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   STATEMENT OF THE PROBLEM

   OBJECTIVES

   HYPOTHESES

   RESEARCH METHODOLOGY

   RESULTS & DISCUSSION

   FINDINGS

   RECOMMENDATIONS/SUGGESTIONS

   CONCLUSIONS

   SCOPE FOR FURTHER RESEARCH

   ACKNOWLEDGMENTS

   REFERENCES

   APPENDIX/ANNEXURE

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

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- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

INTEREST RATE FUTURES MARKET IN INDIA

DIVYA SRIVASTAVA
RESEARCH SCHOLAR
FACULTY OF MANAGEMENT STUDIES
BANARAS HINDU UNIVERSITY
VARANASI

ABSTRACT

The uncertainty in the movement of the interest rates has increased manifold due to the volatility of interest rates. Banks, insurance companies, primary dealers and provident funds, individuals bear a major portion of the interest rate risk. Interest rate risk management has become very important and assorted instruments like interest rate derivatives (interest rate swaps, forward rate agreement and interest rate futures) have been developed to deal with such types of risk. Therefore the present paper has been designed to throw light on Interest Rate Futures in India as well at global level. Further, it will focus on the regulatory framework on Interest Rate Futures laid by RBI. The paper will also analyze the applicability of Interest rate future in Indian economy. For this secondary data has been collected from the website of BIS, RBI, NSE, etc. The time frame used in the paper is from June 2003 to Sep 2003 as Interest Rate Futures were traded in those three months only and from 31 Aug.2009 till March 2010. This paper will focus on two interest rate futures contracts namely 10 YGS7 181209 and 10 YGS7 220310 offered by NSE. The study investigates the trading activity using volume, change in volume, open interest, change in open interest, open, close, low and settlement price, applicable and annualized volatility. It was found that Indian Interest Rate Futures market is dominated by hedgers as the volatility seems to be low. In spite of the decrease in the volume traded the market continues to grow at slow pace as new money is flowing in the market. As the investment in Government securities increases the investment in Interest Rate Futures will also increase.

KEYWORDS
Interest Rate Futures, trading activity.

INTRODUCTION
An interest rate is a rate which is charged or paid for the use of money, in return a lender receives for deferring the use of funds, by lending it to the borrower. There exists a risk in an interest-bearing asset, such as a loan or a bond, due to the possibility of a change in the asset's value resulting from the variability of interest rates. The risk that an investment's value will change due to a change in the absolute level of interest rates is often known as interest rate risk. In other words, Interest rate risk is the uncertainty in the movement of the interest rates. Banks, insurance companies, primary dealers and provident funds bear a major portion of the interest rate risk on account of their exposure to government securities. With a large stock of household financial savings on the asset side and an increasing quantum of housing loans on the liabilities side interest rate risk has become increasingly important for the household sector as well. It affects the value of bonds more directly than stocks, and it is a major risk to all bondholders. As interest rates rise, bond prices fall and vice versa. The rationale is that as interest rates increase, the opportunity cost of holding a bond decreases since investors are able to realize greater yields by switching to other investments that reflect the higher interest rate. For example, a 5% bond is worth more if interest rates decrease since the bondholder receives a fixed rate of return relative to the market, which is offering a lower rate of return as a result of the decrease in rates.
Interest rates have never been constant in the past and one can easily presume they would not remain constant in the future.
The volatility of interest rates has increased manifold in the last couple of years. The annualized volatility of yield of 10 year benchmark GOI security for the calendar year 2000 was 10.62%. It increases up to 14.17% in 2001 but decreases in next year. Again in 2003 the volatility was reported as 15.74% and in 2004 it reduces to 14.31%. In consecutive years, it remained almost stable 8.15%, 8.22% and 8.44% till 2007. In 2008 it has reached up to 19.75%. Such volatility in interest rate increases risk which requires tools to manage interest rate risk.

