FOREIGN EXCHANGE MARKET BEHAVIUOR AND ITS MANAGEMNT IN THE POST-REFORM PERIOD: THE INDIAN EXPERIENCES

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ABSTRACT

The Indian foreign exchange market has operated in a liberlised environment for more than a decade. A cautious and well-caliberated approach was followed while liberlising the foreign exchange market and the focus was on gradually dismantling controls and providing an enabling environment to all entities engaged in external transactions. Hence, in view of the high volumes of Foreign Exchange Reserve (FER) and their currency composition, the need for and the significance of its management has emerged as an extensive issue of debate in India since the aftermath of recent Asian crises. The issues are mainly centered on the desirability, form and content of capital control, risk containment strategies in external debt management and the desirable sequence of capital account liberalization. Though the desire to accumulate FER arises for several reasons, the full and push factors are also equally responsible for the flow of reserves to the emerging economies including India. But the movments in the behaviour of the exchange rate policies seen in most of the emerging economies have influenced to greater dgree the Indian system as well during the post-unification period. Further, the volatilities in the exchange rate regimes since 1992, certainly awakend the monetary authories to take up appropriate policy initiaties to ensure stability and confidence among the participants in the exchange market world over.

Against these backdrops, this paper focuses on the evolution of the movements of exchange rate regimes undergone since 1992 onwards. Besides, this, the paper also examines the emerging policy concerns in the light of the initiative to fuller capital account convertibility approach recently in India. The paper concludes with needed future agenda in view of impacts of recent global financial imbalances on different economies.

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Introduction

Over the years, the foreign exchange market has emerged as the largest market in the world and the breakdown of the Bretton Woods system in 1971 marked the beginning of floating exchange rate regimes in several countries. The decade of the 1990s witnessed a perceptible policy shift in many emerging markets towards reorientation of their financial markets and these changing contours were mirrored in a rapid expansion of foreign exchange market in terms of participants, transaction volumes, decline in transaction costs and more efficient mechanisms of risk transfer.

In India the foreign exchange market has originated in 1978 begeining with the banks to undertake intra-day trade in foreign exchange. Before the reform process the Indian foreign exchange system was in a critical juncture and in the 1990s the Indian foreign exchange market witnessed far reaching changes along with the shifts in the currency regime. Following the recommendations of Rangarajan Committee on Balance of Payments, the exchange rate of the rupee pegged earlier was floated partially in March 1992 and fully in March 1993. Thus, the unification of the exchange rate was instrumental in developing a market-determined exchange rate of the rupee and an effort towards current account convertibility. Further, following the recommendations O.P.Sodhani Expert Committee, since 1996, wide-ranging reforms have been undertaken for deepening and widening of the Indian foreign exchange market. An Internal Technical Group on the Foreign Exchange Market was constituted in 2005 to undertake a comprehensive review of the measures initiated by the Reserve Bank and identify areas for further liberalisation or relaxation of restrictions in a medium-term framework. These efforts have resulted in the momentous developments in the enhanced risk-bearing capacity of banks along with rising foreign exchange trading volumes and finer margins. Thus, the foreign exchange market in India has acquired depth (Reddy, 2005) and the conditions have also generally remained orderly (Reddy, 2006c). Although it is not possible for any country to remain completely unaffected by developments in international markets, India was able to keep the spillover effect of the Asian crisis to a minimum through constant monitoring and timely action, including recourse to strong monetary measures, when necessary, to prevent emergence of self fulfilling speculative activities (Mohan, 2006a).

Cost and Benefit of Holding Foreign Exchange Reserves

Reserves management is mainly guided by how best to deploy foreign reserve assets, the portfolios considerations take into account inter alia, safety, liquidity and yields on reserves

as the principal objectives of reserve management. Over time, the need for maintaining foreign exchange reserves has increased with the acceleration in the pace of globalization and enlargement of cross border capital flows. The direct financial cost of holding reserves is the difference between interest paid on external debt and returns on external assets in reserves. Hence in any cost-benefit analysis of holding reserves, it is essential to keep in view the objectives of holding reserves, which , inter-alia, include: (i) maintaining confidence in monetary and exchange rate policies; (ii) enhancing the capacity to intervene in foreign exchange markets; (iii) limiting external vulnerability so as to absorb shocks during times of crisis; (iv) providing confidence to the markets that external obligations can always be met; and (v) reducing volatility in foreign exchange markets (Jalan, 2003a). Sharp exchange rate movements can be highly dis- equilibrating and costly for the economy during periods of uncertainty or adverse expectations, whether real or imaginary.

Recent strengthening of the external position of many developing countries through building up of substantial foreign exchange reserves can be viewed from several perspectives (Reddy, 2003): Firstly, it is a reflection of the lack of confidence in the international financial architecture. International liquidity support through official channels is beset with problems relating to adequacy of volumes, timely availability, and reasonableness of costs and above all, limited extent of assurances. Secondly, it is also a reflection of efforts to contain risks from external shocks. Private capital flows which dominate capital movements tend to be pro-cyclical even when fundamentals are strong. It is, therefore, necessary for developing countries to build cushions when times are favorable. High reserves provide some self-insurance which is effective in building confidence including among the rating agencies and possibly in dealing with threat of cities. Thirdly, the reserve accumulation could also be seen in the context of the availability of abundant international liquidity following the easing of monetary policy in industrial countries, which enabled excess liquidity to flow into the emerging markets. In the event of hardening of interest rates in industrialized countries, this liquidity may dry up quickly; in that situation, emerging markets should have sufficient cushion to withstand such reserves flow of capital. Finally, and most important, the reserve build up could be the result of countries aiming at containing volatility in foreign exchange markets. It should be recognized that the self-corrective markets. It should be recognized that the self – corrective mechanism in foreign exchange markets seen in developed countries is conspicuously absent among many emerging markets.

The accumulation of reserves is also a reflection of imbalances in the current account of some countries and since the level of reserves held by any country is consequence of the exchange rate policy being pursued by the policy makers, for instance, capital flows have implications for the conduct of domestic monetary policy and exchange rate management. However, the manner in which such flow's impact domestic monetary policy depends largely on the kind of exchange rate regime that the authorities follow. It is clear that, in a fixed exchange rate regime excess capital inflows would, perforce, need to be taken to foreign exchange reserves so as to maintain in desired exchange rate parity. On the other, in a fully floating exchange rate regime, the exchange rate would adjust itself according to the demand and supply conditions in the foreign exchange market, and as such there would be no need to take such inflows into the reserves.

Movements in Exchange Rate Regimes in Emerging Markets

Generally, to a large extent, the exchange rate regime followed in an economy is based on the regulatory framework governing the foreign exchange market and the operational freedom available to market participants. The experience of large capital flows in the1990s has inflenced on the choice of the exchange rate regime in EMEs and the trend was in favour of intermediate regimes with country-specific features and with no fixed targets for the level of the exchange rate. The EMEs, in general, have been accumulating foreign exchange reserves as an insurance against shocks and the combination of these strategies which guide monetary authorities through the impossible trinity of a fixed exchange rate, open capital account and an independent monetary policy (Mohan, 2003). The appropriate policies on foreign exchange markets has converged around the views like, (i) exchange rates should be flexible and not fixed or pegged; (ii) there is continuing need for many emerging market economies to be able to intervene or manage exchange rates- to some degree - if movements are believed to be destablising in the short run; and (iii) reserves should at least be sufficient to take careof fluctuations in capital flows and liquidity at risk (Jalan, 2003). Broadly, the overall distribution of exchange rate regimes across the globe among main categories remained more or less stable during 2001-06, though there was a tendency for some countries to shift across and within exchange regimes which is evident in table.1. Thus, it is clear that managed floats are found in all parts of the globe, while conventional fixed pegs are mostly observed in the Middle East, the North Africa and parts of Asia. On the other hand, hard pegs are found primarily in Europe, Sub-Saharan Africa (the CFA zones) and small island economies (for instance, in the Eastern Caribbean). The substantial movement between soft

pegs and floating regimes suggests that floating is not necessarily a durable state, particularly for lower and middle-income countries, whereas there appears to be a greater state of flux between managed floating and pegged arrangements in high-income economies.

