leading to a lending boom, followed by a consumption boom and financial sector vulnerability.

The initial euphoria of accelerated economic growth induced by lending boom of banks leads to an increase in asset prices and financial wealth, which raises the value of loan collateral, increases households' aggregate consumption and further reinforces the process of the lending boom. However, when the unsustainable level of asset prices plunges ultimately, the economy experiences slow growth accompanied by reduction in consumption and investment spending. Firms and the households will have difficulty servicing their debts and banks will call back loans and liquidate the assets used as collateral. Because the banking system is vulnerable to confidence crisis, this sequence of events may lead to a bank run, further reducing total credit and liquidity and aggravating the slowdown in economic activity. The Report cites empirical evidences that excessive bank lending leads to increase in the current account deficit, under-investment and over-consumption. In addition to amplifying the magnitude of the business cycle, a poorly regulated and supervised banking industry will tend to misallocate resources. Poorly capitalised and regulated banks, for instance, invest excessively in risky projects, such as real estate, or other sectors prone to boom-bust cycles. Also, poorly managed banks operating under distorted incentives will not diversify their portfolios adequately, thus exacerbating financial sector vulnerability. The weaker the initial conditions in the banking sector, higher will be the vulnerability to large downturns and the banking crisis will be more costly. In this connection, the policy makers should monitor the profitability, the capitalisation ratios, the level of provisions and non-performing assets, the magnitude of exposure to foreign exchange risk and portfolio composition of banks to assess the finan-

cial health, risk exposure and resilience to shocks of the banking sector and take timely action to prevent a banking crisis. Thus, financial integration puts a premium on the need for developing countries to reform the institutional and regulatory framework governing their banking sectors.

The last Chapter of the Report deals with the capital markets issues of financial integration as a growing proportion of flows to the developing countries is getting channeled through their capital markets. These investments provide an important opportunity for the developing countries and have been accompanied by a spectacular increase in activity in equity markets in these countries. For example, as a ratio to GDP, the average market capitalization of the 18 major developing countries went up from 7 per cent in 1985 to 40 per cent in 1996. Further financial integration has led to increase in foreign presence in domestic markets and increase in access to foreign markets for resources (through GDRs, ADRs, FCCBs, etc.). Capital market derives significant benefits from financial integration which helps foster investment. More directly financial integration expands, the supply of investment resources by tapping foreign resources and increasing the demand for domestic securities. In particular, the liquidity improves and the cost of equity capital declines. The corporate governance also improves under pressure from institutional and foreign investors. Foreign investment increases depth and liquidity of domestic capital markets, thereby reducing volatility. In addition, increasing foreign participation in domestic capital markets may induce improvements in accounting, information and reporting systems, as well as increase the sophistication of the domestic securities industry. However, shallow markets are prone to volatility. Further, with financial openness, domestic capital markets are exposed to new financial shocks such as changes in global interest rates, spillover effect from foreign stock markets and investor herding. When the share of foreign investors rises in the emerging markets, these potential external sources of volatility become important. Efforts by many developing countries aimed at improving domestic fundamentals and stabilizing their economic policies and improving capital market by reducing information asymmetries and other market imperfection and building the

necessary infrastructure have helped in reducing domestic market volatility arising from external shocks. However, most of the developing markets are still in early stages of development. In order to attract additional portfolio flows developing countries need to address investor concerns, especially the reliability and efficiency of infrastructure and trading systems and transparency and fairness. The Report highlights further improvements in market infrastructure of the developing markets in the areas of trading, clearing settlement, regulatory framework, etc. In particular, for attracting potential investors and reducing systemic risks the regulatory framework should protect investors from abuse and fraud and promote competition by ensuring the market practices and rules that do not impose any unnecessary burden on competition.

Prima facie, the Report has a very optimistic note on the issue of prospect and sustainability of private capital flows to developing countries. It states that the policy reforms that are being embarked upon by the developing countries focussing on macroeconomic stability and the promotion of more deregulated, outward oriented and market based economies are likely to increase the productivity of investments in these countries. Thus there will be growing opportunities for foreign investors. With regard to contagion, the Report states that the period following Mexican crisis indicates that pure contagion is a relatively brief phenomenon; international markets were able to differentiate among emerging markets, so that those countries with the strongest economic fundamental saw a resumption in flows quickly. However, on the domestic side, developing countries are stated to be more susceptible to real and policy shocks which in turn result in greater volatility of capital flows and asset prices and returns. The Report argues that Asian financial crisis tends to give the impression that contagion may not be a purely temporary phenomenon. Net private capital flows to 29 emerging markets have fallen to an estimated \$200 billion in 1997, down from their peak of \$295 billion in 1996. It may further fall to about \$170 billion in 1998. However, it goes without saying that the developing countries should aim at improving their macroeconomic management, put forth policies for averting overheating and limiting vulnerability, strengthen the banking system and the

capital markets, so as to attract private capital flows on a sustained basis.

