The Effect of Futures Trading on the Underlying Volatility: Evidence from the Indian Stock Market

P. Sakthivel*[*]

Abstract

The effect of the introduction of futures trading on the spot market volatility has been widely documented in the financial literature. The main objective of the study is to investigate the impact of introduction of index futures trading on volatility of Nifty. The study employed GARCH (1, 1) model to capture the time varying nature of the volatility and volatility clustering phenomena using daily closing price of the Nifty. The results showed that after introduction of the futures trading reduced stock market volatility, due to increase market efficiency. The study is also examined futures trading changes structure of spot market volatility using GARCH model. The study observed that there is a changes structure in spot market volatility after introduction futures trading. Specifically, there is evidence that the increased impact on recent news and reduced effect of the uncertainty originating from the old news. The study finally observed that the introduction of the derivatives contract improved the market efficiency and reduced the asymmetric information.

* Doctoral fellow, Department of Economics, University of Hyderabad, India.

I

Introduction

The stock index futures contracts were, perhaps the most successful financial innovation of 1980's. The first contract was the Chicago mercantile exchange S&P 500 futures, which begin trading in the US in April 1982. The futures contracts design spread to almost every financial futures market world wide- the Sydney Futures Exchange's, Australian All Ordinary Share Price Index Futures first traded in 1983; the London International Financial Futures exchange's FTSE 100 futures in 1984; the Hong Kong Futures Exchange's, Hong Kong Index Futures in 1986; the MATIF CAC 40 index futures in 1988; the Osaka Stock Exchange's in Nikki 225 futures in 1988 and DTB's DAX index futures in 1990. In the last decade many emerging financial markets have started introducing derivatives instruments such as index futures. India is also one of the real emerging financial markets in the world and having common trading infrastructure, which will have important advantages if derivatives market is introduced. Therefore, SEBI has taken important steps to introduce the derivatives instruments in National stock exchange of India (NSE) and Bombay stock exchange (BSE). The main objectives of the introduction of the derivatives in Indian stock market is to fully integerate,the Indian financial markets with the global developed markets, to improve the information efficiency and to provide tools for risk management for investors.

L. C Gupta committee on derivatives has recommended in 1998 the introduction of the index future in the first place to be followed by other instruments once the market matures. The preparation of the regulatory for the operation of the index futures took some time, until in June 2000 futures on benchmark index was introduced and followed by option on indices, which was introduced in June 2001, which was again followed by option on individual stock on July 2001, and finally followed futures on individual stock in November 2001.

A derivative is financial instruments whose value is derived from another underlying asset. The underlying asset can be equity, forex, and any other asset The price of derivatives is driven by the spot price of the asset price which is underlying. The derivative futures contracts are exchange traded instruments where one party agreed to

purchase an asset at future time for a certain price and other party agreed to sell the asset at same time for same price.

Since their introduction, stock index futures markets have experienced a substantial increase in trading activity. Financial futures contracts are key instruments in portfolio management, as they allow for risk transference. Moreover, derivatives markets play an important role within the price discovery process of underlying assets. Stock index futures have relatively lower transaction costs and capital requirement, so the arrival of external information is quickly incorporated into as prices as investor's expectations are updated.

The study is organized as follows: Section II Presents Motivation of study. Section III discusses a brief review of theoretical debate. Section IV Review the empirical literature on futures trading listing effects. Section V Deals with the main characteristics of NSE 50 and data set used. Section VI Examines the impact of futures trading on volatility of Nifty index. Section VII Discuss the main results and finally section gives concluding remarks.

II

Motivation of the Study

The main concern is how the introduction of the futures affects trading the volatility of the underlying assets has been an interesting subject for the investors, exchanges and regulators, because the introduction of the futures trading has significantly altered the movement of the share price in the spot market. The spot and futures market prices are linked by arbitrage, i.e., participants liquidating position in one market and taking comparable position at better price in another market or choosing to acquire position in the market with most favorable prices. The main argument against the introduction of the futures trading is that it destabilizes the associated spot market by increasing the spot price volatility. Under risk aversion, higher volatility should lead to higher risk premium. In this way transmission of the volatility from futures to spot market would raise the required rate of return of the investors in the market, leading to

misallocation of the resources and the potential loss of the welfare of the economy. Hence, it is important to study the effect of the futures introduction on spot market volatility which is considerable interest for regulators.

