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Impact of Futures Trading on Spot Market and Price Discovery of Futures Market

R. Ramakrishna and Jayasheela*

I

INTRODUCTION

As a result of the revival of commodity futures in a big way in 2003, the nature of commodity trade in India has undergone a big change. Going by trade volume and also possibly as an identifiable influence on the price-making processes with respect to the traded commodities, both the futures market and actual merchandising have undergone a change. The disproportionately large size of the former compared to the latter underlines the financial market character of the futures trade[1] (Kamal Nayan Kabra, 2007). The liberalisation of trade, closer economic integration of different countries of the world, deregulation of interest rate in recent years and a large fluctuation in output and growth have exposed the players in the market to different risks such as price risk, interest risk and exchange rate risk that have led to a great uncertainty at the market place. To keep pace with the globalisation, India needs to develop its financial sector along with physical trade through the introduction of derivative market. Increased volatility in asset price in the financial sector, increased integration of domestic financial sector with international financial sector demand the trading in the derivative market.

In India, derivatives trading was introduced in June 2000 on National Stock Exchange (NSE) and Bombay Stock Exchange (BSE). Soon after this, NSE introduced trading based on Standard and Poor's CNX NIFTY-50 in June 12, 2000. This was followed by the approval in trading in options based on two indices. The trading in index options commenced in June 2001 and those in options on individual securities in July 2001. After the introduction of derivative market, there are certain changes that occur in the financial sector of the economy. These include changes in the price volatility, reduction in the risk of investors and increase in the stock market trading. Ederington (1979) Figleski (1984a, b); Chang (1985); Holmes (1995); Chou *et al.* (1996); Yang (2001); Floros and Vougas (2002); Pancholi and Kurkel (2003) examined the hedging effectiveness in futures market. Figleski, (1984a, b); Kalwaller *et al.* (1987); Harris (1989); Stoll and Whaley (1990); Hodgson Nicholas (1991); Gregory and Michael (1996); Shenbagaraman (2002); Nath (2003) concentrated on

*Professor and Former Head, and Doctoral Fellow, respectively, School of Economics, Andhra University, Visakhapatnam – 530 003 (Andhra Pradesh).

the impact of futures trading on spot market and price discovery function of the futures market. The purpose of the present study is to highlight some of the issues relating to the financial futures in India.

The study focuses on the following issues: Firstly, to evaluate the hedging effectiveness of Nifty futures. Secondly, to show the impact of Nifty futures trading on the spot market. Thirdly, to examine the price discovery function of futures market. And finally, to study the growth and development of futures market in India and make policy suggestions, thereof.

The study consists of six sections: Section I deals with introduction, objectives, while methodology and data is discussed in Section II. Section III studies the hedging effectiveness of Nifty futures. Section IV presents the impact of futures trading on spot market and the impact of futures trading on price discovery function of the futures market is highlighted in Section V. The last Section presents the conclusions of the study.

II

METHODOLOGY

Data

The data for the study has been collected from NSE. The main data for the study is the returns of the S&P CNX Nifty futures index and spot index. S&P CNX Nifty consists of 50 individual stock companies, out of these 10 companies[2] are selected as a sample for the study. The basis for the selection of these companies is the high market capitalisation as on 27th Febuary 2004. For measuring the hedge effectiveness and relationship between spot and futures, the data are collected from 12th June 2000 to 29th April 2004. In order to estimate the impact of futures trading on the volatility of Nifty spot index, daily closing prices are calculated from 1st January 1997 to 29th April 2004.

Model Design

To examine the hedging effectiveness of Nifty futures, the present study employs the Ordinary Least Squares (OLS) technique. It shows to what extent the changes in the futures price explain the variation of the spot market through hedging effectiveness. The regression model is as follows.

$$\Delta S_T = \beta_{1+}\beta_2\ \Delta 1_T + \varepsilon_T$$

Where S_T and F_T refer to the logged spot and futures prices respectively.

ΔS_T and $\Delta\ F_T$ represent spot and futures prices changes.
β_2 is the hedge ratio. It is the ratio of futures to the underlying spot position.
ε_T is the error term.