Table.1.Evolution of Exchange Rate Regimes, 1996-2006 (figures-No of countries)

Regimes	1996	2001	2002	2003	2004	2005	2006
I. Hard Pegs	30	47	48	48	48	48	48
No separate legal tender	24	40	41	41	41	41	41
Currencyboard arrangements	6	7	7	7	7	7	7
II. Soft Pegs	94	58	59	59	59	61	60
a. Conventional Pegged arrangements	50	42	46	46	48	49	49
Pegs to Single Currency	36	32	36	38	40	44	44
Pegs to Composite	14	10	10	8	8	5	5
b. Intermediate Pegs	44	16	13	13	11	12	11
Pegged within horizontal bands	18	5	5	4	5	6	6
Crawling Pegs	14	6	5	6	6	6	5
Crawling Bands	12	5	3	3	0	0	0
III.Floating Regimes	60	81	80	80	80	78	79
Managed Floating	37	43	45	46	49	52	53
Indepentaly Floating	23	38	35	34	31	26	26

Source: Annual Report on Exchange Arrangements and Exchange Restrictions, 2006, IMF and other sources

During the last 15 years, there was a general tendency among the emerging market economies to adopt a more flexible exchange rate regime, which is depicted in the following table.2. In emerging Asia, there is a broad consensus that the soft US dollar peg operated by a number of Asian countries contributed to the regional financial crisis in 1997-98. Since the Asian financial crisis, several Asian economies have adopted more flexible exchange rate regimes except for Hong Kong, which continued with its currency board arrangement, and China, which despite some adjustments, virtually maintained its exchange rate peg to the US$

Table.2. Transition to More Flexible Exchange Rate Regimes in EMEs: 1990-2006

Transition Type	**Country**
Move towards a more flexible exchange rate regime	Algeria, Korea, Argentia, Mexico, Brazil, Peru, Chile, Poland, Colombia, Romania,

	Czech Republic, Russia, Egypt, India, Indonesia, Slovakia, Thailand, Turkey
Move towards a less flexible exchange rate regime	China, Malasiya, Uruguay, Hong Kong, Ecuador, Venezuela, Bulgeria**,**

Source: Annual Report on Exchange Arrangements and Exchange Restrictions, 2006, IMF and other sources

Appropriate Level of Forex Reserves: Accumulation and Determinants

The desire to accumulate FER arises for several reasons among the countries. Though the earlier literature focused on the need for reserves to maintain fixed exchange rates and to intervene in the market (Flood and Marion 2002), more recently, empirical literature shows that high FER are held for precautionary purposes (Ben-Bassat and Gottlieb 1992; Aizenman and Lee 2005).) Using a regression tree technique, Frankel and Wei (2004) have shown that countries that hold low FER are prone to more frequent and more severe crisis; whereas Felstein (1999) had made an observation that the large FER could be an important source of flexibility, protection and confidence in a crisis-serving as a first defense, a self-insurance- and reflecting a lack of confidence in the current international financial architecture. But Feldstein (2002) argues that an absolute level of FER is important for deterring speculative attacks and suggests that one of the primary ways in which a country can reduce the risk of a currency crisis is by maintaining a substantial level of reserves.

The role of the rate of interest has also been stressed another reason for reserve accumulation in the literature. For instance, Calvo et al (1993) argue that the high interest rates in Latin America as compared with the US played a key role in the movement of capital internationally. On the other, Calvo and Reinhart (2002) argue that countries are building reserves as they fear floating, and that they use interest rates to manipulate the exchange rates. However, Ferrucci et al (2004) suggests that pull and push factors are responsible for the flow of reserves to the emerging economies, measured in higher growth rates and higher interest rates. In 2005 two interesting explanations of rising FER have been provided; First, Bernanke (2005) has argued that some of the developing countries are suffering from a savings glut and are able to find an easy outlet to the US, where national savings rates are currently low while investment continues to be high. Second, Mc Kinnon (2005), providing a long-term theoretical perspective, observes that some countries, with current account surpluses or capital inflows or both, attempt to prevent their currencies from appreciating. These countries peg their currency to the US dollar, which is the dominant international

money, as a monetary anchor against unwanted domestic deflation. If any one of them was to yield to this external pressure, their currency would appreciate sharply causing it to lose mercantile competitiveness followed by a slowdown of economic growth and, if repeated, followed by outright deflation.The upshot is that official foreign exchange reserves just accumulate indefinitely as a residual that is subordinate to the exchange rate objective.

High demand for reserves in developing countries can be explained by sovereign risk, political instability, inelastic fiscal outlay and high cost of tax collection and do not reflect any productive investment (Aizenman and Marion, 2003). It has also been argued that accumulating large volume of reserves creates moral hazards problems and reflects insurance against weak domestic fundamentals and political uncertainty (Kapur and Patel, 2003).

While in practice, all central banks intervene in the foreign exchange markets; a more intensive approach to intervention may be warranted in the EMEs in the context of large capital inflows. In emerging markets, capital flows are often relatively more volatile and sentiment driven, not necessarily being related to the fundamentals. Such volatility imposes substantial risk on market agents, which they may not be able to cope. Even in countries where the exchange rate is essentially market determined, the authorities often intervene in order to contain volatility and reduce risks to market participants and for the economy as a whole. In such cases, policy makers are confronted with some difficult choices; first, a choice has to be made whether or not to intervene in the foreign exchange market; and second, if the choice is made to intervene, the extent of intervention (RBI, 2003b). Despite the fact that the level of reserves is the consequences of the exchange rate policy and the consequent choices with regard to intervention in the foreign exchange market, reserves can still be evaluated according to the various adequacy indicators.

Traditionally, the adequacy of reserves was determined by a simple rule of thumb, viz., the stock of reserves should be equivalent to a few months of imports. Such a rule-based reserves adequacy measure stems from the fact that official reserves serve as a precautionary balance to absorb shocks in external payments. Triffin (1960) had suggested 35 per cent of import cover. Indeed the policy for reserve management in India is built upon a host of identifiable factors and other contingencies, including, inter alia, the size of the current account deficit and short-term liabilities (including current repayment obligations on long-term loans), the possible variability in portfolio investment, and other types of capital flows, the unanticipated pressures on the balance of payments arising out of external shocks and movements in repatriable foreign currency deposits of non-residents Indians. The comprehensive view on

the approach to reserve management as stated by the former RBI Governor, Jalan (2002), is of special significance here: "A sufficiently high level of reserves is necessary to ensure that even if there is prolonged uncertainty, reserves can cover the 'liquidity at risk' on all accounts over a fairly long period. Taking these considerations into account, India's foreign exchange reserves are now very comfortable. The prevalent national security environment further underscores the need for strong reserves. We must continue to ensure that, leaving aside short-term variations in reserves level, the quantum of reserves in the long-run is in line with the growth of the economy, the size of risk-adjusted capital flows and national security requirement. This will provide us with greater security against unfavorable or unanticipated developments, which can occur quite suddenly".

Evolution of Indian Foreign Exchange Market

The evolution of India's foreign exchange market may be viewed in line with the shifts in India's exchange rate policies over the last few decades. With the breakdown of the Bretton Woods System in 1971 and the floatation of major currencies, the conduct of exchange rate policy posed a serious challenge to all central banks world wide as currency fluctuations opened up tremendous opportunities for market players to trade in currencies in a borderless market. In order to overcome the weaknesses associated with a single currency peg and to ensure stability of the exchange rate, the rupee, with effect from September 1975, was pegged to a basket of currencies. The impetus to trading in the foreign exchange market in India since 1978 when banks in India were allowed to undertake intra-day trading in foreign exchange. The exchange rate of the rupee was officially determined by the Reserve Bank in terms of a weighted basket of currencies of India's major trading partners and the exchange rate regime was characterised by daily announcement by the Reserve Bank of its buying and selling rates to the Authorised Dealers (ADs) for undertaking merchant transactions. The spread between the buying and the selling rates was 0.5 percent and the market began to trade actively within this range and the foreign exchange market in India till the early 1990s, remained highly regulated with restrictions on external transactions, barriers to entry, low liquidity and high transaction costs. The exchange rate during this period was managed mainly for facilitating India's imports and the strict control on foreign exchange transactions through the Foreign Exchange Regulations Act (FERA) had resulted in one of the largest and most efficient parallel markets for foreign exchange in the world, *i.e.*, the hawala (unofficial) market.

The Post-Reform Period (1992 onwards) phase was marked by wide ranging reform measures aimed at widening and deepening the foreign exchange market and liberalisation of exchange control regimes. It was recognised that trade policies, exchange rate policies and industrial policies should form part of an integrated policy framework to improve the overall productivity, competitiveness and efficiency of the economic system, in general, and the external sector, in particular. As a stabilsation measure, a two step downward exchange rate adjustment in July 1991 effectively brought to close the regime of a pegged exchange rate. Following the recommendations of Rangarajan's High Level Committee on Balance of Payments, to move towards the market-determined exchange rate, the Liberalised Exchange Rate Management System (LERMS) was introduced in March 1992, was essentially a transitional mechanism and a downward adjustment in the official exchange rate and ultimate convergence of the dual rates was made effective and a market-determined exchange rate regime was replaced by a unified exchange rate system in March 1993, whereby all foreign exchange receipts could be converted at market determined exchange rates. On unification of the exchange rates, the nominal exchange rate of the rupee against both the US dollaras also against a basket of currencies got adjusted lower. Thus, the unification of the exchange rate of the Indian rupee was an important step towards current account convertibility, which was finally achieved in August 1994, when India accepted obligations under Article VIII of the Articles of Agreement of the IMF.