Some of the studies have undertaken to investigate the impact of the introduction of futures trading on volatility of developed and under developed economies including Indian stock market. The majority group of researchers supported the argument that the introduction of the futures trading stabilizes the spot market by decreasing its volatility. Few of them are, Baldauf and Samtoni (1991) using the S&P 500 index in US, Antoinmu and Holems (1995, Galloway and Miller (1997) using mid 400 index, Darram (2000) using the FITSE Mid 250 contract in UK), Bologna (2002) using MIB 30 in Italy, (2003), Gupta (2002) and Raju and Kardnde (2003) using NSE 50 in India. Most of the studies show that there is decrease in the spot market volatility upon the introduction of the index futures trading.

Another group of researchers supported that introduction of the futures trading increased the spot market volatility there by destabilizing the market, due to futures market promoting speculation and high degree of leverage Figlewaski (1981), Harris (1989) suggested uninformed speculator trader in the futures market add noise to spot market and decrease the information content of the spot price. , Chang at el (1989) Nikki index in the Japan, Brosan at el (1991), Lee and Ohk (1992) for Japan and UK, Kmara at el (1992) S&P 500 in US are some of studies which supported that destabilizing hypothesis. Since the introduction index futures trading whether decrease or increase stock market volatility, we need to investigate empirically.

III

The Theoretical Debate

Stabilization Hypothesis:

There is debate how introduction of index futures trading influence cash market volatility. One group of author's views argued that, the introduction of index futures trading decreases spot market volatility, due to speculative traders migrated from spot to futures market. Grossman and Miller (1988) suggested that spot market volatility decreases by higher liquidity provided by speculators. This additional liquidity allows hedging the position and curb volatility attributes to order imbalance. There are several ways by which futures market increases the efficiency and smoothens price variations in the underlying spot market. Futures markets provide a mechanism for those who buy and sell the actual commodity to hedge themselves against unfavorable price movement. Though the futures market spreads across a large number of investors and transferred away from those hedging spot position to professional speculators who are willing and able to bear it. The availability of risk transference afforded by the futures market reduces the spot price volatility because it eliminates the need to incorporate risk premium in the spot market transaction to compensate the risk of price fluctuations. Futures' trading attracts more traders to spot market making it more liquid and therefore less volatile.

The debate about speculators and impacts of futures trading on spot price volatility suggesting decreases volatility in stock market. Bologna (2002) argued that the speculation in the futures market also leads to stabilization of the spot prices. Since futures are characterized by high degree informational efficiency, the effect of the stabilization permits to the spot market. The profitable speculation stabilizes the spot price because informed speculators tend to buy when the price is low pushing it up and sell when the price is high causing it to fall. These opposing forces constantly check the price swings and guide the price towards to the mean level. Uninformed speculators are not successful and are eliminated from the market. This profitable speculation in the futures market leads to a decrease spot price volatility.

There are several empirical studies shows that introduction on index futures trading improve market efficiency and reduced informational asymmetries. Darram (2000) also argued that introduction of the futures market leads to more complete market enhancing the information flow. Futures market allows for new positions and expanded investment sets and enables to position to take at lower cost. Futures' trading brings more information to the market and allows for quicker disseminations of the information. The transfer of the speculative activity from spot to futures market decreases the spot market volatility.

Destabilizing Hypothesis

Another group of authors views argument that, introduction of index futures trading increases cash market volatility, due to low transaction costs in futures market induce more uninformed speculative traders, adding noise to the market and decreases in formatives of prices. Figlewaski (1981) argued that speculation in the futures market is transmitted to the underlying spot markets. The speculation produces a net loss with some speculators gaining (and others loosing), thereby destabilizing the market. Uninformed speculative traders increase price volatility by interjecting noise to a market with limited liquidity. The inflow and existence of the speculators in the futures market produces destabilization forces, which creates un desirable bubbles. Kmara at el (1992) suggested the futures market activity increases the spot price variability when futures price is changed by technical factors or manipulations. Some times futures market induces a significant amount of hedge trading without attracting enough speculation to permit the effective risk transfer. The hedging pressure in the futures market than spills over to the spot market when traders end up bearing risk transfer through both futures and spot market.