The methodology of Ederington extended from Johnson and Stein is employed to see the percentage of reduction of risk in terms of variance reduction. The effectiveness of the minimum variance can be examined in terms of percentage of risk reduced by the hedge. The return of the series is calculated by the formula log (P_t/P_{t-1}). The model employed by Ederington (1979) and Yang (2001) for the estimation of hedging effectiveness is:

$$HE = Var (U)-Var(H)/Var(U)$$

Where HE is the hedging effectiveness of the Nifty futures returns,

Var (U) is the variance of the unhedged returns,
Var(H) refers to the variance of the hedged returns.

In order to test the impact of introduction of Nifty futures trading on the Nifty spot index volatility, Ordinary Least Square (OLS) method is employed. The volatility of the return series is estimated with the help of standard deviation. The daily standard deviation of the return series is calculated by:

$$\delta = \sqrt{\Sigma (R_t-R)^2/(T-1)}$$

where R_t is the return in relation to the day t, (t-1…..T)

R is the mean value of the return series and δ measures the inter-day volatility.

The following OLS model measures the impact of futures trading on spot market.

$$VS_T = \beta_0 + \beta_1 VNJ_T + \beta_2 D_T + \varepsilon_T$$

where VS_T is the volatility of the Nifty returns series which is the standard deviation of Nifty returns series.

VNJ_T is the volatility measures of Nifty Junior returns which is a proxy measure of market volatility in period t, and it is unrelated to the onset of futures trading. The volatility is measured by the standard deviation.

D_T is the dummy variable and assumes the value zero for the pre-futures and one for the post-futures. ε_T is the error term.

The pattern of causality can be identified by estimating regression of spot and futures on all relevant variables including the current as well as post values of spot and futures prices respectively. To test the causal relationship between changes in the spot prices and futures prices, the Granger-causality method is employed.

$$Y_t = b_0 + \sum_{j=0}^{m} a_j X_{t-j} + \sum_{i=1}^{n} b_i Y_{t=1} + \mu_t$$

$$X_t = C_0 + \sum_{j=0}^{m} C_j Y_{t-j} + \sum_{i=1}^{n} d_i X_{t=1} + v_t$$

The two series for testing the causality is Nifty futures prices and Nifty spot price.

III

HEDGING EFFECTIVENESS OF NIFTY FUTURES

The people's interest in investment in derivative market has increased in recent years. As a part of awareness programme, the NSE also imparts training programmes to create awareness among the investors about the derivatives trading. The introduction of derivatives trading brings reforms in the financial sector that is helpful in taking our financial system to the international level. Evaluating to what extent the futures market is able to reduce risk in terms of hedging effectiveness is the main theory of stock market research today. The main objective of hedging is to reduce or eliminate the risk of spot market volatility that arises due to changes in the market prices. Hedgers are the farmers, portfolio managers, importers, exporters and jewellers who face risk associated with the price of an asset. According to Perrings and Meolenberg (1997), a determinant in explaining the success of financial futures contracts is the hedging effectiveness of futures contracts. The effectiveness of a hedge depends on how far the risk is reduced by hedging. If the hedging enables to reduce the risk of spot market, then it is said to be effective, otherwise ineffective. Hence, this section concentrates on examining the hedging effectiveness of Nifty futures.

EMPIRICAL RESULTS

Index Futures

The results shown in Table 1 represent the hedging effectiveness of the Standard and Poor's CNX Nifty futures. The results are calculated for the near month, middle month and far month. The hedging effectiveness is given by the coefficient of determination, i.e., R-square. The overall fit of the model is shown by the F-statistics. The F-statistics is very high, that is, 2078054, 32940541 and 33580118 for near, middle and far month, respectively and the corresponding P-values is zero. This shows that the overall fit is good. This is also indicated by the high R-square value. As autocorrelation is a serious problem, in some of the cases, the estimates are adjusted for AR (1), which is indicated by * in the tables and in all other cases the problem of autocorrelation is not present. The marginal contribution of the variable to

explain the variation in dependent variable is given by the t-ratios. The intercept coefficient is not significant at 5 per cent level of significance. The coefficient of change in futures prices is found to be statistically very significant as it is 89.84 per cent, 94.91 per cent and 95.80 per cent for the near, middle and far month respectively. The hedge ratio as represented by the coefficient of the independent variable (Nifty futures return) shows that whether the futures prices are equal to, less than or more than the spot prices in the expiration of the contract. The figures show that the coefficient is less than one for the near, middle and far month. It implies that the futures prices are less than spot price at the expiration day, but the hedge ratios are 0.8984, 0.9491 and 0.958 for near, middle and far month respectively. The high hedge ratios show that, at the expiration of the futures contract, the futures prices are closer to the spot prices.

