International Journal of Applied Business and Economic Research

ISSN : 0972-7302

available at http: www.serialsjournals.com

© **Serials Publications Pvt. Ltd.**

Volume 15 • Number 22 (Part 2) • 2017

A Study of CNX Nifty Index and CNX Nifty Junior: Impact of Inclusion of Derivatives on the Volatility

Dikshita Wadhawan[1] and Harjit Singh[2]

[1]*Ph.D. Scholar, Amity College of Commerce and Finance, Amity University, Noida, India. E-mail: dikshita84@gmail.com*
[2]*Associate Professor, Amity School of Business, Amity University, Noida, India. E-mail: harjit_mfc@rediffmail.com*

ABSTRACT

Derivatives supposed to have an influence on the market volatility in different ways since their inclusion in Indian capital market. Understanding market volatility is important as that helps in investing by knowing the trading and investment style and risk tolerance level. Derivative trading forms approximately 90 percent of the total turnover of the National stock Exchange (NSE). In this study, pre-inclusion phase, post inclusion phase and post financial crisis 2008 phase had been studied and analysed in the context of the impact of the inclusion of derivatives on the volatility with reference to CNX Nifty and CNX Nifty Junior. CNX Nifty Index, being a benchmark had been considered as wider, balanced index for giving applicable results which can be used in context to Indian derivative market. Standard deviation measures the deviation of the current price of an asset from its average past prices. This is how the volatility will be calculated and analysed in different scenarios of the Indian Capital Market.

JEL Classification: G0, G01, G23.

Keywords: Volatility, CNX Nifty Index, CNX Nifty Junior, Derivative Inclusion.

1. INTRODUCTION

The volatile characteristic of the stock market has become complex as the inclusion of derivatives gave new avenues for the speculation and hedging. The main objective of launching the derivative market was mainly to increase the liquidity as well as to transfer the risk, which would, in turn, ensure market efficiency. In India, derivative trading started in June 2000 with the inclusion of first futures contract in BSE Sensex on the Bombay Stock exchange (BSE) and the S&P CNX Nifty Index on the National Stock Exchange (NSE). Options were introduced for trading in June 2001. Futures and options *i.e.* F & O segment had

been growing since its introduction in context to contracts, value, traded volume. In India, derivatives had been introduced since 2000, i.e. around 15 years had been passed which is enough time period in order to evaluate the pros and cons of the introduction of derivatives. As there are no such significant examinations done on the impact of derivatives on market volatility after their introduction, so this study would fill this gap. In this study, we study the volatility behaviour before and after the introduction of derivatives on the CNX Nifty Index and the CNX Nifty Junior. In this paper, pre-inclusion phase, post inclusion phase and post financial crisis 2008 phase had been studied and examined with respect to derivative impact on the volatility with reference to CNX Nifty and CNX Nifty Junior. Nifty Index, being a benchmark had been considered as wider, balanced index for giving applicable results which can be used in context to Indian derivative market.

2. LITERATURE REVIEW

There had been few studies in the area of equity derivatives, which investigated the effect of stock prices because of the introduction of options for the stocks. It has not been widely researched with the view of stock market's reaction with regard to the introduction of equity derivatives. The research on the volatility of the index in context with the pre and post introduction of the derivatives had generally been done in the developed markets, especially the US, but not much with respect to the Indian stock market. Most of the literature till date had been on analysing the impact of trading in options and its expiration on the underlying stock price. Major work done had been discussed.

Black and Scholes (1973) and Ross (1976) gave a platform for the empirical analysis as well as theoretical analysis for understanding the effect of price because of option introduction. In their work on option valuation, they assumed options as redundant assets and logically their model suggested that introduction of option had no significant effect on the price of the underlying stock. Ross suggested that the price of stock generally gets affected by the option inclusion in the incomplete markets or emerging markets.

Conrad (1989), in one of his seminal papers, described the effect of price due to the introduction of options. He found an increase in the underlying stock's price due to the stock option's inclusion, approximately 3 days before their introduction. Specifically, it was seen that effect on price was associated with the inclusion and not with the date of the announcement. It was seen that the variance of underlying individual stock returns after the inclusion of option decreased.