Futures trading increases spot price volatility if traders in the futures market do not have good information as participant in the spot market even if futures prices accurately reflect the information available to the trader in the market, their collective actions pushes the spot market prices away from its most appropriate value. This situation presents profitable opportunities to better informed spot market participants whose

trading acts to stabilize futures prices while allowing greater volatility in the spot market. Further, futures market are distributed information asymmetrically the information content of the spot price is altered, spot prices variability and welfare is reduced.

Since the proposed logical arguments both support and reject the proposition of futures markets having a destabilizing effect on spot market, it is self-evident that the theoretical debate on how futures trading affects underlying stock market still remains rather inconclusive. Thus the uncertainty of the existent theoretical literature implies that the issue of whether and how futures trading affect underlying spot market remains mainly an empirical one.

IV

The Empirical Literature

1. Futures Trading and Spot Price Volatility

The effect of the introduction of stock index futures on volatility of the Italian stock exchange was examined by Bologna and Cavallo (2002).They employed GARCH family of techniques to capture time varying nature of volatility using daily closing price of MIB stock index periods from 2nd January 1990 to December 1997. The result shows that, there was no destabilization of spot market as result of the introduction of equity index futures contracts in Italy. They concluded that the introduction of the stock index futures trading has lead to diminish the stock market volatility, due to the increased impact on recent news and reduced effect of the uncertainty originating from the old news.

In a similar study done to investigate the impact of introduction of index futures trading on stock market volatility on S&P CNX Nifty and BSE**,** Bandivadekar and Ghosh (2003) found a decline in volatility of Nifty and BSE sensex after futures introduction. They employed ARCH/ GARCH family of techniques to capture time varying nature of volatility and volatility clustering using daily closing price of Nifty and BSE sensex period from January 1997 to March 2003. They concluded that introduction of index futures trading has not destabilization spot market .However; they consider external

factors that might have influenced the general volatility of spot market during period of study. The results showed that while the futures effects play important role in reduction of volatility in case of on S&P CNX Nifty, in case of BSE sensex, where derivative turnover is considerable low, its role seems to ambiguous

This study examined the impact of introduction of KOSPI 200 futures on Korean stock market using data for the period from 1 September 1993 to December 1998. Ryoo and Graham smith (2003) argued that introduction of index futures trading have destabilizations spot market. They used ARCH/ GARCH models to capture time varying nature of volatility phenomena in present data. The results shows futures trading increases the speed at which information impounded into the spot market prices, reduces the persistent of the information and increase the spot market volatility..

This study investigated the influences of the inception of Taiwan Index future trading on spot price volatility on the Taiwan Stock exchange using the data period from 5th January 1995 to May 2000. The macro economic effects are controlled and asymmetric response behavior is studied. Chiang and Wang (2002) suggested that the trading of TAIEX futures has major impact on spot price volatility mechanism, while the trading of MSCI Taiwan does not. They used GJR GARCH model to capture the asymmetric features in the data. The result shows that the increase asymmetric response behavior the following the beginning the trading of two index futures reflect that a fact the major proportion of the investors in TSE is of non-institutional investors are generally un-informed and are inclined to the over react to the bad news. Meanwhile, the instruction of the TAIEX the futures trading improves the efficiency of the information transmission from futures to spot markets

In a study that compared the volatility of NSE 50 index before and after introduction of Nifty futures trading, vipual (2006) found a decline volatility of Nifty index of each year between 1998 and 2004. He used GARCH model to capture time varying nature of volatility and volatility clustering phenomena present in data. The results shows that introduction of derivatives trading has not destabilization stock market. This is largely

attributed to reduce the persistence in the previous day's volatility. However, intraday unconditional volatility of equity increases. This contradiction is explained by a increased correlation between price of its constituent shares caused by arbitrage transaction in the cash market.

The effect of the introduction of the futures and options to FTSE/ASE 20 index on volatility of underlying was investigated. According to Drimpets and Sariannidis (2007), there is reduction in spot market volatility after introduction on stock index futures trading. They used EGARCH technique to capture the asymmetric features in data. They points out that asymmetric an effect of the futures trading has induced a reduction in the conditional volatility of the FTSE/ASE 20 index and consequently it has increased the efficiency.