TABLE 1. INDEX FUTURES-RESULT METHOD: ORDINARY LEAST SQUARE

$\Delta S_T = \beta_1 + \beta_2 \Delta F_T + \varepsilon_T$

Sr. No. (1)	Variable (2)	Symbol (3)	Coefficients (index futures) Near Month (4)	Middle Month (5)	Far Month (6)
1.	Constant	B_0	0.000025	0.000204	0.000019
2.	Nifty futures	β_1	0.898493	0.949108	0.958035
			(65.86)*	(84.73)*	(85.26)*
3.	Coefficient of determination	R^2	0.8151	0.872	0.8788
4.	Variance test	F-statistics	20780.54*	3294.54*	3358.12*
5.	Auto-correlation	D-W statistics	2.0397	2.0724	2.0664
6.	Unit Root Test	ADF-Test	-23.43563	-16.4411	-16.07082
			(-3.96531)*	(-3.4398)*	(-3.4401)*
			Spot return -16.96531 (-3.4400)*		

Source: Compound.

Note: Figures in parentheses refer to t-statistics and * indicates 1 per cent of level of significance, dependent variable: Nifty closing spot prices and independent variable: Nifty closing futures price return.

The results shown in the following table depict the extent to which the futures market are able to reduce the risk of people or the extent to which the change in spot prices are explained by the change in futures prices. It shows that the Nifty futures are able to explain 81.51 per cent, 87.20 per cent and 87.88 per cent of variation in the dependent variable for near, middle and far month respectively. As the independent variable explains more than 80 per cent of the dependent variable and the hedge ratios are high, the hedge becomes effective for near, middle and far month stock index futures.

Stock Futures

This study also estimates the hedging effectiveness of the individual companies of Nifty futures. Under NSE, 50 individual companies went to trade with futures segment. Out of these 50 companies, 10 companies are taken as a sample, based on their high market capitalisation. The result of the stock futures has been mentioned in Table 2. In case of BPCL, the overall fitness of good has been indicated by high f-

values. The t-statistics of the change in futures price is also significant at 1 per cent level of significance. The explanatory variable R-square shows that the futures prices only explain 58.26 per cent, 49.60 per cent and 40.88 per cent of variation of spot prices for *near, middle* and *far month* respectively. As the R-square is not high, the hedging is not effective for BPCL stock futures. The hedge ratio is less than one, i.e., 0.701, 0.703 and 0.5038, which shows that the futures prices are lagging behind the spot price.

For HDFC stock futures, the overall fit is good as indicated by high values. The R-square for the near, middle and far month are 65.14 per cent, 69.34 per cent and 71.62 per cent respectively. Hence, the HDFC stock futures provides a better hedge than other companies. It is able to reduce to some extent the degree of risk. Similarly, for Ranbaxy, Reliance and Infosys Tech the hedge is to some extent effective. For all these three stock futures companies, the overall fit is found to be good as represented by the high F-statistics and significant at 1 per cent level. In case of Ranbaxy, the hedge is to some extent effective for near and far month and ineffective for middle month as it reduces the risk by 32.97 per cent, 39.23 per cent and 64.12 per cent for near, middle and far month respectively. For Infosys Technology, the far month, contracts are better than the other two contracts. Similar is the case with Reliance Industries. In case of Hind Lever, ITC, SBIN and TISCO stock futures the R-square values are low. It is less than 50 per cent for the three months. Hence, the hedge is not effective for these companies.

The hedge ratios are calculated for all the ten individual companies and the hedge ratio is less than one, which indicates that, at the expiration day of the futures contract, the futures prices are less than the spot prices to a large extent. Thus, the overall hedge is not effective for the stock futures as explained by the R-square and the hedge ratio. The hedging effectiveness is also shown by the minimum variance method, presented as follows:

$$HE = VAR(U) - VAR(H)/VAR(U)$$

The results obtained from this method are given in Table 3. It shows the exact measure of the percentage of original risk that is removed by the hedge. Firstly, the results of the index futures are shown. In case of near month, the hedging effectiveness is 80.63 per cent, i.e., the reduction in variance. It means that the hedge will reduce the price risk by 80.63 per cent and the remaining 19.37 per cent will remain as the basic risk. Hence, the futures contract in case of near month is able to reduce more than 80 per cent of the risk. It is considered that the hedge is effective. Similarly, in case of near and middle month, the hedging effectiveness are 86.64 per cent and 87.05 per cent respectively. The price risk is reduced by 86.64 per cent and 87.05 per cent for the middle and far month respectively. For the index futures, the far month contracts are more effective than middle and near month contracts as it reduces more risk of the people. The over all hedging effectiveness of the index futures is good as it is able to reduce more than 80 per cent of risk in each case.

