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# **GROWTH OF FINANCIAL DERIVATIVES IN INDIA AND ITS IMPACT ON UNDERLYING STOCK MARKET**

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## ***Abstract***

*This paper investigates the growth of financial derivatives in India in terms of number of contracts traded and turnover at NSE and its impact on underlying stock market. Earlier studies concluded that introduction of derivatives resulted either in reducing the volatility or no change in the volatility, increased efficiency, increase in trading volume and significant impact of the expiration days of stock futures and options. These existing studies concerning financial derivatives had their focus on lead-lag relationship between derivatives and spot market, impact of the introduction of derivatives and their expiration days effect on the behavior of underlying spot market. This paper generalizes the results offered by the existing studies conducted in different ways regarding the impact of financial derivatives on the underlying stock market. The study is based on secondary data which includes various websites, journals and research papers published.*

## **Introduction**

Derivatives are financial instruments which derive their value from their underlying assets or securities. For examples, if a buyer enters into a contract with a seller to buy a specified number of shares of a company at a specified price after a specified period, the buyer has entered into a futures contract. It is important to note that the buyer has bought the contract and not the stock of shares. This contract is called a derivative while the stock of shares to which it applies is called the underlying assets. Four most common examples of derivative instruments are forwards, futures, options and swaps. In India, derivatives were introduced as part of financial market reforms to hedge the price risk which started in 1990s. These reforms were aimed at enhancing competition, transparency, and efficiency in the Indian financial market.

## **The Need for a Derivatives Market**

The derivatives market performs a number of economic functions:

1. They help in transferring risks from risk averse people to risk oriented people.
2. They help in the discovery of future as well as current prices.
3. They catalyze entrepreneurial activity.
4. They increase the volume traded in markets because of participation of risk averse people in great numbers.
5. They increase savings and investment in the long run.

## **Methodology of the Study**

This paper provides comprehensive review of the empirical studies conducted to show the impact of derivatives and their expiration day effect on the trading volume and volatility of underlying spot market. The objectives of the study are as follows:

1. To measure the growth of financial derivatives in terms of number of contracts traded and turnover at NSE.

2. To know the impact of index and stock futures on spot market volatility and efficiency.
3. To evaluate impact of options on spot market volatility.
4. To identify the impact of expiration day of financial derivatives, both options and futures, on stock market.
5. To know the impact of stock derivatives on the trading volume of the spot market.

### **Sources of Data**

The study is based on secondary data which include various websites, selected referred journals such as *The ICAI Journal of Applied Finance*, *The Journal of Finance*, *The Journal of Futures Market and Finance India*, etc. and the research papers published.

### **Significance**

The study would be useful for regulators, researchers, investors and security analysts.

### **Limitations**

The empirical studies analyzed in this paper have some limitations. These are: (1) Lesser number of studies devoted to expiration day effects and arbitrage opportunities offered by derivatives prices and spot prices using high frequency data; and (2) the issue of effectiveness of derivatives pricing models has not been adequately addressed by the recent studies.

### **Growth of Derivatives in India**

The first step towards the introduction of derivatives trading in India was the promulgation of the Securities Laws (Amendment) Ordinance, 1995, which withdrew the prohibition on options in securities. The market for derivatives, however, did not take off as there

was no regulatory framework to govern trading of derivatives. SEBI set up a 24-member committee under the Chairmanship of Dr.L.C.Gupta on November 18, 1996 to develop appropriate regulatory framework for derivatives trading in India. The committee submitted its report on March 17, 1998, prescribing necessary preconditions for introduction of derivatives trading in India. The committee recommended that derivatives should be declared as 'securities' so that regulatory framework applicable to trading of 'securities' could also govern trading of derivatives.

