Aspects of Exchange Rate Behaviour and Management in India 1993-98

The change in regime in India from a multi-currency peg to a floating price convertibility provides sufficient motivation for a preliminary analysis of the country's exchange rate behaviour and management between 1993-99. Using international experience with floating exchange rates as a reference point, the paper examines these changes in a comparative perspective. The paper also documents the response of the central bank to exchange rate instability during this period.

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I Introduction

With introduction of freely floating exchange rates in 1973, governments have intervened actively in foreign exchange markets. While the nature and pattern of intervention has varied from country to country, a common desire to prevent unduly large movements in their exchange rates can be observed. The need for 'managing' exchange rates emerged by 1985 as a consensus response of all major countries to excessive exchange rate fluctuations that accompanied the abolishment of fixed-price convertibility. Exchange rates exhibited considerable volatility and increased capital mobility overrode the insulation offered by floating exchange rates, straining the monetary authorities with instability. Subsequent developments in the international economy, viz, medium-term mis-alignment of exchange rates epitomised by the sharp appreciation of the dollar in the early eighties, prolonged current account imbalances, and massive fiscal deficits further complicated the task of macro-economic management. These experiences undermined the theoretical belief that balance of payments deficits would automatically adjust through variations in the market price of foreign exchange, giving complete monetary autonomy to policy-makers to secure internal objectives under a floating exchange rate arrangement.

International experience with floating exchange rates has some relevance for India, which switched to a floating exchange rate regime in early 1993. This was accomplished after a gradual transition between 1991-93 through a dual exchange rate regime. Prior to the floating exchange rate period, exchange rate flexibility was pursued through a currency basket peg. The change in regime from a multi-currency peg to a floating price convertibility provides sufficient motivation for a preliminary analysis of exchange rate behaviour and management between 1993-99, using international experience with floating exchange rates as a reference point. This paper aims to examine changes in the rupee-dollar exchange rate behaviour associated with change in exchange rate regime in a comparative perspective. A second aim of the paper is to document the response of the central bank to exchange rate instability during this period.

The paper is divided into four sections. Section II looks at exchange rate variability and its evolving relationship with prices. The main objective here is to look for changes that could possibly be related to increased flexibility of exchange rate regime after 1993 and observable common patterns between Indian and international experience. Section III traces exchange rate management by the central bank in relation to policy objectives. Inter linkages with domestic monetary conditions are also briefly examined in this section. Section IV draws the conclusions.

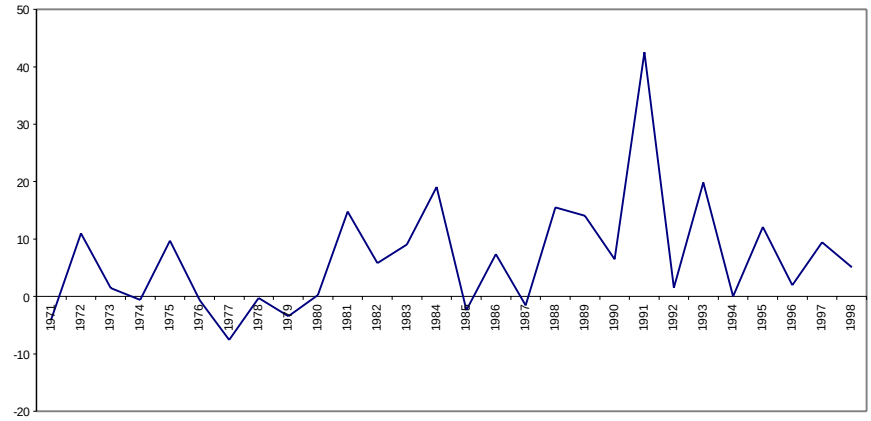
II Exchange Rate Behaviour

This section will examine some aspects of the rupee-dollar rate taking some stylised facts about exchange rate behaviour observed in transition from fixed to flexible exchange rate regimes elsewhere in the world as a benchmark. Two aspects are explored here: one, the association, if any, between exchange rate movements and choice of exchange rate regime, and two, the evolution of the relationship between exchange rates and prices.

Exchange rate variability: International experience has shown that the transition from a fixed to a floating exchange rate regime has unambiguously been accompanied by a rise in exchange rate volatility.[1] Practically all industrialised countries that changed over to flexible exchange rate regimes after the collapse of the Bretton Woods arrangement witnessed a rise in the variability of their exchange rates. Given the switchover to a flexible exchange rate arrangement in India in 1993, we look for observable differences between the two regimes to see whether there is any conformity with international experience in this regard. Note however that the previous exchange rate regime in India was not strictly a fixed-rate arrangement, being linked to a multi-currency basket, making it closely approximate an adjustable peg [Joshi 1984].