With the rupee becoming fully convertible on all current account transactions, the risk-bearing capacity of banks increased and foreign exchange trading volumes started rising. This was supplemented by wide-ranging reforms undertaken by the Reserve Bank in conjunction with the Government to remove market distortions and deepen the foreign exchange market.. Several initiatives aimed at dismantling controls and providing an enabling environment to all entities engaged in foreign exchange transactions have been undertaken since the mid-1990s. The focus has been on developing the institutional framework and increasing the instruments for effective functioning, enhancing transparency and liberalising the conduct of foreign exchange business so as to move away from micro management of foreign exchange transactions to macro management of foreign exchange flows. Along with these specific measures aimed at developing the foreign exchange market, measures towards liberalising the capital account were also implemented during the last decade. Thus, various reform measures since the early1990s have had a profound effect on the market structure, depth, liquidity and efficiency of the Indian foreign exchange market.

Growth in India's Foreign Exchange Market Activity, Segments and Sources of Supply and Demand

a. Foreign Exchange Market Activity

The continuous improvement in market infrastructure has had its impact in terms of enhanced depth, liquidity and efficiency of the foreign exchange market. The turn over in the Indian foreign exchange market has grown significantly in both the spot and derivatives segments in the recent past. The daily average turnover impressed a substantial pick up from about US $ 5 billion during 1997-98 to US $ 18 billion during 2005-06. The turnover has risen considerably to US $ 23 billion during 2006-07 with the daily turnover crossing US $ 35 billionon certain days during October and November 2006. The inter-bank to merchant turnover ratio has halved from 5.2 during 1997-98 to 2.6 during 2005-06, reflecting the growing participation in the merchant segment of the foreign exchange market. This is very evident in the following Table.6.

Table.6. Indian Foreign Exchange Market Activity Indicators (US$bilion)

Item	1997-98	2005-06	2006-07
Total Annual turnover	1,306	4,413	5,734
Average Daily Turnover	5	18	23
Average Daily Merchant Turnover	1	5	7
Average Daily Inter-bank Turnover	4	13	18
Inter-bank to Merchant ratio	5.2	2.6	2.6
Spot/Total Turnover (%)	51.6	50.5	52.4
Forward/Total Turnover (%)	12.0	19.0	18.0
Swap/Total Turnover (%)	36.4	30.5	29.6

Source: RBI

Turnover in the foreign exchange market was 6.6 times of the size of India's balance of payments during 2005-06 as compared with 5.4 times in 2000-01 which is evident in Table.7.

Table.7. Relative Size of the Foreign Exchange Market in India

Year	Forex.Market Annual Turnover (US$bln)	BOPs Size (US$ billion)	Foreign Currency Assets of RBI (US $billion)	Col.2 over Col.3	Col.2 over Col.4
2000-01	1,387	258	40	5.4	35
2001-02	1,421	237	51	6.0	28

2002-03	1,560	267	72	5.8	22
2003-04	2,118	362	107	5.9	20
2004-05	2,892	481	136	6.0	21
2005-06	4,413	664	145	6.6	30

Source: RBI

Table.7a. Composition of India's Foreign Exchange Reserves

	In Rupees croe			**In US$ million**				
Financial year	**SDRs**	**Gold**	**Foreign Currency assets**	**Total**	**SDRs**	**Gold**	**Foreign Currency assets**	**Total**
1990-91	200	6828	4388	11416	102	3496	2236	5834
1991-92	233	9039	14578	23850	90	3499	5631	9220
1992-93	55	10549	20140	30744	18	3380	6434	9832
1993-94	339	12794	47287	60420	108	4078	15068	19254
1994-95	23	13752	66005	79780	7	4370	20809	25186
1995-96	280	15658	58446	74384	82	4561	17044	21687
1996-97	7	14557	80368	94932	2	4054	22367	26423
1997-98	4	13394	102507	115905	1	3391	25975	29367
1998-99	34	12559	125412	138005	8	2960	29522	32490
1999-00	16	12973	152924	165913	4	2974	35058	38036
2000-01	11	12711	184482	197204	2	2725	39544	42281
2001-02	50	14868	249118	264036	10	3047	51049	54106
2002-03	19	16785	341476	361470	4	3534	71890	76100
2003-04	10	18216	466215	490129	2	4198	107448	112959
2004-05	20	19686	593121	619116	5	4500	135571	141514
2005-06	12	25674	647327	676387	3	5755	145108	151622

Source: Hand book of Statistics on the Indian economy, 2005-06, pp 271

It is clear from the above table.7a. that the larger share of India's foreign exchange sources consists of various foreign currency assets, followed by gold assets**.**

b. Market Segments

Foreign exchange market activity in most EMEs takes place on shore with many countries and the Spot market emerged as the predominant form of foreign exchange market segment in developing and emerging market countries. Though most of the emerging market countries

allow operations in the forward segment of the market, it is still under developed andlacking in most of these economies, and the lack of forward market development reflects many factors, including limited exchange rate flexibility, the *de facto* exchange rate insurance provided by the central bank through interventions, absence of a yield curve on which to base the forward prices and shallow money markets, in which market-making banks can hedge the maturity risks implicit in forward positions (Canales-Kriljenko, 2004).

The Indian foreign exchange market is a decentralised multiple dealership market comprising two segments – the spot and the derivatives market. In the spot market, currencies are traded at the prevailing rates and the settlement or value date is two business days ahead. The derivatives market encompasses forwards, swaps and options. A swap transaction in the foreign exchange market is a combination of a spot and a forward in the opposite direction. As in the case of other EMEs, the spot market is the dominant segment of the Indian foreign exchange market. The derivative segment of the foreign exchange market is assuming significance and the activity in this segment is gradually rising. Players in the Indian market include (a) ADs, mostly banks who are authorised to deal in foreign exchange, (b) foreign exchange brokers who act as intermediaries, and (c) customers – individuals, corporates, who need foreign exchange for their transactions. Though customers are major players in the foreign exchange market, for all practical purposes they depend upon ADs and brokers. In the spot foreign exchange market, foreign exchange transactions were earlier dominated by brokers. Nevertheless, the situation has changed with the evolving market conditions, as now the transactions are dominated by ADs. Brokers continue to dominate the derivatives market. In India the Reserve Bank intervenes in the market essentially to ensure orderly market conditions and it undertakes sales/purchases of foreign currency in periods of excess demand/supply in the market

c. Sources of Supply and Demand

The major sources of supply of foreign exchange in the Indian foreign exchange market are receipts on account of exports and invisibles in the current account and inflows in the capital account such as foreign direct investment (FDI), portfolio investment, external commercial borrowings (ECB) and non-resident deposits. On the other hand, the demand for foreign exchange emanates from imports and invisible payments in the current account, amortisation of ECB (including short-term trade credits) and external aid, redemption of NRI deposits and out flows on account of direct and portfolio investment. In India, the Government has no foreign currency account, and thus the external aid received by the Government comes

directly to the reserves and the Reserve Bank releases the required rupee funds. Hence, this particular source of supply of foreign exchange is not routed through the market and as such does not impact the exchange rate. During last five years, sources of supply and demand have changed significantly, with large transactions emanating from the capital account, unlike in the 1980s and the 1990s when current account transactions dominated the foreign exchange market. The behaviour as well as the incentive structure of the participants who use the market for current account transactions differs significantly from those who use the foreign exchange market for capital account transactions. Besides, the change in these traditional determinants has also reflected itself in enhanced volatility in currency markets. It now appears that expectations and even momentary reactions to the news are often more important in determining fluctuations in capital flows and hence it serves to amplify exchange rate volatility (Mohan, 2006a). On many occasions, the pressure on exchange rate through increase in demand emanates from "expectations based on certain news". Sometimes, such expectations are destabilising and often give rise to self-fulfilling speculative activities. The role of the Reserve Bank comes into focus when it has to prevent the emergence of destabilising expectations and recourse is undertaken in such ocassions to direct purchase and sale of foreign currencies, sterilisation through openmarket operations, management of liquidity underliquidity adjustment facility (LAF), changes in reserve requirements and signaling through interest rate changes. In the last few years the demand/supply situation is affected by hedging activities through various instruments that have been made available to market participants to hedge their risks.

Foreign Exchange Market Behaviour in the Post-Unification period

Exchange rate policy in the post-unification period was aimed at providing a stable environment by giving a boost to exports and foreign investment in line with the structural and stabilisation programme. Though the Indian foreign exchange market has experienced occasional periods of volatility in the post-1993 period, it was managed with an effective and timely approach. Under this approach, the exchange rate policy is guided by the need to reduce excess volatility, prevent the emergence of destabilising speculative activities, help maintain adequate level of reserves and develop an orderly foreign exchange market. With a view to reducing the excess volatility in the foreign exchange market arising from lumpy demand and supply as well as leads and lags in merchant transactions, the Reserve Bank undertakes sale and purchase operations in the foreign exchange market. Such interventions, however, are not governed by any pre-determined target or band around the exchange rate.

Phase of Stability during March 1993 to July 1995

The Real Effective Exchange Rate (REER) of the rupee in the months following the unification represented almost an equilibrium situation. The large capital inflows during 1993-94 and 1994-95 tended to exert appreciating pressure on the rupee. In order to obviate any nominal appreciation of the rupee, which could have eroded export competitiveness, the Reserve Bank purchased a portion of such inflows and augmented the reserves. During this period, the sterilization operations were on a lower scale, resulting in some what larger growth in monetary aggregates.Thus, the focus of exchange rate policy during this period was on preserving the external competitiveness at a time when the economy was undergoing a structural transformation. The Building up of the reserves was also one of the considerations.