FIG. 1: ANNUALIZED VOLATILITY

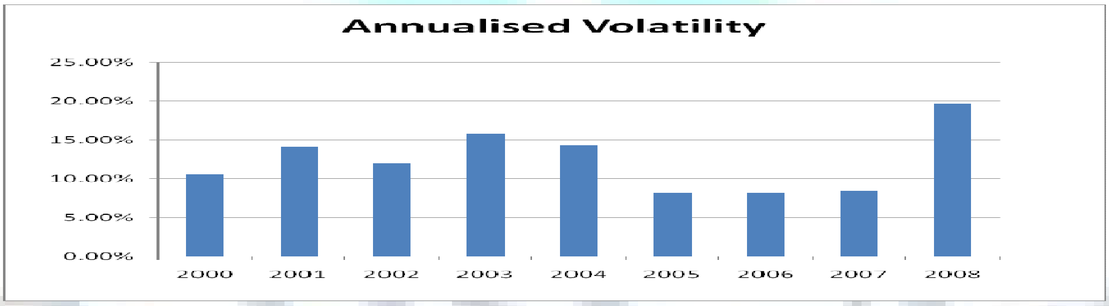


FIG. 2: GOVERNMENT OF INDIA 10 YEAR YIELD CURVE

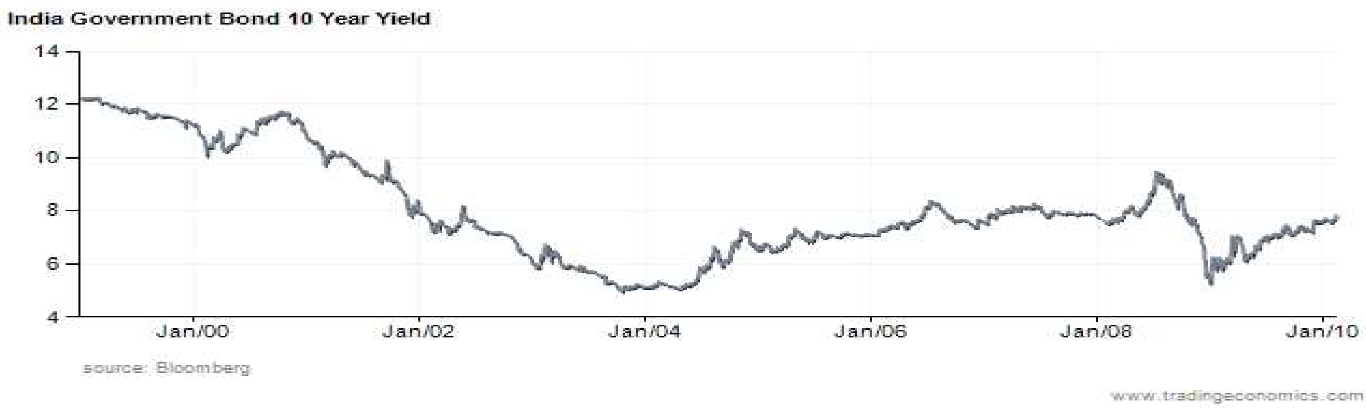


Fig: 2 shows 10 year Government of India bond yield curve. In the year 1999 the yield on 10 yr GOI bond was around 12% which was reduced to around 5% in 2004. Again it rose up to 9% in 2008. The yield in the month of Aug 2009 was 7.15%, 7.6% in Sep, 7.32% in Oct., 7.28% and7.58% in Nov. and Dec respectively. Jan 2010 recorded the yield of 7.61%; it was 7.83% and 7.93% in Feb and Mar respectively. Therefore it is a need of hour to mitigate such type of fluctuation in interest rate.

The government of India has been taking a series of steps to reform the debt market in the country with the view of improving its transparency, efficiency and accessibility. The changes in interest rate can be mitigated by diversifying (investing in fixed-income securities with different durations) or hedging (e.g. through an interest rate swap). Thus, Interest rate risk management has become very important and assorted instruments like interest rate derivatives (interest rate swaps, forward rate agreement and interest rate futures) have been developed to deal with such types of risk.

Interest rate Derivative contracts are entered into or traded, either OTC or on exchanges. In Over the counter market, trades are contracted and prices agreed bilateral, i.e. between a pair of one seller and one buyer, either directly or through the intermediation of brokers through electronic communication system, for example, interest rate swaps and forward rate agreement. The other is exchange traded interest rate derivatives, which are preferred due to standardization, transparency and clearing house participation to narrow down counterparty risk. Interest Rate Futures are the product for managing the interest rate risk.

Therefore the present paper has been designed to through light on this particular segment with reference to Interest Rate Futures in India. An interest rate future is a financial derivative with an interest bearing instrument as the underlying asset. An IRF contract is a futures contract on an asset whose price is dependent on the level of interest rate.

PURPOSE OF IRF

Interest rate futures trading can be generally used for the following purpose:

1. Trading: Trading involves entering into positions in the futures market for the purpose of making a profit, assuming that market developments are forecasted properly.
2. Hedging: People holding a portfolio of bonds or investments subject to interest rate risk can reduce losses arising out of interest rate volatility by hedging.
3. Arbitrage: Arbitrage strategies take into account the price difference between the future prices and the underlying price.
4. Spreading: Spread trading is a trading method for traders who observe mispricing in the relative value of two different contracts. The same can be in two contracts on same underlying, with different expires or between two contract on two different underlying.

RESEARCH METHODOLOGY

The present paper will attempt to throw light upon interest rate futures at global level. It will examine the use of interest rate futures in India. Further, it will focus on the regulatory framework on IRFs laid by RBI. The paper will also analyze the applicability of Interest rate future in Indian economy. For this secondary data has been collected from the website of BIS, RBI, NSE, etc. The time frame used in the paper is from June 2003 to Sep 2003 as IRF was traded in those three months only and from 31 Aug.2009 till March 2010. This paper will focus on two interest rate futures contracts namely 10 YGS7 181209 and 10 YGS7 220310 offered by NSE. The paper concludes with suggestions and recommendations.

LITERATURE REVIEW

Investigating the relationship among information, volume, volatility and return is usually the starting point to understand the financial market (Pati P.C. 2007). Karpoff (1987) listed four reasons why the price-volume relationship is important: Firstly, it provides insight into the structure of financial markets. Secondly, it is important for event studies that use a combination of price and volume data from which to draw inferences. Thirdly, it is critical to the debate over the empirical distribution of speculative markets. Fourthly, price- volume relationships have significant implications for research into futures markets. Volume of trading is an important statistics which are closely monitored by exchanges, regulating agencies as well as investors. Hedgers are motivated to trade in futures contracts to stabilize their future income flow or cost. Similarly, speculators take interest in futures contracts based upon their expectations of futures prices volatility.

Low volume usually implies that the market is illiquid and the bid/asks spread will tend to be large, resulting in high price volatility. Such a market will discourage hedgers, but may benefit speculators. On the other hand, high trading volume contributes to high liquidity and the bid/asks spread will tend to be small, resulting in low price variability. Hedgers prefer low day-to-day volatility while speculators usually do not, because low volatility reduces speculators profits.

