



The Role of RBI to Manage *Exchange Rate Volatility*

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Abstract: - The analysis unveil that there has been a significant increase in exchange rate volatility soon after the global financial crisis. This demonstrates a larger impact of fluctuations in capital flows on exchange rate movements. An imperative characteristic of the policy feedback in India towards various incidents of volatility has been the market intervention along with monetary and reliable measures to meet the threats to financial stability. The results from various empirical tests utilized in the study confirms 1) the clustering of volatility prevailing in India's foreign exchange, 2) the long run relationship existing between Return, Net RBI Intervention, Net FII Inflow and Interest Rate Differential and 3) an effective RBI intervention in Indian foreign exchange market during the study period.

Keywords: India US Exchange Rate, Volatility, Reserve Bank of India, Intervention, Foreign Institutional Investment, Interest Rate Differential. X-Rates, forex.

Research Objective :-

Present study is designed to accomplish the consequent objectives in the context of India during the period of 40 Years(1982-2022).

- ❖ To measure the degree of volatility in India's X-Rates;
- ❖ To explore the relationship among exchange rate return, net RBI intervention, net FII inflow and interest rate differential within the framework of X-Rates management;
- ❖ To analyze the effectiveness of RBI intervention on managing India's X-Rates volatility.

Research Hypothesis :-

The hypothesis with regard to the current empirical study is that the level and nature of volatility pertaining in Indian forex market due to the factors including net RBI intervention, net FII inflow and interest rate differential being unpredictable, the efficiency of the RBI intervention is the main matter of concern under the prescribed study.

Research Design:-

The research design screening the data source, methodology, the period chosen for the study and the description about selected variables for the empirical analysis are explained in this section.

Data Source, Methodology, and Period of Study:-

The present study is completely based on secondary data. The main sources of data for the study are Journals, Annual Reports and the web sites of selected platforms. In addition to this the information published by the central government of India and the published literature available in the form of books and journal articles are used to complete relevant data for the purpose of the study. The data period is chosen from January 1982 to August 2022 with a monthly frequency having 214 observations. The data has been drawn primarily from RBI database, Handbook of Statistics on the Indian Economy Federal Reserve Bank of St. Louis (for the US interest rate) and Securities and Exchange Board of India database generating in monthly series. The relationship between the selected macroeconomic variables is analyzed with the ARDL model. The Central bank by making a change in the market rudiments, expectations regarding the future precept or policy actions and speculative trends, it intervenes in the forex market. Usually studies analyze this with the help of a regression model. Here, in the present study analysis of the effectiveness of RBI intervention on the X-Rates

and its volatility is done with the GARCH (1, 1) model. Apart from this, other statistical tools like ADF test, descriptive statistics, time series plots, and significance tests have also been used.

Variables Used in the Study :-

RBI Net Intervention in Indian Forex Market The net intervention variable (INV) is the net purchases of the USD by RBI. Specifically, it is the

- ❖ difference between the purchase and sale of forex by the RBI in rupee crore at contract rate. The RBI purchase and sale of forex includes spot, swap, and forward transactions. X-Rates Return Using the bilateral India-US nominal spot exchange rate
- ❖ the X-Rates return is computed as:

$$\text{Returnt} = 100 (\ln (E_t) - \ln (E_{t-1}))$$

Where, E is ₹ - \$ Nominal Spot X-Rates.

- ❖ The interest rate differential (INTD) is regarded as the difference between Indian 91-days Treasury bill rate and the US 3-month Treasury bill rate, with a monthly data on both series.
- ❖ Net Foreign Institutional Investment The net FII inflows is the net purchase of both debt and equity by the foreign institutional investors during a month expressed in rupees crore.

Limitations of the Study:-

The major concerns and limitations with regard to the present study include:

- ❖ The secondary data collected for analysis is limited to 40 years from 1982 to 2022.
- ❖ The data collected for the analysis is limited to few factors. The analysis can provide considering structural break which will provide much more insight of the influencing variables.