First Phase of Volatility from August 1995 to March 1996

After a long spell of stability during 1993-95, on account of a sudden and sharp reversal of sentiment and expectations of market participants at the end of 1995, the rupee came under some pressure. Slowing down of capital inflows in the wake of the Mexican crisis, a moderate widening of the current account deficit on resurgence of activity in the real sector and the rise of US dollar against other major currencies after a bearish phase were the main factors contributing to this trend. During this period, there was a sharp movement in exchange rate often resulting in over shooting. During most periods the opening rate in the foreign exchange marketmoved beyond the Reserve Bank buying and selling range and a distinct downward trend was seen. Some of the structural weaknesses of the Indian inter-bank market like thinness and lack of heterogeneity of views among market participants became apparent. Further, with the objective of having an active market intervention strategy, it was decided to keep a watch over day-to-day merchant demands of some large banks which handled more than 50 per cent of the import payments. As the main buying requirements of these banks were in respect of mainly public sector undertakings, a system was put in place to obtain information about their daily requirements. Market intelligence and information gathering were strengthened and the Reserve Bank started obtaining direct price quotes from leading foreign exchange broking firms. Two basic approaches on intervention were adopted. On days when there was information about large all round demand, an aggressive stance was taken with intensive selling in larger lots till the rate was brought down decisively. On other occasions, continual sale of small/moderate amounts was undertaken to prevent unduly large intra-day variations.While the first approach was aimed at absorbing excess market demand, the second at curbing one ‘ratcheteffect’. The size of individual intervention deals was

usually in the range of US $ 1-2 million, although some large size deals not exceeding US $ 5 million were also resorted to occasionally.

Consequent upon tightness in liquidity conditions due to intervention which led to soaring of call money rates, money market support was restored with the easing of CRR requirements on domestic as well as non resident deposits from 15.0 per cent to 14.5 per cent in November 1995. With a view to discouraging the excessive use of bank credit for funding the demand for foreign exchange, interest surcharge on import finance was raised from 15 to 25 per cent. The scheme for extending Post-shipment Export Credit denominated in US dollar (PSCFC) was discontinued with effect from February 8, 1996 as it enabled exporters to earn a positive differential over the cost of funds simply by drawing credit and selling forward, thereby receiving the premia. More over, to curb excessive speculation in the forward market, cancellation of forward contracts booked by ADs foramounts of US $ 1, 00,000 and above was required to be reported to the Reserve Bank on a weekly basis.The decisive and timely policy actions brought stability to the market and the rupee traded within the range of Rs.34.00 to Rs.35.00 per US dollar in the spot segment during the period from October 1995 to March 1996.

Second Phase of Stability between April 1996 and Mid-August 1997

The foreign exchange market witnessed remarkable stability during the period from April 1996 to mid-August 1997. During this period, the spot exchange rate remained in the range of Rs.35.50-36.00 per US dollar. The stability in the spot rate was reflected in forward premia as well. The premia, which remained within 6 to 9 per cent (six month) during the financial year 1996-97, declined further during the first five months of 1997-98 within a range of 3 to 6 per cent following easy liquidity conditions. From the second quarter of calendar year 1996 onwards, capital flows restored and the reserve loss was recouped within a short period of time.

Second Phase of Volatility- Mid-August 1997 to August 1998

The year 1997-98 and the first quarter of 1998-99 posed serious challenges to exchange rate management due to the contagion effect of the South-East Asian currency crisis and some domestic factors.There were two periods of significant volatility in the Indian foreign exchange market: (i) from mid-August 1997 to January 1998, and (ii) May 1998 till August 1998. During the early 1997, appreciation of rupee in some quarters led many market participants to keep their over sold or short positions unhedged and substitute partly domestic debt by foreign currency borrowings to take advantage of interest arbitrage. The relatively

stable exchange rates of the Asian currencies prior to this period had contributed to theirappreciation in real terms which is analysed in the Table.8.

Table.8. REAL EFFECTIVE EXCHANGE RATE (REER) and NOMINAL EFFECTIVE EXCHANGE RATE (NEER) of Selected Asian Countries (Base: 2000=100)

Country	1995	1997	2000	2001	2002	2003	2004	2005
REER								
China	84.7	100.4	100.0	104.3	101.9	95.2	92.7	92.5
India	101.7	103.0	100.0	100.9	96.9	96.6	98.4	103.7
Japan	108.2	85.3	100.0	89.9	83.0	83.6	84.5	79.4
Malaysia	122.7	122.6	100.0	104.9	105.0	99.2	94.9	95.2
Philippines	120.4	128.7	100.0	95.6	96.2	89.1	86.2	92.3
Singapore	106.2	110.2	100.0	100.5	97.9	94.3	93.3	92.1
NEER								
China	82.2	92.5	100.0	105.5	105.1	98.6	94.2	94.3
India	117.0	114.3	100.0	97.9	93.3	90.1	88.6	91.3
Japan	99.4	81.3	100.0	90.5	85.7	85.4	87.1	85.3
Malaysia	127.6	126.8	100.0	105.4	104.8	99.6	95.9	95.5
Philippines	145.8	142.5	100.0	90.9	89.7	81.3	75.7	76.9
Singapore	97.1	105.6	100.0	102.6	100.8	98.4	97.9	98.7

Source: International Financial Statistics, IMF, 2006, and RBI

Reserve Bank's Intervention for stabilty of foreign exchange market

A distinguishing aspect of the foreign exchange market interventions during the 1997-98 volatility episodes was that instead of doing the transactions directly with ADs, a few select publicsector banks were chosen as intermediaries for this purpose. Under this arrangement, public sector banks undertook deals in the inter-bank market at the direction of the Reserve Bank for which it provided cover at the end of the business hours each day. Care was taken to ensure that the public sector banks' own inter-bank operations were kept separate from the transactions undertaken on behalf of the Reserve Bank. Periodic on-site scrutiny of the records and arrangements of these banks by the Reserve Bank was instituted to check any malpractice or deficiency in this regard. The main reason for adopting an indirect intervention strategy in preference to a direct one was a judgmental view that this arrangement would provide a cover for Reserve Bank's operations and reduces its visibility and hence would be more effective. This view was premised on the assumption that buying/selling by a market-

maker will have a pronounced impact on market sentiment than would be the case if it does the same directly. The fact that the Reserve Bank was intervening in the market through a few other public sector banks was not disclosed, though in due course of time, it was known to the market. Besides, as a measure of abundant precaution and also to send a signal internationally regarding the intrinsic strength of the economy, India floated the Resurgent India Bonds (RIBs) in August 1998, which was very well received by the Non-Resident Indians (NRIs)/ Persons of Indian Origin (PIO

In response to the developments in the foreign exchange market, the Reserve Bank intervened both in the spot and the forward segments of the market to prevent sharp depreciation of the rupee and to curb volatility, especially in the forward segment, which led to rise in out standing forward liabilities by US $ 904 million in September 1997. Keeping in view the status and to ensure stability of the functioning of foreign exchange market, the Reserve Bank undertook intervention in both spot and forward segment and liquidated its forward liabilities as shown in Table. 9.

Table.9. Reserve Banks's Intervention in the Foreign Exchange Market (US$ billion)

year	Purchase	Sale	Net	Outstanding Net Forward Sales/ Purchase
1995-96	3.6	3.9	-0.3	-
1996-97	11.2	3.4	7.8	-
1997-98	15.1	11.2	3.9	-1.8
1998-99	28.7	26.9	1.8	-0.8
1999-00	24.1	20.8	3.3	-0.7
2000-01	28.2	25.8	2.4	-1.3
2001-02	22.8	15.8	7.0	2.4
2002-03	30.6	14.9	15.7	1.4
2003-04	55.4	24.9	30.5	1.4
2004-05	31.4	10.6	20.8	0
2005-06	15.2	7.1	8.1	0
2006-07	24.5	0	24.5	0

Source: RBI

There after, however, persistent excess demand conditions combined with considerable volatility prevailed in the foreign exchange market. Between November 1997 and January 1998, the exchange rate of the Indian rupee depreciated by around 9 per cent. The Reserve Bank undertook wide ranging and strong monetary and administrative measures on January 16, 1998 in order to curb the speculative tendencies among the market players and restore orderly conditions in the foreign exchange market. As a result of monetary measures of January 16, 1998, the stability in the foreign exchange market returned and more importantly, the expectations of the market participants about further depreciation in the exchange rate of rupee were somewhat contained.