On the whole, the Report is very educative and informative on the subject. It discusses in threadbare all important aspects of private capital flows to developing countries and makes interesting reading for students of economics in general and international economics in particular.

Braja Mohan Misra*

* Braja Mohan Misra is Director in the Calcutta office of the Department of Economic Analysis and Policy of the Bank.

The Microstructure of Foreign Exchange Markets,
Edited by Jeffrey A. Frankel, Giampaolo Galli and Alberto
Giovannini, NBER 1996, Chicago, pp. x+346, \$71.50

Ever since the advent of the generalised floating exchange rate regime many theoretical and empirical research have appeared explaining the behaviour of exchange rates. The theoretical insight of all recent empirical research is the so-called asset market approach, which has produced a number of models and have been useful in explaining and quantifying exchange rate movements. The asset market approach, which assumes free capital mobility presumes that current or future change in the return on assets denominated in different currencies has an immediate and unambiguous effect on exchange rates. The basic characteristic of these models is that they are highly aggregated. The need for looking into the microstructure of foreign exchange markets stems from the shortcomings involved in the macro models. These models face a *prima facie* contradiction between the models and reality, fail to predict exchange rates at short horizons and are incapable of explaining exchange rate movements *ex post* and volatility of exchange rates. This edited volume by Frankel, Galli and Giovannini addresses the micro aspects of foreign exchange markets with special emphasis on institutional aspects and behaviour of market participants. Certain aspects like transparency, decentralisation, the use of brokers, the location of trading, the efficiency of clearing of foreign exchange transactions, the relation between spot and derivative markets, and the importance of systemic risk in the market are also covered in this volume. This edited volume is composed of two parts containing nine innovative essays. The first part of the book covers broad areas like trading volume, asymmetric information, and bid-ask spreads, whereas the second part covers analytical issues like speculation, exchange rate crises and macroeconomic fundamentals.

In the first chapter of this book, Philippe Jorion makes an attempt to examine the correlation between trade volume and volatility of prices (average of trader's option prices) in the foreign exchange market based on the theory developed by Tauchen and

Pitts. The theory says that the correlation between trading volume and volatility should be positive when the source of trading volume is from heterogeneous (fixed number of) traders and negative when source of trading volume is determined by a large number of traders. Jorion considers daily closing quotes for deutsche mark (DM) currency futures and options over January 1985-February 1992 for his analysis. He uses the Implied Standard Deviation (ISD) and the Generalised Autoregressive Conditional Heteroscedastic (GARCH) models to estimate the volatility. This study confirms positive relationship between unexpected risk and unexpected volume. The study also finds that spreads are positively correlated with expected risk.

In Chapter 2, Hsieh and Kleidon explore the implications of foreign exchange markets for alternate markets of intra-day price and volume behaviour. They argue that current models of asymmetric information appear inadequate to explain volatility in the foreign exchange market because private information associated with high volatility in one market is not picked up by the other market. They suggest two possible explanations to account for the behaviour of prices and volumes in foreign exchange markets. First, importance should be given to nature of traders, their behaviour, structure of the market, and identity of other traders. Second, at the close of the trade, much of activity in the closing market may be due to the inventory-related activities of traders at market close, especially for the large group of intra-day traders who must close their positions by the end of trading.

In Chapter 3, Perraudin and Vitale develop a theory which examines the reasons behind the high percentage of trading volume being accounted for by dealers instead of customers. They emphasise that, because the foreign exchange market is decentralised, order of flow cannot be observed by everyone. Perraudin and Vitale provide a model for trading process by means of which the new information gets disseminated to the market place by dividing the interval into four stages. They found that bid-ask spreads are wider in decentralised markets. By posting wider spreads in a decentralised market the dealers can discourage price-

sensitive liquidity traders and hence improve the information contents of their order flow. The information embodied in orders can in turn be used to earn high profits and can be 'sold' to the market makers through interbank transactions at advantageous prices. Decentralised markets are much less subject to market crashes than centralised markets. Under certain circumstances static or centralised markets would crash owing to excessive number of informed traders, whereas, in decentralised markets dealers will have an incentive to preserve some turnover as they can employ the information in the order flow in the subsequent trading.

