

## GROWTH OF THE CURRENCY DERIVATIVES TRADED ON THE NSE

Dr. Dharen Kumar Pandey<sup>1</sup>

*The futures market holds a great importance in the economy, and, therefore, it becomes imperative that we analyse this important market and seek answers to a few basic questions. The main theme of this paper is to assess the growth of currency derivatives in India. It also aims at examining the volatility of the currency derivatives. In order to study the growth of the currency futures and options, the number of contracts traded and open interest at NSE has been inclusively compared. Attempt has been made to check whether the daily returns of the NSE on currency futures are normally distributed. For this purpose the changes in the daily value of Rupee as compared to Dollar, Yen, Euro and Pound have been calculated for the period and the data have been used for the ANOVA Test to test the hypothesis that the returns are normally distributed. The currency futures have received a good response from the investors as well as the hedgers. Initially, currency futures were started for USD-INR contracts but trading in Euro-INR, Yen-INR and Pound-INR contracts have been introduced in January 2010. Currency Options on US Dollars was introduced on October 29, 2010. A comparison between the currency futures and options on USD-INR has also been done. The risk involved is comparatively low in this case and currency futures and options have proved to be a good tool for hedging the risk involved in the currency of a country (currency risk).*

**Keywords:** *Currency Futures, Currency Options, Volatility, Currency Risk, Open Interest.*

### INTRODUCTION

Currency futures have significantly gained importance all over the world since the first currency futures contract was traded in the year 1972. With the successful three years of the currency futures on USD-INR which was allowed for trading on the NSE in August 2008, trading in Euro-INR, Yen-INR and Pound-INR contracts have been introduced in January 2010. A currency derivatives segment is not complete with just currency futures floating over the trading platform; in fact, it needs the options, too. Hence, currency

---

<sup>1</sup> Tax Assistant, O/o the Chief Commissioner of Income Tax (CCA), Patna. dharen.p@gmail.com

options on USD-INR was introduced on October 29, 2010. The introduction of currency futures in India has passed a journey of more than three years and many changes have been implemented in the trading system in this regard. Currency options, although a year old, have gained upright access in the NSE's currency derivatives segment.

### **Pricing and Settlement of Currency Futures**

According to the interest rate parity theory, the currency margin is dependent mainly on the prevailing interest rate (for investment for the given time period) in the two currencies. Therefore, the currency futures prices are determined with the help of the spot rates and interest rates prevailing at that time. The following formula is used to set the price for a contract for a given currency pair:

$$F = S (1 + R_Q \times T) \div (1 + R_B \times T)$$

**Where,**

**F** = the price for the currency futures contract;

**S** = the spot rate for the currency pair;

**R<sub>Q</sub>** = the interest rate of the quote currency;

**R<sub>B</sub>** = the interest rate of the base currency;

**T** = the time to maturity (in days).

After the expiry of the currency futures contracts, the currency futures are settled in cash in the underlying currency. This is due to the reason that the currency futures are based upon the exchange rate of both the currencies. The delivery is made in cash in the underlying currency.

### **OBJECTIVES, SCOPE AND METHODOLOGY**

Currency futures have significantly gained importance all over the world. The futures market holds a great importance in the economy and, therefore, it becomes imperative that we analyse this important market and seek answers to a few basic questions. The main theme of the study is to assess the progress of the currency futures in India with a compact view over the volatility of the currency futures. In order to study the growth of the currency futures, the number of contracts traded and open interest for the available four currency futures contracts at the NSE have been inclusively compared. The correlation between the open interest and the contracts traded is used to conclude the

growth of the currency futures. If both these values are increasing and correlated positively, then it means that the growth has been satisfactory. But if there is a negative correlation between the two values, the growth is not considered to be satisfactory. The open interest and contracts traded for the currency futures and options on USD-INR have been compared. The correlation between the open interest and the volume of contracts traded have been calculated to study the growth of the currency options. In order to find out the strength of the relation between currency options and futures, the open interest and contracts traded of both have been compared inclusively. Attempt has been made to check whether the daily returns of the NSE on currency futures are normally distributed. ANOVA has been used to test the variance among the returns from various currencies. The value of F (0.438) calculated is less than the critical value of F and, thus, the null hypothesis is accepted.