TABLE 1: BASIC INDICATORS MATRIX/RELATIONSHIP AMONG BASIC INDICATORS

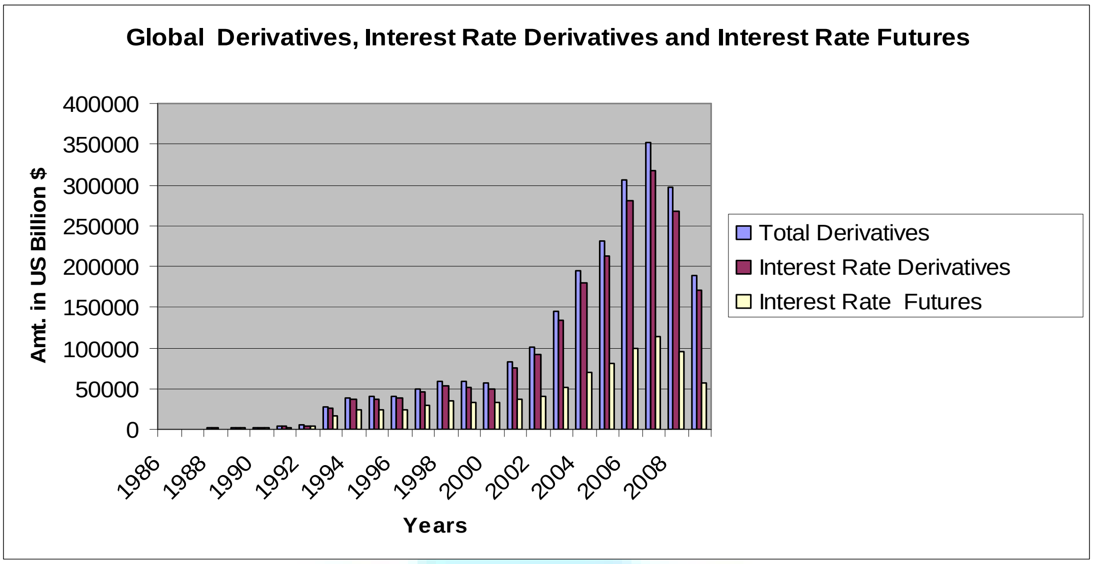
Volume	Liquidity position	Spread	Price Volatility	Beneficiaries
Low	Illiquid	Large	High	Speculators
High	Liquid	Small	Low	Hedgers

Another important measure of trading activity is Open interest which is the sum total of all outstanding long and short positions of futures contracts that have not been closed out. By monitoring the changes in the open interest figures at the end of each trading day, some conclusions about the day's activity can be drawn. Increasing open interest means that new money is flowing into the market, while declining open interest means that the market is liquidating and implies that the prevailing price trend is coming to an end.

The relationship between futures trading activity and price volatility in Indian stock index futures market using volume and open interest was studied by (Pati P.C. 2007) shows that futures price volatility is positively related to volume but negatively related to the expected level of open interest. According to Bhar R P & Chiarela Carl (1995) hedging interest rate exposure using IRF contract requires some knowledge of volatility function of interest rate. Costa et al., 2007 finds IRF as predictor of short term interest rate at short forecast horizon.

INTEREST RATE FUTURES: A GLOBAL PERSPECTIVE

FIG. 3: GLOBAL EXCHANGE TRADED DERIVATIVES, INTEREST RATE DERIVATIVES AND INTEREST RATE FUTURES



Global exchange traded derivatives was at its initial stage till 1992 but have tremendously increased over the years from 1994 till 2007 but declined in 2008 due to global meltdown. The data for 2009 include till Sep. only. Interest rate derivatives account nearly 95 % of total exchange traded derivatives in 1994-95. It slightly decreased by 2% in 1996-97, and again 3% in 1998-99. It again increased to 90% to 93 % in 2001-2004. The contribution slightly decreased but account 90 % of the total derivatives.

Interest rate futures shared 67% out of total Interest rate derivatives in 1994; it has increased till 2000 but has decreased over the years. In 2008-09, interest rate futures account for 36 % of the total interest rate derivatives.

INTEREST RATE FUTURES: AN INDIAN PERSPECTIVE

Interest rate futures market in India is at a nascent stage. Out of the total exchange traded derivatives market the contribution of Interest rate futures in terms of No. of contract traded was merely 0.355% in July 2003, it declined to 0.025% and 0.011% in Aug. and Sep. 2003 respectively. In 2009 the contribution of Interest rate futures in terms of No. of contract traded was only 0.012% in Aug. 2009 which has slightly increased to 0.019% in Sep. 2009, 0.028% in Oct. 09 and 0.039% and 0.149 in Nov.09 and Dec 09, respectively.

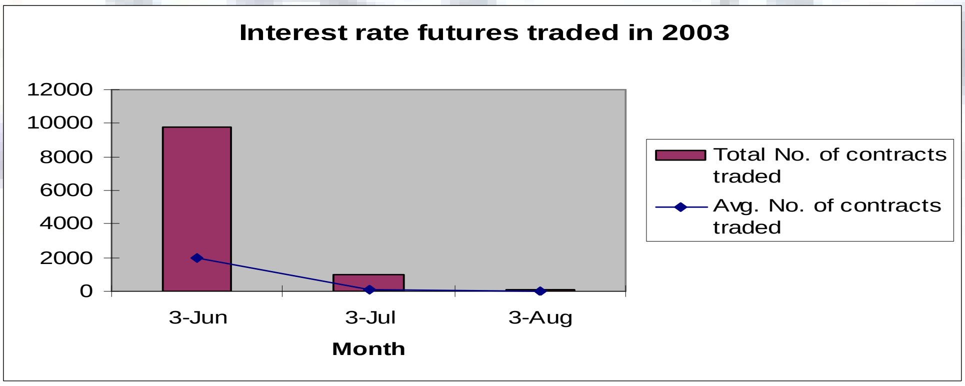
REGULATORY FRAMEWORK

In the wake of deregulation of interest rates as part of financial sector reforms and the resultant volatility in interest rates, a need was felt to introduce hedging instruments to manage interest rate risk. Accordingly, in 1999, the Reserve Bank of India took the initiative to introduce Over-the-Counter (OTC) interest rate derivatives, such as Interest Rate Swaps (IRS) and Forward Rate Agreements (FRA). With the successful experience, particularly with the IRS, NSE introduced, in2003, exchange-traded interest rate futures (IRF) contracts. However, for a variety of reasons, the IRF, failed to attract a critical mass of participants and transactions, with no trading at all thereafter. To review the experience with the Interest Rate Futures so far, with particular reference to product design issues and make recommendations for activating the Interest Rate Futures Technical Advisory Committee (TAC) on Money, Foreign Exchange and Government Securities Markets in December 2006 and July 2007, respectively. In October 13, 2008 has been decided to allow banks to take trading positions also in IRF. As announced in the Mid-Term Review of Annual Policy for the year 2008-09, RBI-SEBI Standing Technical Committee had been entrusted with the work relating to the operationalisation of the recommendations of the TAC Report. The report was released in June 2009. Ultimately interest rate futures has been launched by NSE from 31-Aug.2009. Four IRF contracts having maturity of three months will be offered by NSE in a year.