In Chapter 4, Goodhart, Ito and Payne study the foreign exchange dealers' behaviour as reported by the 2000-2 Reuters foreign exchange trading system. Using data from the Reuters system they have compared the actual transaction prices with the indicative quotes. They found that movements in the two are very close. On the other hand, Lyons examines the traders' behaviour through the structure of the foreign exchange data in Chapter 5. He examines the trading intensity with the help of two competing theories, viz., *the event-uncertainty view* and *the hot potato view* as found in the literature. The event-uncertainty view holds that traders are more informative when trading intensity is high whereas, the hot potato view holds that traders are more informative when trading intensity is low. His empirical evidence supports the hot potato view: the quantity traded has a significant effect on the trader's prices only when the time between transactions is very long.

Garber and Spencer examine the effects of dynamic hedging strategies on foreign exchange markets during the periods of excessive volatility in the exchange rate in Chapter 6. During the European currency crises of 1992, dynamic hedging instrument were put into practice by a number of countries to contain speculative activities that caused increased sales of the currencies under attack following defensive interest rate hikes by central banks. Garber and Spencer argue that in a fixed exchange rate regime, a defensive exchange rate policy requires that interest rates must be raised to high levels albeit gradually. Such a policy would trigger daily selling of the currency by dynamic hedgers, but not in quantities that

would overwhelm the central bank's net reserve limits by the end of the day beyond its reserve position limits.

One feature of this dynamic hedging is that different agents respond differently to the same information. This issue of heterogeneity across agents is discussed explicitly by Bagliano, Beltratti and Bertola in Chapter 7. They analyse Italian data from the balance of payments statistics and central bank's balance sheets and conclude that there is evidence of heterogenous behaviour before the September 1992 crisis. During the pre-crisis period in Italy, non-bank residents were net exporters of capital and revealed gradual portfolio diversification. They argued that there were sources of heterogeneity which were linked to risk aversion, need for liquidity, and asset preferences rather than those related to perceptions of market players in determining the direction and intensity of trading by different agents. Furthermore, formal and informal regulatory constraints, especially on banks, was also an important factor.

While establishing the microstructure analysis of exchange rate dynamics, Flood and Taylor in Chapter 8 have questioned the strength of conventional macro models in explaining the exchange rate movements in the short run. They have critically reviewed the asset market approaches to exchange rate determination and tested them empirically for industrialised economies. Using data on 21 industrialised countries for the floating rate period, they found that macro fundamentals are poor guide to variations in short-run exchange rate movements (where the short-run is defined as one year or less), although they may have considerable explanatory power over longer horizons.

The last Chapter of the book by Eichengreen, Rose and Wyplosz deals with policy prescriptions to be followed during currency crises under self-fulfilling speculative attacks against a pegged exchange rate. They argue that European Monetary Union (EMU) will not be achieved unless the Maastricht Treaty is amended in one of the following ways. Either the exchange rates are required to fluctuate within the 'normal' fluctuations band, or capital controls are required to maintain the required stability in exchange

rates during the transition. Their specific proposal is to introduce a non-interest bearing deposit on bank lending to non-residents where bank lending is observed to be the raw principles for carrying out speculative activities. Using data for twenty-two countries over twenty-five years, they found that capital controls have been associated with significant differences in the behaviour of macroeconomic variables such as budget deficits and growth rates.

In the recent period there have been significant developments in the Indian foreign exchange market. The monthly average turnover rose significantly from about US \$78 billion during 1996-97 to about US \$ 109 billion during 1997-98 where about 80 per cent of the total transactions were undertaken by the inter-bank segment. Towards further deepening the foreign exchange market in the context of a globalised financial system, a large degree of freedom has been given to the authorised dealers. They have been allowed to use longer term hedging instruments. Looking into the microstructure of the Indian foreign exchange market, in terms of spread of information and use of risk-based instruments, the market is not well developed and dominated by spot transactions. While establishing a well developed foreign exchange market, a detailed re-examination of the microstructure aspect of the market along with a sound financial system is required.

This book offers a unique contribution to the microstructure theory of foreign exchange markets by discussing both the operational and analytical aspects. The issues addressed in this book will be extremely useful for both macro and micro model builders to arrive at a balanced approach.

Satyananda Sahoo*

* Satyananda Sahoo is Research Officer in the Department of Economic Analysis and Policy of the Bank.