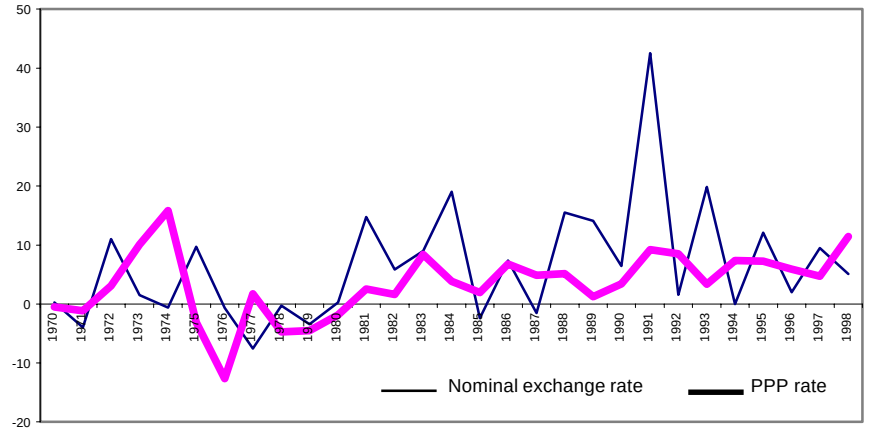
We begin the analysis by looking for differences in exchange rate volatility in the adjustable-peg and floating exchange rate periods in India. Figure 1 illustrates variability of the rupee where the yearly changes of the rupee/dollar (spot) rate are plotted between 1970-99. It can be observed from the plot that movements in the rupee-dollar rate do not exhibit any significant behavioural change in the two exchange rate regimes. A statistical measure of volatility, the standard deviation of yearly changes, shows practically constant rupee-dollar rate variability (7.6 for 1970-90 and 7.0 for 1993-99. Note that the years 1991-92 have been excluded from these computations due to two major exchange rate adjustments in 1991 and the turbulence specific to the transition period). Since short-term movements might

Figure 1: Re/$ Variability between 1970-98



Re/Dollar rate (yearly change in per cent). A positive change indicates a depreciation of the rupee.

Figure 2: Exchange Rate and Price Movements, 1970-98



The nominal Re/$ exchange rate is the price of dollars in terms of rupees. A rise is a nominal depreciation of the rupee and a nominal appreciation of the dollar. The PPP rate is the Indian CPI divided by the US CPI. Annual per cent changes are shown here.

indicate exchange rate volatility more appropriately, we also examined variability with respect to monthly changes in the exchange rate. However, the monthly data (not plotted here) too shows only a marginal increase in nominal variability from 1.43 to 1.7 between the two time periods.

The fact that exchange rate volatility has not risen after the transition runs contrary to the experiences of other, particularly industrialised countries, all of which typically experienced a rise in exchange rate variability accompanying the shift from fixed to floating exchange rate regimes. One reason for this observation could be the management of the exchange rate in India after 1993 vis-a-vis instability as a stable exchange rate is one of the explicit objectives of exchange rate policy. The degree to which the exchange rate is 'successfully managed' through intervention, direct as well as indirect, by the monetary authority would then obviously colour observed volatility in exchange rate movements. This aspect is scrutinised in Section III where we find a significant intervention response to volatility in exchange rate movements.

Exchange rate and prices: We next look at exchange rate movements and their relationship with the movements of one of its fundamental determinants, i e, the price level. The theory of purchasing power parity (PPP) provides the theoretical rationale for the belief that floating exchange rates would offset trend inflation differentials. Thus, it predicts that differentials between foreign and domestic rates of inflation caused by an increase/decrease in the foreign price level would be offset by an appreciation/depreciation of the domestic currency in equilibrium.

Figure 2 plots the dynamics of exchange rates and prices, the rupee/dollar nominal exchange rate and the equilibrium exchange rate, i e, the PPP rate (ratio of domestic to foreign prices) between 1970-98. We observe that changes in the rupee/dollar rate and the difference between Indian and US inflation rates (consumer price index) are not of equal magnitude as the PPP theory would predict. Particularly after 1993, when we would expect movements in the nominal exchange rate to reflect changes in the price levels, given the increased flexibility of the exchange rate regime, the exchange rate movements exceed the change in price levels. The two series also move in the opposite direction during this period, suggesting that relative inflation rates do not provide a satisfactory description of exchange rate behaviour in this period. This feature conforms to the experience of industrialised countries with floating exchange rates where PPP does not hold in the short-run, indicating sluggishness of output prices.

