

**FOREIGN EXCHANGE MARKET IN INDIA:
DERIVATIVES, EXPERTISE AND INSIGHT**

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Abstract

The economic liberalization of early nineties in India facilitated the introduction of derivatives based on interest rates and foreign exchange. Derivatives products provide certain important economic benefits such as risk management and help in price discovery. Market determined exchange rates were adopted by India in March 1993. In August 1994, the rupee was made fully convertible on current account. These reforms allowed increased integration between domestic and international markets, and created a need to manage currency risk. Rupee derivatives in India were introduced in July 1999 when RBI permitted banks and Financial Institutions to undertake interest rate swaps and forward rate agreements. These institutions were allowed to offer these products to corporate for hedging interest rates as well as deal in these instruments for hedging and trading purpose. The financial markets including derivative markets, in India have been through a reform process over the last two decade nearly, witnessed growth in terms of size, product profile and participants base. Derivative markets worldwide have witnessed explosive growth in recent past. Indian forex and derivative markets have also developed significantly over the years. This paper finds the possible factors and developments pushing the growth in these financial segments and seeks to present the trends in foreign exchange market in India.

Keywords: Foreign currency derivatives, Foreign Exchange Management Act (FEMA), OTC derivatives, Foreign Exchange Markets, capital account convertibility.

Introduction:

The foreign exchange market (forex or currency market) is a form of exchange for the global decentralized trading of international currencies. Financial centers around the world function as anchors of trading between different types of buyers and sellers around the clock. The foreign exchange market determines the relative values of different currencies and assists international trade and investment by enabling required currency availability. Salient characteristics of the Foreign Exchange market are:

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- its huge trading volume representing the largest asset class in the world;
- its geographical dispersion;
- its continuous operation: 24 hours a day except weekends;
- large variety of factors affecting currency rates;
- generally transactions squared-off on lower profit margins as compared with other markets and
- high leveraging of margin money to enhance profit and loss.

The gradual liberalization of Indian economy has resulted in substantial inflow of foreign capital into India. Simultaneously, dismantling of trade barriers has also facilitated the integration of domestic economy with world economy. With the globalization of trade and relatively free movement of financial assets, risk management through derivatives products has become a necessity in India also, like in other developed and developing countries. As Indian businesses become more global in their approach, evolution of a broad based, active and liquid forex derivatives market is required to provide them with a spectrum of hedging products for effectively managing their foreign exchange exposures.

Literature Review

Just prior to the launch of financial derivatives in Indian Market, Money & Finance (Bhaumik, 1997, 1998) published comprehensive details of various derivatives instruments, their applications, pricing mechanisms, strategies and the associated risks as well as issues related with regulation for introducing such financial instruments in India.

Market participants and regulators need to be cautious regarding derivatives from “abuse of derivatives” and the “negative consequences” from the misuse of derivatives (Dodd, 2003). The former is similar to a kind of financial market manipulation and poses a threat to the integrity of markets. The effect of such manipulation lead to increase capital costs in financial and commodity markets, and also reduce market efficiency by distorting market prices. The incidents of manipulation keep wary investors away from derivatives markets; as a result market activity suffers from lower trading volume thus reducing liquidity and possibly a cause of higher risk premium to be priced in. Investors sometimes abuse derivatives in order to manipulate accounting rules and financial reporting requirements, to overcome market regulations such as restrictions on foreign exchange exposure on financial institutions, balance sheets, or to evade or avoid taxation (Dodd, 2003).

During framing of regulations for the derivatives market, the regulator cannot afford to lose the prime need for ensuring high competition and liquidity in the market in order to yield fair prices. The policy should be framed to keep the entry barriers to the minimum so as to stimulate high competitive pressure. On the other side, if capital adequacy requirement is kept high to reduce the risk of counterparty failure, it would be counterproductive and degenerate the competitiveness in the market. Hence very high capital adequacy requirements are not recommended, since one of the unfavorable outcomes of setting high capital adequacy requirements leads to low competitiveness in the industry resulting in distorted prices and inefficiency in the economy (Shah, 1998).