FIRST STAGE OF IRF

Interest Rate Futures was started on June 24, 2003 on the Exchange but was not successful as the No. of contracts declined from 9768 to 963 in Jun 03 and July 03 a tremendous decline of 90% and again declined to 50 contracts which was 94% in Aug 03 and reached to 0 in Sep 03. The total traded value was Rs.181.85 cr. in June 2003 which was reduced to nearly 90% amounting Rs.19.32 cr. in July. Further it again declined to 94% amounting only Rs.1.04 cr. in Aug 03.

FIG. 4: IRF TRADED IN 2003



One reason for IRF not taking off is describable to deficiency in the product design of the bond futures contracts which was required to be cash settled and valued of a zero coupon yield curve. As the ZCYC is not directly observable in the market and is not a representative of illiquid market, participants were not willing to accept a product which was priced off a theoretical ZCYC. The success of any financial product at in the early stages, critical depends not only upon the presence of market makers but also on their credibility and ability to provide liquidity. At times of initial launch of IRF only primary dealers were allowed to take trading positions, hence the market was illiquid.

SECOND STAGE OF IRF

Conscious effort has been made by the regulatory bodies to relaunch IRFs on 31st Aug 2009. The re-launch of interest rate futures has been actively appreciated by the market with the highest no. of contracts traded 14559 on the first day of trading i.e. 31-Aug. In the month of Sep 79648 contracts were traded amounting Rs.1458.07 Cr. but a declining trend could be noticed till March. A steep decline of 73% was recorded in the month of Oct. with merely 21867 contracts, figuring Rs.373.56 Cr. This shows that the market was not so responsive as compared to previous month. A continuous declining trend was visible from Nov. till Feb. but it increased in March 2010. The total Number of contracts traded in the month of Nov. showed a decrease of 17% figuring 18134 contracts, it again fell to 10761, 6443 and 3124 contracts amounting Rs.197.62 Cr., Rs.118.82 Cr. and Rs.57.41Cr. in the month of Dec 09, Jan 10 and Feb 10 respectively. A sharp increase of 95% was viewed in the month of March. 6101 contracts were traded with the total value of Rs.111.38 Cr. The total volume of IRF traded till March was Rs.2921.02 Cr. The mean value was Rs. 20.86 cr. with the SD of Rs. 36.35 Cr. The data was positively skewed therefore the concentration of values are on the right side of distribution.

FIG. 5: IRF TRADED IN 2009-10

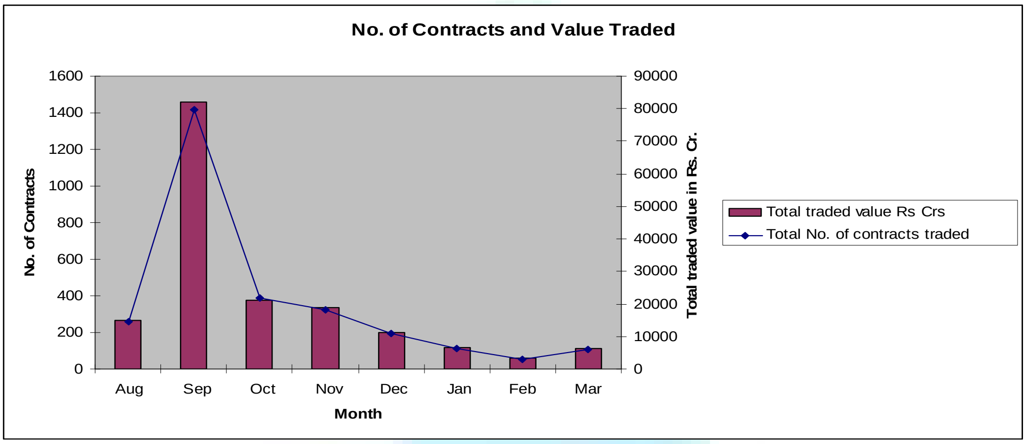
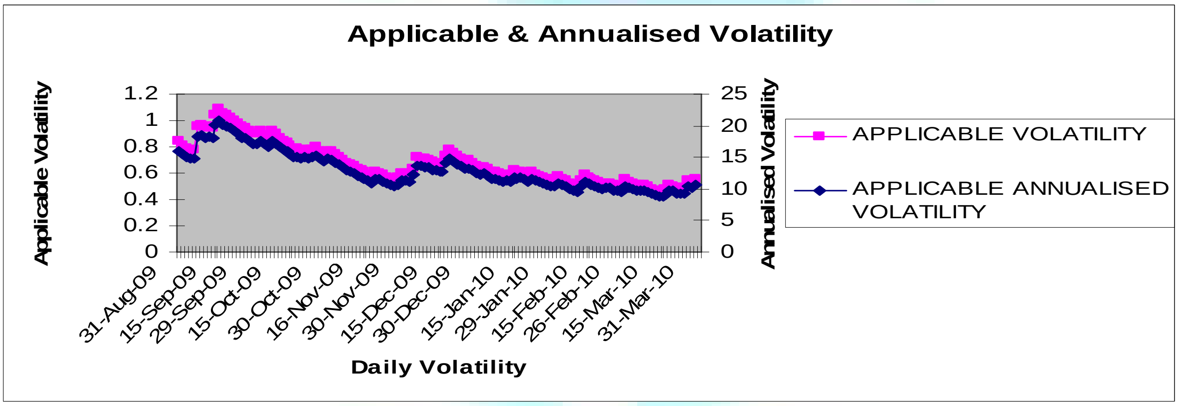


FIG. 6: APPLICABLE VOLATILITY & ANNUALIZED VOLATILITY



The Maximum applicable Volatility was recorded as 1.0883 while the minimum was 0.4573. The applicable annualized volatility was measured to be 12.0546 which range from 20.7919 to 8.7373. The volatility figure depicts almost a similar pattern in both the cases while the range for daily and annualized volatility was .6309 and 12.0546 respectively.