Keeping in view the above-mentioned objectives of the study, it was intended to test the research hypothesis about the level and nature of volatility pertaining in the Indian forex market due to the factors including net RBI intervention, net FII inflow and interest rate differential being unpredictable, the efficiency of the RBI intervention in Indian forex market. Secondary data was utilized to analyze objectives and concerning hypotheses using time series monthly data set of India-US nominal spot X-Rates, net purchase of the US Dollars by the RBI, net FII inflows and interest rate differential between India and the US from a period of 1982 to 2022.

The results from the ARDL analysis confirmed the long run relationship between the X-Rates return, net RBI intervention, net FII inflow and interest rate differential. The GARCH (1, 1) model used to test the level of volatility and the effectiveness of RBI intervention in the forex market confirms a clustering of volatility pertaining in the Indian forex market and the effectiveness of the Central bank intervention in the forex market of India. Major findings about empirical analysis of the current study including, descriptive statistics, unit root tests, ARDL model, tests for ARCH effects and GARCH (1, 1) model are incorporated in this section.

X-Rates are just the price of foreign currency which clears the forex market. In this way, X-Rates of currency are the connection between domestic and foreign prices of merchandise and ventures. Likewise, X-Rates can either acknowledge or deteriorate. A hike in the X-Rates happens if less unit of domestic currency exchanges for a unit of foreign currency while deterioration in X-Rates happens if more unit of domestic currency exchanges for a unit of foreign currency. In any case, exchange rate can be estimated in two different ways; (i) the nominal X-Rates (ii) the real X-Rates The nominal X-Rates is known to be the quantity of a unit of the domestic currency which is offered to get a unit of foreign currency. In other words, nominal X-Rates are regarded as the price of domestic currency to foreign currency. The real X-Rates is the relative price of foreign commodities in terms of domestic commodities. In other words, it is the exchange rate balanced for price. It is unexceptional to perceive nominal X-Rates from real X-Rates. Nominal X-Rates are developed on currency financial markets called forex markets, which resemble stock exchange markets. Rates are commonly settled in constant reference, with day-by-day paper uncovering each day reference as typical or finishing citation in the trading day on a specific market. Central bank may comparably settle the nominal X-Rates.

Real X-Rates are nominal rate revised by some methods by inflation measures.

Types of X-Rates Regimes

The X-Rates are determined in the market of forex including a wide range of buyers and sellers in which the trading of currency occurs and continues. The government considers the position of the economy and trade balance of the country before selecting an appropriate X-Rates regime. The main three types of X-Rates systems are the fixed X-Rates, floating X-Rates and the managed floating X-Rates.

➤ **Fixed X-Rates System:-** In the fixed X-Rates system there is a complete government intervention in the forex markets. One of the most important drawbacks of this regime is that it makes difficulty for the central bank to safeguard the X-Rates. During the deficit period, the central bank makes sure to inculcate more money to preserve the X-Rates. The foreign investments will be not more as the investor's fears about a loss of their investments.

➤ **Floating X-Rates system :-**

- ❖ In the floating X-Rates system the market forces decides the price of the X-Rates freely or independently. The demand and supply forces determine the X-Rates in the market.
- ❖ In such a system Central bank does not intervene in the market and permits the market forces to function accordingly to resolve the value of X-Rates.
- ❖ The major merit of the floating X-Rates regime is that there will not have any government intrusion. The exact price of the domestic currency is drawn as X-Rates and hence this will be convinced by the investors.