SEBI also set up a group in June 1998 under the chairmanship of Prof.J.R.Varma, to recommend measures for risk containment in derivatives market in India. The report, which was submitted in October 1998, worked out the operational details of margining system, methodology for charging initial margins, broker net worth, deposit requirement and real-time monitoring requirements. Accordingly, stock index futures were introduced on Bombay Stock Exchange (BSE) and National Stock Exchange in the first place. BSE was the first stock exchange in the country, which commenced trading in index futures based on BSE Sensex on June 9, 2000. Immediately, thereafter, on June 12, 2000, NSE introduced its trading based on S & P CNX Nifty.

Introduction of derivative products has been one of the most significant developments in the history of Indian capital markets. It has been almost six years since the introduction of the first derivative product, index futures. The response to the same in such a short span of time has been encouraging, especially considering the complexity of the products. Let us take a look at some interesting trends in the derivative markets.

Stock futures have caught the market fancy very fast. The product managed to divert market attention from other products that have been around for a longer period of time. Stock futures now account for more than half the total turnover in the derivatives segment on the NSE. The probable reasons for the popularity could be that investors accept the product as a substitute for carry forward products. The stock futures are relatively easy to understand. Since there is no need to deliver the underlying asset (stocks) i.e. it is not reversed at the end of the day, the speculative interest has shifted to this product. Further, since equity financing is still cumbersome for retail investors, stock futures are providing the easiest way of financing open positions. Derivative instruments were introduced with a view to separating speculative interest from the cash markets. Rolling settlement was introduced to discourage speculation in the cash markets. These moves seem to be working. The reason for dramatic rise in volume for stock futures is related to the decline in intra-day speculative business in the cash markets.

### **Impact of Index Futures and Stock Futures**

Futures market may influence spot prices if they have an effect on the behavior of investors. Since futures markets allow investors to hedge price risk, the existence of futures may affect an investor's decision to invest, how much to invest and what investment strategies to use. In addition, the futures prices may contain information about anticipated demand that can influence investment decisions. Several studies have highlighted the impact of Index Futures and Stock Futures on spot market volatility and efficiency.

Thenmozhi M (2002) studied the impact of the introduction of index futures on underlying

index volatility in the Indian markets. Applying Variance Ratio Test, Ordinary Least Square Multiple Regression Technique, he concluded that futures trading has reduced the volatility in the spot markets. Further, in a lead-lag analysis, Thenmozhi found that the futures market leads the spot index returns by one day. But this study neglected inherent time varying characteristics and clustering of volatility and possible autocorrelation.

Thiripalraju M and Prabhakar R Patil (2002) investigated non-linear volatility with the help of ARCH model to find out volatility changes due to introduction of index futures in S&P CNX Nifty and its underlying stocks. Using data from June 22, 1999 to May 31, 2001, he concluded that the volatility is non-linear and there is a reduction in volatility both in the cash index and in its underlying stocks after the introduction of trading on index futures in the Indian stock market.

Premalatha Shenbagaraman (2003) examined the impact of introduction of NSE Nifty index futures on Nifty index. Using an event study over the period from October 1995 to December 2002, she tested for changes in the volatility before and after the introduction. Using GARCH techniques to model the time series, she concluded that futures trading has not led to a change in the volatility of the underlying stock index but the structure of volatility seems to have changed in the post-futures period.

Nagaraj K Sand and Kotha Kiran Kumar (2004) studied the impact of Index futures trading on spot market volatility using the data from June 12, 2000 to February 27, 2003 of S&P CNX NSE Nifty. Using ARMA-GARCH Model, the study also examined the effect of the September

11 terrorist attack on the nifty spot-futures relation. The study found that after September 11 attack, the relation between futures trading activity and spot volatility has strengthened, implying that the market has become more efficient in assimilating the information into its prices.

Nupur Helamsaria and Saikat Sovan Deb (2004) analyzed the impact of index futures on Indian stock market volatility using the data for the period June 9, 1999 to August 1, 2003 of NSE 500, S&P CNX Nifty index. The results obtained using GARCH model show that the introduction of futures results in a reduction in spot market volatility. It also showed that domestic market factors represented by NSE 500 had a significant effect in determining the volatility of the Nifty index but international factors are found to have insignificant effect.