It is desirable to know how efficiently the derivatives market is functioning and how it is benefitting in price discovery or fair pricing in asset markets by the flourishing derivatives market. There are a number of pointers to the efficient functioning of the derivatives markets. Shah and Thomas (2003) have indicated a few important characteristics of the Indian financial derivatives market, which relate to features like liquidity, volatility, costs and width of the market.

The most common definition of the measure of exchange-rate exposure is the sensitivity of the value of the firm, derived from the firm's stock return, to an unanticipated change in an exchange rate. This is calculated by using the partial derivative function where the dependant variable is the firm's value and the independent variable is the exchange rate (Adler and Dumas, 1984). A key assumption in the concept of foreign exchange risk is that exchange rate changes are not predictable and that this is determined by how efficient the markets for foreign exchange are. Research in the area of efficiency of foreign exchange markets has thus far been able to establish only a weak form of the efficient market hypothesis conclusively, implying that successive changes in exchange rates cannot be predicted by analyzing the historical sequence of exchange rates (Soenen, 1979). However, when the efficient markets theory is applied to the foreign exchange market under floating exchange rates there is some evidence to suggest that the present prices properly reflect all available information (Giddy and Dufey, 1992). This implies that exchange rates react to new information in an immediate and unbiased manner and no one can make profit by this information. It implies that foreign exchange risk management cannot be done away as exchange rate changes are random and unpredictable.

An IMF working paper attempts to quantify counterparty risk that may stem from the OTC derivatives markets. The risk is measured by losses that may result via the OTC derivative contracts to the financial system from the default of one or more banks or broker

dealers. It finds that considering that the notional value of all categories of the OTC contracts reached almost \$600 trillion at the end of December 2007, the failure of a single major financial institution could result in losses to the OTC derivatives market of \$300-\$400 billion. The paper argues that since such a failure would likely cause cascading failures of other institutions, the total global financial system losses could exceed \$1,500 billion.

It is recognized that OTC trading, while permitting unlimited flexibility in the contract, suffers from non-transparency, inefficient price discovery and generally involves counterparty risk. However, there are some benefits of OTC markets, as pointed out by Prof. J. R. Varma, who argues for the creation of an OTC equity derivative market in India. He is of the view that competition between OTC markets and exchanges forces the markets to lower the costs and adopt the best practices of the other market. He further holds that standardized and highly liquid contracts are best traded in organized exchanges because of the enhanced transparency and lower system risk.

According to data released by Ministry of Commerce and Industry, Indian corporates have been using the external commercial borrowings route to raise capital in a big way. The amount of ECB raised was an all-time high of USD 35.9 billion in 2006-07 and stood at USD 45 billion in 2010-11. Together with this enhanced foreign investment inflows India has been witnessing enhanced trade flows. Exports from India already crossed to US\$218 billion (in 9 months) during 2011-12 and imports into India have reached from USD 350 billion in same period. All this has led to need for hedging currency risk, particularly keeping high volatility of the exchange rates.

Global View of Foreign Exchange Market:

The global market for derivatives has grown substantially in the recent past. The Foreign exchange and Derivatives Market Activity survey, conducted by Bank for International Settlements (BIS) points to this increased activity. The financial markets, including derivative markets, in India have been through a reform process over the last decade and a half, witnessed in its growth in terms of size, product profile, nature of participants and the development of market infrastructure across all segments – equity markets, debt markets and forex markets.

According to the BIS Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity as of April 2010 and the OTC derivatives segment, the average daily turnover of interest rate and non-traditional foreign exchange contracts was 20% higher to \$4.0 trillion in April 2010 over April 2007, maintaining an annual compound growth of 20

percent witnessed since 1995.

The increase was driven by the 48% growth in turnover of spot transactions, which represent 37% of foreign exchange market turnover. Spot turnover rose to \$1.5 trillion in April 2010 from \$1.0 trillion in April 2007. The growth of turnover in other foreign exchange instruments was more modest at 7%, with average daily turnover of \$2.5 trillion in April 2010.