During the period of crisis, India had a low current account deficit, comfortable foreign exchange reserves amounting to import cover of over seven months, a market determined exchange rate, low level of short-term debt, and absence of asset price inflation or credit boom. These positive features were the result of prudent policies pursued over the years notably, capon external commercial borrowings with restrictions on end-use, low exposure of banks to real estate and the stock market, insulation from large intermediation of overseas capital by the banking sector, close monitoring of off-balance sheet items and tight legislative, regulatory and prudential control over non bank entities. Some capital controls also helped in insulating the economy from the contagion effect ofthe East Asian crisis. The ultimate result could be seenin terms of low volatility in the exchange rate of the Indian rupee, during the second half of the 1990s, when most of the Asian currencies witnessed high level of volatility which is available in table.10.

Table.10. Daily Exchange Rate Volatility in Select Emerging Economies (Annualised in percent)

Currency	1993-95	1996-00	2001	2003	2004	2005	2006
Indian Rupee	7.5	4.3	1.6	2.1	4.7	3.5	4.0
South Korean Won	2.6	22.2	8.1	8.3	6.5	6.8	6.9
South African Rand	5.3	11.4	20.2	20.9	21.4	15.4	16.0
Turkish	29.3	5.4	63.1	16.2	12.2	10.4	16.6

New Lira							
Indonesian Rupaiah	2.1	43.4	21.7	6.8	7.7	9.1	8.9
Tai Baht	1.7	18.3	4.9	4.4	4.3	4.7	6.2
New Taiwan Dollar	3.7	5.3	3.6	2.7	4.9	4.9	4.9
Singapore Dollar	3.7	7.4	4.5	4.5	4.6	4.4	3.9
Philippine Peso	6.8	12.9	17.6	4.1	3.1	4.1	4.6

Note: Volatility has been calculated by taking the standard deviation of perecentage change in daily exchange rates.

Source: RBI and IMF

Phase of Relative Stability with Intermittent Event-Related Volatility

The period between April 2000 and March 2003 generally remained stable with intermittent periods of volatility associated with sharp increase in international crude oil prices in 1999-2000, successive interest rate increases in industrial countries, cross-currency movements of the USdollar *vis-à-vis* other major international currencies and the sharp reversals of portfolio flows in 2000.The Reserve Bank responded promptly through monetary and other measures like variations in the Bank Rate, the repo rate, cash reserve requirements, refinance to banks, surcharge on import finance and minimum interest rates on overdue export bills to curb destabilising speculative activities during these episodes of volatility, while allowing orderly corrections in the exchange rate of the rupee. Financing through India Millennium Deposits (IMDs) was resorted to as a pre-emptive step in the face of hardening of world petroleum prices and the consequent possible depletion of India's foreign exchange reserves. Inflows under the IMDs to the tune of US $ 5.5 billion during October-November 2000 helped in easing the market pressure.

The exchange rate pressure in the aftermath of September 11, 2001 incident in the US was tackled by the Reserve Bank through quick responses interms of a package of measures and liquidity operations. These measures included: (i) a reiteration by the Reserve Bank to keep interest rates stable with adequate liquidity; (ii) assurance to sell foreign exchange to meet any unusual supply-demand gap;(iii) opening a purchase window for select government

securities on an auction basis; (iv) relaxation in FII investment limits up to the sectoral cap/statutory ceiling; (v) a special financial package for large value exports of six select products; and (vi) reduction in interest rates on export credit by one percentage point.

Surge in Capital Flows- 2003-04 onwards

Excess supply conditions have dominated the foreign exchange market since 2003-04 due to surgein capital inflows. The Reserve Bank resorted to sterilisation operations to tackle such flows. Faced with the finite stock of Government of India securities with the Reserve Bank, market Stabilisation scheme (MSS) was introduced in April 2004 wherein the Government of India dated securities/Treasury Bills was issued to absorb liquidity. As a result, its foreign exchange reserves more than trebled during the period from US $ 54.1billion at end-March 2002 to US $ 199.2 billion at end-March 2007 - an average increase of US $ 29.0 billion per annum. Foreign exchange reserves stood at US$ 203.1 billion as on April 13, 2007.

Movements in Exchange rate bevaiour in the post-liberalisation period- A Summary

A look at the entire period since 1993 when India moved towards market determined exchange rates reveals that the Indian Rupee has generally depreciated against the dollar during the last 14 years, except during the period 2003 to 2005 when rupee appreciated on account of general dollar weakness against major currencies. For the period as a whole, 1993-94 to 2006-07, the Indian rupee depreciated against dollar by about 30.9 per cent on an annual average basis. In terms of real effective exchange rates (REER), while the REER (6 currency trade based indices) appreciated by about 7 per cent, the REER (36 currency trade based indices) recorded an appreciation of above 2 per cent during the period 1993-94 to 2005-06 which is clear in Table.11.

Table.11. Trends in External Value of Indian Rupee

	36-Currency Trade based				**6-Currency Trade Based**			
	REER	% Variation	NEER	% ariation	REER	% Variation	NEER	% Variation
1993-94	100.00	0.0	100.00	0.0	100.00	0.0	100.00	0.0
1994-95	104.32	4.3	98.91	-1.1	105.71	5.7	96.86	-3.1
1995-96	98.19	-5.9	91.54	-7.5	101.14	- 4.3	88.45	-8.7
1996-97	96.83	-1.4	89.27	-2.5	100.97	-0.2	86.73	-1.9
1997-98	100.77	4.1	92.04	3.1	104.24	3.2	87.80	1.2
1998-99	93.94	-7.7	89.05	-3.2	95.99	-7.9	77.37	-11.9
1999-00	95.99	3.2	91.02	2.2	97.52	1.6	77.04	-0.4

2000-01	100.09	4.3	92.12	1.2	102.64	5.3	77.30	0.3
2000-02	100.86	0.8	91.58	-0.6	102.49	-0.1	75.89	-1.8
2002-03	98.18	-2.7	89.12	-2.7	97.43	-4.9	71.09	-6.3
2003-04	99.56	1.4	87.14	-2.2	98.85	1.5	69.75	-1.9
2004-05	100.09	0.5	87.31	0.2	101.36	2.5	69.26	-0.7
2005-06	102.34	2.2	89.84	2.9	106.67	5.2	71.41	3.1
2006-07	98.07	-4.2	85.80	-4.5	104.91	-1.6	68.13	-4.6

REER: Real Effective Exchange Rate NEER: Nominal Effective Exchange Rate

Source: RBI

An important feature has been the reduction in volatility of rupee exchange rate during last few years.Among all currencies world wide, which are not on a nominal peg, and certainly among all emerging market economies, the rupee-dollar exchange rate has beenless volatile. The REER of India has been relativelystable compared with other key Asian countries. The volatility measured from the effective exchange rates, *i.e.*, 6 currency NEER and REER indices for India, was also lower as compared with other countries such as the US and Japan for recent period which is clear from Table.12.

Table.12. Volatility of Exchange Rates in the Global Foreign Exchange market (%)

	NEER						**REER**					
Year	India	US	UK	Japan	Euro	China	India	US	UK	Japan	Euro	China
93-94	1.2	1.0	1.0	2.6	1.8	8.2	1.3	0.8	1.1	2.8	1.9	8.2
94-95	1.3	1.4	0.8	2.2	0.9	1.1	2.5	1.3	0.9	2.2	1.1	1.3
95-96	2.9	1.5	0.7	3.7	0.7	1.2	2.9	1.5	0.8	3.5	0.9	1.2
96-97	1.4	1.2	1.4	1.4	1.0	0.7	1.2	0.7	1.4	1.4	1.1	0.7
97-98	1.7	1.3	1.8	3.0	1.5	1.8	1.8	1.4	1.7	2.8	1.7	1.6
98-99	1.8	2.0	1.5	4.0	1.6	1.5	1.6	1.4	1.4	4.1	1.7	1.6
99-00	1.0	1.3	0.7	2.7	1.1	0.8	1.2	0.8	0.8	2.9	1.3	1.0
00-01	1.4	1.8	1.8	2.8	2.4	0.8	1.4	1.0	1.6	2.2	2.4	0.9
01-02	1.0	1.1	0.7	2.1	1.2	0.9	1.0	0.7	0.6	2.0	1.6	1.1
02-03	1.0	1.4	1.1	1.6	0.8	1.1	1.3	1.0	1.1	1.6	1.2	1.0
03-04	1.5	2.2	1.2	1.4	1.5	1.1	1.3	1.6	1.1	1.4	1.7	1.3
04-05	1.7	1.7	1.0	1.9	0.9	1.0	1.1	1.2	1.2	1.9	2.0	1.2
05-06	1.1	1.4	1.1	1.4	0.9	1.3	1.1	0.9	1.1	1.4	1.0	1.5

Note: Volatility has been calculated by taking the standard deviation of percentage change in monthly REER/NEER indices

Source: IFS, IMF 2006, and RBI

In the context of the behaviour of the exchange rate in the post-liberalisation period, it is worth exploring some related aspects such as the changing invoicing pattern of trade, the cross currency movement and the impact of global imbalances on the Indian foreign exchange market. In international trade, the pattern of currency invoicing depends on anumber of factors such as historic relationships between the trading partners, established conventions, the relative bargaining strength of trading parties, as well as the extent of development of the foreign exchange market. Under a flexible exchange rate system, the exchange rate developments of major currencies also play an important role. The invoicing pattern of trade has implications for exchange rate pass through. Although the invoicing of trade in rupee has been permitted, there has not been any significant growth. The substantial share of exports invoiced in rupees during 1990-91 was on account of the practice of exports invoicing in rupees to bilateral account countries which is explained in Table.13.