➤ **Managed Floating X-Rates:-** The managed floating X-Rates regime is considered to have few behaviors of both fixed and floating X-Rates systems. The market forces of demand and supply is free to determine the market prices and the Central bank intervenes whenever it is required to settle the exchange rate and stabilize it from volatility. The managed floating exchange rate regime is mainly sub-classified into four part -

- ❖ Adjusted Peg: in this system a currency is fixed to a particular value against other foreign currency like dollar with a degree of flexibility allotted against a certain level. If the X-Rates deviates from this rate then the central bank intervenes in the market to maintain the pegged rate of exchange.
- ❖ Crawling Peg system: In this exchange rate regime a continues changing of the X-Rates is applicable in accordance with the change in demand and supply
- ❖ Clean Floating: in the clean floating X-Rates system market is free to determine its X-Rates with the help of demand and supply forces of forex market. Central bank intervention is not required under this system. This is impossible to differentiate with the floating X-Rates regime.
- ❖ Dirty Floating: in this X-Rates regime even though market forces of X-Rates market is determining the X-Rates, the Central bank intervenes in the market so as to maintain stability in the X-Rates. additionally become progressively integrated with the worldwide system since

Indian X-Rates Chronicle

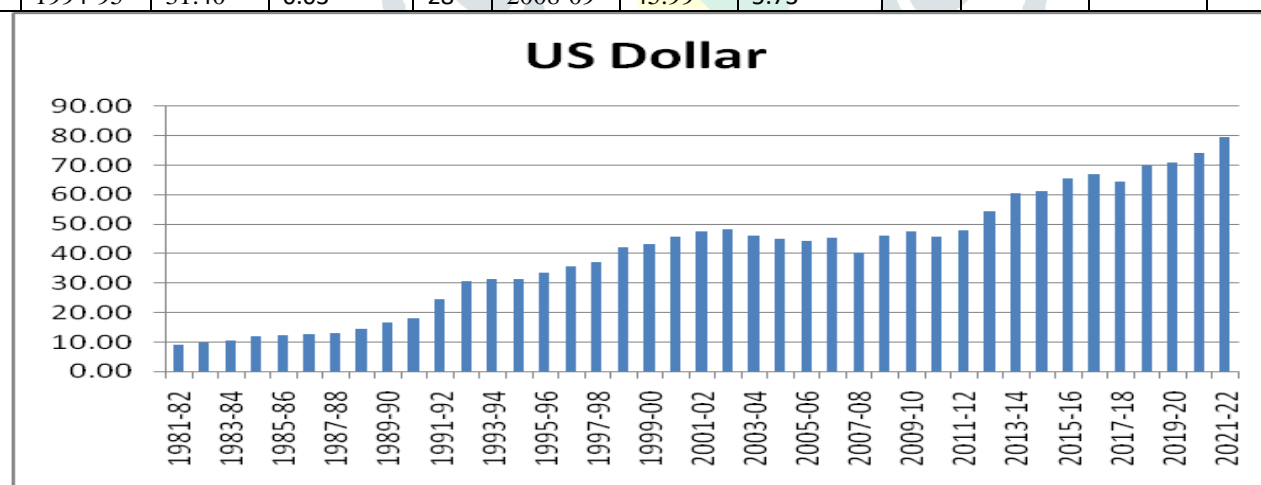
- ❖ 1947-1971- Maintained a Par Value structure of X-Rates. Rupee's external par value was set with respect of gold by means of pound sterling as the intervention currency.
- ❖ 1971 -Collapse of the Bretton-Woods system and floating of major currencies was marked. Indian Rupee linked with pound sterling in December 1971.
- ❖ 1975 -To guarantee stability of the Rupee, and steer clear of the weaknesses related with a single currency peg, the Rupee was pegged to a basket of currencies. Currency assortment and weight obligation was left to the prudence of the RBI and not publicly broadcasted.
- ❖ 1978 -RBI approved the domestic banks to commence intra-day trading in forex.
- ❖ 1990-1991-Banks started excerpting two-way prices against the Rupee as well as in other currencies. As trading volumes augmented, the guidelines for internal control over forex business were put up in 1981. The forex market was then also exceedingly synchronized with several boundaries on external transactions, entry barriers, and transaction costs. Forex dealings were guarded through the Forex Regulations Act (FERA). These limits ended in an extremely well-organized unofficial parallel market for forex. Balance of Payments crisis
- ❖ July 1991 -To calm down the forex market, a two-step downward X-Rates adjustment was done (9% and 11%). This claimed a crucial end to the pegged X-Rates regime.
- ❖ March 1992 -To relieve the conversion to a market-determined X-Rates system, the Liberalized X-Rates Management System (LERMS) was introduced, which wore a dual X-Rates system. This was above all a transitional system.
- ❖ March 1993 -The dual rates come together, and the market determined X-Rates regime was introduced. All forex receipts could now be transformed at market determined X-Rates.