Since purchasing power parity essentially refers to a long-run equilibrium relationship between price levels and the exchange rates, a long-run analysis might be better able to shed light on this relationship for India. The aim here is to examine whether the rupee-dollar exchange rate tends to revert to its equilibrium (PPP) value under the flexible exchange rate arrangement after 1993. Figure 3 shows the evolution of the rupee-dollar rate (market rate) and the PPP rate (ratio of domestic to foreign price levels). We have used 1993 as a base year to calculate the indices.[2] The choice of base year reflects an implicit belief that the exchange rate was equivalent to its 'equilibrium' value in that year but is of no consequence here as the sole aim is to examine the reversion of the exchange rate to its PPP value [De Grauwe 1991:67].

Figure 3 reveals a consistently overvalued exchange rate with the gap between the two series reducing over time. This convergence reflects an exchange rate policy of active rupee devaluation followed between 1986-90 [Joshi and Little 1994:277]. After the two major exchange rate adjustments in 1991, the market rate moves closer to its PPP value. In the period after the float, the market rate is close to its 1993 value; also note the long periods of stability with periodic adjustments of the deviations from the base value. The latter suggests the 'parity' rule guiding exchange rate policy and the next section offers further empirical evidence in this regard.

One implication of the fact that exchange rates move more than the national price levels has been a high correlation between

Figure 3: Nominal and PPP Exchange Rates (1993=100)

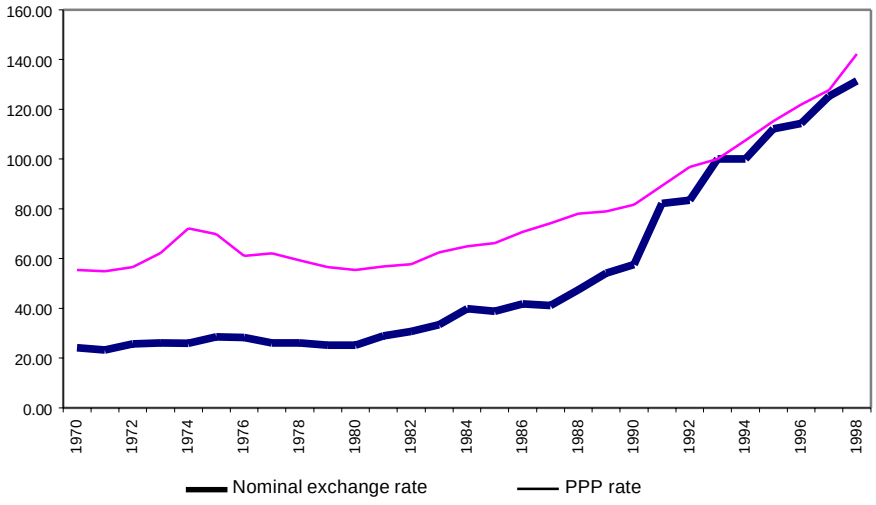
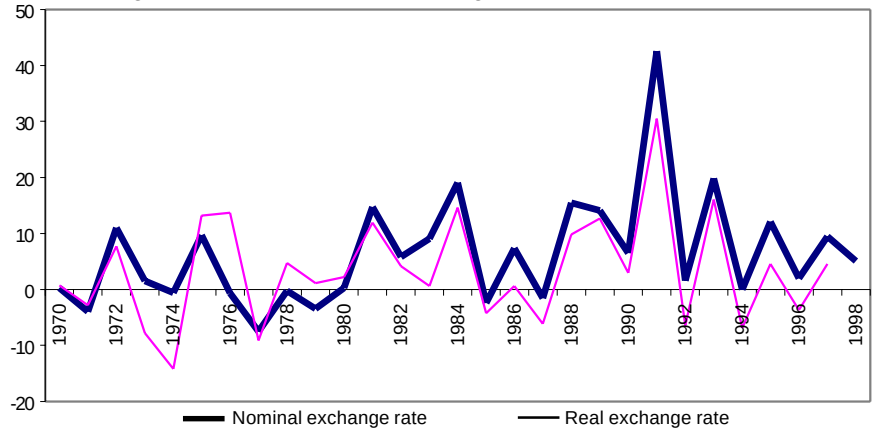