Detemple and Jorion (1990) while studying the effect of the introduction of option on the underlying stocks found that the underlying stock price increased abnormally after the listing of new options and the market value increased from the listing period of new options. Detemple and Selden (1991) further evaluated that the primary stock prices depended on the derivatives with respect to their contractual behaviour. It was analysed that stock prices increased post-inclusion of the options market.

Ho et.al. (1995) found that after the listing of options, the accuracy for the forecasts of consensus improved. Ho and Liu (1997) again investigated the behaviour of the return around the introduction period by using different data for options listing and gave new results. The study explained different price effect before and after the options introduction. The study demonstrated the negative abnormal return around and post introduction day and the positive abnormal return during the introduction period.

Sorescu (2000) studies the effect of the introduction of options on the price of the underlying stocks and described that by the use of two-regime switching means model, the cross-sectional variations in the effect of price due to the introduction of options can be explained. The results showed significantly positive

returns for the options which were listed for the period from 1973 to 1980 and whereas the returns for those options were abnormally negative in 1981 and later. The study did not give a definite explanation for this kind of abrupt switch but still few of the possible reasons that it investigated were changes in regulatory framework's implementation in 1981, the introduction of index options in 1982 and the chances that options accelerate the distribution of negative information.

A study by Bekaert and Harvey (2000) analysed the impact of market liberalizations on the beta, cost of capital, correlation, and volatility with respect to the returns from the world market in the emerging equity markets by using the cross-sectional time series model. The study concluded that capital market integration reduces the cost of capital.

Chan and Wei (2001) conducted a study for the derivative warrants in Hong Kong and studied the effect of price and volume around the announcement date for the derivatives. The findings showed the excess buying pressure on the underlying stock on and before the issuance of the new derivative warrant. Short term weak effect of information had been concluded because of the high levels of the underlying stock's price had been seen on the first day after the announcement of the warrants and went stable thereafter.

In a study, Faff and Hiller (2005) found that the leverage properties of stock options brought about prominent levels of informed trading in the overall market (*i.e.* the underlying asset along with its derivative), in turn, which led to excess price movements on the listing day in the underlying stock. They tested if there was any effect of price movement around the introduction of the options in the derivative market because of inflow of informed traders towards the derivative market. The result was in sync with a view that the options market is used by the informed traders in order to speculate for their open positions.

Maheshwari (2012) studied the impact of the introduction of equity derivatives on the prices of the underlying stocks and found no significant difference after the introduction of the equity derivatives, after concluding that the stocks did not get any abnormal returns after being added to the permitted underlying on and around their inclusion date. Commonly it has been seen that the inclusion of the stock experience positive effects after being added to the list of underlying for derivative trading.

3. RESEARCH OBJECTIVES

1. To evaluate the growth and development of financial derivatives in the Indian Capital Market.
2. To evaluate the trend of volatility in case of underlying assets of CNX Nifty and CNX Nifty Junior.
3. To study the volatility of underlying asset of future CNX Nifty Index and CNX Nifty Junior during the period of study.

4. RESEARCH METHODOLOGY

The method adopted for research is a conclusive, descriptive type design which would study the impact of derivatives on the equity market and how much the derivatives have been successful in managing the volatility of the market. The design involves observation of the past performance of the equity market and the differences in the behaviour of the market post implementation of derivative instruments after the year 2002. The study also aims to predict the future behaviour of the market, given the deeper penetration of derivatives in the future.

Volatility is the relative dispersion of changes in stock prices relative to some average for a period (Jones and Wilson, 1989). Statistically, the term volatility implies standard deviation around the mean value of the stock or index return.Therefore, keeping in view nature of data accessible to investors and availability of resources, the study makes use of traditional close to close volatility estimator to compare the volatility of CNX Nifty & CNX Nifty Junior. It is a measure of how far the current price of an asset deviates from its average past prices. Greater the standard deviation, greater is the volatility. The standard deviation for the rate of return (*r*) is estimated as follows:

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$$

Where, $x_i = \ln (I_t / I_{t-1})$

$(I_1, I_2, I_3, ----I_{n+1})$ is a set of index value quoted at the close of each trading day.

$t = 1, 2, 3, --------, n$

μ = mean value of log returns.