The impact of the introduction stock index futures on underlying index volatility evidence from India was investigated by Kumar and Mukhpondnyan (2002). They employed ARIMA ARCH models to capture volatility of clustering and time varying nature of volatility or heteroskedasticity using daily closing price of nifty index periods from June 1999 to June 2001. They concluded that while the introduction of the stock index trading has no effect on underlying mean level and marginal volatility, it has significantly altered the structure of the stock market volatility. This can explained by new information is assimilated into prices more rapidly then before and there is decline in the persistence of volatility since onset of futures trading.

In a similar study done to explored the impact of introduction of index futures and options contracts on volatility of Indian stock market, Shenbagaran (2003**)** found there was no significant impact on spot market volatility after futures introduction. He employed ARCH/GARCH models to capture the keteroskedasticity in returns that characterize stock market returns. The analysis shows that introduction of futures trading has not destabilization spot market. This can explain by introduction of derivatives contracts improve liquidity and reduced informational asymmetries in market.

This study investigated the effect of introduction of futures trading on stock market in USA, UK, Japan, Australia, France and Hong Kong. Shang (2001) argued that impact of introduction of index futures on volatility of stock returns in USA, France and Australia, rose significantly, while no significant changes in the volatility were found in UK and Hong Kong. The different results might be attributed to macroeconomic factors and the structure of various markets.

The effect of the index futures trading on the underlying market volatility in Australia, Hong Kong, Japan, and UK have been examined by Lee and Ohk (1992).Using multivariate GARCH model and they found that the stock market volatility had increased significantly after the introduction of the stock index futures rendering it more efficiency, volatility of the shocks reflect the information which is transmitted and absorbed rapidly by the market. However, Australia and Hong Kong were observed to be exceptional cases, where stock market volatility did not increase.

The effect of introduction of index futures trading on stock market volatility was investigated by Gupta (2002) He study used four measures of the volatility on spot market (a) the first is based on close to close (b) the second is the on open to prices (c) third is pnakinson's extreme value estimation and (d) the fourth is german class measure the volatility. The empirical result reported that overall underlying stock market volatility has declined after introduction index futures in terms of four measures.

This study examined impact of the futures trading on KOSPI 200 index and KLSE. Pok and Posahavlale (1991) suggested that while derivatives increased the volatility of the underlying markets; they simultaneously improved its effectiveness as well by increasing the speed at which information into spot market prices.

V

Methodological Issues/ Objectives

Since there is a theoretical disagreement as to whether futures trading increases or decreases the spot market volatility, the question need to be investigated empirically and policy makers in India may also like to know its impact so that future policy can be implemented.

Against this backdrop the following issues need to be addressed.

- What is existence of index futures trading does affect the volatility?
- What is extent to which futures' trading influences the volatility of the Nifty index ignoring other market wide factors?
- Does introduction of stock index futures trading alter the structure of volatility?

VI

Market and Data Sample

The data for present study has been collected from NSE of India website. The main data for the study is returns of the S&P CNX Nifty and Nifty index futures. Nifty comprises of the 50 liquid stocks, each stock being awarded a weight in proposition to its relative market capitalization. The constituent stock represents wide range of industries and their total market capitalization accounts for the 60 percent of the market capitalization of the equity market

In order to estimate the impact of the introduction of index futures trading on the volatility of the NIFTY, daily closing prices returns of the NSE 50 index is collected during the period January 3, 1992 to 31st may, 2007. During the sample period, nifty index trades from 9.55 A.M to 3.30 P.M. The study used for the higher frequency data rather than the daily closing prices, due to non-availability of inra-day data (minute by minute hourly data). This study is also collected data of daily closing prices of S & P 500 (USA) from 1992 to 2007. In order to examine whether world market factors are affecting spot market volatility or not. The study calculated daily returns using the

equation $R_t = \log (P_t/P_{t-1})^* 100$ where, R_t is the daily returns, P_t is the value of the security at time t, P_{t-1} is the value of the security at time t-1.