Figure 4: Nominal and Real Exchange Rate Movements, 1970-98



The nominal rate is the price of dollar in rupees. The real Re/$ rate is the nominal rate multiplied by the ratios of US CPI and the Indian CPI. A rise is a nominal/real depreciation of the rupee. Figures are yearly percentage changes of the two series.

nominal and real exchange rates in the floating exchange rate period for industrialised countries. Does the rupee/dollar rate behaviour generalise to this international pattern? Figure 4 plots the nominal and real exchange rates, where the real exchange rate is defined as the nominal exchange rate times the ratio of the foreign (US) to domestic price levels. The evidence on co-movement of these two series is a test for the sticky price hypothesis in the short run. To elaborate, if output prices adjusted constantly so as to clear the market as proposed under the flexible-price models, then nominal exchange rate variability should not affect movements in the real exchange rate. The post-1993 data for India, however, does not support this proposition; in fact, the correlation between the two series increases after the float to 0.97 against a 0.73 prior to the float. This suggests that output prices move slowly in the short run, so that greater nominal exchange rate variability impacts upon the real exchange rate.

In the following section we focus upon exchange rate management during the floating exchange rate period by the Reserve Bank in relation to objectives of exchange rate policy. We focus upon intervention measures, direct as well as indirect, used by the central bank to realise their policy objectives and briefly touch upon how they impinge upon domestic monetary conditions.

III
Exchange Rate Management

A notable feature of the post-float period has been the use of heavy exchange rate management by the central bank. Figure 5 plots yearly changes in foreign reserves (deflated by the wholesale price index at 1990 prices). We observe that annual reserve changes are higher in the floating exchange rate period than in the adjustable peg regime, suggesting that the size of central bank interventions in the foreign exchange market has increased. The mean absolute change in foreign exchange reserves during 1970-90 is merely Rs 0.03 billion which increases to 0.73 billion after the rupee started to float in March 1993 (the average size of intervention for the transition period, 1991-92, which was particularly turbulent, is 0.64 billion).

A perusal of the central bank's annual reports during the period under review shows that the RBI uses both direct and indirect intervention to manage the exchange rate. Direct intervention refers to purchases and sales in intervention currency (i e, US dollars) in both spot and forward markets, whereas indirect intervention alludes to the use of quantitative restrictions, reserve requirements and interest rate flexibility to smoothen temporary mismatches between demand and supply of foreign currency. Table 1 presents some facts about the central bank's intervention activity in the post-float period. It can be observed that intervention activity by the central bank was considerable in the early years of the float.

Since in principle, the intervention strategy of a central bank will be determined by what the policy objectives are, we examine intervention behaviour of the Reserve Bank in the context of the country's stance regarding its currency and its exchange rate policy. A review of official accounts of exchange rate policy suggest that the Reserve Bank's exchange rate management strategy is centred on maintaining stability and keeping the exchange rate aligned to fundamentals. Consider, for example, the following statements: "...it will be important to maintain a stable REER ...to prevent an erosion in the incentives available to exporters" [GoI 1993:94:85] "the Reserve Bank of India stands ready to intervene to maintain orderly market conditions and to curb excessive speculation" [GoI 1995-96:103] and "...exchange

Table 1: Interventions[a] by RBI during 1993-98
(*Rs billion*)

	Gross Intervention	Net Intervention
1993	225.64	201.89
1994	346.22	300.78
1995	223.34	40.06
1996	194.91	91.64
1997	343.79	206.11
1998	291.65	205.59

Note: a Intervention calculated as changes in reserves.