Activity was supported by the increase in trading by "other financial institutions" - a category that includes non-reporting banks, hedge funds, pension funds, mutual funds, insurance companies and central banks. Turnover with these counterparties grew by 42%, rising to \$1.9 trillion in April 2010 from \$1.3 trillion in April 2007. This was the first time, since the survey began in 1989, that trading conducted by other financial institutions surpassed trading by reporting dealers.

Foreign Exchange Market in India:

Indian forex and derivative markets have also developed significantly over the years. As per the BIS global survey the percentage share of the rupee in total turnover covering all currencies increased from 0.3 percent in 2004 to 0.7 percent in 2007 and further to 0.9% in 2010. The size of the Indian derivatives market is evident from the above data, though from global standards it is still in its nascent stage. Broadly, Reserve Bank is empowered to regulate the markets in interest rate derivatives, foreign currency derivatives and credit derivatives. Until the amendment to the RBI Act in 2006, there was some ambiguity in the legality of OTC derivatives which were cash settled. This has now been addressed through an amendment in the said Act in respect of derivatives which fall under the regulatory purview of RBI (with underlying as interest rate, foreign exchange rate, credit rating or credit index or price of securities), provided one of the parties to the transaction is RBI, a scheduled bank or any other entity regulated under the RBI Act, Banking Regulation Act or Foreign Exchange Management Act (FEMA).

Evolution of the forex derivatives market in India:

This tremendous growth in global derivative markets can be attributed to a number of factors. They reallocate risk among financial market participants, help to make financial markets more complete, and provide valuable information to investors about economic fundamentals. Derivatives also provide an important function of efficient price discovery and make un-bundling of risk easier.

In India, the economic liberalization in the early nineties provided the economic rationale for the introduction of forex derivatives. Business houses started actively approaching foreign markets not only with their products but also as a source of capital and direct investment opportunities. With limited convertibility on the trade account being introduced in 1993, the environment became even more conducive for the introduction of the hedge products. Hence, the development in the Indian forex derivatives market should be seen along with the steps taken to gradually reform the Indian financial markets.

Developments in the capital inflows:

Since early nineties, we are on the path of a gradual progress towards capital account convertibility. The emphasis has been shifting away from debt creating to non-debt creating inflows, with focus on more stable long-term inflows in the form of foreign direct investment and portfolio investment. In 1992, foreign institutional investors were allowed to invest in Indian equity & debt markets and the following year, foreign brokerage firms were also allowed to operate in India. Non-Resident Indians (NRIs) and Overseas Corporate Bodies (OCBs) were allowed to hold together about 24 percent of the paid up capital of Indian companies which was further raised to 40 percent in 1998. In 1992, Indian companies were also encouraged to issue ADRs/GDRs to raise foreign equity, subject to rules for repatriation and end use of funds. These rules were further relaxed in 1996 after being tightened in 1995 following a spurt in such issues. Presently, the raising of ADRs/GDRs/FCCBs is allowed through the automatic route without any restrictions.

FDI norms have been liberalized and more and more sectors have been opened up for foreign investment. Initially, investments upto 51 percent were allowed through the automatic route in 35 priority sectors. The approval criteria for FDI in other sectors was also relaxed and broadened. In 1997, the list of sectors in which FDI could be permitted was expanded further with foreign investments allowed upto 74 percent in nine sectors. Ever since 1991, the areas covered under the automatic route have been expanding. This can be seen from the fact that while till 1992 inflows through the automatic route accounted for only 7 percent of the total inflows; this proportion has increased steadily with investments under the automatic route accounting for about 25 percent of total investment in India in 2001.

In 2000, the Indian Government permitted the raising of fresh ECBs for an amount upto US\$ 50 million and refinancing of all existing ECBs through the automatic route. Corporates no longer had to seek prior approval from the Ministry of Finance for fresh ECBs of upto US\$ 50 million and for refinancing of prevailing ECBs.

