An Analysis of the Impact of Derivatives on Spot Market, Risk and Portfolio Management

Abstract

One of the main objectives of the capital market is to stabilize the values of securities and reduce the unwanted fluctuations in the stock prices. The value stabilization and price volatility minimization are facilitated by financial instruments namely derivatives. However, they have been accused of destabilization in the capital markets, particularly during financial crisis. Therefore, the study of the impact of futures trading on spot market volatility is of great importance in Indian market as one of the most successful transition economies in terms of a vibrant market for exchange-traded derivatives. In addition, the futures and spot markets are highly integrated in Indian market by arbitrage establishing in the long-run. Therefore, it is very important to study the long-run cointegration relationship, price discovery leadership, volatility spillover, and information dissemination between spot and futures markets. However, a large number of studies have been conducted in Indian context; there is still a lack of consensus. The GARCH family models (i.e. simple GARCH (1, 1), EGARCH (1, 1) and GJR-GARCH (1, 1)) were applied to investigate the impact of futures introduction on spot market volatility. A dummy variable was incorporated in the simple GARCH model to estimate this effect. To conduct this investigation, 187 stocks were selected according to certain criteria. The forecasting performance of the GARCH family models were evaluated using the most common measures of forecasting evaluation --i.e. Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE) and Theil Inequality Coefficient (TIC). The vector error correction model (VECM), Granger causality test and bi-variate-BEKK-GARCH model were applied to carry out the intraday price discovery leadership role and volatility spillover between spot and futures market. Out of 50 components of CNX Nifty index, one minute intraday data of 42 stocks were selected based on the certain criteria. The analysis of volatility indicates that spot market volatility reduced after the introduction of futures trading. This stabilization effect also supported by conditional (levels of persistence) and unconditional (constant) volatility obtained by GARCH family models. In general, the estimates of past information of GARCH family models show that stock return volatility responds more to the old
news than the recent information. The estimates of GJR-GARCH model evidence that stock price volatility is more impacted by negative news than positive shocks. However, from the results of EGARCH model, it can be concluded that Indian stock market prices are more sensitive to positives information (news) than negative news. According to the results of forecasting evaluation measures, EGARCH (1, 1) is found a flexible model to accommodate the characteristics of data in Indian stock market. Therefore, it can be concluded that EGARCH model might be more useful than the other two models when implementing risk management and optimal hedging strategies for Indian stock market returns. The overall findings of VECM and bi-variate BEKK-GARCH models show that there is a bi-directional lead-lag relationship and volatility spillover between futures and underlying spot market in one minute resolution. In other words, it is evidenced that no market (either spot or futures) has a predominant role in the price discovery process. Besides, a long-run cointegration is found between spot and futures markets. One market deviates from equilibrium in the short-run; however, it quickly adjusts to the changes in the opposite market in the next period and restores the long-run cointegration. In total, it can be found from both volatility analysis and lead-lag relationship that Indian futures market is an effective market to stabilize the spot market and it can also provide the needful information to discover the future prices of spot market.