TABLE 2. RESULTS OF STOCK FUTURES

			Coefficient Companies (BPCL)			BHEL			HDFC		
Sr. No. (1)	Variable (2)	Symbol (3)	Near Month (4)	Middle Month (5)	Far Month (6)	Near Month (7)	Middle Month (8)	Far Month (9)	Near Month (10)	Middle Month (11)	Far Month (12)
1.	Constant	B_0	0.000499	0.00043	0.0008	0.0008	0.000953	0.1087	-0.00015	0.000023	0.000056
2.	Nifty futures	β_1	0.700019	0.7036	0.5038	0.7553	0.676308	0.568384	0.744301	0.801158	0.871631
			(28.2331)*	(25.0999)*	(16.525)*	(25.266)*	(17.6041)*	(14.9588)*	(2.8782)*	(39.0562)*	(39.0562)*
3.	Coefficient of determination	R^2	0.582636	0.4961	0.4088	0.5471	0.444026	0.369384	0.65143	0.693379	0.716165
4.	Variance test	F-statistics	797.1111	288.461	3358.1	250.7535	309.9016	112.2716	828.4358	662.5768	769.567
5.	Auto-correlation	D-W statistics	2.07	2.028657**	2.0617	2.0342	2.006543	1.997063	2.18885	2.010445**	2.017125**
6.	Unit Root Test	ADF-Test	-13.9587	-14.2276	-14.5740	-13.782	-14.4838	-15.0340	-13.9315	-14.2879	-14.3494
			Spot price return : -13.9587			Spot price return: -14.2421			Spot price return: - 14.3388		

(Contd.)

TABLE 2. (*CONCLD.*)

Sr. No. (1)	Variable (2)	Symbol (3)	Hind Lever Near Month (13)	Hind Lever Middle Month (14)	Hind Lever Far Month (15)	Infosys Technology Near Month (16)	Infosys Technology Middle Month (17)	Infosys Technology Far Month (18)	ITC Near Month (19)	ITC Middle Month (20)	ITC Far Month (21)	Ranbaxy Near Month (22)	Ranbaxy Middle Month (23)	Ranbaxy Far Month (24)
1.	Constant	B_0	0.000176	-0.00024	-0.000183	0.000336	0.000165	6.31E-05	0.00036	0.000581	0.000367	0.000098	0.000512	0.000371
2.	Nifty futures	β_1	0.50129 (1.6325)*	0.646791 (23.0018)*	0.719139 (23.9539)*	0.616084 (23.3116)*	0.832264 (27.7674)*	0.943902 (43.3894)*	0.607038 (17.7721)*	0.420989 (10.3235)*	0.531101 (17.2011)*	0.799181 (34.7394)*	0.57123 (24.3217)*	0.83125 (37.3712)*
3.	Coefficient of determination	R^2	0.254791	0.480053	0.483889	0.487631	0.570994	0.739753	0.356145	0.253441	0.323983	0.32973	0.39234	0.64123
4.	Variance test	F-statistics	731.3354	270.5189	573.7921	543.4321	389.0894	866.9649	315.8454	106.5765	146.1719	246.1719	512.2712	213.875
5.	Auto-correlation	D-W statistics	2.1371**	1.9985	2.1032	2.0774	2.0384**	2.0391**	2.1857	2.1169	2.0207**	2.0207	2.013	2.0530
6.	Unit Root Test	ADF-Test	Spot price return: -15.45269			Spot price return: -15.45269			Spot price return: -13.62089			Spot price return: -13.75244		