$H_0$ : The returns of the currency futures are normally distributed.

$H_1$ : The returns of the currency futures are not normally distributed.

## QUANTITATIVE ANALYSIS

This section deals with the analysis part where the open interest and the contracts traded have been compared for all the four currency futures contracts traded on the NSE. The analysis of the change in value of Rupee for various currencies have also been done. Let us discover the facts through our analysis in process. The growth of the open interest and contracts traded are explained below:

### I. Open Interest and Volume of Contracts Traded

Open interest is the total number of outstanding contracts that are held by the market participants at the end of the day. It is also considered as the number of futures contracts that have not yet been exercised, expired or fulfilled by delivery. It is often used to confirm the trends and trends reversals for futures markets. It measures the flow of money into the futures market. A seller and a buyer forms one contract and hence in order to determine the total open interest in the market we need to know iether the total of buyers or the sellers and not the sum of both the open interest position that is reported each day represents the increase or decrease in the number of contracts for that day. An increasing open interest means that the new money is flowing in the marketplace and the present trend will continue. If the open interest is declining it implies that the market is

liquidating and the prevailing price trend is coming to an end. The leveling off of open interest following a sustained price advance is often an early warning of the end to an uptrending or bull market.

The number of contracts traded on a stock exchange shows the total volume of contracts traded. An increase in the number of contracts traded on an stock exchange expresses the growth of trade in that particular stock exchange for a particular currency future. Given below are the figures which shows the flow of open interest and contracts traded for various currency futures contracts.

Figure 1 shows the open interest and contracts traded for the EURO-INR currency futures. We can easily see that till December 2010, both open interest and the volume of contracts traded, have been declining in this case. Again with a rise since January 2011 it followed a downward trend from August 2011. This is not a good indication for the growth of currency futures. The correlation calculated between the open interest and the contracts traded gave a positive value of +0.14 which represents that although not so strong the correlation between them indicates that the growth for EURO-INR currency futures is not satisfactory. Further study of other currency futures reveal that all have performed well but only the performance of the EURO-INR currency futures have been dissatisfactory.

**Figure 1: Volume and open interest for EURO-INR currency futures since February 2010**

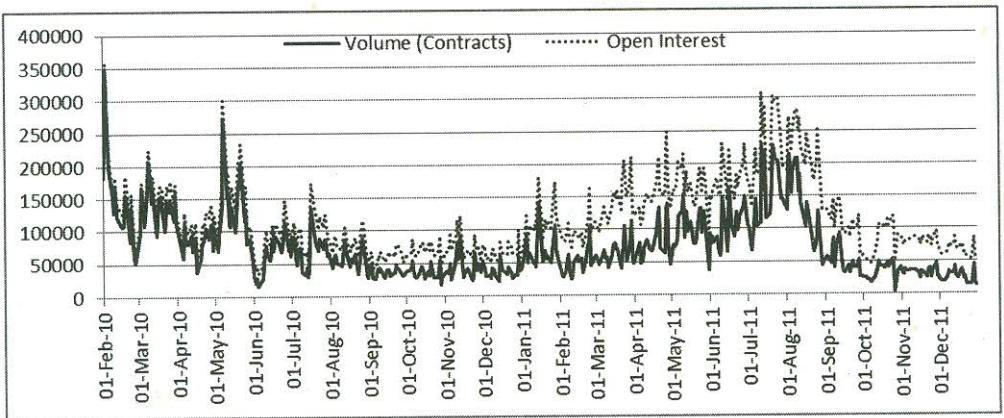


Figure 2 shows the open interest and volumes contracted for the GBP-INR currency futures and depicts that the currency futures have been growing at a steady rate. Both, the open interest and the volumes contacted, have been growing and thus indicating towards positivity. In this case, too, the volumes and open interest has been declining since

August 2011. However, the correlation coefficient  $+0.76$  also supports that there has been a strong positive relation between the open interest and contracted volumes which again concludes that the GBP-INR currency futures have been performing well.