5. DATA COLLECTION

The futures trading in India is carried out on the S & P CNX Nifty Index of the NSE and the BSE Sensex Index of the BSE started in June 2000. In the derivative segment, about 99.5 percent of the total trading volume is accounted by NSE; as a result, S&P CNX Nifty Index is used to study the volatility behaviour of the market. This study uses the daily closing prices of the Nifty Index spot and Nifty Junior Index. For the CNX Nifty Index spot, the data from 1997 onwards is used as the study commits itself to study both the pre and post derivative volatilities of the market. The S&P CNX Nifty spot and the Nifty Junior Index price data were collected from the NSE website (www.nseindia.com). The research considers the inclusions from two prominent indices *i.e.* the CNX Nifty and CNX Nifty Junior. The valuation is done on the historical data for the past 18 years starting from 1997-98 till 2014-15.

The CNX Nifty Index is composed of 50 different stocks comprising about 23 sectors of the economy. It is used for different purposes such as index-based derivatives, benchmarking fund portfolios and index funds. CNX Nifty Index is professionally maintained and thus considered ideal for derivative trading. On March 31, 2015, the CNX Nifty Index represents approximately 66.17% of the free float market capitalization of the stocks which are listed on National Stock Exchange (NSE). CNX Nifty Junior is the next part of liquid stocks after CNX Nifty. The stocks listed in the CNX Nifty Junior are considered as the most liquid stocks which had been left out from the CNX Nifty Index. The CNX Nifty Junior represents approximately 12.02% of the free float market capitalization of the stocks which are listed on NSE as on March 31, 2015.

6. RESULTS AND DISCUSSIONS

The measure that calculates the dispersion or the variation for the given set of values is the standard deviation for those data values. A large variation shows how much the return on the Index (fund) is deviating from the expected normal returns. The following table shows the standard deviations of each accounting year starting from 1997-98 till 2014-15.

The year-on-year basis comparison of volatility on CNX Nifty and CNX Nifty Junior reveals that ever since the launch of index derivative, volatility of CNX Nifty is either less than or equal to that of CNX Nifty Junior except the year 2012-13. The average volatility of CNX Nifty is 1.48whereas that of CNX Nifty Junior is 1.61 which shows that average volatility of CNX Nifty is less than that of CNX Nifty Junior over the period of study (see table 1).

Table 1
Volatility* of CNX Nifty & CNX Nifty Junior (Percent)

Year	*CNX Nifty*	*CNX Nifty Junior*
1997-1998	2	4
1998-1999	1.5	2.7
1999-2000	1.8	3.1
2000-2001	2.8	2
2001-2002	1.4	1.6
2002-2003	1.0	1.2
2003-2004	1.4	1.6
2004-2005	1.6	1.8
2005-2006	1.0	1.1
2006-2007	1.8	2.1
2007-2008	2.0	2.4
2008-2009	2.7	2.8
2009-2010	1.9	2.0
2010-2011	1.1	1.1
2011-2012	1.3	1.3
2012-2013	0.9	0.8
2013-2014	1.1	1.1
2014-2015	0.8	1.1
Average	1.56	1.88

Note: * Volatility is the standard deviation of daily returns. Source: Compiled by authors.

6.1. Findings CNX Nifty

CNX Nifty is measured on a relative rate at which price of a security moves up and down. As discussed earlier, volatility is found by calculating the annualized standard deviation of daily change in price.

A stock is considered to be of high volatility if its price increase or decrease rapidly over a short time interval. If the stock price remains almost constant then it is supposed to have low volatility. Stock with high volatility is also known as High Beta Stocks. The Beta is a measure of how sensitive the security return is to the return of the market. A beta of more than one represents securities are more responsive to the market movement. The beta factor is dependent upon macro factors like interest rate, money supply, and derivative segment.