CONTRACT WISE

a) 10 YGS 181209: The commencement of IRF was warmly welcomed by the market participants. On the first day, 13789 contracts valuing 253.29 Cr. were traded but it follows a continuous decline till maturity i.e. 18th Dec 2009.

FIG: 7 NO. OF CONTRACTS & VALUE IN DEC CONTRACT

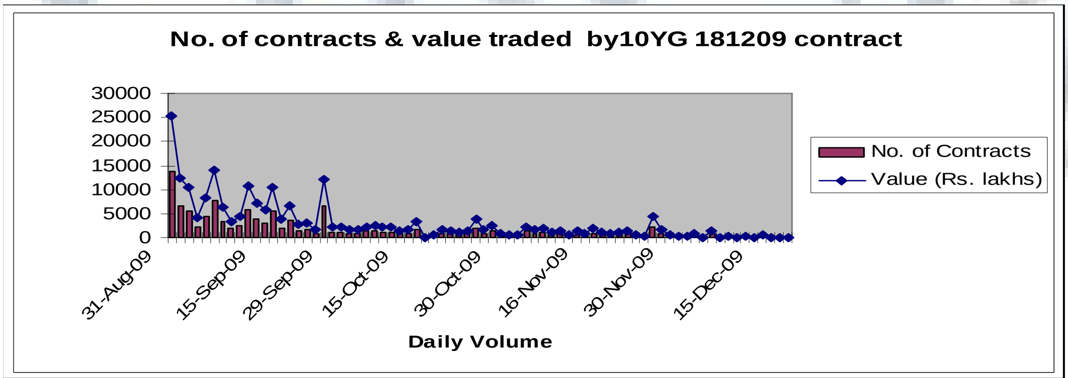
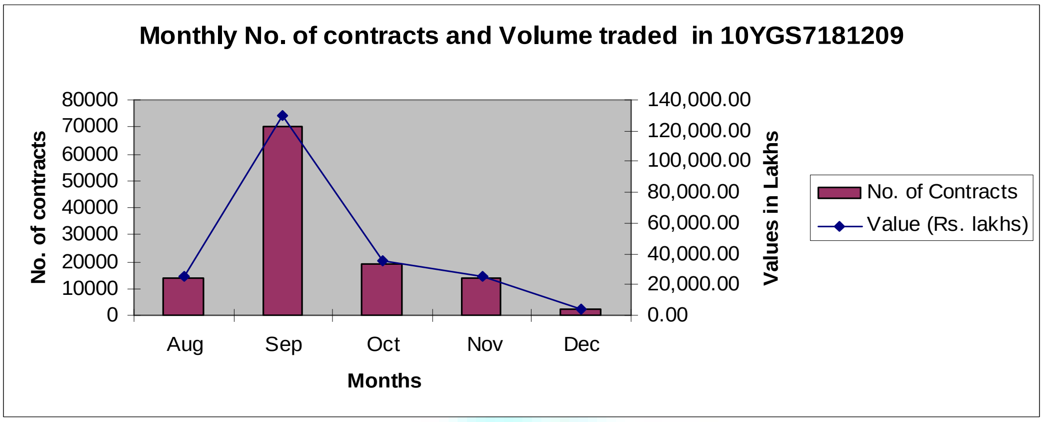
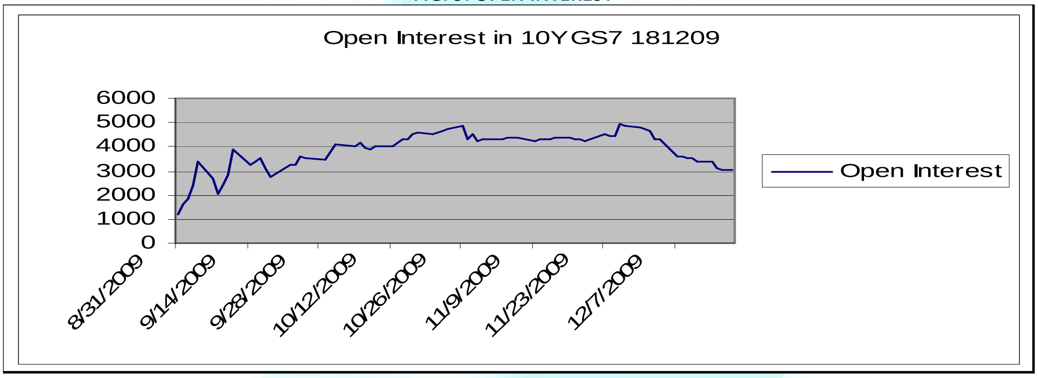


FIG. 8: MONTHLY NO. OF CONTRACTS & VALUE IN DEC CONTRACT



The total no. of contract traded was highest in Sep, 70002 contract amounting 1297.29Cr. The proceeding months recorded steep decline. Only 2195 contract were traded with the volume of 40.99 Cr. The total volume of Dec contract was Rs.2202.98Cr. the mean value was Rs.29.77Cr. with the SD of Rs.41.69Cr. The volume change for Dec contract has the mean value -6.93 Cr. with the SD 52.99 Cr. The data was negatively skewed as the concentrations of values are on the left side of distribution therefore there was a decline in the volume traded.