Table.13. Curreny- Wise Invoicing of India's Exports and Imports (%)

	IMPORTS				**EXPORTS**			
Currency	1990-91	1994-95	1999-00	2005-06	90-91	94-95	99-2000	05-06
US Dollar	59.7	73.5	85.8	88.6	57.2	78.8	87.0	85.8
Deutsche Mark	7.0	5.9	1.6	0.0	5.1	6.3	1.6	0.0
Euro	-	-	3.3	6.5	-	-	3.0	7.6
Japanese Yen	4.4	4.4	3.8	2.2	0.1	0.3	0.3	0.5
Pound Sterling	3.1	2.5	1.7	1.0	4.5	4.8	3.9	2.8
Indian Rupee	7.7	0.4	0.0	0.0	27.7	3.3	0.3	1.9
Others	18.1	13.3	3.8	1.7	5.4	6.5	3.9	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: RBI

An important feature of the Indian foreign exchange market observed in recent years has been the growing correlation between the movement in exchange rate of the Indian rupee and currencies of the Asian countries. In the last couple of years, the rupee-dollar exchange rates is increasingly getting linked to exchange rate of some of the Asian currencies such as

Japanese yen *vis-a-vis* US dollar. This feature of the market could be ascribed to the greater integration of the Asian markets led by large trade and capital flows in the region as well as greater interdependence of financial markets within the region. Some kind of a supply chain is emerging from the Asian region with Japan at the top of the chain supplying high value technological products. China is the major supplier of intermediate products, while India, besides being a supplier of intellectual capital, is emerging as supplier of intermediate products. The financial markets including the foreign exchange markets, are increasingly taking cognisance of the growing integration of the Indian economy with the rest of the world, particularly with the Asian region. The cross currency impact on the exchange rate of the Indian rupee is observed to be particularly pronounced for Japanese Yen and Singapore dollar (Ranjan and Dhal, 1999).

Recognising the growing influence of cross currencies on Indian exchange rate, the issue of relevance of the impact of potential disorderly adjustments in the current global imbalances on the exchange rate of major currencies and the second round impact on the Indian rupee need to be examined in order to achieve stability in the domestic exchange market. The current global imbalances represent the large and increasing current account deficit (CAD) of the US that has been financed by surpluses elsewhere, especially emerging Asia, oil exporting countries and Japan. As a percentage of GDP, the CAD of the US has almost doubled every 5 years since the early 1990s. In contrast to the US that is dependent on the domestic demand, growth in Asia and other emerging economies since the late 1990s has been led by external demand. The current accounts of China, other East Asian EMEs (Indonesia, Malaysia, Taiwan, and Thailand) and the two island economies, *viz*, HongKong and Singapore have recorded large surpluses, especially since 1999. Another new source contributing to the global imbalances has been the large current account surpluses of oil exporting countries. The Middle East region recorded current account surplus of 18.1 per cent of GDP in 2006 mainly associated with higher oil revenues due to both higher prices and some expansion in production. With the size of these imbalances becoming large, concerns have been raised regarding its sustainability and possible disorderly unwinding. Further historical episodes of large and sustained imbalances and their reversals suggest that a market led realignment of real exchange rates can play an important role to demand rebalancing across countries to facilitate smooth unwinding (IMF, 2007).

An issue that is of relevance to India in this regard is the likely response of different nations to global imbalances and its impact on the Indian foreign exchange market. India has not

contributed either positively or negatively to large current account deficit; India's saving-investments have been by and large balanced (Table.14); the economy is domestic demand driven and generally India's policies, including exchange rate are market oriented.

Table.14. Savings-Investment Gap in emerging Economies (as % of GDP, annual average)

Country	1981-85	1986-90	1991-95	1996-2000	2001-05
China	-0.1	-0.4	1.5	3.2	2.4
Hong Kong	3.9	9.8	3.2	1.1	8.6
India	-1.5	-2.5	-1.2	-1.1	0.2
Indoneasia	2.0	1.5	1.5	5.5	6.7
Korea	-1.7	4.1	-1.1	3.7	2.6
Malaysia	-2.7	7.6	-1.6	13.9	19.7
Singapore	-2.9	4.6	11.8	16.4	23.6
Thailand	-4.4	-1.8	-5.3	6.4	4.5

Source: World Bank online database, Central Statistical Organisation, GOI

Thus, India has been following policies which have not only served it well but also contributed to global stability (Reddy, 2006b). Any large and rapid adjustments in major currencies and related interest rates or current accounts of trading partners would impact the Indian economy, though the impact on India may be less than many other emerging market economies.

Volatility and Risks in Foreign Exchange Reserves Mangement: Need for and the Role of Central Bank's intervention

The emerging consensus on the conduct of exchange rate policy and managing volatilities in foreign exchange market is that, for successful conduct of exchange rate policy, firstly, it is essential for countries to pursue sound and credible macro economic policies so as to avoid the build-upof major macro imbalances in the economy. Secondly, it is essential for EMEs to improve the flexibility of their product and factor markets in order to cope and adjust to shocks arising from the volatility of currency markets and swings in the terms of trade in worldproduct markets. Thirdly, it is crucial for EMEs to develop and strengthen their financial systems in order to enhance their resilience to shocks. In addition, a sound and efficient banking system together with deep and liquid capital market contributes to the efficient intermediation of financial flows. This could help prevent the emergence of vulnerabilities in the financial system by minimising unsound lending practices that lead to

the build-up of excessive leveraging in the corporate sector and exposure to foreign currency borrowings. Fourthly, countries would need to build regulatory and supervisory capabilities to keep pace with financial innovations and the emergence of new financial institutions' activities, and new products and services, which have complicatedthe conduct of exchange rate policy. Finally, policy makers need to promote greater disclosures and transparency.

The level of development and preparedness of financial markets and their risk taking ability is crucial in the perception about the volatility and flexibility in exchange rate context. If the level of development and preparedness of financial markets is low, a small movement in exchange rate could be interpreted as volatile, while even large movement in exchange rate in developed foreign exchange markets may not be seen asvolatile. Thus, as financial markets develop in an emerging economy, the tolerance to volatility improves and hence what was once volatility would later become flexibility. A key issue, therefore, for the authorities is where and when to make policy adjustments, including the use of official intervention to help avoid substantial volatility and serious misalignments.

Intervention by most Asian central banks in foreign exchange markets has become necessary from time to time primarily because of the growing importance of capital flows in determining exchange rate movements in these economies as against trade deficits and economic growth, which were important in the earlier days. The latter does matter, but only over a period (Jalan, 2003). On a day-to-day basis, it is capital flows, which influence the exchange rate and interest rate arithmetic of financial markets. Capital movements have also rendered exchange rates significantly more volatile than before (Mohan, 2003). For the relatively open economies, this raises the issue of appropriate monetary policy response to sharp exchange rate movements since exchange rate volatility has had significant real effects in terms of fluctuations in employment and output and the distribution of activity between tradable and nontradable, especially in the developing countries, which depend on export performance as a key to the health of their balance of payments. In the fiercely competitive trading environment, countries seek to expand market shares aggressively by paring down margins. In such cases even a small change in exchange rates can develop into significant and persistent real effects. However, while some flexibility in foreign exchange markets and exchange rate determination is desirable, excessive volatility can have adverse impact on price discovery, export performance, sustainability of current account balance, and balance sheets in view of dollarisation. The EMEs'experience has highlighted the need for developing countries to allow greater flexibility in exchange rates. With progressive opening of the

emerging markets to financial flows, capital flows are playing an increasingly important role in exchange rate determination and are often reflected in higher exchange rate volatility

The objectives of reserve management vary across countries and a recent survey of reserve management practices of select countries (IMF Guidelines, 2001) provides that: firstly, most countries hold reserves to support monetary policy. While ensuring liquidity in the foreign exchange market to smooth out undue short-term fluctuations in exchange markets constitutes the primary objective in some countries, some countries take a cautious approach to intervention. Smaller countries hold the reserves mainly for consideration of transaction motives to meet external payment imbalances as well as a store of wealth. Precautionary motive of holding reserves to mitigate adverse external shocks is implicit in most countries' objectives though among a few it finds explicit mention. Few countries explicitly use international reserves as the backing for monetary base and to maintain the stability and integrity of the monetary and financial system. From a policy perspective, the objective of holding reserves to support monetary policy is common to most countries. Secondly, most countries have informal coordination between debt management and reserve management policies. As part of informal coordination, most countries take into account external debt indicators, particularly the maturity composition of short-term and long-term debt, as part of reserve management. Thirdly, in regard to transparency and disclosure standards, many countries adhere to the IMFs Special Data Dissemination Standards (SDDS) requirement. Most countries publish data on external debt and reserves on an annual basis in either their central bank annual reports or other reports of their governments. Fourthly, liquidity and safety (low risks) prevail upon reserve management entities in most countries as part of objective of reserve management. The yield objective is secondary to most countries in reserve management. Finally, most countries use benchmarks for managing currency composition of reserve though information to the public about the benchmarks for the underlying currency composition of reserves is generally not made available. Information about the underlying norms for adopting the benchmarks are, however available in a number of countries.