Figure 5: Movements in Reserves, 1970-98

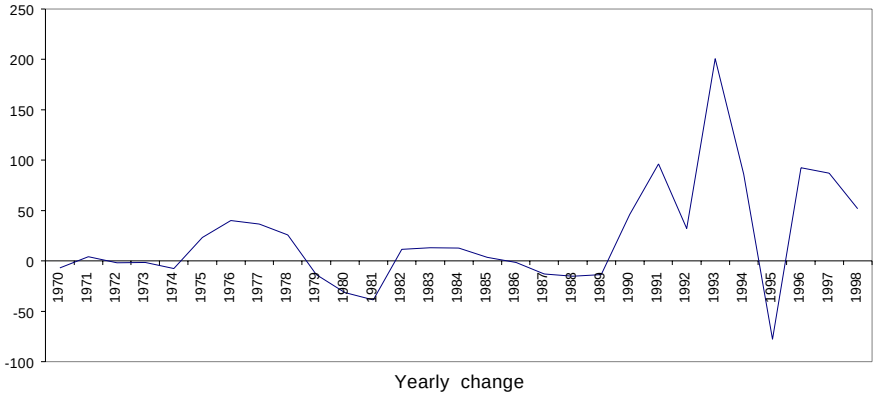
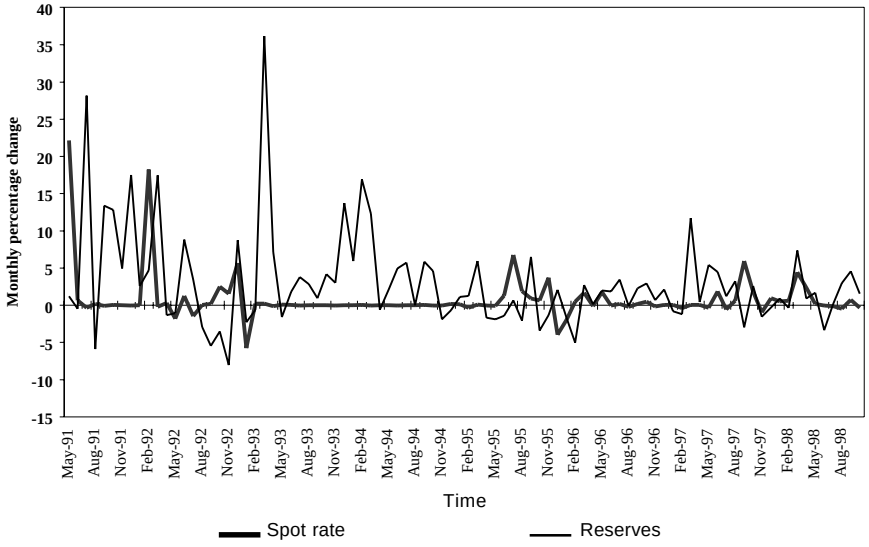


Figure 6: Intervention and Movements in the Spot Rates



rate management continues its focus on smoothing excessive volatility in the exchange rate to ensure that the ex-change rate remains consistent with economic fundamentals" [GoI 1997-98:92].

These statements indicate that the central bank responds to exchange rate volatility in the foreign exchange market, with the intention of stabilising the nominal exchange rate. They also suggest a belief in the 'real targets' approach under which the central bank would aim at prevention of 'misalignment'[3] of the exchange rate. Pursuit of a real exchange rate target typically aims at controlling the level of the real exchange rate, either to insulate it from internal and external shocks and therefore keep it constant, or achieve a different (usually depreciated to make exports more competitive) level.

Figure 6 plots monthly intervention activity of the Reserve Bank during this period along with changes in the nominal exchange (spot) rate to bring out the association, if any, between central bank intervention and exchange rate movements. The period immediately following the floating of the rupee, 1993-95, is a period of relative calm in terms of exchange rate movements. A closer look at the data however reveals extensive management on the part of the central bank with the nominal exchange rate (spot) being held almost constant between 31.23 – 31.81 rupees per US dollar, despite a widening inflation differential between domestic and foreign (US) prices.

The main source of disturbance during this period (March 1993-August 1995) was heavy capital inflows leading to an appreciation of the real exchange rate, which was countered by intervening purchases by the Reserve Bank. In the central bank's own words, intervention strategy was aimed at "...protecting the export competitiveness and consolidating the foreign exchange reserves" [RBI 1994-95:X-17]. Clearly, a rigid defence of the exchange rate (averting an appreciation) led to very large interventions during these two years. The exchange rate appears to have been maintained at its 'equilibrium value', i e, the March 1993 value, confirming the central bank's commitment to its policy objectives. It also indicates pursuit of a 'real target' by the central bank.[4]

