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AN OVERVIEW OF THE INDIAN VOLATILITY INDEX (VIX)

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ABSTRACT

At present, India's economy looks upbeat with an increase in investment in the stock market. At the same time, it is also seen that the market fluctuations are very high. Such high levels of fluctuations or volatility make it difficult to predict the future expected values of the market and make investment decisions. In such a situation, having an estimate of future volatility is very useful. Similar to the price indices that are used as indicators of the overall market value and returns, volatility indices are used as indicators of expected market volatility over a future period. Indian version of VIX (called India VIX) was introduced by the National Stock Exchange (NSE) in November 2007. The methodology of India VIX is based on VIX of CBOE. India VIX is based on Nifty 50 index options contracts. The method does not use any option pricing model, but simply uses near and mid-month options bid and offer prices to derive the implied volatility. India VIX is expressed an annualized percentage of volatility for next 30 days. Of course, there has not yet been any product launched on VIX in India. The paper highlights the asymmetric behavior of VIX compared to nifty, VIX computation, its shortcomings and derivative trading. The Purpose of this study is to enlighten investors and practitioners about the new avenue of VIX India in the capital market as a tool of hedging and for price discovery. Research design refers to the way the study is designed, this study used descriptive research to get overview about VIX. The study used only secondary data from sources like journals, reports, books for readings, websites etc. This study is useful for understanding the behaviour of India VIX and helps policymakers in the design of appropriate instruments based on India VIX for hedging and risk management.

Keywords: Volatility Index (VIX), CBOE, NSE and Fear Gauge

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ISSN: 2347 5587
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INTRODUCTION

For most investors, the prevailing market turmoil and lack of clarity on where it's headed, are a cause for concern. Wouldn't it be good to have a tool that could help you keep track of volatility? Or, perhaps, guide you in your investments if you miss out on a rally. The Indian Volatility Index (VIX) is the new tool. Volatility is known as a measure of change. A higher value of volatility indicates that prices can change at a faster pace (either going up or down) as compared to the immediate past.

Globally known as a 'fear index', VIX is actually one of the best contrarian indicators in the world. Chicago Board Options Exchange (CBOE) which owns the VIX trademark say that since volatility (high) often signifies financial turmoil, VIX is often referred to as the investor fear gauge. The index is colloquially referred to as the fear index. The India VIX gives a sense of how much of a swing trader expect in the market over the next 30 days. It does this by taking the prices of the near and middle month out of money options contracts and uses the Chicago Board Options Exchange methodology to arrive at the volatility.

When the VIX rises, it is interpreted as a sign that the stock market will experience a pull-back. When the VIX falls, the market is expected to rally. The size of the fluctuation in the VIX is an indication of the extent of the up or down market trend. As global tension increases, even analysts who have nothing to do with investments tend to watch the VIX as an indicator of potential geopolitical and economic changes. Currently, the India VIX (Nifty-50) is hovering around 17 per cent, which is fairly stable. This means traders believe the Nifty could go up/down by 17 per cent (on an annualised basis).

LITERATURE REVIEW

Corrado, et al. (2003) study the implied volatility indexes in “The Forecast Quality of CBOE Implied Volatility Indexes”. The researchers find that the forecast quality of CBOE implied volatilities for V IX has significantly improved. The research assessed the information content and forecast quality of implied volatility. Statistical technologies of OLS Regressions and instrumental variable regressions are used. The results suggest that the CBOE Implied

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Volatility indexes dominate historical index volatility in providing forecasts of future price volatility for the S& P 100 and NASDAQ 100 stock indices.

In his study entitled "Can the VIX signal market direction?" Alessandro (2007) examines whether VIX is an important factor influencing the S&P 500 future returns. The method adopted here is a regression based on dummy variables. The author finds that VIX based strategy outperforms the long-only strategy on the same underlying index. This is a belief shared by traders and market participants as opined by the author.

The study 'model for forecasting volatility in indian stock market: the volatility index' conducted by Jadhav Aditya Mohan and Chakrapani Venkata Chaturvedula(2008) aimed to construct an Indian Market Volatility Index (IMVI) for the Indian stock market using the Nifty option series which are based on the S&P CNX Nifty Index. The study also aimed to validate the predictive properties and effectiveness of IMVI. The study showed that IMVI and hence the implied volatility has low information content regarding the realized volatility in the Indian market. They also suggested that it can be attributed to the lack of liquidity in the options market which had started few years back.