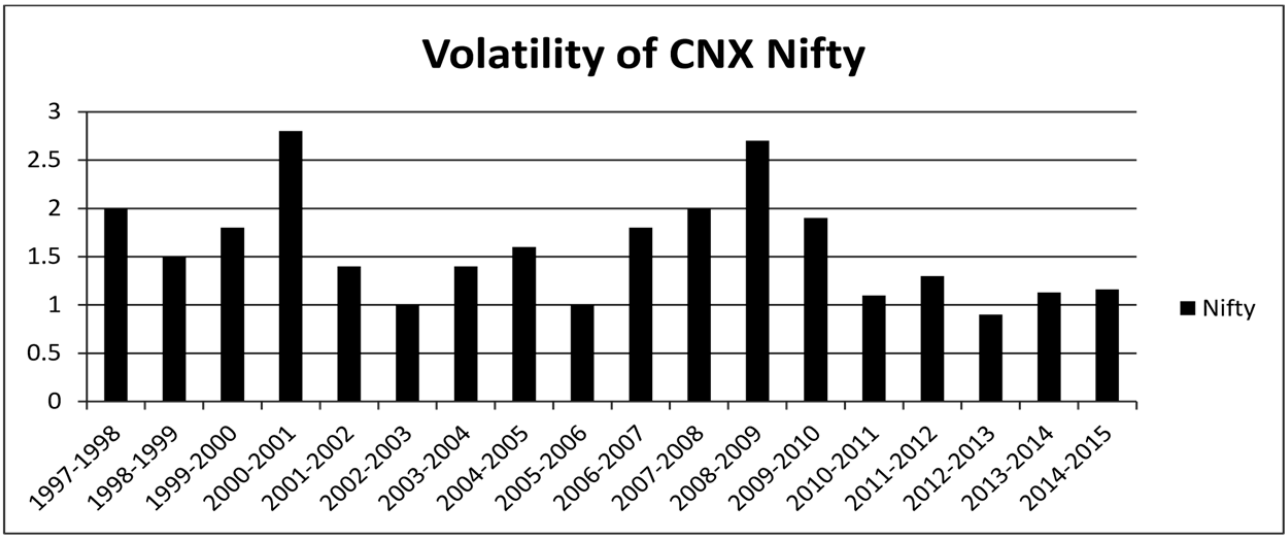

Figure 1

Source: Compiled by authors

Phase wise analysis:

1. **Pre Derivative Period:** The pre-derivative period lies between 1997- 2002. The data so analysed shows the year on year volatility to be in the range of 1.5 to 3 and is the highest during the year 2000-01 *i.e.* a year before derivatives were introduced to the index.

2. **Post Derivative Period:** The post derivative period which lies between 2003-08 shows a significant decrease in the volatility. The deviations range from 1 to 2 units, the average being 1.75 for the period.

3. **Post Financial Crisis:** The Global Financial Crisis in 2007-08 led the stock markets to drop heavily worldwide. The volatility jumped to about 2.7% during the 2008 crisis leading to a situation of turmoil despite the introduction of derivatives in India. The present day scenario shows a steady volatility in the market.

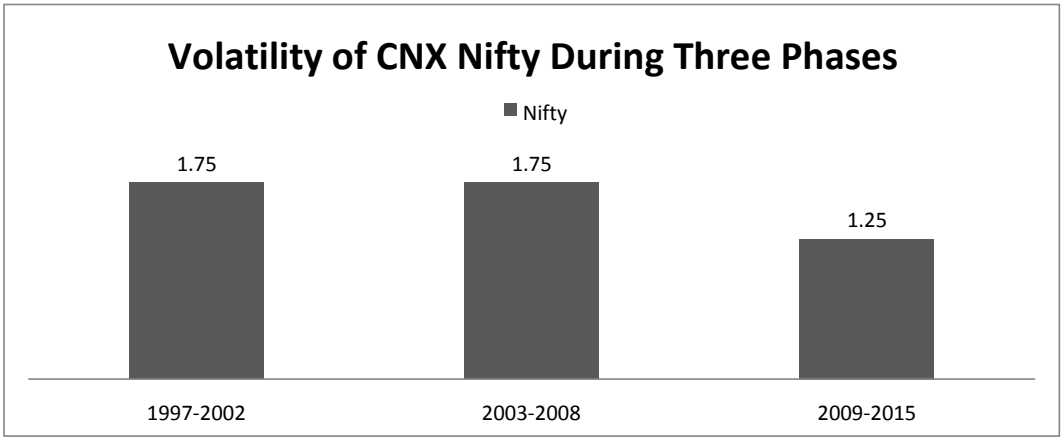

Figure 2

Source: Compiled by authors

6.2. CNX Nifty Junior

A liquid stock as the name suggests is the stock which is easily sold due to the fact that large volumes of the stock are traded on the market. Highly liquid stocks are more volatile as they are driven by market speculations and a lot of stocks are daily traded. The volatility of a liquid stock usually declines over time but macroeconomic factors also play a crucial role in the overall performance of the index. Nifty junior being a purely equity driven index has been relatively impacted by the introduction of the derivative segment in June 2000.