**Figure 2: Volume and open interest for GBP-INR currency futures since February 2010**

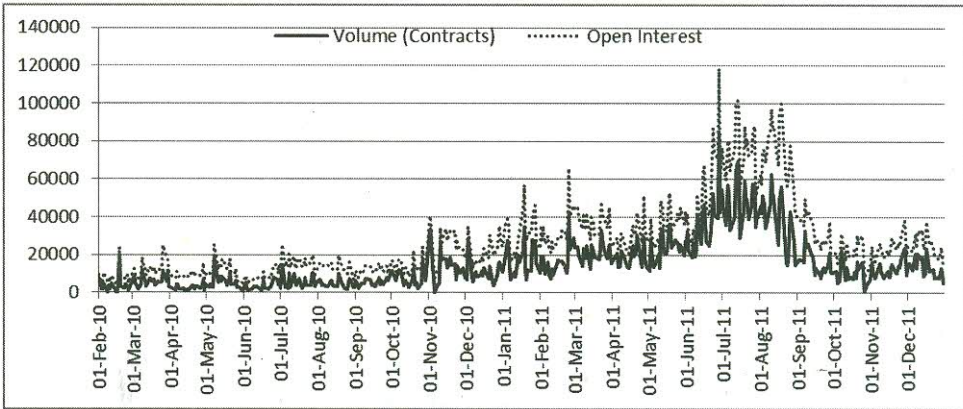


Figure 3 shows the open interest and volumes of contracts traded for the JPY-INR currency futures and depict that the currency futures have been growing but not steadily. There has been major downfalls during May 2010 when it got lowered and then again started rising up. With a similar trend in the year 2011, in this case, too, the volumes and open interest has been declining since August 2011. But the correlation between the open interest and the contracted volumes is  $+0.52$  and concludes that a significant growth has took place in the JPY-INR contracts during the period.

**Figure 3: Volume and open interest for JPY-INR currency futures since February 2010**

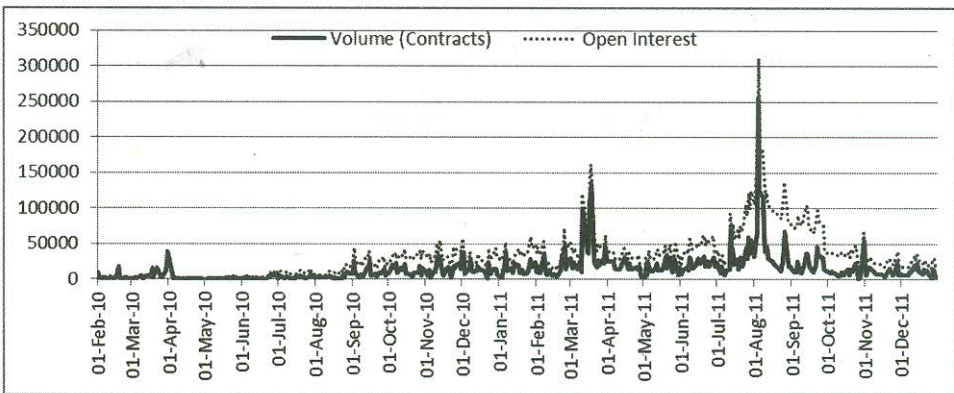
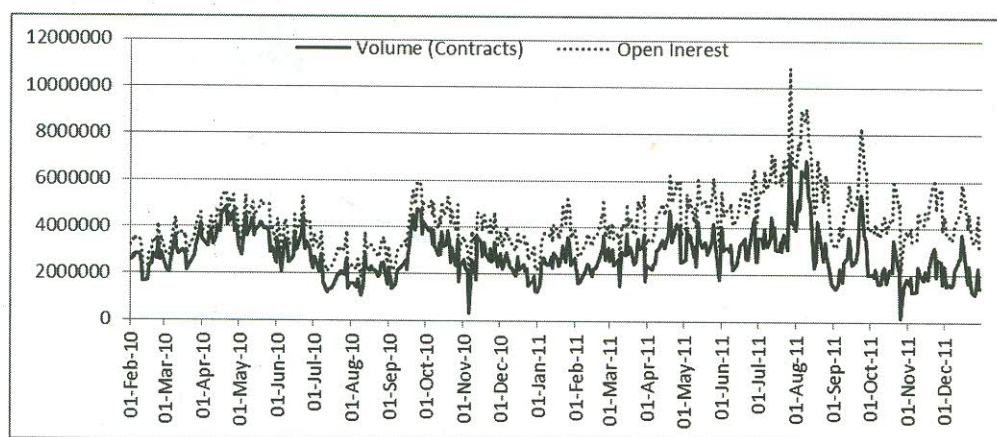


Figure 4 shows the open interest and contracted volumes of the USD-INR currency futures. A good growth is noticed for the USD-INR currency futures. As it has been noticed in the other three currency futures contracts, the volumes and open interest of USD-INR currency futures has also been declining since August 2011. The correlation coefficient of +0.81 in fact shows that the growth of both, the open interest and the contracted volumes has been high. The two-and-a half year period experienced a good demand for the USD-INR currency futures.

