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Futures Trading, Information and Spot Price Volatility of NSE-50 Index Futures Contract

Introduction:

The advent of stock index futures and options has profoundly changed the nature of trading on stock exchanges. The concern over how trading in futures contracts affects the spot market for underlying assets has been an interesting subject for investors, market makers, academicians and regulators alike. These markets offer investors flexibility in altering the composition of their portfolios and in timing their transactions. Futures markets also provide opportunities to hedge the risks involved with holding diversified equity portfolios. As a consequence, significant portions of cash market equity transactions are tied to futures and options market activity. In a perfectly frictionless world, price movements of the two markers are contemporaneously correlated. However, if one market reacts faster to information, and the other market is slow to react, a lead-lag relation is observed. The lead-lag relation between price movements of stock index futures and the underlying cash market illustrates how fast one market reflects new information relative to the other, and how well the two markets are linked.

***Objective*:**

The objective is to analyze the relationship between information, spot price volatility and futures trading. In doing so, the following issues are being considered:

1. Do movements in the index futures price provide predictive information about subsequent movements in the index, that is, does the futures market serve as a price discovery vehicle for stock prices?

2. Does the introduction of futures trading alter the structure of volatility in the spot market?

3. Does the character of the spot/futures price relationship differ on expiration days from that on non-expiration days?

***Literature Review*:**

A review of the literature shows that the results for the effect of index futures on the underlying spot market volatility are mixed. Edwards (1988), Harris (1989), Herbst & Maberly (1992), Jegadeesh and Subrahmanyam (1993) and Antoniou & Holmes (1995) have found that the introduction of stock index futures have caused an increase in volatility in the short run while there is no significant change in volatility in the long-run. The apparent increase in volatility has been attributed to increased information flow in the market through the channel of futures trading.

However, several studies {Schwert (1990), Bessembinder and Seguin (1992), Kamara *et al.* (1992) and Darrat & Rahman (1995)} categorically deny any increase in spot market volatility resulting from the introduction of futures trading. Apart from increase in informed traders taking positions in the spot market, decrease in volatility is also attributed to shift in speculators from spot to futures markets due to low transaction costs and high leverage in the futures market.

The volatility has been measured using GARCH models when the data spans over a long time period to accommodate heteroskedasticity in the returns and for short run analysis of data, standard deviation of daily returns have been used as a measure of volatility.

Some studies focus on the causal relationship between the spot and futures markets. The literature shows that in most of the studies (Kawaller et. al. (1987), Finnerty and Park (1987), Gordon *et al.* (1987), Stoll and Whaley (1990), Chan *et al.* (1991)), the futures lead the spot market while there is very little evidence of spot index leading the futures market. Abhyankar (1995) finds support for the hypothesis that lower transactions and entry costs in the stock index futures market is one of the reasons why futures market lead the spot index.

The data used for examining the lead-lag relationship varies from minute-by-minute return series to daily return series depending on the availability of the data. ARIMA (p,q) is used to estimate the lead/lag coefficients.

The effects of expiration-day of the futures contracts on the underlying assets have also been assessed. Stoll and Whaley (1991), Stoll and Whaley (1997) find it hard to distinguish the price effects of index stocks on expiration days from index stocks on non-expiration days. It is seen that while index stock trading volume is abnormally high near the close on expiration days, price movements are not different from those observed on other days. It is shown that expiration-day price effects arise from a combination of factors, including the existence of index-arbitrage opportunities, the cash-settlement feature of index options and futures, and the market procedures for accommodating the unwinding of arbitrage positions in the underlying index stocks.

***Need for the study*:**

Research in this area is important for several reasons. First, the existing literature has concentrated largely on the U.S. index futures markets. It is of interest to extend this work to a different market environment. Nifty futures being a recent phenomenon in India, not much work has been done in the aforementioned lines to assess its impact on the volatility of the underlying index and its role as a price discovery vehicle for the NSE-50 index.

The lead-lag relationship and its behaviour are of particular relevance to arbitrageurs who are involved in index arbitrage transactions. The results of this study should therefore be of interest to practitioners, which will enable them to develop, trading strategies based on lead-lag relationship. Finally, tests of the predictive power of volatility in the futures market on the underlying cash market is of concern to regulators who need to know the impact of index futures trading on the underlying market.

***Data and Sample*:**

The data comprises of the daily closing prices of the Nifty index and Nifty futures for a period from 1999 to 2001.

***Method of Analysis*:**

The index futures and index relationship will be examined using Time series analysis and Simultaneous equations model. The lead lag relationship will be examined using ARIMA model. The expiration-day effects are measured in terms of *Abnormal trading volume* and *Abnormal price movements. Abnormal price movements* will be measured by computing (a) the variance of stock returns on expiration days compared to non -expiration days, and (b) the degree to which index arbitrage unwinding drives stock prices away from their equilibrium levels. The measure abnormal trading activity, the difference between the trading volume on expiration days and the trading volume on non -expiration days

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