The Behavioral Finance explanation for the negative asymmetric volatility index- return relationship is studied by Hibbert, et al (2008). The authors examined the short-term dynamic relation between the S&P 500 (Nasdaq100) index return and change in implied volatility at both daily level and intraday level. The study proposes a behavioral explanation as an alternative to Leverage hypothesis and the Volatility feedback hypothesis. The empirical results indicate a strong daily and intraday negative return-implied volatility relation. The research further suggests that the presence and magnitude of the negative relation and the asymmetry are closely associated with extreme changes in the index returns and the strength of this relationship is consistent with the implied volatility skew.

Whaley (2009) in the study entitled "Understanding VIX" describes the VIX and its history and purpose. The author examines the VIX relation to the stock market. The study tested and accepted the proposition that the change in VIX rises at a higher absolute rate when the stock market falls than when it rises. The literature attributes the introduction of VIX to Whaley (1993).

ISSN: 2347 5587
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Siripoulos, et al. (2009) in his paper titled "Implied Volatility Indices – A review" studies the information content of implied volatility indices across the world. The authors research findings suggest that implied volatility indices include information about future volatility beyond that contained in past volatility. The study further reveals that there is a statistically significant negative and asymmetric contemporaneous relationship between implied volatility changes and the corresponding underlying equity index returns.

In his master's thesis entitled "The secret life of Fear: Interdependencies among implied volatilities represented by different stock volatility indices treated as assets"; Nousiainan (2010) investigates the systemic interdependencies of selected volatility indices with underlying assets as major stock indices of developed financial markets. The time period under study ranges from January 2000 to June 2009 thus including normal market conditions and crises.

Badshah (2009) in his paper titled "Asymmetric Return-Volatility Relation, Volatility transmission and implied volatility indexes" investigates the asymmetric volatility-return phenomenon using VIX, VXN, VDAX and VSTOXX. The author further examines implied volatility transmissions across implied volatility indexes using Granger Causality, generalized impulse response function and variance decomposition. The study found that there are pronounced negative and asymmetric volatility-return relationships between each volatility index and its underlying stock market index. It further reveals that there are significant spillover effects across the volatility indexes and bi -directional causality running between the volatility indexes.

Debasis (2011) examines the predictive ability of India VIX. In a NSE paper entitled "Some Preliminary Examination of Predictive ability of India VIX", the researcher examines the behavior of India VIX. The author employs Market-to-Book value of equity and market capitalization as controlling variables and document that India VIX yields a positive and significant relationship with portfolio returns. The author suggests that India V IX is a distinct risk factor, capable of predicting the price discovery mechanism of the market.

Padhi (2011) in a NSE working paper titled "On the linkages among selected Asian, European and US Implied volatility Indices", examines the implied volatility linkages. Their results suggest that the US implied volatility index has substantial impact over the variations of other international implied volatility indices. The author¶s research reveals that the selected volatility indices have no notable impact over India VIX. The author surmises that

ISSN: 2347 5587
Peer Reviewed International Journal Vol. No. IV Issue No. 09 SEP 2016

this may be attributable to Indian markets lag in terms of integration with the global financial system.

Ghulam Sarwar (2012) in his study intertemporal relations between the market volatility index and stock index returns examined the inter temporal relationships between Chicago Board Options Exchange (CBOE) market volatility index (VIX) and returns of the S&P 100, 500 and 600 indexes among three subperiods during 1992–2011 to account for structural shifts in VIX and to investigate if the role of VIX as an investor fear gauge and indicator of portfolio insurance price has strengthened in periods of high market anxiety and turbulence.

In the Indian context there are very few studies relating to volatility index as it has less data history. Data on the NSE website is available only from March 2009. So through this paper I have tried to give insights to the investors and practitioners about VIX- the new tool of measuring volatility, predicting market and hedging risks.

THE OBJECTIVES OF THE STUDY ARE:

1. To understand VIX and study the process of computation of VIX in India;
2. To study the shortcomings of VIX India.
3. To discuss the Futures Trading of VIX India.

RESEARCH METHODOLOGY

This study adopted descriptive survey because it ensures complete description of the situation making sure that there was minimum bias in the collection of data. In this study mainly secondary data has been used. Journals, articles, websites, reports, book for readings etc were the main source of information.

WHAT IS VOLATILITY?