**Figure 4: Volume and open interest for USD-INR currency futures since February 2010**



## II. Daily fluctuations in the Value of Rupee:

With a maximum mean, Yen reveals that it has been more profitable for the investors. However, US dollar has been performing well among these four currencies when both return and volatility is considered. When it comes for volatility, the value of Rupee has been much volatile in case of Yen, then in case of Pound, Euro and US dollar respectively. Less volatility and a good average return has been seen for the US Dollar currency. A detailed statistic is given in the Table 1.

**Table 1: Descriptive statistics**

	USD	GBP	EURO	JPY
Mean	0.0315	0.0253	0.0172	0.0666
Median	0.0215	0.0022	0.0414	0.0786
Standard Deviation	0.5238	0.7193	0.6754	0.8685
Sample Variance	0.2743	0.5174	0.4562	0.7542
Minimum	-2.621	-5.600	-2.343	-4.428
Maximum	1.9430	6.1943	2.8892	2.9984
No. of Observations	462	462	462	462

The analysis of variance among the changes in value of Rupee for all the four currency reveals that the returns have been following a normal distribution and that there is no significant difference between the returns from these currencies. The results of the ANOVA are shown in Table 2.

**Table 2: ANOVA results**

Source of Variation	SS	df	MS	F	P-value	F- crit
Between Groups	0.658	3	0.219	0.438	0.725	2.609
Within Groups	922.994	1844	0.501			
Total	923.652	1847				

### III. Growth of the Currency Derivatives Segment

The currency derivatives segment of the NSE started in the year 2008. Table 3 depicts the growth of the currency derivatives segment of the NSE. With an average daily turnover of Rs.20284,05 in 2008-09, the currency derivatives segment was widely accepted by the market participants and the average daily turnover for the second year went up by 632 per cent followed by 93 per cent growth in 2010-11 and by a mere 35 per cent in 2011-12. However, the currency futures have been the major performers in the currency derivatives segment with 95 per cent and 72 per cent of the total market share of the currency derivatives segment of the NSE. There are four currency futures contracts and one currency options contracts traded in this segment. The USD-INR currency option alone held the 28 per cent share of this segment in 2011-12 and is expected to move on with the same pace ahead.

**Table 3: Business Growth in the Currency Derivatives Segment of the NSE**

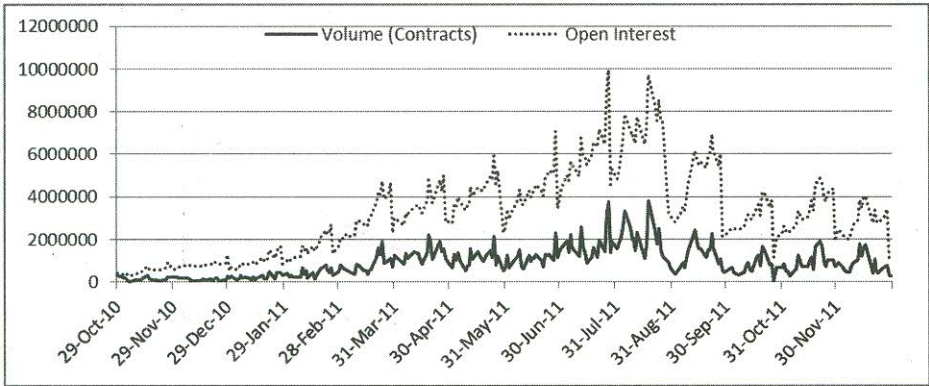
Year	No. of Contracts in Currency Futures	Per Cent of Total No. of contracts	No. of Contracts in Currency Option	Per Cent of Total No. of contracts	Total No. of contracts	Average Daily Turnover (in Rs.)	Per Cent Growth
2008-09	3,26,72,768	100	-	-	3,26,72,768	20284.05	
2009-10	37,86,06,983	100	-	-	37,86,06,983	148550.67	632
2010-11	71,21,81,928	95	3,74,20,147	5	74,96,02,075	287482.31	93
2011-12	70,13,71,974	72	27,19,72,158	28	97,33,44,132	389582.49	35