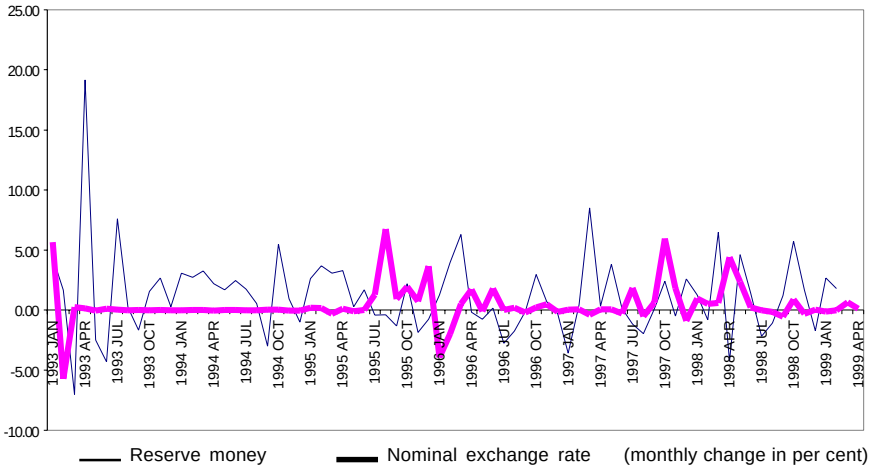
Figure 6 highlights two periods of volatility in the nominal exchange rate, i e, September 1995-June 1996 and August 1997-June 1998 which have been used by us to study exchange rate management of the central bank. Table 2 (columns 2 and 3) presents some of measures of exchange rate volatility during periods of exchange rate pressure. The last column of Table 2 provides evidence of central bank response, i e, intervention. A close positive association can be observed between intervention and exchange rate volatility from Table 2, confirming the observation from Figure 6. Note for instance the co-movement between intervention and volatility between July-September 1995 and January-March 1996. The central bank initially defended the exchange rate, giving way to a readjustment in September 1995, when the rupee's value vis-a-vis the dollar rose from

Table 2: Exchange Rate Volatility and Intervention in Periods of Pressure

Period	Nominal Exchange Rate Variability vis-a-vis US Dollar		Interventions
April-June 1995	0.21[1]	-0.14[2]	5.80[3]
July-September 1995	3.59	1.28	10.30
October-December 1995	0.66	9.85*	7.88
January-March 1996	3.95	0.29	12.11
April-June 1996	0.92	0.10	5.21
July-September 1997	1.30	1.06	7.69
October-December 1997	2.80	6.61*	4.55
January-March 1998	0.99	1.88	10.61
April-June 1998	1.90	5.59*	8.03
July-September 1998	0.17	2.56*	10.42

Notes: 1 Standard deviation of absolute percentage change in the bilateral rupee/dollar exchange rate;
2 Percentage change of the median value of the exchange rate in the current quarter over the median value of the preceding quarter;
3 Quarterly averages expressed as a percentage of the yearly average of gross intervention undertaken;
* Intervention leading to realignment of the exchange rate.

Figure 7: Nominal Exchnage Rate and Reserve Money, 1993-99



31.81 (end of period exchange rate, August 1995) to 33.96 (September 1995) and further to 34.61 in October 1995. A depreciation of almost 10 per cent can be discerned from column 3, Table 2 during this period; after the re-adjustment, intervention activity subsides somewhat. This is confirmed by the central bank's own account of the episode "...due to the policy guided correction in the exchange rate of the rupee in the second half of 1995-96, the rupee remained stable during 1996-97" [RBI 1995-96:X-12]. The 'parity' rule seems to have guided the re-alignment; this is also clear from Figure 3 where we find that the adjustment moves the market rate closer to the March 1993 base value.

Table 3: Monetary Measures used by RBI to Counter Exchange Rate Movements: 1993-98