The main objectives in managing a stock of reserves for any developing country, including India, are preserving their long-term value in terms of purchasing power over goods and services, and minimizing risk and volatility in returns. After the east Asian crisis of 1997, India has followed a policy to build higher levels of FER that take into account not only anticipated current account deficits but also liquidity at risk arising from unanticipated capital

movements. Accordingly, the primary objectives of maintaining FER in India are safety and liquidity; maximizing returns is considered secondary. In India, reserves are held for precautionary and transaction motives, to provide confidence to the markets, both domestic and external, that foreign obligation can always be met. The objectives in holding FER influence the currency composition of reserves. To meet the transactions motive, composition of FER should be closely related to the pattern of external trade. The RBI, in consultation with the GoL, currently manages FER. As the objectives of reserve management are liquidity and safety, attention is paid to the currency composition and duration of investment. The conservative strategy adopted in the management of FER has implications for the rate of return on investment. The direct financial return on holdings of foreign currency asset is low, given the low interest rates prevailing in the international markets. However, the low returns on foreign investment have to be compared with the costs involved in reviving international confidence once eroded, and with the benefits of retaining confidence of the domestic and international markets, including that of the credit rating agencies (Reddy 2002).

The foreign exchange market is characterized by constant changes and rapid innovations in trading methods and products. In India, recognising the systemic impact of foreign exchange settlement risk and in pursuance of the recommendations of the Sodhani Committee, the Reserve Bank had set up the Clearing Corporation of India Ltd. (CCIL) in 2001 to mitigate risks in the Indian financial markets. The CCIL undertakes settlement of foreign exchange trades on a multilateral net basis through a process of novation and all spot, cash and tom transactions are guaranteed for settlement from the trade date. Every eligible foreign exchange contract entered between members gets novated or replaced by two new contracts – between the CCIL and each of the two parties, respectively. The CCIL has consistently endeavoured to add value to the services and has gradually brought the entire gamut of foreign exchange transactions under its purview. Intermediation, by the CCIL thus, provides its members the benefits of risk mitigation, improved efficiency, lower operational cost and easier reconciliation of accounts with correspondents.

It emerges from the above analysis that flexibility and pragmatism, rather than adherence to strict theoretical rules, is the order of the day in exchange rate policy in developing countries. It also underscores the need for central banks to keep instruments or policies in hand for use in difficult situations. On the whole, the Indian approach to exchange rate management has been described as ideal for Asia (Jalan, 2003). India has been able to effectively withstand periods of volatility in the foreign exchange market associated with several unexpected

external and domestic developments (Mohan, 2006a). An important aspect of policy response to various episodes of volatility has been market intervention combined with monetary and administrative measures to meet the threats to financial stability, while complementary or parallel recourse was taken to communications (Reddy, 2006e). Going forward, there will be a continuous need to adopt a combined strategy of liquidity management as well as exchange rate management for effective monetarymanagement and short-term interest rate smoothening (Mohan, 2006a).

Official exchange rate intervention refers tosales and purchases of foreign exchange by authorities in order to affect exchange rates. When the Bretton Woods system broke down in 1971, major industrial countries discontinued pegging their currencies to theUS dollar, bringing in an era of floating exchange rates.In principle, freely floating exchange rates would ruleout intervention by central banks. The central banks have, however, often intervened for a variety of reasons: (i) to influence trend movements in the exchange rates because they perceive long-run equilibrium values to be different from actual values;(ii) to maintain export competitiveness; (iii) to manage volatility to reduce risks in financial markets; and (iv)to protect the currency from speculative attack and crisis.

Intervention by most central banks in foreign exchange markets has become necessary is primarily because of the importance of capital flows in determining exchange rate movements as against trade balances and economic growth, which were important in the earlier days. In recent times, there has been a large increase in the international capital movements, in emerging market economies, particularly, these capital flows are very volatile, and largely sentiment driven exposing financial markets to large risks. Thus, in order to reduce the risks, authorities intervene to curb volatility. Secondly, unlike trade flows, capital flows in "gross" terms, which affect exchange rate can be several times higher than "net"flows on any day. Therefore, herding becomes unavoidable (Jalan, 2003).

In essence, the principles laid down by IMF Executive Board 1977, states that, the countries need not manipulate their exchange rates to gain unfair competitive advantage over others, or to prevent balance of payment adjustment, but they can intervene to counter 'disorderly market conditions' wherever needed. Because, it is difficult to define 'disorderly market conditions' but they are generally taken to refer to management of exchange rate volatility. While intervention by central banks in the foreign exchange market is being accepted; it lacks concenses as it is consistent with a full flexible exchange rate system, results in the ineffectiveness of central bank intervention. In so far as sterilised intervention is

concerned, the proponents of monetary approach claim that it is ineffective. The literature, however, identifies three possible channels through which even sterilised intervention would work: (a) portfolio balance channel under which domestic and foreign bonds are assumed to be imperfect substitutes, and intervention, even though sterilised, impacts exchange rate by changing the relative supplies of bonds; (b) signalling channel where sterilized purchase of foreign currency will lead to a depreciation of the exchange rate if the foreign currency purchase is assumed to signal a more expansionary domestic monetary policy and *vice versa* ; and (c) more recently, the noise-trading channel, according to which, a central bank can use sterilised interventions to induce noise traders to buy or sell currency (Kortian,1995). Even if an intervention has only a temporary effect, it can still lead to noise traders assuming that the trend has been broken and induce investors to take positions in line with the central bank'sintentions.

In the Indian context, empirical evidence on the effectiveness of sterilised intervention through the portfolio balance channel has been found to be limited for the period April 1996 to March 1999 (Bhaumik and Mukhopadhyay, 2000). As regards signaling channel, studies have shown that the Reserve Bank has used intervention though not very significantly for signaling the future course of monetary policy (Sahadevan, 2002). The use of profitability analysis to gauge the success of intervention has also been in conclusivein the Indian case (Pattanaik and Sahoo, 2001). Empirical evidence in the Indian case, however, suggests that in the present day of managed float regime, intervention can serve as a potent instrument in containing the magnitude of exchange rate volatility of the rupee even though the degree of influence may not be strong (Pattanaik and Sahoo, 2001). Studies in the Indian context have observed a positive response of direct intervention activity during exchange rate volatility, with the intervention activity subsiding once a re-alignment has taken place (Kohli, 2000). Besides, significant asymmetry has been observed in the volatility response to market pressure with heightened volatility leading to depreciating pressure on the rupee (RBI, 2002-03). This underscores the importance of intervention by the central bank to manage volatility.

The comprehensive view on the approach to reserve management as stated by the former RBI Governor, Jalan (2002), is of special significance here: "A sufficiently high level of reserves is necessary to ensure that even if there is prolonged uncertainty, reserves can cover the 'liquidity at risk' on all accounts over a fairly long period. Taking these considerations into account, India's foreign exchange reserves are now very comfortable. The prevalent national security environment further underscores the need for strong reserves. We must

continue to ensure that, leaving aside short-term variations in reserves level, the quantum of reserves in the long-run is in line with the growth of the economy, the size of risk-adjusted capital flows and national security requirement. This will provide us with greater security against unfavorable or unanticipated developments, which can occur quite suddenly".

Volatality in Foreign Exchange Rates: Emerging Policy issues

The major policy concern centre on whether the countries should liberalize their capital account before or after moving to greater exchange rate flexibility. The experiences of emerging markets over the past decade highlight the risks associated with opening the capital account before adopting a flexible exchange rate. Even when exchange rate flexibility comes before the capital account is opened, however, the direction and composition of capital account liberalization has macro economic implications. The shift towards exchange rate flexibility need to be supported by a gradual removal of existing asymmetries in capital mobility to facilitate an orderly correction of any potential exchange rate misalignment. The degree of institutional and market development is a key determinant of the appropriate pace. In the absence of supporting institutions and markets, a gradual exit strategy may be more appropriate as it reduces the risk of excessive exchange rate volatility and its potentially adverse effects on market credibility, inflationary expectations, and balance sheets. It also allows the foreign exchange market to depend through the mutually reinforcing relationship between exchange rate flexibility and foreign exchange activity.

The foreign exchange market, which witnessed deregulation in conjunction with current account convertibility and liberalisation of capital controls in many areas, lent considerable support to the external sector reform process. The criticality of a well functioning market with its ability to trade and settle transactions in new products and adapt itself quickly to the changing regulatory and competitive environment has been demonstrated well in the Indian context. The bid-ask spread of rupee/US dollar ratehas almost converged with that of other major currencies in the international market. The Reserve Bank intervenes in the foreign exchange market primarily to prevent excessive volatility and disorderly conditions. Such intervention is not motivated by any pre-determined target or band around the exchange rate. The objective is to keep market movements orderly and ensure that there is no liquidity problem or rumour/panic-induced volatility. India's approach of market determination of the exchange rate, flexibility, combined with intervention, as felt necessary, has served it well so far (Mohan, 2006a).