VII

Methodology

An Empirical Framework of Univariate GARCH Modeling

Some of the stylized features which are common to wide set of financial assets are time varying volatility, clustering volatility, leverage effects, mean reversion and skew ness and excess kurtosis etc. The GARCH model proposed by Bollerslev,(1986) has widely used in the finance literature to explicitly capture these empirical features. The model like standard regression parameters will not able to capture the volatility or these stylized features. Especially the GARCH family techniques are expected to explain the sufficient time variant volatility behavior of the cash index. Therefore, GARCH model will be used to investigate effects of the introduction of the index futures trading on spot market volatility. The main advantage of the GARCH model to make the connection between information and volatility explicit, since any changes in rate of information arrival into the market will be changes in the volatility in the market. Thus, unless information remains constant, which is hardly the case volatility must be varying even on daily basis.

In the present study GARCH framework is used to investigate any possible effects of the futures trading on the volatility of the spot market for Indian stock market. In the ARCH model the conditional variances at time t depend upon size of square error term at time t-1, thus allowing the conditional variance to change over the time. Defining the GARCH process, Bollerslev introduced a further generalization to the ARCH models allowing for past conditional variance in the conditional equation. One of the most appealing features of the GARCH framework which explains, why this model is so widely used in the financial literature is that it captures one well known empirical regularities of the assets returns, the time varying volatility or keteroskedasticity.

The GARCH (1, 1) model suggested by Bollerslev is represented as follows:

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + €_t$$

$$€ \Psi_{t-1} \sim N(0, h_t)$$

Where, R_t is the spot price returns, the change in the logarithm of the spot price index in the period and R_t depends upon past lagged returns.

Where, $€_t$ is the error in the conditional mean equation and Ψ_{t-1} is the set of information available at time t-1.

$$h_t = \alpha_0 + \alpha_1 u_{t-1} + \beta_1 h_{t-1}$$

If $\alpha_1 + \beta_1 \leq 1$, then unconditional variance $€_t$ is given by

$$\text{Variance } (€) = \alpha_0 (1 - \alpha_1 - \beta_1)$$

the co-efficient of moving average component of the conditional variance α_1 are typically interpreted as news coefficients that measures the impact of the recent news on current volatility; β_1 the co-efficient of the auto-regressive component of the conditional variance are similarly interpreted, as persistence co-efficient that measures impact of the less recent or old news on current volatility.

Since the study proposed to investigate the impact of the introduction of index futures trading on spot market volatility, a dummy variable is introduced into conditional variance equation

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + €_t$$

$$€ \Psi_{t-1} \sim N (0, h_t)$$

$$h_t = \alpha_0 + \alpha_1 u_{t-1} + \beta_1 h_{t-1} + \gamma DF$$

where, DF is the dummy variable taking the value of the zero before futures introduction and 1 after the futures introduction. If the co-efficient of the dummy is negatively statistically significant it indicates that the there is a decrease in the volatility

associated with futures introduction. If the co-efficient is positively significant indicates that there is increase in the volatility due to futures introduction.

Controlling Other Factors

The present study found that introduction of derivative trading has resulted in reduction in cash market volatility. Hence, we tried to investigate whether futures trading introduction is only factor responsible for reduction in volatility of NSE 50 or macro economic factors affecting the market volatility. For this purpose, the study included return from a surrogate S & P 500 index into GARCH mean equation to control the additional factors affecting the market volatility. The following GARCH model is estimated.

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \alpha_{2\ s\ \&\ p\ 500\ t-1} + \epsilon_t$$

$$\epsilon \Psi_{t-1} \sim N(0, h_t)$$

$$h_t = \alpha_0 + \alpha_1 u_{t-1} + \beta_1 h_{t+1} + + \gamma_{DF}$$

Where R_t is the spot price returns, the change in the logarithm of the spot price index in the period and R_t depends upon past lagged returns of nifty index and S & P 500 index. The lagged S & P 500 index return is used to remove the effects of worldwide price movement on volatility of nifty. For example, if the Indian market is influenced by US markets, this will be reflected through the lagged S & P 500 return. Where ϵ_t is the error in the conditional mean equation and Ψ_{t-1} is the set of information available at time t-1.