	Cash Reserve/Statutory Liquidity Ratio Changes	Interest Rate changes	Other Direct Measures
October 1995	Increases in NRER, NR(NR)RD a/cs over their outstanding levels on October 27, 1995 exempted from CRR requirements.	Rise in interest rate on NRER deposits; interest surcharge on import finance; reduction in interest rate concessions on export finance between 3-6 months	
January-February 1996	CRR requirements for all FCNR (B) and NR(NR) Deposits relaxed; average CRR on NRER liabilities reduced from 14 to 12 per cent.	Interest rate surcharge on import finance raised from 15 to 25 per cent; interest rates on post-shipment export credit freed to expedite exports payments into the country.	
April 1996	NRER deposits exempted from CRR requirements; SLR on NRER reduced from 30 to 25 per cent.	Interest rates on NRER term deposits over two years freed.	
November-December 1997	CRR increased by 0.5 per cent; incremental CRR of 10 per cent on NR(E)RA and NR(NR) removed;	Interest rate on post-shipment export credit increased from 13 to 15 per cent; interest rate on fixed rate repos increased by 0.5 per cent;	
January 1998	Bank rate raised from 9 to 11 per cent; CRR raised from 10 to 10.5 pre cent; general refinance limit reduced from 1 to 0.25 per cent of fortnightly average outstanding aggregate deposits; export refinance limit reduced from 100 to 50 per cent of the increase in outstanding export credit eligible for such refinance over the level of such credit as on January 16, 1996;	Interest rate on fixed rate repos increased from 7 to 9 per cent;	Banks barred from offering forward contracts based on past performance; declaration of exposure suspended;
June 1998		Lowering of interest rate on export credit on 'incremental exports' over the base year level of exports in 1997-98;	FII allowed to undertake foreign exchange cover on their 'incremental equity investment from June 12, 1998; merchants advised to monitor credit utilisation to meet genuine foreign exchange demand but not unanticipated import requirements beyond a reasonable period to discourage inventory build-up; domestic financial intermediaries to buy back their won debt or other Indian paper from the international market; Banks acting on behalf of FIIs allowed to but foreign exchange directly from the RBI at the prevailing market rate.
August 1998	CRR maintained by banks raised from 10 to 11 per cent; CRR – cash reserve ratio; NRER, NR (NR) RD, FCNR(B), etc –various categories of Non-resident accounts ADs – authorised dealers	Interest rate on fixed rate repos hiked from 5 to 8 per cent;	ADs allowed to offer forward cover directly to FIIs upto 15 per cent of their investment as on June 11, 1998; facility of rebooking of cancelled import contracts withdrawn; facility for splitting forward and spot leg for a commitment withdrawn; extension of time limit for realisation of export payments allowed only in exceptional circumstances; Ads advised to report their peak intra-day positions.

A further depreciation (3.7 per cent) in January 1996 again prompted intervention (sales) by the Reserve Bank and appears to have been successful, as a further depreciation was averted and the rupee's value fell to 35.04 (Rs/$), which was the re-adjusted price accepted by the central bank. In fact, the rupee-dollar rate was maintained at this value until July 1997. Note that this again aligns the market rate close to the March 1993 'equilibrium' value (Figure 3).

In the second period of exchange rate pressure, the fluctuations in the foreign exchange market possibly originated in the expectations of economic agents about future depreciation in line with the currencies of neighbouring countries as India's competitiveness was directly hurt in international markets. The Reserve Bank's intervention activity again increased with volatility in the foreign exchange market. A small upward adjustment (1.8 per cent) took place in August 1997, which seems to have been accepted by the central bank. This was followed by a larger one in November-December 1997 (approximately 7 per cent), when intervention activity was relatively subdued. Between January-July 1998, substantial interventions took place, when the Reserve Bank resisted further pressures upon the exchange rate. Despite the direct as well as indirect (cf Table 3) intervening measures, further re-alignments of the market rate were accepted as indicated by column 3 of Table 2. Again, the 'parity' rule seems to have been followed by the Reserve Bank.

These observations suggest that the central bank is averse to excessive fluctuations and aims to moderate exchange rate movements when there is volatility in the foreign exchange rate market. They also indicate a 'parity' rule guiding the periodic re-alignments that are managed by the central bank, as indicated by the latter's withdrawal from intervening activity once the markets have stabilised around the re-adjusted rate. Presumably, the intervention strategy is centred upon moving the real exchange rate in order to effect trade flows; this is pursued by moderating movements of the nominal exchange rate in relation to the price level.

Intervention and domestic monetary conditions: Has intervention been successful? One way of examining this question is to see whether intervention is sterilised or non-sterilised. With sterilised intervention, the monetary authorities buy or sell foreign exchange and offset it with open market operations so that the domestic money stock remains unaltered. Conversely, non-sterilised intervention implies that the domestic money stock is affected. The implication of this type of intervention is that the automatic adjustment mechanism via domestic money stock expansion/contraction, interest rate effects and subsequent substitution between foreign and domestic currency assets by economic agents help stabilise the exchange rate. The absence of a monetary effect with a sterilised intervention has led to almost a consensus amongst economists that it is ineffective. Thus, the answer whether an intervention is effective or not will depend upon whether there is sterilisation or not.