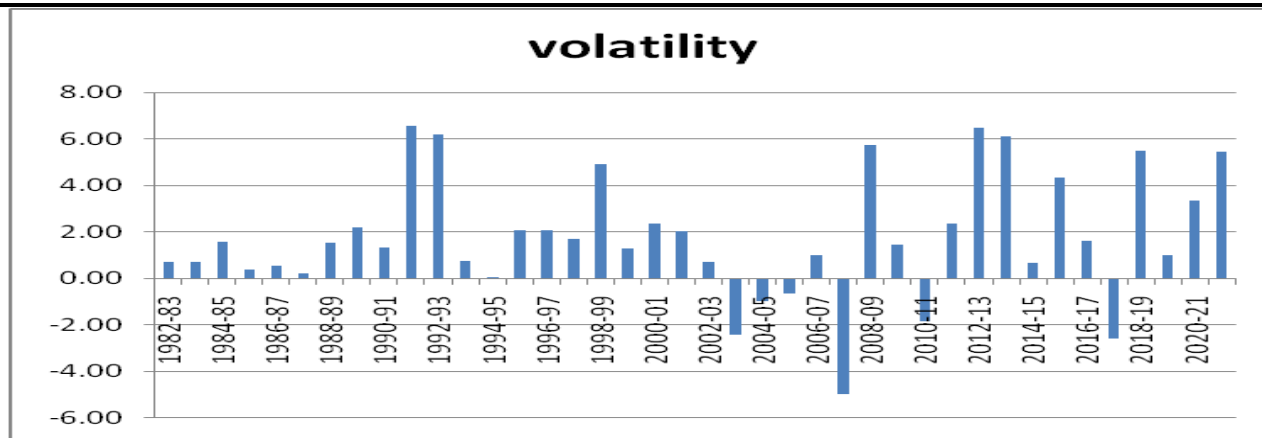
Source: Pami Dua and Rajiv Rajan, (2010). X-Rates Policy and Modelling in India, RBI publication,

The Indian Rupee-US Dollar X-Rates:-

X-Rates is the ultimate most important price influencing every single outer exchange in an open economy. One particular part of X-Rates developments that has been of concern for policy creators and scholastics alike is their volatility. The X-Rates could show higher volatility as a result of a few factors, for example, deviation from essentials, over-the-top theoretical exercises, macroeconomic shocks, or other worldwide and domestic news. Inordinate vacillations in exchange rates could overflow to different fragments of financial markets, can obscure the monetary policy flags, and prompt financial security issues. X-Rates risk emerges because of sudden changes in the prices of two currencies. These price changes could be good or they could be non-great