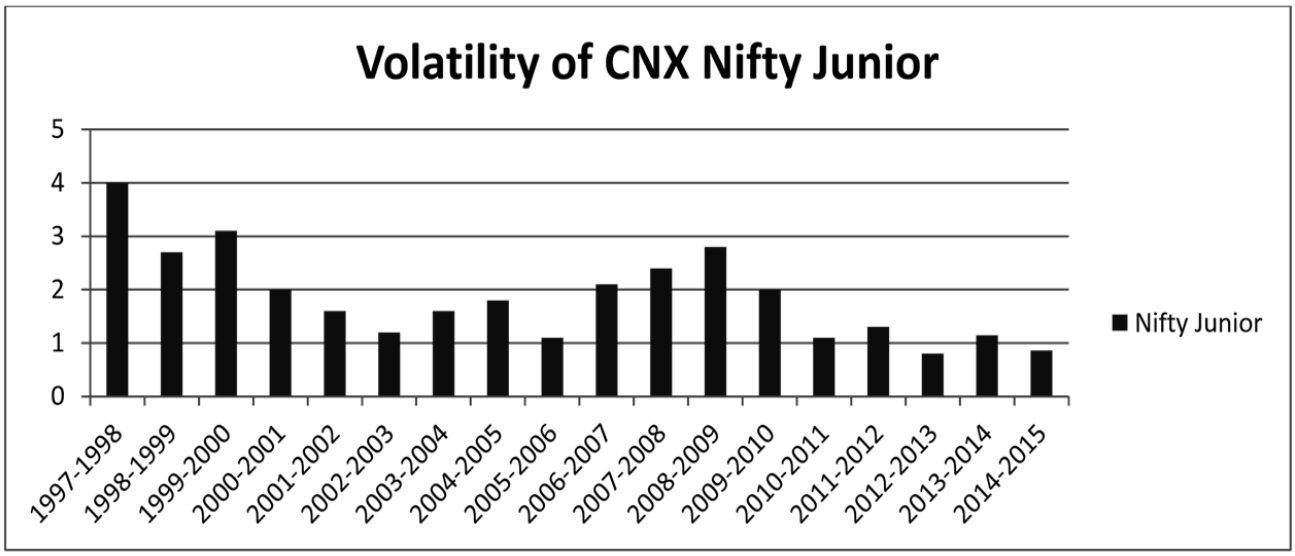

Figure 3

Source: Compiled by authors

Phase wise analysis :

1. **Pre derivative Phase:** The pre-derivative phase lies between 1997- 2002 in the study. Findings indicate that there exists a high volatility ranging from 1.75 to 4 in the first phase. The observed behaviour is parallel to that of Nifty in this phase as there is huge volatility before the advent of derivatives and lesser stability in the market.

2. **Post Derivative Phase:** The introduction of derivatives in the year 2002 brought about a positive change in the returns of the stock market in India. It helped the volatility to slow down with the maximum reaching to about 1.7% in the year 2004-05 as opposed to 3% in the year 2000. It was examined that there was a series of continuous decline in the volatility from 2001 till 2003 which shows the positive impact of derivatives and how much it has been successful to curb uncertainty.

3. **Post Financial Crisis:** The post-financial crisis phase starts from 2008 till the present day. During the financial crisis, the stock market crashed and the volatility reached to 2.8% high despite the presence of derivatives. The scenario changed after 2009 when the volatility hit a new low of 1% and is maintained between 1-2% brackets.