VIII

. Empirical Results and Discussion

Descriptive Statistics

The descriptive statistics is given in Table 1. A comparison of standard deviation of the nifty return is estimated both before and after the introduction of the nifty futures. The table shows that standard deviation has fallen from 0.01687 in the pre-futures period to 0.0145 in the post-futures period. It can be observed that Nifty volatility measured by standard deviation shows the volatility in the post-futures is less than the volatility of the pre introduction of the futures. Probably the extent to which the index futures trading

causes decrease in the spot market volatility can be better explained by capturing news co-efficient in the subsequent section. Further, the results also observed that the post-futures Nifty return series follows non normal distribution, which is given, by measures of skew ness and kurtosis. The higher value of sample kurtosis, however, implies that the distributions of nifty returns are leptokurtic or tailed.

Table 1: Descriptive Statistics

	Whole Period	Pre-Futures	Post-Futures
Mean	0.000415	0.000193	0.000625
Median	0.000776	-0.000307	0.00165
Standard Deviation	0.0156	0.016879	0.0145
Skewness	-0.2789	0.156109	-0.875818
Kurtosis	7.4869	6.186177	9.263959
Jaque-Bera	2829.8241	671.3227	3083.006
Probability	0	0	0

The Effects of the Futures Trading and Spot Price Volatility

First the study conducted unit root test to check nifty series stationary or not using augmented Dickey- Fuller (ADF) and Phillips – Perron models. The results shown that unit root reject null hypothesis implies that nifty return series stationary with first difference. Second study proposed to investigate the impact of the introduction of futures trading on stock price volatility using GARCH (1,1) models. First a dummy variable included in the variance equation; D_t takes the value zero and one for pre and post futures period respectively. The estimated co-efficient on dummy variable is negative and significant implying that the introduction of the stock index futures resulted in decrease in the volatility in the stock market.

Table 2: The Effect of Nifty Futures on Spot Price Volatility

GARCH (1,1) model

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \epsilon_t$$

$$\epsilon \Psi_{t-1} \sim N(0, h_t)$$

$$h_t = \alpha_0 + \alpha_1 u_{t-1} + \beta_1 h_{t-1} + \gamma_{DF}$$

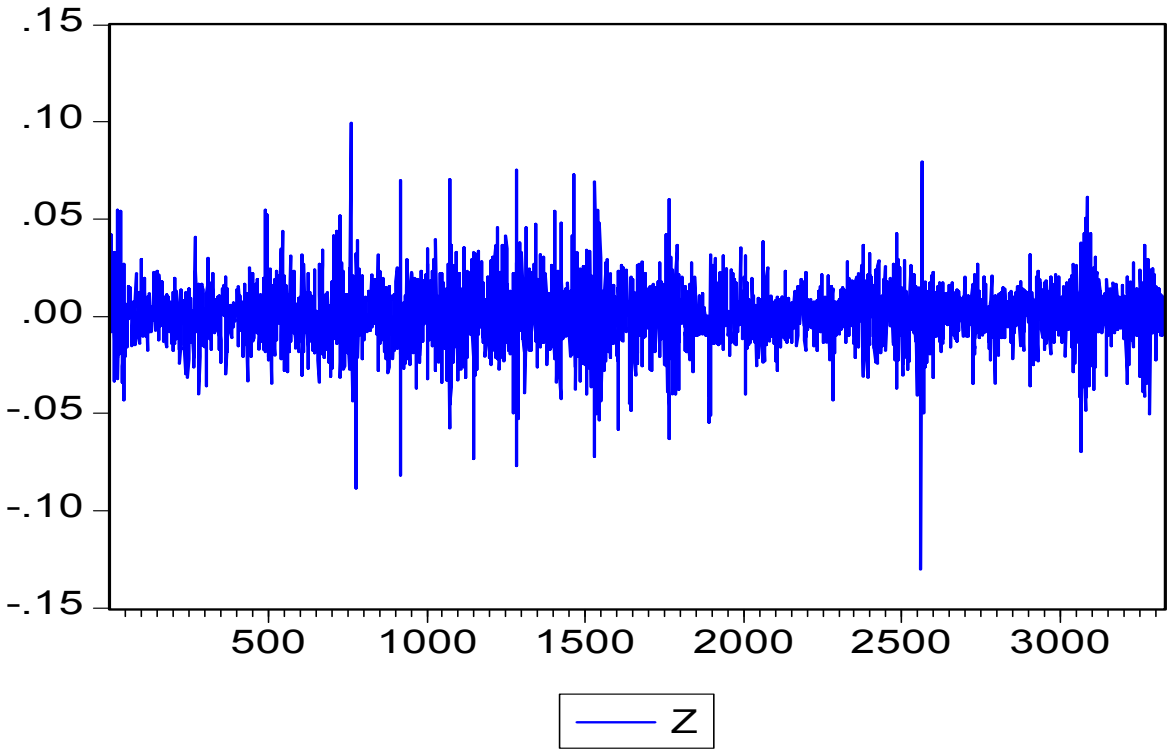
	Nifty Closing Returns	
	Coefficients	Significance
Constant	1.62E	7.534*
ARCH (1)	0.1291	16.484*
GARCH (1)	0.8227	93.968*
Dummy	-6.69E	-4.396*

