Impact of Financial Derivatives on Stock Market's Volatility

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Abstract – Regarding product wise growth of derivatives, the study showed that Stock futures have the credit of sharing 50 to 60 percent share of the total derivatives market's turnover during the last five years. The index futures also improved their position after March 2003 as their share rose to 33.67 percent in December 2006 from 10 percent four years back. Regarding preference of options, it was found that the index options are more popular than stock options among investors as the former solely contributes 8.29 percent of total market as compared to 3.29 percent share of the later. Interestingly, the call options and put options on index are observed more or less equally popular among the investors particularly after November 2004. Both of them have contributed above 11 percent in the derivatives market trade.

Key Words: Preference Of Options, Contributed, Derivatives, Market Trade.

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INTRODUCTION

The Indian capital market has undergone a considerable change in the recent past. The hallmarks of this change are the winds of innovation, globalization and deregulation blowing all over the world. The equity market of India has become a modern twenty first century market having features such as new bourses viz. National Stock Exchange (NSE) and Over-the-Counter Exchange of India (OTCEI); new trading techniques like computerized trading, internet trading, rolling settlement; regulatory bodies and other bodies such as Securities Exchange Board of India (SEBI), National Securities Clearing Corporation Ltd. (NSCCL) and National Securities Depository Ltd. (NSDL); presence of FIIs in capital market and so on. The various measures initiated by the regulators of Indian security market, during 1990s and onwards, were aimed to bring transparency, liquidity, depth and efficiency in Indian stock market. Introduction of derivative contracts at NSE and BSE is one of the major reforms initiated by SEBI.

REVIEW OF LITERATURE

Derivative contracts were introduced in Indian stock market in June 2000 on the recommendations of L C Gupta Committee. At the time of introduction of derivative products, the regulators were very optimistic about their positive impact. The stock brokers, however, had suspicion about the success of these new instruments and even they went on strike to oppose the introduction of derivative instruments in Indian stock market. They were of the opinion that derivatives market being a market of speculators, might affect the market adversely. At the same time, FIIs were the main source of financing the Indian capital market and they were not satisfied with the existing risk management tools especially when the advanced risk hedging tools were available in other competitive developed markets around the world. Therefore, the policy makers had to come with the derivative instruments to replace Badla which was a very well conversant term for the Indian community. Even after the introduction of equity derivatives; stock brokers, regulators and participants in the market had suspicion about the future consequences of these products. Now we have come out of the clutches of the climate of suspicion and ignorance as we are now a country with an active derivatives market and seeking to develop similar markets in other areas. Now, almost 7 years have passed with the availability of these instruments and the volume of derivative contracts have grown phenomenally in this period as the total turnover of NSE crossed the mark of Rs. 9 Lakh crore in March 2006, of which around 80 percent was contributed by derivatives segment of the market. Therefore, it is the right time to visit its status and to lay at rest the debate about their impact on various

dimensions of the spot market such as liquidity, efficiency, return and volatility. The present research is an attempt in this direction.

Objectives: The broad objectives of the present study are to examine the impact of equity derivatives on Indian stock market. More specifically, the present study is conducted to achieve the following objectives:

1) To measure the impact of introduction of equity derivatives on the marketability of underlying assets;

2) To calculate and compare the return of underlying securities before and after the introduction of futures and options;

3) To measure the volatility of spot market before and after the introduction of futures and options;

4) To assess the impact of introduction of financial derivatives on the efficiency of underlying securities;

5) To examine the impact of expiration day of derivatives on the spot market's marketability;

6) To find out difference between mean return of the spot market on the expiration day of derivatives and the rest of days;

7) To examine the impact of expiration day of derivatives on the spot market volatility; and

8) To suggest concrete steps for expansion of derivative instruments as a risk management tool in Indian stock market.

MATERIAL AND METHOD

*Database***:** The study has utilized the secondary data to achieve its objectives. The parameters on which data were collected include daily and monthly trading volume, daily opening and closing values of individual stocks and indices.

The research work is based on 22 individual stocks and S&P CNX Nifty Index of NSE. Further, the data related to two indices namely, S&P CNX Nifty Junior and S&P 500 have been taken into consideration to control the impact of market wide factors on stocks under reference. The data on trading volume of cash and derivatives market for the period ranging from January 1998 to December 2006 have been taken in order to assess the impact of derivatives on marketability. For analyzing the marketability of individual stocks, the data have been taken from January 1998 to June 2006. Further, the averages of the daily opening and closing prices of indices as well as of individual stocks for the period January 1998 to June 2006 are used for analyzing the impact of derivatives on return, volatility and efficiency of the market. In order to measure the impact of derivatives on underlying assets, the before-and-after control sample technique was used. Therefore, the collected data have been segmented in to various sub-periods according to the introduction of various derivative instruments.

The secondary data on various parameters of the study have been collected from the various websites such as www.nseindia.com, www.indiainfoline.com, www.sebi.gov.in, and http://finance.yahoo.com/. Further, the publications of National Stock Exchange (NSE), Bombay Stock Exchange (BSE), and Security Exchange Board of India (SEBI) etc have been used to collect other useful information. PROWESS database maintained by CMIE (Centre for Monitoring Indian Economy) has also been an important source of data relating to stock prices, stock splits & company announcements etc.

Tools of Analysis: The statistical tools applied to analyze the data include percentages, ratios, arithmetic mean, standard deviation, maximum, minimum, skewness, kurtosis, compound annual growth rate (CAGR), Compound Monthly Growth Rate (CMGR) and two-tailed t-test. The structured regression technique, AR class of models and GARCH techniques are the econometric tools applied for the analysis of return and variance of the stock prices.