FIG. 9: OPEN INTEREST



The open interest for Dec contract has the mean value 76.62 Cr. with the SD 16.28 Cr. The data was negatively skewed therefore the concentration of values were on the left side of distribution. A declining trend was visible when the contract was about to mature. The change in open interest for Dec contract has the mean value .5027 Cr. with the SD 6.23 Cr. The data depicts positive skewness therefore the concentrations of values were on the right side of distribution this means that new money was flowing into the market.

FIG. 10: DAILY SETTLEMENT PRICE

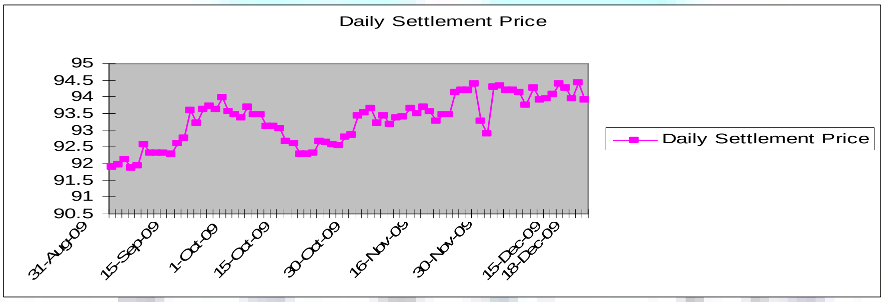
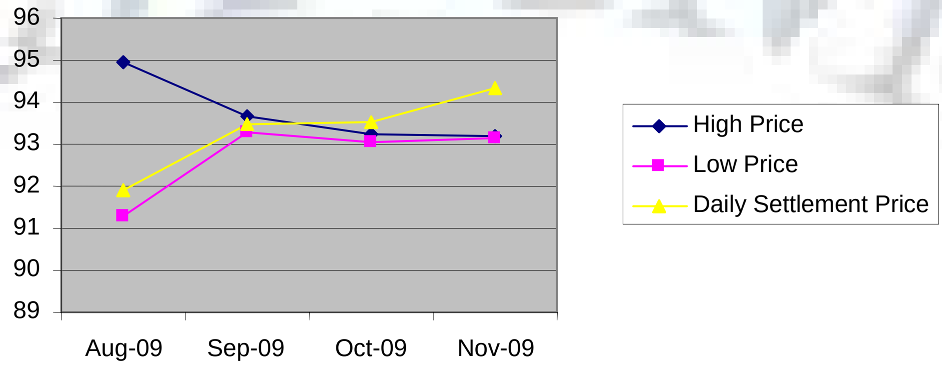


Fig11: **Price Volatility (10 YGS7 181209)**

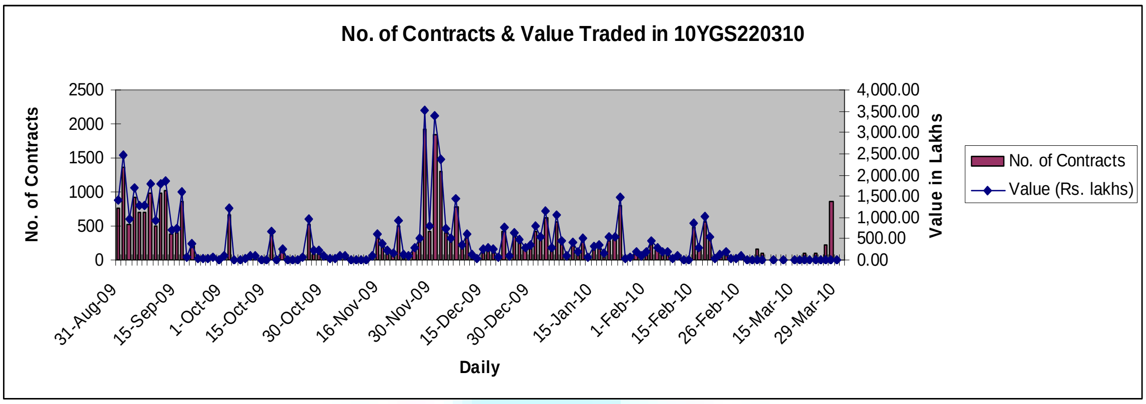


We can see that there are minor fluctuations between the high, low and settlement price. It is also clear that the fluctuation over the period of time is low ranging from 94.5 to 93 with the exception in Aug which range from 95 to 91 in 10YGS 181209. The daily settlement price ranges from 92 to 94.5.

b) 10YGS220310

The last trading day for Mar contract was March 19, 2010 which was revised to March 29, 2010.

FIG. 12: NO. OF CONTRACTS & VALUE IN MARCH CONTRACT



The total volume of Mar contract was Rs.610.53Cr. The mean value was Rs.4.45Cr. with the SD of Rs.6.34Cr. The data was positively skewed therefore the concentration of values are on the right side of distribution. The volume change for Mar contract has the mean value -0.33Cr. with the SD 6.86 Cr. the data was negatively skewed therefore the concentration of values are on the left side of distribution.