EXCHANGE RATE OF THE INDIAN RUPEE VIS-A-VIS US DOLLAR,& volatility per year											
S.No	Year	US Dollar	volatility	S.No	Year	US Dollar	volatility	S.No	Year	US Dollar	volatility
1	1981-82	8.97		15	1995-96	33.45	2.05	29	2009-10	47.44	1.45
2	1982-83	9.67	0.70	16	1996-97	35.50	2.05	30	2010-11	45.56	-1.88
3	1983-84	10.34	0.67	17	1997-98	37.16	1.66	31	2011-12	47.92	2.36
4	1984-85	11.89	1.55	18	1998-99	42.07	4.91	32	2012-13	54.41	6.49
5	1985-86	12.23	0.35	19	1999-00	43.33	1.26	33	2013-14	60.50	6.09
6	1986-87	12.78	0.54	20	2000-01	45.68	2.35	34	2014-15	61.14	0.64
7	1987-88	12.97	0.19	21	2001-02	47.69	2.01	35	2015-16	65.47	4.32
8	1988-89	14.48	1.52	22	2002-03	48.40	0.70	36	2016-17	67.07	1.60
9	1989-90	16.65	2.17	23	2003-04	45.95	-2.44	37	2017-18	64.45	-2.62
10	1990-91	17.94	1.29	24	2004-05	44.93	-1.02	38	2018-19	69.92	5.47
11	1991-92	24.48	6.54	25	2005-06	44.27	-0.66	39	2019-20	70.90	0.97
12	1992-93	30.65	6.17	26	2006-07	45.25	0.98	40	2020-21	74.23	3.33
13	1993-94	31.37	0.72	27	2007-08	40.26	-4.99	41	2021-22	79.65	5.43
14	1994-95	31.40	0.03	28	2008-09	45.99	5.73				





Interest Rate Differential between India and US:-

An interest rate differential is a distinction in interest rate between two currencies in a couple. If one currency has an interest rate of 3 percent and the alternate has an interest rate of 1 percent, it has a 2 percent interest rate differential. The utilization of interest rate differentials is of particular concern in forex markets for estimating purposes. If somehow happened to purchase the currency that pays 3 percent against the currency that pays 1 percent, payment would be made on the distinction with everyday interest payments. This straightforward definition is known as the convey trade, acquiring on the interest rate differential. Advancements as of late have conveyed interest rate differentials to another light that merits research.

The Central bank in most of the economy makes a higher interest rate policy whenever the currency is under pressure and a low-interest rate policy is kept when there is a normal situation. Hence, the X-Rates depreciation may lead to an increase in the interest rate. By this, the interest rate, as well as the X-Rates, affects each other. As of uncovered interest parity, the economies interest rate is the sum of the world interest rate among the usual depreciation of the domestic currency. Mundell-Flemming model accounts that if there is a hike in interest differential the more is the capital inflow and this appreciates the X-Rates. Monetarist on the other hand believes that an increase in interest rate will decrease the demand for money which makes way for depreciation of the currency because of the higher inflation.

The overshooting model of Dornbush provides that the usual X-Rates appreciate more than the spot rate that exists before raising interest rates. Hence, there can be a negative relationship between interest rate and X-Rates that is, a high-interest rate policy is associated with X-Rates appreciation. There exists a high correlation between interest rates, inflation, and X-Rates. Interest rates are commonly settled by Central bank of the country.

Changes in interest rates impact the inflation rates, which thus results in change in the X-Rates. More foreign capital will be pulled in if the interest rates in a country are high and this will prompt gratefulness in the country's X-Rates. Then again bring down the interest rates less will be the foreign capital inflows and low inflow of foreign capital prompts devaluation of currency. X-Rates volatility in the forex market entails real cost on the economy. High volatility in the forex market affects investment and could also obscure the performance of the monetary policy. With regard to this, there is a focus among the policymakers and academicians in investigating the Central bank responses to various incidents of volatility in the foreign exchange markets. Aligned with this background, present study analyses fluctuations in Indian forex market caused by various factors and responses made by RBI (Reserve Bank of India) to restrain the volatility. The study aims to identify the long-run relationship among the major macroeconomic factors affecting the X-Rates of INR-USD (Indian Rupee- United States Dollar) and more specifically analyses the effectiveness of RBI intervention in managing the X-Rates volatility of India during the period of 1982-2022.