An indirect way of looking for such evidence is to observe changes in the monetary base in relation to intervention activity. Figure 7 plots movements in reserve money along with changes in the rupee/dollar rate. We can observe a negative correlation between the two movements between April 1995-April 1996 and again for some months in the second period of exchange rate tension in July 1997-April 1998. From Figure 6 we observe that the central bank was selling dollars during April-July 1995, implying thereby that rupees were being purchased leading to an expansion in the domestic money stock. Figure 7 shows a positive change in money stock during this period, suggesting that there were no offsetting operations by the central bank. However, the adjustment predicted by theory will not have the desired effect in the Indian context in the presence of a closed capital account. We therefore observe from Table 3, which presents the indirect monetary measures complementing the direct intervention of the Reserve Bank, a range of interest rate and reserve requirement changes that directly impinge upon domestic liquidity conditions. It can be observed that the October 1995 intervention was combined interest rate and reserve requirement changes to bring the rupee to "...levels consistent with fundamentals" [RBI 1995-96:x-13]. In the second period of exchange rate pressure, beginning July 1997, we find a similar tendency, though the phenomenon is not so pronounced. The November-December 1997 depreciation is accompanied by a monetary expansion; a brief monetary contraction and then expansion, indicating part sterilisation follow the upward movement of the exchange rate in April-June 1998.

It is therefore difficult to conclude with certainty that direct intervening operations are successful or otherwise, because the central bank does not rely on direct intervention alone to counter exchange rate fluctuations. It also intervenes indirectly through trade and interest rate restrictions to correct demand-supply imbalances in the foreign exchange market, a summary of which is given in Table 3. These measures directly affect the ability of market participants to surplus foreign currency or delay export receipts by making it costlier to do so. Similarly, varying interest rates affect the capacity of importers. Finally, foreign exchange market spillovers into the domestic market are prevented indirectly through variations in reserve requirements even though no sterilisation might be undertaken.

IV
Conclusion

This paper has focused upon a preliminary anlaysis of exchange rate behaviour and its management in the short period of floating exchange rate regime in India with the use of descriptive statistics. Several interesting features emerged from the analysis. We find that exchange rate volatility does not increase in the period imparting greater flexibility to the exchange rate, which is contrary to the experiences of other countries in this regard. Second, we find evidence of reversion of the exchange rate to its purchasing power parity value over a long period. This, however, is directly linked to exchange rate policy measures prior to 1993 and exchange rate management thereafter.

As is the case with most countries, what we observe in India is an 'intermediate' regime, which lies between the two extreme textbook versions of fixed and free exchange rate regimes, and where the exchange rate is 'managed'. A scrutiny of the exchange rate management strategy of the Reserve Bank reveals a strong commitment to exchange rate stability and keeping the exchange rate aligned to one of its fundamentals, i e, the price level. Thus we find a positive response of direct intervention activity to rise in exchange rate volatility. We also find that intervention activity subsides once a re-alignment has taken place; the adjustments appear to be tied to the price level. It is possible that speculation by economic agents arises in situations when the 'fundamentals' are on a divergent path.

We are unable to comment conclusively upon whether intervention operations of the Reserve Bank are successful or not, since these are often in conjunction with indirect

measures. Though such restrictions cannot be a permanent substitute for a continuous depreciation of the exchange rate when the domestic inflation exceeds that of its trading partners, use of trade restrictions indicates that the Reserve Bank is not averse to using them to avoid a real devaluation that a commitment to a real target might demand.

There are implications for these operations in the future with the progressive dismantling of foreign exchange restrictions, both current as well as capital. The scale of intervention required to preserve exchange rate stability is likely to rise in the absence of these controls. The implications for intervention activity are even more significant in a situation where the capital account is liberalised. Lessons from other countries indicate that foreign exchange markets are unable to cope with unrestricted capital flows, many of which represent unstable expectations that induce movements in the exchange rate. Since these relative price changes are not caused by changes in the fundamentals, moderation of such changes would be an obvious objective of exchange rate management in the future. A rise in the scale of future intervention would therefore imply a significant build-up of reserves.

Notes

[The views expressed are the author's own and not of the institution to which she belongs.]

1 See Mussa (1986) for an exhaustive thorough account of this empirical observation.
2 The base of March 1993 is reported to have been notionally established as an 'equilibrium' rate for the rupee by the official authorities. See EPW Research Foundation (1997).
3 Misalignment refers to a persistent departure of an exchange rate from its long-run equilibrium level.
4 A real exchange rate target approach requires determination of an 'equilibrium exchange rate', which (in theory is determined by purchasing power parity). Other factors that influence it are the demand and supply of exports and imports, incomes from and the rates of return on domestic and foreign assets, and an estimated persistent capital flow that are expected to be sustainable [Williamson 1993:189].

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