Re-Examining the Nifty Returns after the First Decade of Derivative Trading in Indian Capital Market Using Non-Linear Asymmetric GARCH Models

Sunita Narang, Acharya Narendra Dev College & University of Delhi, Delhi, India

ABSTRACT

This article examines the Indian stock market for conditional volatility using symmetric and asymmetric GARCH (Generalized Autoregressive Conditional Heteroskedasticity) variants with reference to a comprehensive period of 20 years from July 3, 1990 to November 30, 2010 using S&P CNX Nifty. The impact of future trading on Nifty return and volatility is assessed using dummy variable in total period and using Log (Open Interest of Nifty futures) in post-derivative period. Along with the period of two decades the analysis has also been done on a sub-period of a decade from 1995 to 2005 with NiftyJunior as surrogate index as it had no derivatives during this period. The results show that the PGARCH model is best suited to Indian market conditions.

Keywords: Asymmetric Generalized Autoregressive Conditional Heteroskedasticity (GARCH), Conditional Volatility, Indian Capital Market, Leverage Effect, Stock Market

INTRODUCTION

Volatility is the variation in the value of a financial instrument over a period of time. It quantifies risk of the instrument over that period. Volatility occurs because of new information shocks, which arrive in a stochastic manner. If such shocks occur more frequently, and cause larger changes in expected values, asset price volatility will increase. In general, the quicker and more accurately prices reflect new information, the more efficient will be the allocation of resources. The volatility on the stock exchanges may be thought of as having two components: The volatility arising due to information based price changes and volatility arising due to noise trading/speculative trading, i.e., destabilizing volatility.

Derivatives are an innovative financial instrument which derive their value from an underlying which can be a stock index, an individual stock or a commodity like oil. They allow market participants to manage risk by providing an additional channel to invest and
facilitate the investor to extend their settlement through the future contracts. They provide extra liquidity in the stock market and are thus called leveraged products which give you a choice to trade on the underlying at a fraction of a cost.

Indian capital markets opened their doors to foreign investment in 1990. The liberalization process that commenced in 1992 allowed foreign investors to invest directly in the stock markets. Following the Asian crisis (1997-98), Indian markets embarked on a period of fundamental transformation. The government initiated financial sector reforms to curb spot volatility. As a result of this last decade witnessed major transformations and structural changes. As part of this drive derivatives were introduced on two largest exchanges of Indian capital market namely National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) with a view to provide tools for risk management to investors and to improve the informational efficiency of the cash market.

An important step for the preparation of the futures and options trading was the construction of S&P CNX NIFTY Index. It is a diversified index, accurately reflecting the overall market. It includes 50 largest and most liquid Indian securities and covers 21 sectors of the Indian economy as on March 2010. The next rung of 50 liquid securities after S&P Nifty is the CNX Nifty Junior.

After SEBI granted approval in May 2000 National Stock Exchange started Equity derivatives trading on June 12, 2000 with introduction of stock index futures on S&P Nifty. Trading on NIFTY options was introduced on the June 4, 2001 followed by trading on stock options in July 2, 2001. Subsequently trading on stock futures was introduced in November 9, 2001. There was a spurt in volumes in November 2001 when stock futures were introduced.

While India’s derivatives markets have grown dramatically since their introduction, they are still in a developmental stage. In this regard implications from a carefully designed and executed study will not only help assess the economic usefulness of derivatives markets but they will also help build a more effective market operation system in India. The spot and futures market provide investors an opportunity to trade in the same underlying security. It is quite logical therefore, to anticipate a trading induced dynamic relationship between the two markets. What impact does presence of futures market have on volatility of spot market has been an interesting subject for investors, market makers, academicians, exchanges and regulators alike. Many studies have been done on the topic of impact of future trading on spot market volatility in developed markets but there are very few studies which cater to the emerging market. This paper re-opens the debate for an emerging market India which completed the first decade of its derivative trading in 2010.

**REVIEW OF STUDIES**

**Foreign Studies**

A number of studies have examined the effect of futures trading on the operation of highly developed markets such as the United States, United Kingdom, and Japan. Figlewsky (1981), Stein (1987), Harris (1989), Gilbert (1989), Damodaran (1990), Lockwood and Linn (1990), Schwert (1990), Brorsen et al. (1991), Lee and Ohk (1992), Kumara et al. (1992), and Antoniou and Holmes (1995), among others, report a positive relation between futures market trading and variances of the stock returns, implying that volatility has increased after futures trading began. Lee and Ohk (1992) examined the effects of introducing index futures trading on stock return volatility in Australia, Hong Kong, Japan, the United Kingdom, and the United States of America. They found that stock volatility increased significantly shortly after the listing of the stock index futures, with the exception of the stock markets in Australia and Hong Kong. Butterworth (2000) analysed the impact of futures trading in FTSE mid250 index in UK stock markets and found an increase in the unconditional variance post introduction of futures. A study by Kyriacou and Sarno (1999) shows a significant positive effect of both contemporaneous and lagged futures volume
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