*1 % significance level

The results presented in the Table 2 show that all co-efficient in the conditional variance equation are significance at 1 percent level of significance including the dummy variable. The results shows that the effect of introduction of index futures trading on Indian stock market may have affected per se the volatility of the Nifty are confirmed. This is showed by the significance of the dummy variable. Furthermore, the measures of the effect due the introduction of the futures trading (the value of the co-efficient γ) has negative sign indicating that on set of the stock index futures results in diminished stock market volatility.

We can also see from the below graph that the conditional volatility has been steadily going down for nifty index over time. It clear evident that the volatility estimates of pre index futures is higher than the post index futures. This can explain by new information getting assimilated and the effect of old information on volatility getting reduced at a faster rate in the period following the onset of futures trading. The argument seems to

confirm the expectation of increased market efficiency as a conquence of the activity in stock index futures



Conditional volatility

The Impact of the Futures Trading on Spot Price Volatility after Controlling the Wide Market Factors

The present study tried to examine whether futures trading is primarily responsible for reduction in volatility of Nifty or wide market factors affecting the stock market volatility. The empirical results reported in Table 3 shows that the dummy co-efficient (-5.61) has taken negative value after adjusting for the market wide factors and it is significant even though the magnitude of such effect has gone down considerably. Finally, the study concludes that futures trading has significant role in reducing volatility

of the S&P CNX Nifty but market wide factors do not affect the volatility of the spot market.

GARCH MODEL (1,1)

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \alpha_{2\ s\&p\ 500\ t-1} + \epsilon_t$$

$$\epsilon \Psi_{t-1} \sim N(0, h_t)$$

$$h_t = \alpha_0 + \alpha_1 u_{t-1} + \beta_1 h_{t+1} + + \gamma_{DF}$$

TABLE .3

Mean Equation		
Variable	Co-efficient	Significance
α_0	0.000827	3.634*
α_1	0.133	7.013*
α_2	0.00574	0.278*
Variance Equation		
C	0.51E	7.753*
ARCH (1)	0.131	16.252*
GARCH (1)	0.822	97.244*
Dummy	-5.561	-4.180*

*indicates significance at 1 percent level

Futures Trading and Structure of Spot Market Volatility

The study also examined two GARCH models, one for pre-sub period and the other for post-sub period to check how estimation of the GARCH coefficient changes from one period to another. If α_1 increases following the introduction of the futures trading shows that the information is being impounded in the spot price more rapidly. Conversely, if α_1

decreases in the post futures period, this suggests that information is impounded into spot prices more slowly. Engle and Bollerslve (1986) showed for GARCH (1,1) model, the persistent volatility shocks depends upon primarily on ($\alpha_1 + \beta_1$) increase (decreases) in following the introduction of the futures trading indicates the increased (decreased) persistence of volatility shocks.

The empirical results reported in the Table 4 shows that from pre to post futures sub periods the value of α_0 and α_1 have both gone up significantly where as α_2 has fallen from 0.889 to 0.644. This study observed the coefficient of α_1 has increased in the post-futures. Thus, it is suggested that the impact of recent incoming news increases with on set of the stock index futures. However, the coefficient of α_2 has gone down in the post futures sub period. This can be explained by observing increase in the rate of information flow reduce the uncertainty about previous news. In other words, in the presence of stock index futures trading the old news play a small role (have less impact) in determining the volatility of the stock market.