FIG. 13: MONTHLY NO. OF CONTRACTS & VALUE IN MARCH CONTRACT

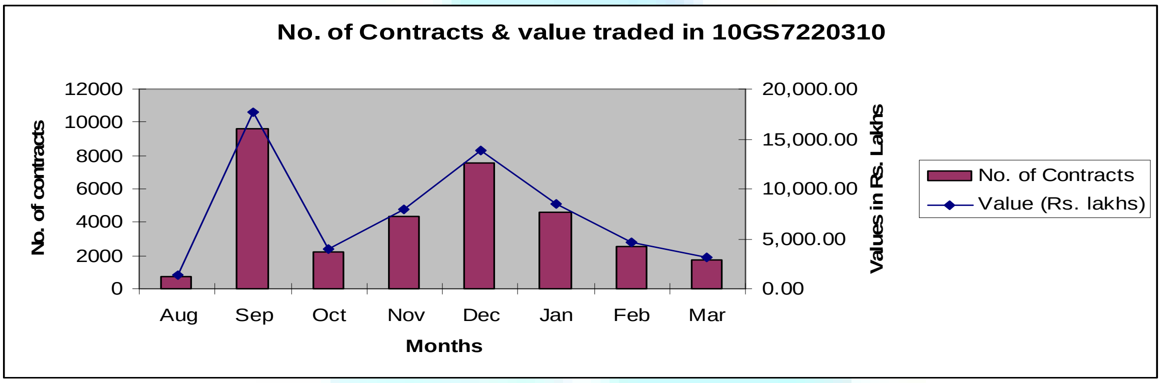
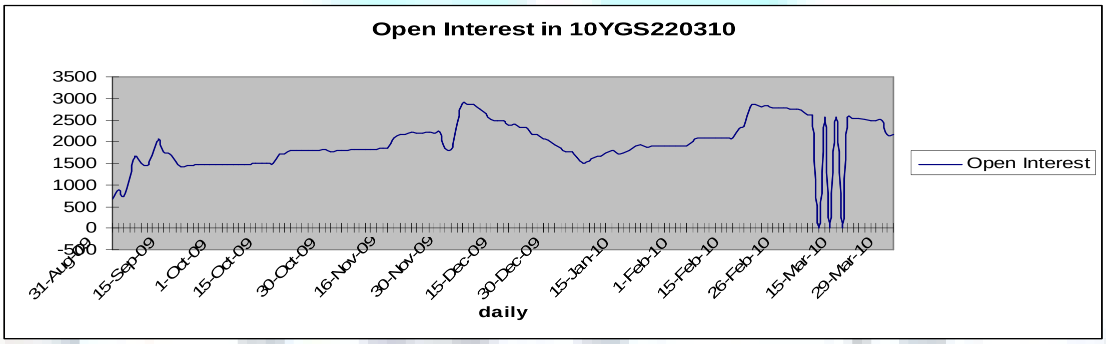


FIG. 14: OPEN INTEREST OF MARCH CONTRACT



The open interest for Mar contract has the mean value 40.16 Cr. with the SD 9.24Cr. The data was negatively skewed therefore the concentration of values are on the left side of distribution. The change in open interest for Mar contract has the mean value 0.2216 Cr. with the SD 2.61 Cr. The data was positively skewed therefore the concentration of values are on the right side of distribution.

FIG 15: DAILY SETTLEMENT PRICE OF MARCH CONTRACT

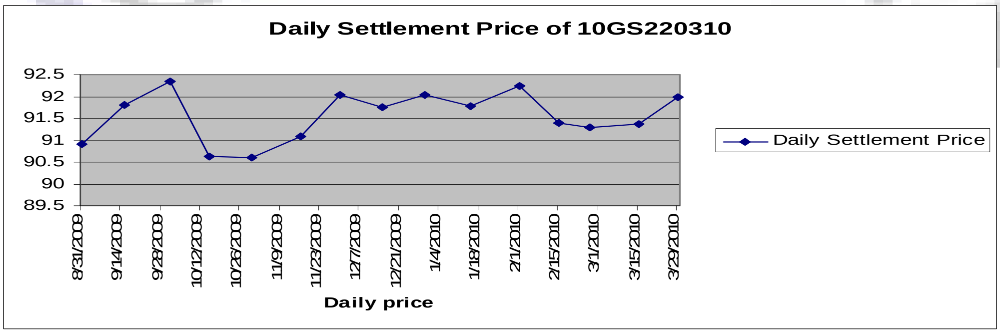
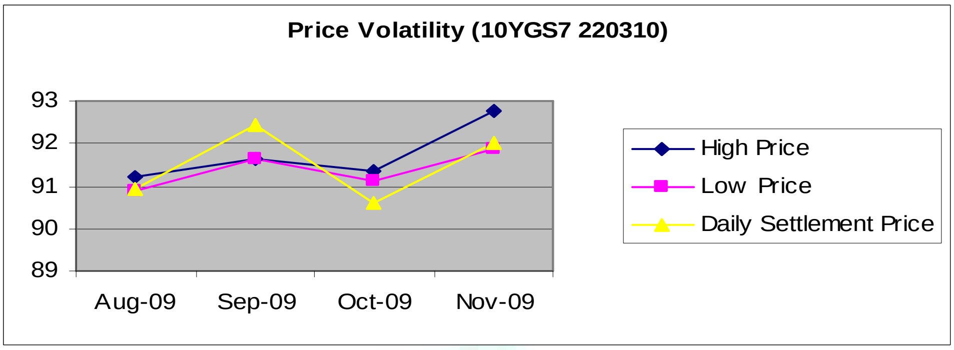


FIG 16: PRICE VOLATILITY OF MARCH CONTRACT

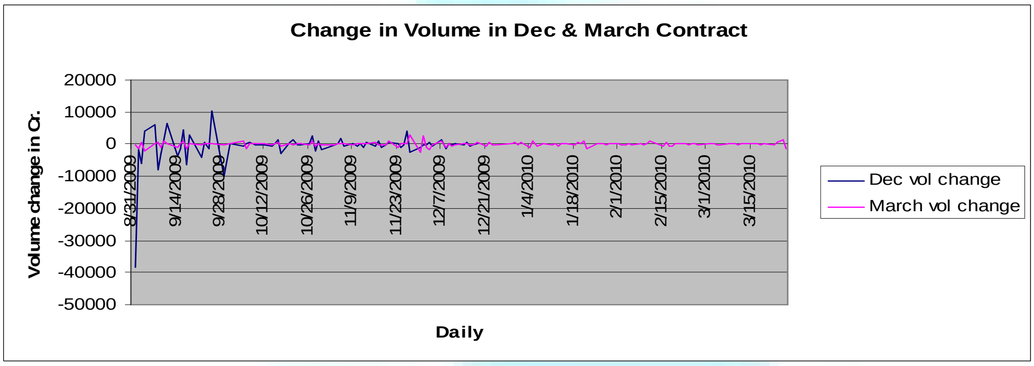


The daily settlement price ranges from 91 to 92.5. Price level change ranges from 91.5 to 93 in 10YGS7 220310.