Volatility refers to the amount of uncertainty or risk about the size of changes in a security or index value. A higher volatility means that a security's value can potentially vary over a larger range of values. This means that the price of the security can change dramatically. A lower volatility means that a security's value does not fluctuate dramatically, but changes in value at a steady pace over a period of time. Volatility is easier to predict than price. One will not know the price of Infosys after it announces its results, but it is easier to know that

ISSN: 2347 5587
Peer Reviewed International Journal Vol. No. IV Issue No. 09 SEP 2016

volatility will increase immediately after profit and guidance numbers are announced by the company's management.

WHAT IS VOLATILITY INDEX?

Volatility Index (VIX) is a key measure of market expectations of near term volatility. As we understand, volatility implies the ability to change. Thus when the markets are highly volatile, market tends to move steeply up or down and during this time volatility index tends to rise. Volatility index declines when the markets become less volatile. VIX is sometimes also referred to as the Fear Index because as the volatility index (VIX) rises, one should become fearful or I would say careful as the markets can move steeply into any direction. Worldwide, VIX has become an indicator of how market practitioners think about volatility. Investors use it to gauge the market volatility and make their investment decisions.

VIX was first introduced by the Chicago Board of Options Exchange (CBOE) as the volatility index for the US markets in 1993 and it was based on S&P 100 Index option prices. The methodology was revised in 2003 and the new volatility index was based on S&P 500 Index options. CBOE also introduced VIX options and VIX Futures. NSE has also started real time dissemination of India VIX which is one step towards introduction of India VIX derivatives. In India the volatility index, named as India VIX was introduced in 2007 and the National Stock Exchange declares that "VIX" is a trademark of Chicago Board Options Exchange, Incorporated ("CBOE") and Standard & Poor's has granted a license to the National Stock Exchange, with permission from CBOE, to use such mark in the name of the India VIX and for purposes relating to the India VIX. Historical data indicates that India Vix has a strong negative correlation of negative 0.8 to the Nifty. This means that every time Vix falls, Nifty rises and every time it rises, it means that a fall is imminent.

DIFFERENCE BETWEEN VOLATILITY INDEX AND PRICE INDEX

It is important to understand that Volatility Index is different from a price index such as NIFTY or Sensex. The price index measure the direction of the market and is computed using the price movement of the underlying stocks where as Volatility Index measures the dispersion or variance or change and is computed using the order book of the underlying index options and is denoted as an annualized percentage.

ISSN: 2347 5587
Peer Reviewed International Journal Vol. No. IV Issue No. 09 SEP 2016

HOW VIX IS COMPUTED?

This volatility index is computed by NSE based on the order book of NIFTY Options. For this, the best bid-ask quotes of near and next-month NIFTY options contracts which are traded on the F&O segment of NSE are used. India VIX indicates the investor's perception of the market's volatility in the near term i.e. it depicts the expected market volatility over the next 30 calendar days. Higher the India VIX values, higher the expected volatility and vice-versa. NSE will also start derivatives based on India VIX. Most probably NSE will come out with India VIX Futures first followed by India VIX options as had been done by the CBOE in the past.

CALCULATIONS FOR INDIA VIX

India VIX is a volatility index based on the index option prices of NSE's benchmark index NIFTY. India VIX uses the computation methodology of CBOE, with suitable amendments to adapt to the NIFTY options order book. India VIX is computed using the best bid and ask quotes of the out-of-the-money near and mid-month NIFTY option contracts, which are traded on the F&O segment of NSE. There are several factors which are used to calculate the index. Some important ones are these –

1) Time to Expiry: Time to expiry of the options contracts of Nifty that are selected to calculate the index. The time to expiry is computed in minutes instead of days in order to arrive at a level of precision expected by professional traders.

2) Interest Rate: The NSE Mibor rate of relevant tenure (i.e 30 days or 90 days) is being considered as risk-free interest rate for the respective expiry months of the NIFTY option contracts.

3) The Forward Index Level: A methodology called the forward index level is being used to select the contracts which will be used to calculate the index. India VIX is computed using out-of-the-money option contracts. Out-of-the-money option contracts are identified using forward index level. The forward index level helps in determining the at-the-money (ATM) strike which in turn helps in selecting the option contracts which shall be used for computing India VIX. The forward index level is taken as the latest available price of NIFTY future contract for the respective expiry month.

4) Bid-Ask Quotes: The strike price of NIFTY option contract available just below the forward index level is taken as the ATM strike. NIFTY option Call contracts with strike price above the ATM strike and NIFTY option Put contracts with strike price below the ATM

ISSN: 2347 5587
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strike are identified as out-of-the-money options and best bid and ask quotes of such option contracts are used for computation of India VIX. In respect of strikes for which appropriate quotes are not available, values are arrived through interpolation using a statistical method namely "Natural Cubic Spline". After identification of the quotes, the variance (volatility squared) is computed separately for near and mid month expiry.