Developments in capital outflows:

Thus, while the inflows from abroad have been freed to a large extent, outflows associated with these inflows like interest, profits, sale proceeds and dividend etc. are completely free of any restriction. All current earnings of NRIs in the form of dividends, rent etc. have been made fully repatriable.

But convertibility in terms of outflows from residents, however, still remains more restricted although these restrictions are gradually reduced. Residents are not allowed to hold assets abroad. However, direct investment abroad is permissible through joint ventures and wholly owned subsidiaries.

An Indian entity can make investments in overseas joint ventures and wholly owned subsidiaries to the tune of US\$ 100 million during one financial year under the automatic route. At the same time investments in Nepal and Bhutan are allowed to the tune of INR 3.50 billion in one financial year. Units located in Special Economic zones (SEZs) can invest out of their balances in the foreign currency account. Such investments are however subject to an overall annual cap of US\$ 500 million. Indian companies are also permitted to make direct investments without any limit out of funds raised through ADRs/GDRs. Recently mutual funds have been allowed to invest in rated securities of countries with convertible currencies within existing limits.

A deep and liquid market for the underlying is necessary for the development of an efficient derivative market. The easy movement of capital between different markets and currencies is essential to eliminate pricing discrepancies and efficient functioning of the markets. The steps mentioned above to increase convertibility on the capital account and the current account aided the process of integration of the Indian financial markets with international markets. These reforms set in motion the process of the development of the forex derivatives markets by gradually opening the Indian financial markets and developing the foreign exchange and the money markets.

Growth of Foreign Exchange markets in India:

Presently the Indian Forex market is the 16th largest Forex market in the world in terms of daily turnover as per the BIS Triennial Survey report. As per this report the daily turnover of the Indian Forex market is around US\$ 100 billion including the OTC derivative segment.

The growth of the Indian Forex market owes to the tremendous growth of the Indian economy in the last few years. Today India holds a significant position in the Global

economic scenario and it is considered to be one of the emerging economies in the World. The steady growth of the Indian economy and diversification of the industrial sectors in India has contributed significantly to the rapid growth of the Indian Forex market. The main centre of Foreign Exchange in India is Mumbai, the commercial capital of the country and other centers including the major cities like Kolkata, New Delhi, Chennai, Bengaluru and Cochin. All these Foreign Exchange Markets of India work collectively deploying latest technology. The Foreign Exchange Market in India is a flourishing ground of profit and initiatives taken time to time by the Indian Central Government also strengthen the foundation.

It is during the year 2008 that Indian Forex market has seen a great advancement that took the Indian Forex trading at par with the global Forex markets. It is the introduction of future derivative segment in Forex trading through the largest stock exchange in country – National Stock Exchange. This step not only increased the Indian Forex market volume too many folds also gave the individual and retail investor a chance to trade at the Forex market, that was till this time remained a forte of the banks and large corporate.

Indian Forex market got yet another boost when the SEBI and Reserve Bank of India permitted the trade of derivative contract at the leading stock exchanges NSE and MCX for three new currency pairs. In its recent circulars Reserve Bank of India accepting the proposal of SEBI, permitted the trade of INRGBP (Indian Rupee and Great Britain Pound), INREUR (Indian Rupee and Euro) and INRYEN (Indian Rupee and Japanese Yen). This was in addition with the existing pair of currencies that is US\$ and INR. From inclusion of these three currency pairs in the Indian Forex circuit the Indian Forex scene is expected to boost even further as these are some of the most widely traded currency pairs in the world.

Forex derivatives:

Economic entities in India currently have a menu of OTC products, such as forwards, swaps and options, for hedging their currency risk and the markets for the same are fairly deep and liquid, as reflected in the volumes and bid-offer spreads. The origin of the forex market development in India could be traced back to 1978 when banks were permitted to undertake intra-day trades. However, the market witnessed major activities only in the 1990's with the floating of the currency in March 1993, following the recommendations of the Report of the High Level Committee on Balance of Payments.