FINDINGS

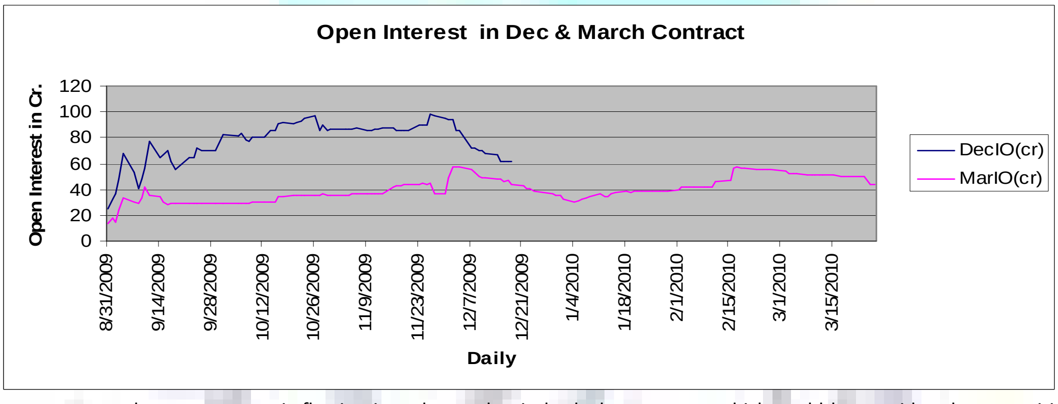
If we compare the number of contracts traded in 2003 and 2009, the same declining trend is evident from the data available.

FIG. 17: VOLUME CHANGE IN DEC & MARCH CONTRACT



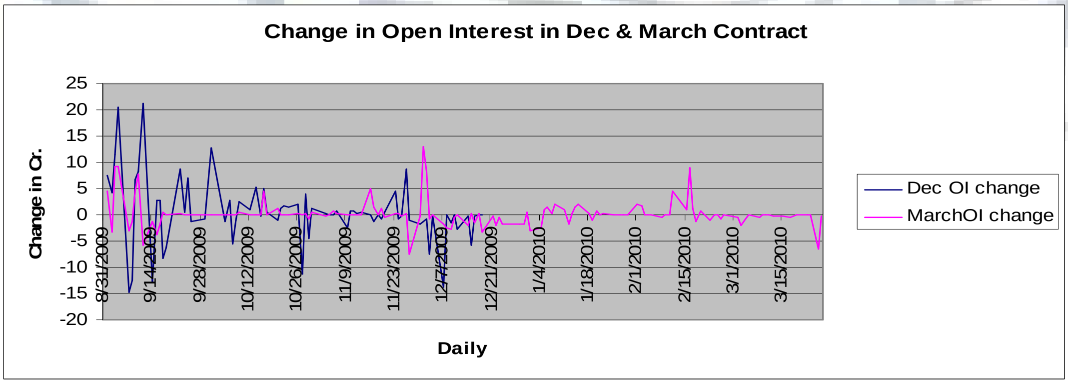
The change in volume in March contract was densely located around the mean (-0.33Cr.) with the SD of 6.86 while in Dec contract the values were more scattered, the mean was -6.93 Cr. with the SD 52.99 Cr.

FIG. 18: OPEN INTEREST IN DEC & MARCH CONTRACT



Increase in open interest means that new money is flowing into the market in both the contracts which could be considered as a positive indicator for the market players to ensure the flow of money in the market. While comparing the open interest in both the contracts it is evident that Dec contract has higher open interest. Open interest for Mar contract has been almost stable.

FIG. 19: CHANGE IN OPEN INTEREST IN DEC & MARCH CONTRACT



Price volatility is negatively related to the open interest in Dec contract but positively related to Mar contract. We can interpret that Indian IRF market is dominated by hedgers as the volatility seems to be low. The applicable volatility is positively related to the volume of IRF.
The investment in Government of India Securities and Interest rate futures are positively correlated, .378 at 0.05 level of significance. Hence we can predict that as the investment in GOI securities will increase the investment in IRF will also increase.

CONCLUSION
Hence it is evident from the above discussion that the number of contracts traded and its value have declined from 31 Aug 2009 to 31 Mar 2010. Low volume implies that the market is illiquid. Certain factors such as involvement of more market participants, awareness among investors and willingness to invest might be considered to increase trade in interest rate futures.

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ANNEXURE

IRF TRADED IN 2003

Month	Jun03	Jul03	Aug03	Sep03	Oct03	Nov03	Dec03	Jan04
No of days	5	23	20	22	23	20	22	21
Total traded value (Rs Crs)	181.85	19.32	1.04	0	0	0	0	0
Avg.dailytraded value Rs Crs	36.37	0.84	0.05	0	0	0	0	0
Total No. of contracts traded	9768	963	50	0	0	0	0	0
Avg. No. of contracts traded	1954	42	2.5	0	0	0	0	0

IRF TRADED IN 2009-10

Month	Aug09	Sep09	Oct 09	Nov09	Dec09	Jan 10	Feb 10	Mar 10	Total
No. of days	1	19	20	21	21	20	19	20	141
Total value Rs. Cr.	267.31	1458.07	373.56	336.85	197.62	118.82	57.4105	111.3812	
Avg. value Rs Cr.	267.31	76.74	18.67	16.04	9.4	5.9	3.02	5.56	2921.02
Total No. of contracts	14559	79648	21867	18134	10761	6443	3124	6101	160637
Avg. No. of contracts	14559	4192	1093.35	863.52	512.42	322.15	164.4211	305.05	

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