Design:- This empirical study analyses the objective using secondary data of mainly four variables including X-Rates return (dependent variable), net FII inflow, RBI net purchase of US Dollar, and interest rate differential. Monthly data of these variables for a period of 40 years (1982-2022) includes 128 observations. The ADF test, Descriptive statistics, Time series plots, ARDL Bound test, Granger Causality Test, GARCH (1, 1) Model, and various significance tests carried out in the analysis facilitate to the exploration of the purpose of the study. Findings: The analysis unveils that there has been a significant increase in X-Rates volatility soon after the global financial crisis. This demonstrates a larger impact of fluctuations in capital flows on X-Rates movements. An imperative characteristic of the policy feedback in India towards various incidents of volatility

have been the market intervention along with monetary and reliable measures to meet the threats to financial stability. The results from various empirical tests utilized in the study confirm 1) the clustering of volatility prevailing in India's forex, 2) the long-run relationship existing between Return, Net RBI Intervention, Net FII Inflow and Interest Rate Differential and 3) an effective RBI intervention in Indian forex market during the study period.

Descriptive Statistics :-

Basic features of the raw data are described with the help of descriptive statistics. The results from Table 6.1 claims that the X-Rates return series is positively skewed and leptokurtic, this indicates the presence of a significant degree of variability in the return series. The Jarque- Bera test has rejected the null hypothesis of normal distribution for the return series with a high confidence level. This shows the non-normality prevailing in the return series of the current data under study.

Unit Root Tests:-

The stationarity of time series variables are to be checked to understand if there is any unit root in the series. The existence of a unit root may cause serious problems like spurious regressions and errant behavior.

X-Rates Volatility and the Role of RBI The present study applied the Augmented Dickey-Fuller Test (ADF) to estimate the presence of unit roots for all the variables. The test results found the variables RETURN, INV and FII as stationary at 1% significance level at I(0). While the variable INTD (Interest Rate Differential) was found nonstationary at level. After taking

first difference the variable interest rate differential got significant hence stationary at I(1). ARDL Model:-

Based on the results of the above-mentioned unit root tests, all the variables are not integrated in the same order. Therefore, it becomes sensible to estimate the short-run and long-run relationship between exchange rate return, RBI intervention, net FII inflow and interest rate differential using ARDL model. Using bounds test the co-integration is tested. The F statistics were higher than the upper and lower bounds indicating cointegration among the dependent and independent variables. Error correction term ECM is negative and significant at 1% significant level providing convergence to long-run equilibrium. The speed of adjustment towards long-run equilibrium is 87.37%.

Tests for ARCH Effects:

The Ordinary Least Squares (OLS) technique was applied on the equation in order to test the presence of ARCH effect. Before estimating basic GARCH specifications it is mandatory to test for the time-varying heteroscedasticity in the time series data. The Ljung-Box Q-Statistic test for checking autocorrelation coefficients showed insignificant while the ARCH LM test and the squared residuals of L-B Q-Statistic (after three lags) confirm the presence of the ARCH effect. The test rejected the null hypothesis of zero autocorrelation of squared residuals and return. Conclude that the return series are heteroscedastic with a non-normal distribution below 10% X-Rates Volatility and the Role of RBI level of significance. The Jarque-Bera statistics result provided the probability value marginally above 5% significance level.

GARCH (1, 1) Model:-

$$RETURN_t = a_0 + a_1INV_t + a_2FII_t + a_3INTD_t + \varepsilon_t \quad \varepsilon_t | \Omega_{t-1} \sim N(0, h_t)$$

$$h_t = b_0 + b_1INV_t + b_2FII_t + b_3INTD_t + \alpha\varepsilon_{t-1}^2 + \beta h_{t-1}$$

$$\text{With } b_0, \alpha, \beta > 0 \text{ and } \alpha + \beta < 1$$

The time series plots of the residuals observed a volatility clustering. The ARCH effects analyzed from the test results like L- B Q Statistic, ARCH LM test and the Jarque-Bera statistics provide for further analyzing the series with GARCH (1, 1) model. The GARCH model was estimated using Bollerslev Woodbridge's Quasi-Maximum Likelihood (QML) technique. As this includes the nonlinear inference Berndt-Hall- Hall-Hausman (BHHH) numerical algorithm (Berndt et al. (1974)) was used with Normal Distribution. The results obtained are checked for no further ARCH effects using L-B Q-Statistics test, and ARCH-LM test up to 8 lags. The test confirmed no further ARCH effect in the residuals. The Wald test in table 7.10 assessed the degree of volatility. The null hypothesis of the Wald test is $\alpha + \beta = 1$ showing that the error variance is non-stationary and the alternative the hypothesis is $\alpha + \beta < 1$, depicting a stationary error variance. The test result rejected the null hypothesis with high confidence level. The sum of the ARCH and GARCH coefficients $\alpha + \beta = 0.086$. The value being substantially lower than unity the stationarity of the variance and long memory is confirmed and it is mean reverting. Findings from these test results confirm the adequacy of the GARCH (1, 1) model for the present empirical analysis.