It can be seen that the total number of contracts have been increasing year by year, but, the growth rate of the average daily turnover has been declining. The reason behind the decline in the growth rate of the average daily turnover is due to the decline in the number of contracts traded of all the four currency futures. In the graphical representation, it is noticed that there has been a major downfall in the number of contracts traded and the open interest for all the four currency futures contracts traded on the NSE.

**IV. Currency Options traded on the NSE: A Comparison with Currency Futures**

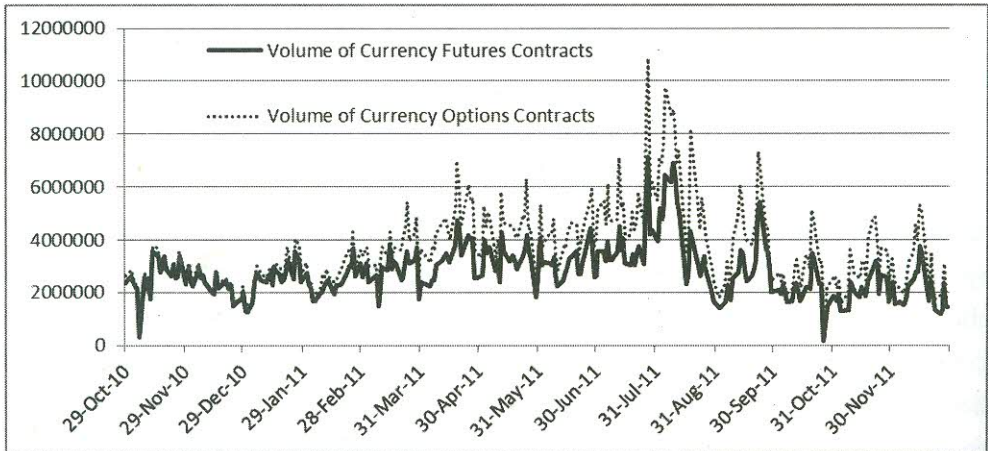
It is clearly noticed in Figure 5 that the contracts traded and the open interest has been moving upward at the same pace. A correlation of +0.81 between the contracts traded and open interest points out that the performance of the USD-INR currency options has been the best in the currency derivatives segment of the NSE. With a strong positive correlation and upward trend, the currency option contracts are performing well.

**Figure 5: Volume and Open Interest for USD-INR Currency Options since October 2010**



However, the graph has been moving downward since August 2011. The same trend has been noticed in the case of the four currency futures contracts in this segment. It can, thus, be concluded that the whole currency derivatives segment has not been performing well during the period August, 2011 to December, 2011.

**Figure 6: Volume for Currency Options and Currency Futures since October 2010**





A comparison between the volume and open interest of currency futures contracts and currency options contracts has been done. Figure 6 depicts the volumes of contracts traded in currency options and the currency futures. In both cases, the contracts traded have been following a similar trend. A correlation of +0.70 between them opines that USD-INR futures and options are more closely held by the market participants.