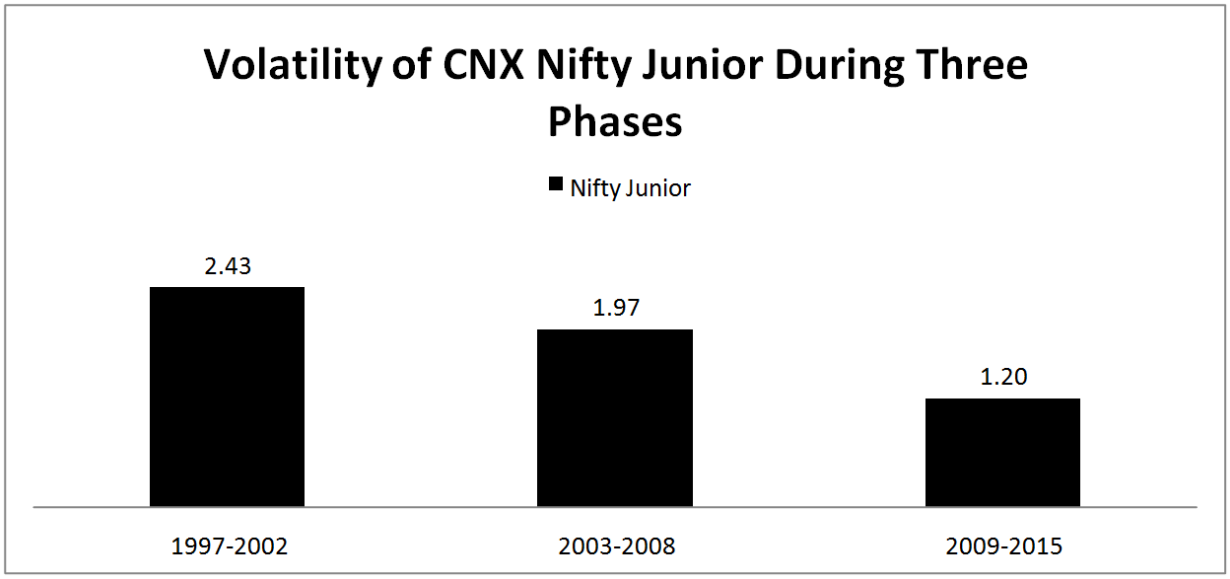

Figure 4

Source: Compiled by authors

Thus, analysis of data discloses that introduction of index derivatives has, in general, resulted in a reduction of the volatility of underlying asset *i.e.* CNX Nifty over the period of study.

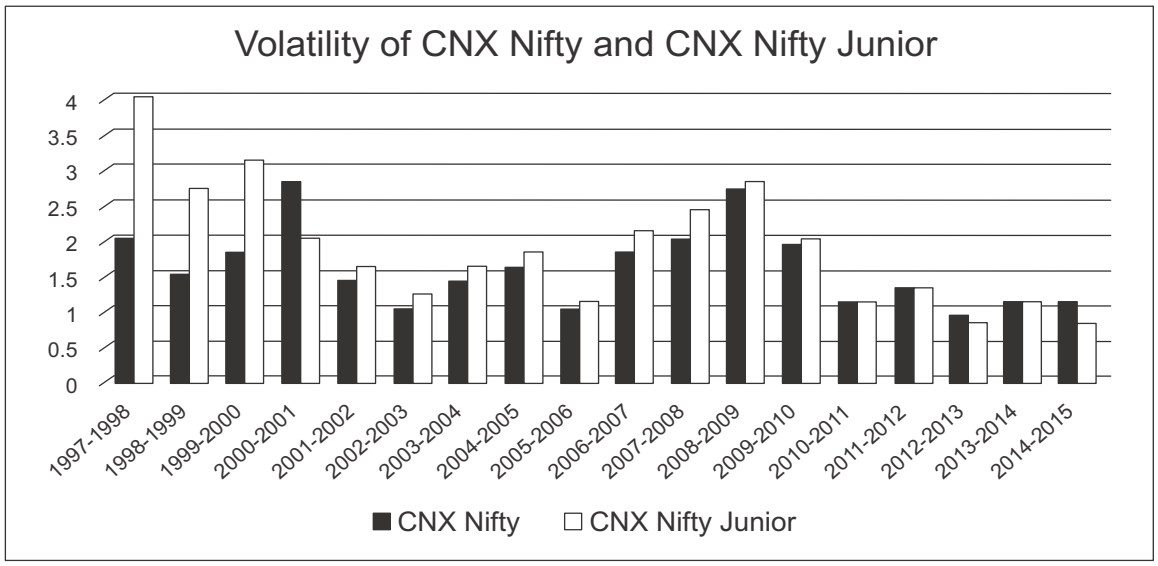

Figure 5

7. CONCLUSION

With the objective of analysing the impact of the introduction of derivatives on spot market volatility, we have examined the volatile behaviour of the CNX Nifty and Nifty Junior Index using the volatility model. The results suggest that the introduction of derivatives in the stock market has a stabilizing effect in terms of decreasing volatility as has been detected in other markets by Trennepohl and Dukes (1979) and Pilar and Rafael (2002).