Parameter Estimates:-

The GARCH model consists of mean and variance equations each of these equations is estimated together in the same system. Summary and Conclusion X-Rates Volatility and the Role of RBI

Mean equation:-

- ❖ The coefficient of the intervention variable has a sign of positive which is essential theoretically.
- ❖ The coefficient a_1 (INV) from the equation is insignificantly positive. Depicting that for every 1 crore rupee worth net purchase of the US dollar by the Reserve Bank of India the X-Rates return will rise by 2.71.
- ❖ An increment in the net purchase (sales) of the Reserve Bank of India leads to depreciation (appreciation) of the rupee in the Indian forex market.
- ❖ Coefficient a_2 from equation has a negative sign showing a negative relationship between the exchange rate return and FII inflows of a one-period lag. The relationship is shown to be highly significant with a p-value of less than 1% level of significance.
- ❖ The coefficient of a_3 from equation has a positive sign with less than 1% significance level showing a positive relationship between the interest rate differential and the X-Rates return. The result upholds the relationship explained by the Mundell Fleming model.

Variance equation: -

- ❖ The coefficients obtained from the estimated variance equations are a sign of the exact relationship or effects of variables on the X-Rates volatility.
- ❖ The b_1 coefficient of the intervention variable in equation is expected to be negative and significant. The result shows a negative sign for the coefficient indicating that the RBI intervention is effective which means that RBI's net purchase of the US dollar in the forex market will lead to a decline in the volatility of X-Rates.
- ❖ The coefficients of b_2 and b_3 from equation show the effects of FII and interest rate differential on the X-Rates volatility. The results expose negative and positive signs respectively with insignificant p-values.
- ❖ The coefficients of lagged squared residuals (showing ARCH effect) and lagged conditional variance (showing GARCH effect) has a negative and positive sign respectively. The lagged conditional variance is highly significant with less than 1% level. This portrays that the lagged volatility has a more significant on the volatility.
- ❖ The volatility seems to be affected significantly by both the interest rate differential and net FII inflows in the mean equation but not in the variance equation. The results portrayed through the GARCH (1, 1) model in the present study have important policy implications for maintaining the volatility in the X-Rates return.

The GFC bring to light that the foreign exchange markets are habitually the primary channels for financial contamination which stimulated closer supervision of these markets by Central banks in provisions of tighter regulations to reduce uncertain behavior. The GFC has also shown that direct intervention in the forex market can limit the negative impact of shocks on exchange rate and liquidity dynamics and could therefore be a vital tool in the arsenal of the Central bank when trading with unstable market conditions and extreme risk aversion. The significance of accounting for different policy and market regimes, as well as the inherent inter-connectedness and endogeneity of policy instruments and market conditions to the effectiveness of Central bank policy were also highlighted. The review of literature has also a bare requirement for perfection in terms of the empirical methodologies for measuring the effectiveness of Central bank policy plans in the forex market.