**Figure 7: Open Interest for Currency Options and Currency Futures since October 2010**

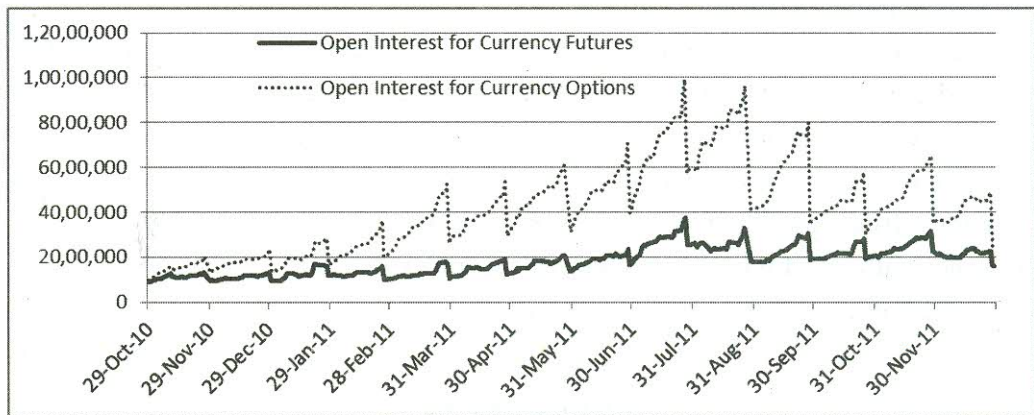


Figure 7 depicts the open interest of the USD-INR futures and options. Although the open interests for currency options were high, they have followed the same trend as the currency futures. A strong positive correlation of +0.82 between them opines that the USD-INR futures and options are more closely held by the currency derivative participants.

**CONCLUSION**

The growth of the Indian currency derivatives market has been quite impressive. The upward trend of the volumes and open interest for currency futures and options more clearly describes the success of the derivatives segment of the NSE. It was the growth of USD-INR currency futures since August 2008, which led to the introduction of the other three currency futures in January 2010. The GBP-INR, JPY-INR and the USD-INR currency futures have also recorded a growth and, thus, confirmed that the introduction of currency futures have been a good step taken by the Government. The US Dollar has been least volatile and the return from it was also

good. The correlation between the open interest and the contracts traded in case of the USD-INR currency futures is +0.81, that was the maximum, and, thus signifies the growth. The overall performance of the currency futures has been encouraging and thus a good future is expected for the currency futures. The correlation test also explained that the relationship between the open interest and traded volumes is very much significant and that the change in the value of currency is normally distributed, thus, illustrating that the risk is minimum in the currency futures contracts. The currency options introduced in October, 2010 have also performed hand to hand with the currency futures. The USD-INR currency options with a strong positive correlation indicate that it has grown well. The comparative analysis of the USD-INR currency futures and options has concluded that they are more closely held by the market participants. The risk involved is comparatively low in this case and currency derivatives has proved to be a good tool for hedging the risk involved in the currency of a country (currency risk). It is hoped that the currency derivatives segment will develop faster and it will be a good choice for all the market participants in the near future. Moving along the road, currency derivatives will surely find its way in the Indian economy.

## REFERENCES

- Choudhari, N.** 2009. *Global Recession and its impact on Indian financial market*. Retrieved from [www.aima-ind.org/.../Nidhi\\_Choudhari\\_24080982820095705178.pdf](http://www.aima-ind.org/.../Nidhi_Choudhari_24080982820095705178.pdf)
- Currency Futures (Reserve Bank) Directions, 2008
- Currency Futures (Reserve Bank) (Amendment) Directions, 2010
- Circulars of the RBI and the NSE
- CA Gandhi, G. S.** 2006. Selecting a Suitable Currency Options Hedging Strategy for Managing Foreign Exchange Risk. *The Chartered Accountant*. November 2006. pp 773-78
- Guru, A.** 2009. *Indian derivative markets: Some policy issues*. Retrieved from SSRN: <http://ssrn.com/abstract=1428685>
- Guru, A.** 2009. *Forex derivative markets in India: Developments thus far and road ahead*. Retrieved from SSRN: <http://ssrn.com/abstract=1420615>
- Jaiswal, K. S. & Saha, D.** 2009. Currency Futures Trading in India. *Indian Journal of Finance*, Vol. 3(4), pp 28-34
- Naik, G. & Jain, S. K.** 2002. Indian agricultural commodity futures market: A performance survey. *Economic and Political Weekly*. Vol. 37 (30). pp 3161-73
- Pandey, D. K.** 2012. Currency futures traded on the NSE. *Indian Journal of Commerce*. Vol. 65 (1). pp
- Patil, R. H.** 2003. Exchange traded interest rate derivatives. *Economic and Political Weekly*. Money, Banking and Finance. Vol. 38 (8). pp 755-60

**Pavaskar, M. G.** 1970. Futures trading and price variations. *Economics and Political Weekly*. Vol. 5 (9). pp 425-28

Report of the RBI-SEBI Standing Technical Committee on Exchange Traded Currency Futures (2008)

Various Reports available on the NSE Website