Golaka C Nath (2004) studied the behavior of stock market volatility after the introduction of futures using the data from January 1999 to October 2003 of S&P CNX Nifty and 20 individual stocks. Using the GARCH Model, he concluded that the volatility of the market as measured by Nifty index had fallen in the post futures period. In the case of individual stocks, the result was mixed.

Gauri Mohan, Saurabh Kumar and Sriharsha Pappu (2004) analyzed the data of NSE NIFTY July 13, 1998 to July 11, 2002 to measure the impact of futures trading on National Stock Exchange (NSE) of India and concluded that introduction of futures had increased the efficiency of market by quicker dissemination of information.

### **Impact of Stock Options**

Premalatha Shenbagaraman (2003) examined the impact of introduction of NSE

Nifty index options on Nifty index. Using an event study over the period from October 1995 to December 2002, she concluded that options trading had not led to a change in the volatility of the underlying stock index but the structure of volatility seemed to have in the changed post-futures period.

Having one-year experience of options trading on individual stocks in the Indian stock market, Saurabh Kumar, Gauri Mohan and Sriharsha Pappu (2003) analyzed its impact on underlying stocks and concluded that in the case of certain underlying stocks, both volatility and returns had declined after the introduction of options trading.

Daniel Jubinski and Marc Tomljanovich (2003) examined the effect of options introduction on the conditional volatility of 548 individual equities selected from the S&P CNX 500 and S&P Small Cap indices. Using GARCH model for the time period of 1973-96, the results of the study indicated that volatility either decreased or was unchanged for a significant number of firms in sample in both the short-run and long-run and thus demonstrated that options provided additional information about the underlying equity security and was not serving as a destabilizing influence in the market.

Khelifa Mazouz and Michael Bowe (2004) investigated the relationship between options listing and the time varying volatility of the underlying stock returns, simultaneously accounting for several inherent sources of measurement bias, which arise in examining the impact of an exchange's options listing decision. Applying GARCH (1,1) to the daily stock returns for the period April 1973 to March 2001, the study evidenced that options listing was volatility-neutral.

Manisha Joshi and Chiranjit Mukhopadhyay (2004) studied the impact of options introduction of the underlying stocks of the company in the Indian equity markets with the help of ARMA model, using data of 29 securities from July 2000 to July 2002. They concluded that there was no significant change in the mean returns and the volatility of underlying stocks.

Thenmozhi M and Sony Thomas M (2004) analyzed the relationship between stock index options and corresponding stock market volatility of the NSE-Nifty using the GARCH technique. Using the data from 1995 to 2003, the study explained the reduction of volatility in the underlying stock market and increased market efficiency.

Golaka C Nath (2004) studied the behavior of stock market volatility after the introduction of options using the data from January 1999 to October 2003 of S&P CNX Nifty and 20 individual stocks. Using the GARCH model, he concluded that the volatility of the market, as measured by Nifty index, subsided in the post futures period but in the case of individual stocks, the result is still inconclusive.

### **Impact of Expiration day of Stock Derivatives**

The empirical literature pertaining to the impact of expiration day of financial derivatives both options and futures, on stock market is as follows:

Thenmozhi M and Sony Thomas M (2004) analyzed the effect of Nifty Index derivatives expiration days and weeks on spot market volatility using the GARCH technique. Using the data from 2000 to 2003, the study concluded that on expiration days, there was a significant increase in the volatility but there was a substantial decrease in volatility during the expiration weeks than the non-expiration weeks.

### **Impact of Stock Derivatives on the Trading Volume of the Spot Market**

Jegadeesh and Subrahmanyam (1993) examined whether the introduction of stock index futures had any effect on the liquidity of the component stocks. Although trading volume in the component stocks increased, they found that after controlling for changes in price, volume, and volatility, bid-ask spreads on the component stocks increased significantly with the introduction of S&P 500 index futures. The component of the bid-ask spread attributable to adverse-selection was also estimated to be higher after the introduction of index futures, but this result was not statistically significant.