The conservative measures of volatility acquired as coefficient of variation or continuing standard deviations are regarded to be biased estimates; hence, any assessment of such biased estimates might be misleading. As an alternative, one must use volatility modeling from an appropriate ARCH/GARCH model. In many cases, the results of empirical studies on the effectiveness of Central bank interventions in the forex market were either ambiguous or perverse because of the use of inappropriate or deficient empirical methodologies. Indeed, many recent studies (Kim and Sheen, 2006; Kearns and Rigobon, 2005) have shown that Central bank intervention in the foreign exchange market was effective once an appropriate methodology was used. There is much scope therefore to improve an understanding of the impact of Central bank policies in forex markets by using more appropriate and comprehensive empirical frameworks for studies in this area. In this context, utilizes the most recent data available and the empirical methodological advance of

GARCH model to measure the effectiveness of Central bank intervention in the forex market of India. It, therefore, contributes to the area of applied empirical methodologies for the measurement of the dynamics of intervention in the forex market. It demonstrates that Central bank policy interventions in the forex market can be effective if the related time series data are used together with more robust and appropriate empirical methodologies to better capture the complex dynamics in forex markets.

Scope for Future Research :-

The possibilities and scope concerning this research are worth mentioning and it provides with few which are mentioned below.

- ❖ Present study regarding the analysis of relationship among major economic variables relating to X-Rates and the effectiveness of RBI intervention on the X-Rates of the Indian Rupee are expected to be constructive for global investors, risk managers and traders looking for the forecast rupee volatility.
- ❖ The pragmatic findings of the study can help analysts on using conditional volatility models for intriguing improved currency investment evaluations. The study is likely to gain researchers in the field, equally in the use of the GARCH-family models and estimation of their forecasting exactness.
- ❖ Familiarity with the technique and process that can endow with the most exact forecasts for a prearranged financial time series is essential. Such sweeping statement may figure the foundation of decision-making by association that regularly depend upon a single procedure for a given data.
- ❖ The study makes significant involvement to the active research in the field as, to the most important of the acquaintance of the authors.

Conclusion :-

The exchange has been on a whim for a considerable period. Human encroachments are carried along with exchange in every part of the world. History engraves the requisite for exchanging that existed because of disparity in openness of resources and comparative advantage. Substantial progress was perceptible in India's X-Rates regime over the reform years. The stir from a nominal fix to the irreversible nominal movement (over the nineties) to two-way with low volatility entailed tight managed X-Rates, to greater volatility and nominal movement after the global crisis. International trade, as well as investment decisions, turns out to be further complex because of volatile X-Rates since volatility increases the risk factor in X-Rates. If the partakers in international trade are conscious of X-Rates risks, they possibly will have a preference to change towards domestic deeds. Wherein profits were comparatively not uncertain up to a convinced extent, other than progressing trading in foreign markets. India has plunged on to a sequence of structural reforms in the forex market ever since 1990s. X-Rates policy has been developed gradually in the fullness of time corresponding to the steady opening-up of the economy about the the far-reaching stratagem of macroeconomic reforms. One among the imperative reforms is a two-step downward adjustment of the Indian Rupee to mount investors' confidence Furthermore boost domestic competitiveness. These were influential methods to denouement pegged X-Rates regime in India. At some stage in this era, the majority of the academia and economists asserted for putting in place flexible X-Rates regime.

In India, when the RBI wants to devalue the rupee it typically does so by using INR to buy up foreign currency from the market. This strengthens the foreign currency and weakens the INR. All Central banks, be it the RBI the Fed in the U.S., the Bank of England, or the People's Bank of China (PBC), keep a watch on the X-Rates of the nation, and when the rate veers too widely off course these Central banks try to intervene directly or indirectly to make corrections. Generally, it is observed that the high capital inflows lead the INR to appreciate, and it grinds down the competitiveness of the economy in the international financial market. This will also increase the volatility in the forex market. To maintain the volatility in the INR caused by such factors, the RBI makes interventions to attain stability in the forex market. The long-run relationship between the X-Rates returns, net RBI intervention, Net FII inflow, and Interest rate differential that determined X-Rates volatility was confirmed using ARDL model. The results from the model asserted co integration among the variables. The estimated GARCH (1, 1) model confirms the effectiveness of RBI intervention in the X-Rates return during the period under study. Hence the intervention made by the Central bank in India to reduce the fluctuations pertaining to the X-Rates market is remarkable.

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