Organisation of the Study: The present research work is divided in to seven chapters. While the first chapter gives a conceptual framework of derivatives, various types of derivatives instruments, mechanism of derivatives trading and regulation of derivatives in India. The second chapter provides a vivid picture of existing literature on the subject under reference. The third chapter encompasses the research objectives and methodology used in conducting this research. The fourth chapter presents the impact of derivative instruments on the marketability of underlying stocks. Chapter 5 and 6 are devoted to the results of impact of equity derivatives on return, volatility and efficiency of the Indian stock market. The last chapter presents the summary of findings along with some important conclusions and suggestions drawn therefrom.

*Major Findings***:** Some of the important findings of the present study are as follows:

The derivatives market could not take off at all in the first year of their introduction. Its percentage share in the total market remained less than 1 percent during various months between June 2000 and May 2001. However, the derivatives market registered an uptrend in July 2001, which is continuing till date (December 2006). In terms of market share, the derivatives segment succeeded to

snatch 50 percent share and attracted a volume equal to that of the cash market in February 2003.

The trading volume of both cash market as well as derivatives market increased significantly during June 2003 to January 2004. In March 2005, the aggregate trading volume of the equity market touched all time high of Rs. 411912.9 crore being contributed by cash and derivatives market separately to the magnitude of Rs. 113055.09 crore and Rs. 298856 crore respectively. The proportionate share of spot market to the total volume of equity market was observed as low as 27.45 percent, in March 2005 as against 46.66 percent in March 2003. Thus, the derivatives market became increasingly popular among the investors. The market followed upward trend in the year 2006 also and the total volume crossed the figure of Rs.900000 crore in this year, out of which the share of derivatives was 79.73%. Total turnover of Indian equity market was observed above Rs. Nine lakh crore for consecutively three months (i.e., March, April and May) during year 2006.

The results relating to the impact of options introduction on trading volume of individual stocks which indicated that out of 22 stocks, 11 stocks showed a reduction in relative volume in comparison to the volume of cash market and except two stocks (Bajaj, Reliance), all stocks showed a significant reduction in their relative volume. However, the remaining 11 stocks showed a significant increase in relative volume after the introduction of derivatives on individual stocks.

About the effect of derivatives expiration on trading volume, it was found that the trading volume of expiration days, on an average, is more than that that of the rest of the days. It means the expiration day of derivatives affect the trading volume of spot market positively.

With regard to impact of derivatives introduction on the efficiency of S&P CNX Nifty, the study brought out that the coefficient measuring the relationship between economic indices (S&P CNX Nifty and S&P CNX Nifty Junior) has increased significantly after the introduction of derivatives. This indicates that macro news have a greater impact on stock returns and they are discounted more quickly in the market after the introduction of index futures. However, the relationship between US Indices (S&P 500) and Nifty has reduced significantly after the introduction of derivatives. This implies that the dependence of Indian stock market on world market has reduced after the introduction of index futures and options.

The results relating to impact of stock options and futures when studied simultaneously showed that the volatility on underlying stocks increased firstly after the introduction of stock options in case of 8 stocks. That might be due to lack of awareness and confidence in these derivative instruments. But the fluctuations in the return came down after the introduction of stock futures only in case of three stocks namely, BPCL, HLL and MTNL. In case of remaining stocks, the volatility has reduced consistently after the introduction of stock options and stock futures. Hence, the hypothesis that derivatives introduction does not affect spot market volatility is rejected in case of most of the stocks under consideration.

CONCLUSION

The analysis regarding the expiration day effect has offered that the volatility of the S&P CNX Nifty got increased on the expiration of derivatives. The results relating to individual stocks have indicated that out of 22 stocks used for analysis of volatility, 11 stocks have shown an increasing trend in volatility at expiration day. There are six scrips in which we observed a significant reduction in volatility. Hence, the hypothesis that derivatives expiration affects spot market volatility in positive way is not true in case of 6 stocks. Thus, it can't be concluded that expiration of derivatives leads to an increase in volatility as the results related to individual stocks are somewhat mixed.

In sum, it can be concluded that the introduction of derivatives leads to increased informational efficiency, reduced volatility with little or no change in growth of trading volume and return of the underlying spot market. The expiration of derivative contracts is associated with increased trading volume, increased volatility (only in case of index) with no price reversal at the closing of the expiration day.

REFERENCES

Amity Business Review published BY Amity Business School, Noida.

Asian Economic Review published by Indian Institute of Economics, Hyderabad.

Chitale Rajendra P., "Use of Derivatives by India's Institutional Investors: Issues and Impediments", http://www.iief.com/Research/CHAP13.PDF

Decision published by IIM, Calcutta.

Ranganathan M & R Madhumathi (2005), *Investment Analysis & Portfolio Management,* Pearson Education.

Turan M S & B S Bodla (2004), *Risk and Rewards of Equity Investments*, Excel books, Delhi.

JOURNALS AND ARTICLES

"SEBI Should have Shown More Gumption", Business line, June, 26, 2001, pg. 1

Fernandes Ashok Jogani and Kshama, "Arbitrage in India: past, present and future", http://www.iief.com /Research/CHAP4.PDF

Finance India Published by Indian Institute of Finance, New Delhi.

Indian Economic Review published by Delhi School Economics.

Jennifer Itskevich, "What Caused the Stock Market Crash of 1987?" http://hnn.us/articles/895.html

Martin R Douglas, "GARCH Modeling of Time-Varying Volatilities and Correlations", http://www.e-circ.net/fen /fensub.asp

Mistry Percy S, "Introduction", http://www.iief.com /Research/INTRO.PDF

Varma Jayanth R., "Equity Options in India: An Empirical Examination", http://www.iief.com/Research/CHAP3.PDF