Kumar, Gauri Mohan and Sriharsha Pappu (2003) indicated a reduction in trading volume of underlying stocks due to options listing while analyzing the data relating to Indian Stock Market.

### **Conclusion**

The impact of financial derivatives trading on the volatility of spot market has been examined by using ARCH, GARCH (p, q), EGARCH, ARMA-GARCH and IGARCH models by majority of the researchers. Majority of the research studies have indicated either a significant decrease or no change in the conditional and unconditional volatility of the underlying spot market due to the introduction of derivatives in the stock market. In other words, financial derivatives help in stabilizing prices and improving the liquidity position of the market. The spot and futures returns are interdependent and hence the relationship can be used for forecasting the futures prices. The efficiency of the derivatives market has improved after the introduction of derivatives. Derivatives help to increase the trading volume of the cash market resulting in the reduction of transaction cost in the long run. As per the

majority of the studies, expiration day of the derivatives affects the volatility in the upper side. This may be attributed to the non-availability of a large number of studies on this issue.

Thus, we can conclude that derivatives help in enhancing the liquidity, marketability and efficiency of the stock market. Therefore, it helps in completing the market and provides a vast number of choices to the investor. On the basis of experience of developed countries, the derivatives are introduced in many of the emerging markets like India to hedge the price risk as well as speculation in the market.

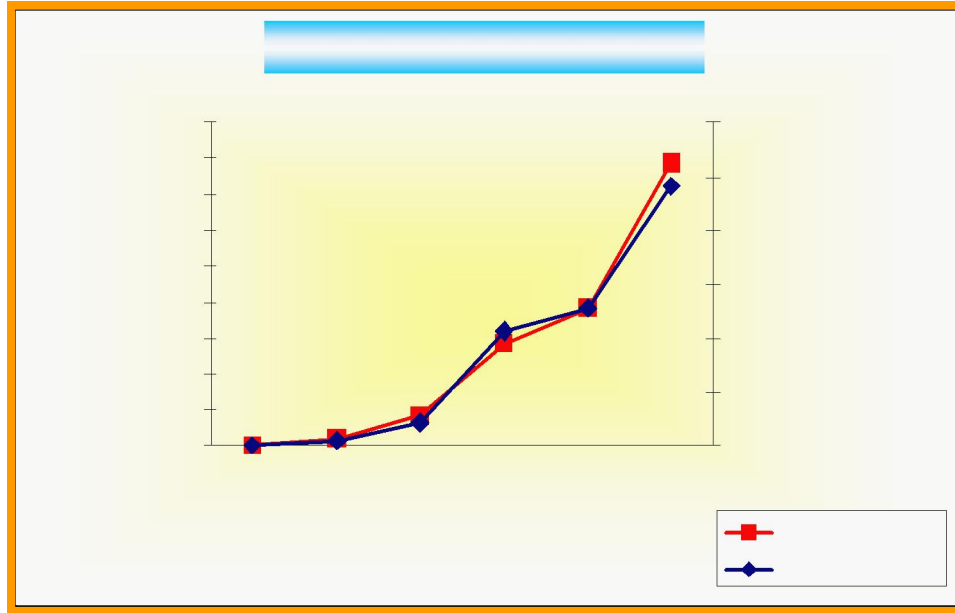
### Suggestions

There should be rapid development of derivatives products in financial as well as commodity market all over the world but with some reservations. Even in India, it is the right time to introduce more types of risk hedging contracts. The main developments may be like this: introduction of innovative products like exotic options and other structured products, increasing the scope of current derivatives products in emerging markets so as to include more individual stocks as well as all types of indices and introducing adequate risk management and internal monitoring techniques to curb unnecessary speculation so as to protect the interest of small investors.

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**Graph 1 Derivatives Growth in India at NSE**



**Graph 2 Product wise Derivatives Turnover in India at NSE**