Sr. No. (1)	Variable (2)	Symbol (3)	Reliance Near Month (25)	Reliance Middle Month (26)	Reliance Far Month (27)	SBIN Near Month (28)	SBIN Middle Month (29)	SBIN Far Month (30)	TISCO Near Month (31)	TISCO Middle Month (32)	TISCO Far Month (33)
1.	Constant	B_0	0.000178	0.000287	0.000228	0.000832	0.000823	0.0000571	0.000142	0.001219	0.000648
2.	Nifty futures	β_1	0.84881 (34.3255)*	0.774195 (24.4587)*	0.774727 (29.6662)*	0.529298 (22.9413)*	0.534718 (20.7021)*	0.593343 (19.9597)*	0.501991 (17.7906)*	0.524626 (18..9253)*	0.731823 (25.4990)*
3.	Coefficient of determination	R^2	0.673572	0.559792	0.578615	0.411118	0.421589	0.394685	0.356626	0.378547	0.515134
4.	Variance test	F-statistics	1178.24	715.3055	418.1176	410.6105	428.578	398.3918	316.506	358.1702	650.2059
5.	Auto-correlation	D-W statistics	2.03605	2.03585**	2.05176**	2.086534	2.024661	2.130018	2.053617	1.972282	2.170564
6.	Unit Root Test	ADF-Test	Spot price return: -13.7866			Spot price return: -13.6578			Spot price return: -14.7001		

Source: Compound.

Note: The ADF critical values for the near month, middle month and far month are -3.4442, -3.4439 and -3.4435 respectively.
Figures in the brackets indicates the t-ratios and the symbol * shows 1 per cent level of significance
** indicates the results are adjusted for the first degree autocorrelation.
The ADF critical value for spot price is -3.4442.

TABLE 3. HE = VAR(U)-VAR(H)/VAR(U)

Futures (1)	Near Month (2)	Middle Month (3)	Far Month (4)
Index Futures	0.8063	0.8664	0.8705
Stock Futures			
BPCL	0.5805	0.4749	0.3074
BHEL	0.447	0.3431	0.2686
HDFC	0.6412	0.6879	0.7094
Hind Lever	0.2978	0.479	0.4801
Infosys Tech	0.4852	0.5486	0.7254
ITC	0.3525	0.2734	0.3539
Ranbaxy	0.6758	0.3973	0.6352
Reliance	0.6739	0.5487	0.5522
SBIN	0.4226	0.4177	0.4146
TISCO	0.35557	0.376438	0.513251

Source: Computed.

Theoretically, a hedge is effective if the price movements of the hedged item and the hedging roughly offset each other. In this section, the hedging effectiveness of the S & P CNX Nifty futures is examined by employing the Ordinary Least Squares (OLS) method and the variance reduction method as developed by Johnston and Stein. The hedging effectiveness developed by Ederington calculated for both the stock index and stock futures show that the hedge is effective in the case of index futures as it reduces more than 80 per cent of the price risk for near, middle and far month. But the results from the stock futures show that the hedging is not effective for individual companies. This is due to the low turnover of the companies. The hedge ratio in case of index and stock futures are less than one, which shows that at the expiration day of the futures contract, futures price lags behind the spot price. Similar results are found by Floros and Vougas (2002), in the case of Greek index futures.

IV

IMPACT OF FUTURES TRADING ON SPOT MARKET

To analyse the impact of Nifty futures trading on spot market, the following two points have to be taken into consideration. First, does the onset of futures trading in itself have any effect on volatility? Second, the extent to which the Nifty futures trading influences the volatility of Nifty spot index ignoring the influence of other market wide features. In order to determine the impact of futures trading on the spot market volatility, it is necessary to separate the volatility that arises from the market wide factors other than futures trading.

Empirical Results

To measure the spot market volatility Ordinary Least Squares (OLS) regression model is employed. The results shown in Table 4 are the regression analysis of the spot index volatility and Nifty junior returns. The F-statistics is significant at 1 per cent level of significance and hence the model is a good fit. The coefficient of standard deviation of Nifty Junior returns is 0.585006 and the t-value of the returns is 42.27, which are significant at 1 per cent level of significance. The R-squared of the regression analysis is 50.71 per cent. Hence, the Nifty Junior returns explain the 50.71 per cent of the variation in Nifty index.

TABLE 4. IMPACT OF NIFTY FUTURES TRADING ON SPOT MARKET
METHOD: ORDINARY LEAST SQUARE $VS_T = B0 + B_1 VNJ_T + B_2 D_T + E_T$

Sr. No. (1)	Variable (2)	Symbol (3)	Without dummy (4)	With dummy (5)
1.	Constant	B_0	0.000087 (13.13)	0.000105 (12.16)
2.	Junior Nifty Return	β_1	0.585006 (42.27)*	0.579405 (41.72)*
3.	Nifty Futures (Dummy variable)	B_2		-0.000309 (-3.25)*
4.	Coefficient of determination	R^2	0.507138	51.1246
5.	Variance test	F-statistics	668.4732	936.2364
6.	Auto correlation	D-W statistics	2.0078	2.006261

Source: Computed.
Note: Figures in parentheses report to t-statistics.
*indicates 1 per cent level of significance.