In respect of forex derivatives involving rupee, residents have access to foreign exchange forward contracts, foreign currency-rupee swap instruments and currency options –

both cross currency as well as foreign currency-rupee. In the case of derivatives involving only foreign currency, a range of products such as IRS, FRAs, option are allowed. While these products can be used for a variety of purposes, the fundamental requirement is the existence of an underlying exposure to foreign exchange risk whether on current or capital account. While initially the forward contracts could not be rebooked once cancelled, greater flexibility has now been given for booking cancellation and rebooking of forward contracts. In the case of exporters and importers, they are also allowed to book forward contracts based on past performance and the delivery condition has also been gradually liberalized.

In order to simplify procedural requirements for Small and Medium Enterprises (SME) sector, RBI has recently granted flexibility for hedging, both underlying as well as anticipated, and economic exposures without going through the rigours of complex documentation formalities. In order to ensure that SMEs understand the risks of these products, only banks with whom they have credit relationship are allowed to offer such facilities. These facilities should also have some relationship with the turnover of the entity. Similarly, individuals have been permitted to hedge up to USD100,000 on self declaration basis.

Rupee Forwards:

An important segment of the forex derivatives market in India is the Rupee forward contracts market. This has been growing rapidly with increasing participation from corporate, exporters, importers, banks and FIIs. Till February 1992, forward contracts were permitted only against trade related exposures and these contracts could not be cancelled except where the underlying transactions failed to materialize. In March 1992, in order to provide operational freedom to corporate entities, unrestricted booking and cancellation of forward contracts for all genuine exposures, whether trade related or not, were permitted. Although due to the Asian crisis, freedom to re-book cancelled contracts was suspended, which has been since relaxed for the exporters but the restriction still remains for the importers.

Currency Futures:

In the context of growing integration of the Indian economy with the rest of the world, as also the continued development of financial markets, there is a need to allow other hedging instruments to manage exchange risk like currency futures. The Committee on Fuller Capital Account Convertibility had recommended that currency futures may be introduced subject to risks being contained through proper trading mechanism, structure of contracts and regulatory

environment. Accordingly, Reserve Bank of India in the Annual Policy Statement for the Year 2007-08 proposed to set up a Working Group on Currency Futures to study the international experience and suggest a suitable framework to implement the proposal, in line with the current legal and regulatory framework.

Given that India is not yet fully convertible on capital account, various options are available to deal with the issue of reconciling the regulatory framework in the cash and OTC forward market with the currency futures segment. The international experience in this regard is mostly from OECD countries except for one single exception of South Africa which has recently introduced domestic currency futures.

Rupee Interest rate derivatives

Rupee derivatives in India were introduced in July 1999 when RBI permitted banks/FIs/PDs to undertake Interest rate swaps and Forward rate agreements. These institutions were allowed to offer these products to corporates for hedging interest rate risk as well as deal in these instruments for their own balance sheet hedging and trading purposes. Since then, many initiatives have been undertaken to deepen and broaden the market.

The rupee interest rate derivatives presently permissible are Forward Rate Agreements (FRA), Interest Rate Swaps (IRS) and Interest Rate Futures (IRF). The permitted benchmarks for FRA/IRS are any domestic money or debt market rupee interest rate; or, rupee interest rate implied in the forward foreign exchange rates, as permitted in respect of MIFOR swaps. While both banks and PDs are allowed as market makers in the swap market, all business entities (including banks and PDs) are permitted to hedge their underlying exposures using these instruments. PDs have been also permitted to hold trading position in IRF, subject to internal guidelines in this regard. The interest rate swap market has grown rapidly with participation from banks and corporates. The market is liquid and bid-offer spreads are narrow.

Structured Credit and Credit derivatives

The structured credit market internationally has grown phenomenally into a distinct asset class, encompassing few of complex products which have facilitated risk transfer across multiple chain of investors, leveraging several times on the original loan amount. The downside of this model has been eloquently demonstrated in the US sub-prime related fallout globally. In India, the structured credit market is still in its infancy,

primarily constituting securitization products, and the lessons of recent events can hold important lessons for the future development of this market here.