Moving forward, further initiatives for developing the Indian foreign exchange market need to be aligned with the external sector reforms. With the Indian economy progressively moving towards fuller capital account convertibility in the coming years and getting increasingly integrated with the global economy, the foreign exchange market is likely to see a significant rise in volumes and liquidity in the spot and derivative segments. With the availability of a large pool of global capital seeking avenues to participate in economies with high growth potential, inflows into India are likely to continue inview of its stable macroeconomic conditions and positive growth outlook. The Indian foreign exchange market, therefore, will have to prepare itself to dealwith such large capital inflows. This would need further deepening of the foreign exchange market. A key issue in managing the capital account is credibility and consistency in macro economic policies and the building up of safety nets in a gradually diminishing manner to provide comfort to the markets during the period of transition from an emerging market to adeveloped market.

The issues that could dominate the agenda for the next phase of development in the foreign exchange market could be catalogued as: (i) introduction of more derivative products involving the rupee and more flexibility to both 'market makers'and 'users' to buy or sell these products; (ii) taking cognisance of the off shore derivative markets involving the rupee and weighing all the options in this regard and (iii) relaxation of the currentrestrictions imposed on the entry of non-resident entities in the domestic foreign exchange market,particularly the derivatives segment. The main guiding principles for further liberalisation on the above lines could be summed up as: (i) entrenchmentof modern risk management systems, procedures and governance in banks and their corporate clients;(ii) diversification of customer base with heterogeneous expectations; and (iii) adoption of accounting and disclosure norms in respect of derivatives by banks and their corporate clients, based on international best practices.

The Annual Policy Statement of the Reserve Bank for 2007-08 released in April 2007 announced several measures to expand the range of hedging tools available to market participants and facilitate dynamic hedging by residents as alluded to earlier.As the foreign exchange market matures, the criteriaof 'underlying' could be considered for further relaxation to include economic exposures, *i.e.,*exposures which may not relate directly to foreign exchange transactions, but are affected by movements in exchange rates.

To encourage interest rate parity in the forward markets, the Committee on Fuller Capital Account Convertibility (2006) recommended more flexibility for banks to borrow and lend

overseas on both short-term and long-term basis and to increase the limits. The Committee further observed that in order to ensure that banks are not exposed to additional risks because of their access to foreign markets, their access should continue to be allowed depending upon the strength of their balance sheets. Some other issues that have been highlighted by the Committee as agenda for future development of the foreign exchange market include (i) permitting FIIs the facility of cancelling and rebooking all forward contracts and other derivatives booked to hedgerupee exposures so as to minimise the influence of NDF markets abroad; and (ii) introduction of currency futures, subject to risks being contained through proper trading mechanism, design of contracts andregulatory environment. The Annual Policy Statementof the Reserve Bank for 2007-08 proposed the settingup of a Working Group on Currency Futures to suggest a suitable framework to operationalise the proposal in line with the current legal and regulatory framework.

India's experience highlights the importance of managing foreign exchange reserves to take care of unforeseen contingencies, volatile capital flows and other developments, which can affect expectations adversely. As there is no international "lender of last resort" to provide additional liquidity at short notice on acceptable terms, the need for adequate reserves is unlikely to be eliminated or reduced even if exchange rates are allowed to float freely (Mohan,2006a). Several factors such as vulnerability of the real sector to shocks, strength of the fiscal and financial sectors, current account balance, the changing composition of capital flows, a medium-term view of growth prospects encompassing business cycles and the exchange rate regime influence the comfort level of reserves. In a sense, official reserves have to reflect the balancing and comforting factors relative to external assets and liabilities in the context of a national balance sheet approach (Reddy, 2006d).Thus, the comfort level of reserves should not be viewed with respect to the current situation alone, but going forward should also reckon with the potentialrisks.

A significant risk arises from the large and growing global financial imbalances. The speed at which the US current account ultimately returns towards balance the triggers that drive that adjustment, and the way in which the burden of adjustment is allocated across the rest of the world have enormous implications for the global exchange rates. Any disorderly adjustments in major currencies and rise in interest rates would impact the Indian economy, though the impact is not expected to besignificant compared to many other emerging market economies (Reddy, 2006b). Any disorderly adjustment in global imbalances may have some impact on corporates, banks and households in India, though their exposures, in aggregate, to the

external sector are not significant. Nevertheless, there will be a need to be alert to unforeseen domestic and global shocks and proactively manage various risks to the foreign exchange market as they evolve.

As India progresses towards fuller capitalaccount convertibility, it would have to contend with the impossible trinity of independent monetary policy, open capital account, and exchange rate regime. With a more open capital account as a 'given' if a choice is made of an 'anchor' role for monetary policy, it needs to be recognised that the impact of exchange rate changes on the real sector is significantly different for reserve currency countries, such as India. In the reserve currency countries, which specialise in technology intensive products, the degree of exchange rate pass-through is low, enabling exporters and importers to ignore temporary shocks and set stable product prices to maintain monopolistic positions, despite large currency fluctuations. Moreover, mature and well developed financial markets in these countries have the wherewithal to absorb the risk associated with exchange rate fluctuations with minimal shocks to the real sector. On the other hand, for the most of developing countries, which specialise in labour intensiveand low and intermediate technology products, profit margins in the highly competitive markets for these products are very thin and vulnerable to pricing power by retail chains. Consequently, exchange rate volatility has significant employment, output and distributional consequences. In this context, managing exchange rate volatility would continue to be an issue requiring attention, even when the exchange rate becomes more flexible.

Cross border flows to various market segments, *viz.,* the equity market, the money market and the government securities market are channeled through the foreign exchange market. In a regime of fuller capital account convertibility, financial flows across borders are expected to rise substantially. The effective management of these large inflows and out flows will depend considerably upon the development of not only the foreign exchange market but also on the efficient functioning of other segments of the domestic market. A pre-condition to develop proper meaningful linkages between the foreign exchange and other domestic financial markets is to develop the term money market and a money market yield curve. This will improve the efficiency of the foreign exchange market by encouraging interest parity conditions in the forward market. The need for providing market participants with more instruments for hedging price risk by developing the interest rate futures market would also arise. Thus, with the opening up of the Indian economy, the linkages of the foreign exchange

market with other segments of the financial market would need to be strengthened with better information flows.

Conclusions

A cautious and well-calibrated approach was followed while liberalising the foreign exchange market with an emphasis on the need to safeguard against potential financial instability that could arise due to excessive speculation. The approach to liberalisation adopted by the Reserve Bank has been characterised by greater transparency, data monitoring and information dissemination and to move away from micro management of foreign exchange transactions to macro management of foreign exchange flows. The emphasis has been to ensure that procedural formalities are minimised so that individuals are able to conduct hassle free current account transactions and exporters and other users of the market are able to concentrate on their core activities rather than engage in avoidable paper work.

Banks have been given significant autonomy to undertake foreign exchange operations. Full convertibility on the current account and extensive liberalisation of the capital account have resulted in large increase in transactions in foreign currency. These have also enabled the corporates to hedge various types of risks associated with foreign currency transactions. Not withstanding a move towards greater exchange rate flexibility by most EMEs, almost all central banks in EMEs actively participate in their foreign exchange markets to maintain orderly conditions. While the use of risk management instruments is encouraged by many emerging markets for hedging genuine exposures linked to real and financial flows, their overall approach towards risk management has remained cautious with an emphasis on the need to safeguard against potential financial instability arising due to excessive speculation in the foreign exchange market.

In the coming years, the challenge for the Reserve Bank would be to further build up on the strength of the foreign exchange market and carry forward the reform initiatives, while simultaneously ensuring that orderly conditions prevail in the foreign exchange market. Besides, with the Indian economy moving towards further capital account liberalisation, the development of a well-integrated foreign exchange market also becomes important as it is through this market that cross-border financial inflows and outflows are channelled to other markets. Hence, the development of the foreign exchange market also needs to be co-ordinated with the capital account liberalisation. Reforms in the financial markets is a dynamic process and need to be harmonised with the evolving macro economic developments

and the level of maturity of participating financial institutions and other segments of the financial market.

To conclude, moving forward, further initiatives towards developing the Indian foreign exchange market need to be aligned with the external sector reforms, particularly, the move towards further liberlisation of capital controls, for which a fresh road map has ben provided by the Committee on Fuller capital Acccount Convertibility. The agenda for the should, therefore, include introduction of more instruments, particularly derivative products, widening of participants base, commensurate regulations along with the entrenchment of modern risk management systems and improved customer service. Reforms in the foreign exchange market will also have to be harmonized with the evolving macroeconomic environment as well as the development of other segments of the financial market, particularly the money, equity and the government securities markets. They will also have to be harmonized with the evolving needs of the real economy (RBI, 2006).

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