5) Weightage: The variance is computed by providing weightages to each of the NIFTY option contracts identified for the computation, as per the CBOE method. The weightage of a single options contract is directly proportional to the average of best bid-ask spread of that option contract and inversely proportional to the option contract's strike price.

Finally, the variance for the near and mid month expiry computed separately are interpolated to get a single variance value with a constant maturity of 30 days to expiration. The square root of the computed variance value is multiplied by 100 to arrive at the India VIX value. In a nutshell, from usage point of view, higher the vix index value, higher the volatility.

DERIVATIVE FUTURE TRADING OF VIX

Traders are often looking for new strategies to trade a major event, say a budget or credit policy or even important results of blue chip companies. Traders will now have an instrument to earn from such an eventuality. India's premier exchange, National Stock Exchange (NSE) is launched in February 2014 India Vix Futures to attract traders who are willing to bet on volatility. India Vix is a volatility index based on prices of Nifty options.

The NVIX contracts will have a weekly tenure and will be settled on Tuesdays. It is an additional tool to hedge along with existing futures and options contracts that are linked to Nifty or Sensex. In markets abroad, investors keep rolling on derivatives contracts. But in India, derivatives are not considered as investments. That is why retail investors should not enter this unless they understand it fully. Since the underlying is volatile, it is difficult to bring down the margins. So, the only way to attract retail investors would be to bring down the high contract size, while maintaining high margins. If the contract size is Rs 1-2 lakh, then investors will not mind paying the high margin. Today retail investors can trade in existing derivative products with small amounts ranging between Rs 25,000 and Rs 1 lakh. In comparison, in VIX futures the margin requirement is too high. With a minimum contract value of Rs 10 lakh of NVIX, it does not encourage participation from retail investors. NVIX has its uses, though. Take for instance, the national elections that are a few months from now. As the outcome is uncertain, investors can buy the NVIX as a hedge against their equities

ISSN: 2347 5587
Peer Reviewed International Journal Vol. No. IV Issue No. 09 SEP 2016

portfolio. If the market falls, the futures will gain. If the market gains, your equities portfolio will gain because there is an inverse correlation between markets and implied volatility. So, if Nifty gains, India VIX can be expected to fall and vice-versa. It is not an investment tool. It is a hedging tool.

FUTURE OF VIX IN INDIA

Right now, there are only two exchanges which have successfully launched instruments on the volatility index in the world, VIX by CBOE and VSTOXX by Eurex. Other exchanges tried but failed to make it popular among the traders. Looking at the history of volatility index products in the world arena, there are more failures then successes when it comes to instruments on volatility index and hence there is a huge question mark on whether India VIX is going to be successful or not. In India, high market volatility and absence of other developed products to hedge volatility risks may make India VIX a success.

SHORTCOMINGS OF THE INDIAN VIX

One of the major shortcomings is the illiquid option markets that are present in India. This is typically seen in the form of very low volumes for far month options, as well as a high bid ask spread. Also, the VIX calculation assumes that the option prices are continuous. In US the difference between the consecutive options strike is 25 while in India it is 50, which is contrary to the continuous strike price assumption. Such factors lead to a calculated VIX value which may be biased due to illiquidity, low volumes and non continuous strike prices. This bias may be removed by using a modified calculation of the Indian VIX using volume and bid ask spread filters.

Another shortcoming that we observed was the lack of transparency in the NSE manual regarding the VIX calculation. The NSE VIX methodology mentions MIBOR as the risk free rate, however it does not mention the term duration of the MIBOR rate that needs to be used.

CONCLUSION

Modeling of market volatility is one of the most important issues of recent times. Accurate modeling and forecast of volatility are of immense importance in managing the risk. The current sub-prime crisis has further emphasized the importance of accurate modeling and forecasting of volatility.

ISSN: 2347 5587
Peer Reviewed International Journal Vol. No. IV Issue No. 09 SEP 2016

In the Indian context, the introduction of VIX has helped the traders gauge market sentiments and many traders are already using VIX values for the trading calls. The introduction of trading in VIX index will enable active management of risks that cannot be hedged. The regulator will allow the trading in index as well when the market participants will become comfortable with the index. We believe that the developed instruments like VIX will significantly contribute to the development of the emerging markets like India in the course of time. Thus, this study will help policymakers in the design of appropriate derivative instruments based on India VIX for hedging and risk management.

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