Securitization in India has been in existence for over a decade confined mainly to a few banks and non-banking finance companies. Both mortgage backed securities and asset-backed securities are in vogue. The securitization market has matured over the last few years and there is now an established investor community and regular issuers. As per ICRA's estimates, the structured issuance volumes have grown from Rs. 77 billion in 2003 to Rs. 369 billion in 2006-07. The growth in 2006-07 has been primarily on account of securitization of single corporate loans, which accounted for nearly a third of the total volume. However, ABS is the largest product class at more than 60%, with securitization of retail loans remaining popular. The growth of ABS market can be attributed to a number of factors such as the growing retail loan portfolios held by banks and other financial institutions, investors' familiarity with the underlying assets class the relatively short tenor of such issues. Growth of the MBS market has been slower despite the growth in the underlying housing finance market mainly due to the relatively long tenor, lack of secondary market liquidity and the risk arising from prepayment/re-pricing of the underlying loans.

In the light of the differing practices followed by banks in India and certain concerns on accounting, valuation and capital treatment, RBI issued formal guidelines in February, 2006 after extensive consultation with market participants. The guidelines are largely in line with those issued by supervisors of other countries, internationally.

Recently, The Securities Contracts (Regulation) Amendment Act, 2007 has amended Securities Contract (Regulation) Act to include "securitized instruments" in the definition of "securities" as defined in Securities Contract (Regulation) Act. The amendment is made to allow listing of securitized debt on stock exchanges and therefore, make the market more liquid.

Learning from the global experience in this regard, it will be of utmost importance that proper disclosure and reporting framework, accounting and valuation policies and clearing & settlement system for these OTC transactions develops concomitantly with the market. This would go a long way in addressing some of the associated concerns.

Other derivatives products are:

Foreign currency – rupee swaps (FC-RE):

Another spin-off of the liberalization and financial reform was the development of a fledgling market in FC-RE swaps. A fledgling market in FC-RE swaps started with foreign banks and some financial institutions offering these products to corporates. Initially, the market was very small and two way quotes were quite wide, but the market started developing as more market players as well as business houses started understanding these products and using them to manage their exposures. Corporates started using FC-RE swaps mainly for the following purposes:

- Hedging their currency exposures (ECBs, forex trade, etc.)
- To reduce borrowing costs using the comparative advantage of borrowing in local markets (Alternative to ECBs – Borrow in INR and take the swap route to take exposure to the FC currency)

The market witnessed expanding volumes in the initial years with volumes up to US\$ 800 million being experienced at the peak. Corporates were actively exploring the swap market in its various variants (such as principal only and coupon only swaps), and using the route not only to create but also to extinguish forex exposures. RBI tried to regulate the spot impact by passing the following regulations:

- The authorized dealers offering swaps to corporates should try and match demand between the corporates.
- The open position on the swap book and the access to the interbank spot market because of swap transaction was restricted to US\$ 10 million
- The contract if cancelled is not allowed to be re-booked or re-entered for the same underlying.

Other Foreign currency derivatives:

There is some activity in other cross currency derivatives products also, which are allowed to be used to hedge the foreign currency liabilities provided these were acquired in accordance with the RBI regulations.

The products that may be used are:

- Currency swap
- Coupon Swap
- Interest rate swap
- Interest rate cap or collar (purchases)
- Forward Rate Agreement (FRA) contract

RBI Regulations:

The exposures for which the rupee forward contracts are allowed under the existing RBI notification for various participants are as follows:

Residents

- Genuine underlying exposures out of trade/business
- Exposures due to foreign currency loans and bonds approved by RBI
- Receipts from GDR issued
- Balances in EEFC accounts

Foreign Institutional Investors

- They should have exposures in India .
- Hedge value not to exceed 15 percent of equity as of 31 March 1999 plus increase in market value/ inflows

Non-resident Indians/Overseas Corporates

- Dividends from holdings in a Indian company
- Deposits in FCNR and NRE accounts
- Investments under portfolio scheme in accordance with FERA or FEMA

The forward contracts are also allowed to be booked for foreign currencies (other than Dollar) and Rupee subject to similar conditions as mentioned above. The banks are also allowed to enter into forward contracts to manage their assets - liability portfolio.