Table 4 also shows a regression analysis introducing futures trading as a dummy variable. It explains that the explanatory variable R-square has slightly improved from 50.71 per cent in the absence of dummy variable to 51.12 per cent during the presence of the dummy variable. Thus, the introduction of futures trading explains approximately 0.4 per cent of the variation in volatility. The coefficient of the dummy variable is -0.000309 and the t-value of the dummy coefficient is -3.246576 and is significant at 0.001 level. The estimated t-values and F-values are greater than the tabulated t and F values. Hence, the null hypothesis is rejected to prove that the volatility of the spot market has not changed after the introduction of futures trading.

V

PRICE DISCOVERY FUNCTION OF THE FUTURES MARKET

In recent years, Indian capital markets have changed to a great extent. One of the major reforms initiated by SEBI was the introduction of derivatives trading. Futures market is one of the important issues of the derivative market. The two main functions of the futures market are price discovery and hedging. This section mainly

focuses on the relationship between spot price and futures price and also to examine the causality relationship between the spot and futures price.

Empirical Results

The results shown in Table 5 for the F-value and P-value are 7.56981 and p-value is 0.0000005. The high F-value and the corresponding low P-value provide evidence against the null hypothesis. Hence, changes in the spot price causes changes in the futures prices. Similarly, the low F-value of 0.89592 and the corresponding high P-value of 0.48310 show the null hypothesis: futures price does not Granger cause spot price cannot be rejected at 5 per cent level of significance, implying that changes in the futures prices does not cause changes in the spot prices. In this case, the causation is in one way.

TABLE 5..PAIR-WISE GRANGER CAUSALITY TESTS

Null Hypothesis (1)	Observations (2)	F-Statistics (3)	Probability (4)
Near Month			
Spot does not Granger Cause the Futures	942	7.56981	0.0000005
Futures does not Granger Cause the spot		0.89592	0.4831
Middle Month			
Spot does not Granger Cause the Futures	966	4.58813	0.00038
Futures does not Granger Cause the spot		0.35499	0.87918
Far Month			
Spot does not Granger Cause the Futures	925	2.49247	0.02972
Futures does not Granger Cause the spot		7.69588	0.0000004

Source: Computed.
Note: *indicates 1 per cent level of significance.

The F-value and the P-value for the middle month are 4.58813 and 0.00038 respectively. The high F-value with the corresponding low P-value shows that the null hypothesis spot prices does not Granger cause the futures prices cannot be rejected at 1 per cent level of significance. It implies that changes in the spot prices cause the changes in the futures prices. Thus, the spot price influences on the futures prices. The low F-value of 0.35499 and the corresponding high P-value of 0.87918 show that the null hypothesis of spot prices does not Granger cause futures prices cannot be rejected at 5 per cent level of significance. Thus, the changes in the futures prices have not cause the changes for the middle month contracts.

In the case of far month contracts, there is both way of causation. The high f-values and the corresponding low P-values provide the strong case against both the null hypotheses. For the null hypothesis, spot does not Granger cause the futures F-value is 2.49247 and the P-value is 0.02972 is significant at 1 per cent level of significance, and for the hypothesis futures does not Granger cause the spot F-value

and P-value are 7.69588 and 0.0000004 is significant at 1 per cent level of significance. In case of both the hypotheses, the high F-value and the corresponding low P-value reject the null hypothesis at 1 per cent level of significance. Hence, change in the spot causes the futures prices and the changes in the futures prices cause changes in the spot price.

VI

CONCLUSIONS

To conclude, the hedge is effective for the Nifty stock index futures where as it is not effective in the case of stock futures. The impact of Nifty futures trading shows that the volatility of the Nifty spot index has been reduced after the introduction of the futures trading, though the per cent reduction of volatility is small. This study shows that there is a causal relationship between the spot price and the futures prices. It provides basic knowledge about the various aspects of the futures trading in India. The results of this study are especially important to stock exchanges officials and regulators in designing trading mechanism and contract specifications for derivatives contracts, thereby enhancing their value as risk management tool.