GARCH MODEL (1,1)

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + €_t$$

$$€ \Psi_{t-1} \sim N(0, h_t)$$

$$h_t = \alpha_0 + \alpha_1 u_{t-1} + \beta_1 h_{t+1} +$$

TABLE .4

Pre futures period		
Variable	Co-efficient	Significance
C	7.76E	4.741*
ARCH (1)	0.0876	8.181*
GARCH (1)	0.889	90.55*
Pre futures period		
C	1.53E	6.586*
ARCH (1)	0.182	9.857*
GARCH (1)	0.644	30.903*

Conclusion

The study investigated the effects of the Nifty futures on underlying the spot market volatility using GARCH (1,1) model that the heteroskedaticity in the returns that characterize the stock market returns.. The results showed that after introduction of the futures trading reduced stock market volatility, contributes to increase market efficiency. The study also examined futures trading changes structure spot market volatility. The study observed that there is a changes structure in spot market volatility after introduction futures trading. Specifically, there is evidence that the increased impact on recent news and reduced effect of the uncertainty originating from the old news.

The study finally tried to investigate whether futures trading introduction is only factor responsible for reduction in volatility of NSE 50 or macro economic factors affecting the market volatility. The study found that futures trading has significant role in reducing volatility of the S&P CNX Nifty but market wide factors do not affect the volatility of the spot market.

Finally, the study concludes that futures' trading reduces spot price volatility, by providing low contingent strategies and enabling investor to minimize the portfolio risk by transferring speculator from spot market to future market. The low margins and low transaction cost and standardized contracts and trading conditions attract risk taking speculator to the futures market. Hence, futures are expected to have stabilizing influence as it adds more traders to the cash market, making it more liquid and therefore less volatile.

References:

1. Thenmozhi M(2002), Futures Trading and Information and Spot Price Volatility NSE 50 Index Futures, NSE Research Initiative, NSE Mumbai, paper No.18, pp.4-8

2. Snehal bandivadekar and Saurabh and Ghosh (2003), Derivative and volatility on Indian Stock Market, RBI occasional papers Vol. 24, No.3 pp.1-12

3. Golaka nath. C (2002), Behavior of the Stock Market Volatility after Derivatives Markets, NSE Research initiative working paper NSE, Mumbai, pp, 1- 16.

4. M-Illueca and Lafuete .J.A (2003), The Effect of Spot and Future trading on Stock Market Volatility: Non-parametric approach, Journal of Financial futures, August, Vol.23, No.8, pp.1-19]

5. Darren Butter worth(2000), the impact of introduction of the index futures trading on underlying stock index volatility in the case of the FISE Mid 250 contract, Journal of Financial Economics, Vol. 7, Pp.223-226

6. Gallowy and miller (1997), Index futures trading and stock return volatility, evidence :from the introduction of the midcap 400 Index futures Vol. 32, No.2, pp 1-14

7. Kuger (2001), Equity Index futures contracts and share price volatility: A south African Prospective, Medicare Accountancy Research Vol.9, pp.217-229.
8. Harroion Hong(2002), The model of the return and trading in the futures markets , Journal of Finance, Vol. 2, PP 1-24

9. Joshia K watanable (2001), Price volatility trading volume and market depth: evidence from Japanese stock index futures markets' applied financial economics, Vol. 11, pp 651-658
10. Chiang and Wang (2002), The impact of futures trading on spot index volatility evidence from Taiwan Index futures; Applied economic letters Vol. 9, pp.381-385.
11. Vipul(2006), the Impact of the introduction of the derivatives on underline volatility :evidence from India, Applied financial Economics, Vol. 16, pp.687-694.
12. Miaho and Mincheol (2004), Stock market volatility and trading activities in KOSPI 200 derivatives market, applied economics letter, Vol.11 pp.49-59.
13. Bolgna and laura cavallo (2002), Does the introduction of stock index futures reduce stock market volatility ? Evidence from the Italian stock exchange using GARCH, Applied Financial Economics, Vol.12, pp.183-192.
14. Shenbargarman (2003) Do futures and Options trading increases stock market volatility?, NSE working paper htpp//ww.nseindian.com/content /research/paper60.pdf, paper no.60, pp 1-17
15. Raju M T, Karande K. Price discovery and volatility of NSE futures market, SEBI Bulletin, Vol.1 (3), pp.5-15.