Conclusion:

The derivatives market in India has been expanding rapidly and will continue to grow. While much of the activity is concentrated in foreign and a few private sector banks, increasingly public sector banks are also participating in this market as market makers and not just users. Their participation is dependent on development of skills adapting technology and developing sound risk management practices. While derivatives are very useful for hedging and risk transfer, and hence improve market efficiency, it is necessary to keep in view the risks of excessive leverage, lack of transparency particularly in complex products, difficulties in valuation, tail risk exposures, counterparty exposure and hidden systemic risk. Clearly there is need for greater transparency to capture the market, credit as well as liquidity risks in off-balance sheet positions and providing capital there for. From the corporate point of view, understanding the product and inherent risks over the life of the product is extremely important. Further development of the market will

also hinge on adoption of international accounting standards and disclosure practices by all market participants, including corporate.

Increasing convertibility on the capital account would accelerate the process of integration of Indian financial markets with international markets. Some of the necessary preconditions to this as suggested by the Tarapore committee report are already being met. Increasing convertibility does carry the risk of removing the insularity of the Indian markets to external shocks like the South East Asian crisis, but a proper management of the transition should speed up the growth of the financial markets and the economy. Introduction of derivative products tailored to specific corporate requirements would enable corporate to completely focus on its core businesses, de-risking the currency and interest rate risks while allowing it to gain despite any upheavals in the financial markets.

Increasing convertibility on the rupee and regulatory impetus for new products should see a host of innovative products and structures, tailored to business needs. The possibilities are many and include INR options, currency futures, exotic options, rupee forward rate agreements, both rupee and cross currency swaps, as well as structures composed of the above to address business needs as well as create real options.

References

- Adler, M., & Dumas, B. (1984). Exposure to currency risk: Definition and measurement. *Financial Management*, 13, (Summer), 41-50.
- Bhaumik, Sumon K. (1997), “Financial Derivatives I: Bird’s Eye View of the Products”, *Money & Finance*, No. 4.
- Bhaumik, Sumon K. (1998), “Financial Derivatives II: The Risks and their Management”, *Money & Finance*, No. 5
- Dodd, Randall (2003), “Consequences of Liberalizing Derivatives Markets”, Financial Policy Forum, Derivatives Study Centre, Washington.
- Giddy, Ian H. and Dufey, Gunter, (1992), *The Management of Foreign Exchange Risk*, Available at: <http://pages.stern.nyu.edu/~igiddy/fxrisk.htm>.
- IMF Working Paper: Counterparty Risk in the Over-The-Counter Derivatives Market by Miguel A. Segoviano and Manmohan Singh, November 2008
- Shah, Ajay (1998), “The Price Discovery Mechanism”, Ajay Shah’s Media Page: <http://www.mayin.org/ajayshah/MEDIA/1998/pricediscovery.html>
<http://www.iimahd.ernet.in/~jrvarma/papers/OTC-Derivatives-Bus-Std-online-14Nov.07.pdf>
- Soenen, L.A, 1979, Efficient Market Implications for Foreign Exchange Exposure Management, *DE ECONOMIST* 127, NR. 2.
- Thomas, Susan and Ajay Shah (2003) “Equity Derivatives in India: The State of The Art”, in Thomas (editor) *Derivatives Markets in India*.

Data sources

RBI website: www.rbi.org.in

Ministry of Commerce and Industry website: <http://commerce.nic.in>

<http://www.bis.org/publ/rpfx10t.htm>

BIS Triennial Central Bank Survey of Foreign exchange and derivatives market activity Dec. 2010.

BIS semiannual OTC derivatives market statistics, June 2011.