The separate estimates for pre-derivatives and post-derivatives reveal that the sensitivity of the Nifty return with respect to the Nifty Junior Index. The day-of-the-week effect disappears after the introduction of derivatives contracts. With the introduction of futures, market volatility is determined by recent innovations. The appearance of moderate deviations in the post-derivatives model points to the fact that returns still predominantly depend on past innovations and volatility is time varying. The existing shocks and long-term memory processes in the post-derivatives period is, therefore, an indicator that introduction of derivatives has brought the desired outcome of decline in volatility.

However, the results clearly indicate a change in the nature of volatility patterns during the post futures period. Based on our results, we conclude that any change in the volatility process is not just due to the introduction of derivatives, but may be also due to many other factors, including better information dissemination and more transparency. Further, it seems that with the increased flow of information, response level of stocks has become more sensitive to recent innovations in the post-derivatives period. Further research is recommended to measure the changes in information flow due to the introduction of derivatives.

8. SCOPE AND LIMITATIONS

The paper seeks to make a broad study of the introduction of financial derivative instruments in Indian stock market and its broad impact witnessed on the stock volatility. The analysis also justifies the fall of price and return variances post inclusion of derivative segment in the exchange.

1. The study analyses the data from only two indices out of a pool of 12 broad market indices in the NSE.
2. The study limits itself to the volatility of returns and does not find the correlation amongst two variables.

References

Bekaert, G and C. R. Harvey (2000), Foreign Speculators and Emerging Equity Markets. *The Journal of Finance* 55,565-614.

Black, F. and Scholes, M. (1973), The Pricing of Options and Corporate Liabilities, *Journal of Political Economy*, 81: 637–659.

Chan, Y. and K.C. Wei (2001), 'Price and Volume Effects Associated Derivative

Warrant Issuance on the Stock Exchange of Hong Kong', *Journal of Banking and Finance*, 25: 1401- 26.

Conrad, J. (1989), The Price Effect of Option Introduction. *The Journal of Finance*, 44: 487–498.

DeMarzoandDuffie(1995), Corporate Incentives for Hedging and Hedge Accounting. *Review of Financial Studies*, 8(3): 743-71.

Detemple, Jerome B.,and Larry Selden. (1991), A general equilibrium analysis of option and stock market interactions, *International Economic Review*, 32(2): 279-303.

Detemple, Jerome B.,and Philippe Jorion. (1990), Option listing and stock returns, an empirical analysis. *Journal of Banking and Finance*, 14:781-801.

Faff, R. and Hillier, D. (2005), "Complete Markets, Informed Trading and Equity Option Introductions", *Journal of Banking and Finance*, Vol. 29, pp. 1359-1384.

Ho, J. L., Hassell, J. M. and Swidler, S. (1995), An Empirical Examination of the Dispersion and Accuracy of Analyst Forecasts Surrounding Option Listing. *Review of Financial Economics* 4(2):171-185.

Ho, L.C. J., & Liu, C.S. (1997). A Reexamination of Price Behaviour Surrounding Option Introduction. *Quarterly Journal of Business and Economics*, *36*(4), 39–50.

Maheshwari, Y. (2012). Equity Derivatives Introduction and Stock Market Efficiency. Journal of Management Research, 12(3), 141-152.

Ross, S. A. (1976), Options and Efficiency, *Quarterly Journal of Economics*, 90: 75–89.

Sorescu, S. M. (2000), The Effect of Options on Stock Prices: 1973 to 1995. *The Journal of Finance*, 55: 487–514.

Mallikarjunappa, T., &Afsal, E. M. (2008). Impact of Derivatives on the Stock Market Volatility: A Study of Nifty Index. *Asian Academy of Management Journal of Accounting and Finance*, 4(2), 43-65.

Bamba, Gupta, Arya (2013). Derivative Trading and Stock Market Volatility in India. *International Journal of Techno-Management Research*, 1(3), 1-7.