NOTES

1. Futures trading is an agreement between a buyer and seller obligating the seller to deliver a specified asset of specified quality and quantity to the buyer on a specified date at a specified place and the buyer in turn is obligated to pay to the seller a renegotiated price in exchange of the delivery. A future trading performs two important functions: price discovery and hedging of price risk in commodity.

2. State Bank of India (Banks). Indian Tobacco companies Limited (Cigarettes), Infosys Technology and Wipro Limited (Computer software), Hindustan Lever Limited (Diversified), Bharatiya Heavy Electrical Limited (Electrical Equipment), Housing Development Finance Corporation Limited (Finance-housing), Reliance Industries (Petrochemicals), Ranbaxy Laboratories Limited (Pharmaceuticals), Bharat Petroleum Corporation Limited (Refineries) and Tata Iron and Steel Corporation (Steel and Steel Product).

3. Basis refers to the difference between spot and futures price.

REFERENCES

Chang, E.C. (1985), "Returns to Speculators and the Theory of Normal Backwardation", *Journal of Finance,* Vol. 40, No.01.

Chou, W.L.; K.K. Denis and C.B. Lee (1996), "Hedging with the Nikkei Index Futures: The Conventional Model Versus the Error Correlation Model", *Quarterly Review of Economics and Finance,* Vol. 36, No.04.

Ederington, L.H. (1979), "The Hedging Performance of the New Futures Market", *Journal of Finance,* Vol.34, No.01.

Figleski, S. (1984a), "GNMA Pass Through Securities: Futures Trading and Volatility in the GNMA Market", *Journal of Finance,* Vol.36, No.02.

Figleski, S. (1984b), "Hedging Performance and Basis Risk in Stock Index Futures", *Journal of Finance,* Vol. 39, No.03.

Floros, C. and D.V. Vougas (2002), *Hedging Effectiveness in Greek Stock Index Features Market,* JEL Classifications, G13, G15.

Gregory, K. and T. Michael (1996), "Temporal Relationship and Dynamic Interactions Between Spot and Futures Market", *Journal of Futures Market,* Vol. 16, No.01, pp. 55-69.

Harris, L.H. (1989), "The October 1987 S and P Stock-Futures Basis", *Journal of Finance,* Vol. 44, pp.77-99.

Hodgson, A. and D. Nicholas (1991), "The Impact of Index Futures on Australian Share Market Volatility", *Journal of Business and Accounting,* Vol. 12, pp. 645-658.

Holmes, P. (1995), "Ex-Ante Hedge Ratios and the Hedging Effectiveness of the FTSE-100 Stock Index Futures Contract", *Applied Economics Letters,* Vol. 2, pp. 56-59.

Kalwaller, I.G.; P.D. Koch and T.W. Koch (1987), "The Temporal Relationship Between S and P 500 Futures and the S and P 500 Index", *Journal of Finance,* Vol.42, pp. 1309-1329.

Kamal Nayan Kabra (2007), "Commodity Futures in India", *Economic and Political Weekly,* Vol.42, No.50, December 15, pp. 1163-1170.

Nath, G.C. (2003), *Behaviour of Stock Market Volatility After Derivatives*, National Stock Exchange, Mumbai.

Pancholi, D. and T. Kurkel (2003), *Hedging Mutual Fund Returns Using Futures and Markets and ETFs,* Isenberg School of Management, University of Massachisetts.

Perrings, J.M.E. and M.T.G. Meolenberg (1997), "Hedging Efficiency: A Futures Exchange Management Approach", *Journal of Futures Market,* Vol.17, No.03, pp. 599-615.

Shenbagaraman, P. (2002), *Do Futures and Options Trading Increase Stock Market Volatility?,* National Stock Exchange, Mumbai.

Stoll, H.R. and R. Whaley (1990), "The Dynamics of Stock Index and Stock Index Futures Returns", *Journal of Financial and Quantitative Analysis,* Vol. 25, pp. 644-648.

Thenmozhi, M. (2002), *Futures Trading, Information and Spot Price Volatility of NSE-50 Index Futures Contract*, National Stock Exchange, Mumbai.

Yang, W. (2001), *M-GARCH Hedging Ratios and Hedging Effectiveness in Australian Futures Market,* Edith Cowan University, School of Finance and Business Economics.