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Price Volatility and Market Efficiency of Futures Market in India

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Abstract: *Due to the increased effects of globalization, economies are invariably exposed to global market factors and are volatile and sensitive to rising level of complexity of risks and changing conditions, making risk universal. However, due to the word of the ill effect of wide fluctuations of risk, various financial innovations have taken place at all times - derivatives being the most important. The uses of derivatives have become very predominant because of increased globalization and financial integration causing unpredictable variables and fluctuations. Though derivative instruments provide benefits, they come with certain risks as well. Low transaction cost and flexibility to take positions are the predominant features of futures and options instruments, which have lead to mushroom growth in their trading volume across the world. Popularity of equity futures contracts in India can be adjudged from the fact that in terms of trading volume.India's experience with the launch of equity derivatives market has been extremely positive. The derivatives turnover on the NSE has surpassed the equity market turnover. The turnover of derivatives on the NSE increased from Rs. 23,654 million (US $ 207 million) in 2000-01 to Rs. 315,330,030 million in 2012-13.*

Key words: *Futures Market, Lead – lag Market Efficiency, Price Volatility, Spot Market, etc.*
JEL Codes: *G100, G140, G190*

I. Introduction

Within the economic sector, it is in the financial markets that globalisation has been particularly dynamic. Financial innovation, internationalisation and institutionalisation of investment activities are differently inseparable aspects of the radical fundamental changes in the financial sector. The markets for financial derivatives -- futures and options -- can be regarded as the epitome of these new structures. The infrastructure of derivatives markets is geared to international transactions. The contract volumes and trading practices are tailored to meet the challenges of professional market players. Taking this fact into consideration, the derivatives market are characterised by exceptionally high degree of internationality.

Economies that do not have systems for derivative trading are supposed to be deprived of the benefits of beneficial financial instruments and are considered to be at comparative disadvantage. Derivatives can make the underlying markets more efficient. Derivatives facilitate investors to trade on information that otherwise might be costly to trade on. There are many studies which compared advantages of derivatives such as market efficiency, risk sharing & transfer, low transaction costs, capital intermediation, liquidity enhancement, price discovery, cash market development, provide hedging tools and regulatory savings, with their disadvantages such as more leverage, less transparency, dubious accounting, regulatory arbitrage, hidden systematic risk, counter-party risk, tail-risk future exposure, weak capital requirements and zero-sum transfer tools, and concluded that derivatives trading is increasingly migrating towards some of the world's largest and most innovative areas but at the same time dangers are still lurking.

Derivatives markets serve two important socio - economic purposes: risk shifting and price discovery. Risk shifting, commonly called hedging, is the transfer of risk from one entity who does not want it to another entity that is more willing or able to bear it. In doing so, derivatives can help discover the price of underlying assets or commodities. Risk shifting is important for a variety of economic reasons. Importers and exporters hedge their foreign exchange exposure so that the local currency value of their importing costs and exporting revenues is less volatile. Firms borrowing in foreign markets hedge the local currency value of their foreign currency debt payments.

A dominant role is played by the derivatives in the process of price discovery by offering the market participants an opportunity to price their future states expectations of the economy and the underlying security. There by, making the future prices' expectations of measurable quantity which is revealed to other market participants who act in derivatives and spot markets.This is based on the theory that derivative pricing and spot market pricing are valuing the same underlying security. The information about future prices of the underlying security which is incorporated in the price of the derivative is shared free of charge by other market participants who have to make their investment, production or consumption decisions. With the help of an efficient price discovery mechanism, a more efficient inter temporal allocation of resources can be achieved which is considered as socially beneficial.

The potential economic utility of the role of derivative trading in price discovery and risk management is yet to be recognised by society at large. There are still apprehensions about the use of derivative trading because of its ill – effects. Due to these apprehensions about the ill – effects of derivatives, futures' trading has been subjected to strict regulations, and certain commodities have been inflicted with occasional bans. Even though the disutility of the market is still under the clouds of suspicion, the government who is behaving in an over cautious way has never ever really allowed the market to develop and prove its utility.

There is another aspect to price discovery function of the futures markets. The anti-market faction has often interpreted results as per its convenience. Since it is anticipated that futures prices act as reference prices for the physical markets during the time of inflation, this group believes that it is the futures which is the culprit behind commodity price rise in the economy. Ultimately, the entire blame for the inflationary trend is placed on the speculative elements in the futures markets, without considering the fact that price, fundamentally, is a function of demand and supply. An efficient future market is the one which will be able to have an access to this piece of information, process it and then spill over it to the physical markets. Thus, there are various socio – economic aspects related to the arena of role of derivatives in price discovery and market volatility which is clear from the related literature.

The main theme behind the introduction of the derivatives in the Indian Scenario was to bring control the rising volatility of the asset prices in the markets bring about sophisticated risk management tools leading to higher returns by reducing risk and transaction costs as compared to individual financial assets. It is yet to be seen if the introduction of stock index futures has achieved the purpose as claimed by the regulators which leaves one pondering over the questions as to the effect of index derivatives over volatility of the cash market. It is yet to be decided as to whether the future trading increases or decreases the volatility of cash segment . Theoretically, when one market reacts faster to an information and other market reacts slowly, there is said to exist a lead lag relationship between the two. The lead lag relationship suggest how fast one market moves as compared to the other as to a new information and the linkage between the two markets.

In terms of number of single stock futures contracts traded in 2011, NSE holds the third position for single stock futures with 161 million contracts. It occupies second position in terms of number of stock index options with 871 million contracts traded and third in terms of number of stock index futures contracts traded. These rankings are based on World Federation of Exchanges (WFE) Market Highlights 2011. As per the data revealed by Global F & O volume of trade from the view point of total equity derivative turnover, NSE holds third position depicting a massive growth of 37.1% for the year 2011-12,consistently improving its worldwide ranking form 15th in 2006 to eighth position in 2008,seventh in 2009 and fifth in 2010. Since, efficient price discovery enables the traders to take optimal hedging and arbitrage positions, it has become so popular that trading volume of futures is more than three times than the trading volume of underlying indices/ stocks.

The present study is an attempt to evaluate the role of futures market, an attempt to analyze whether the price discovery function of the futures has come real or not. The study takes into account the price discovery mechanism of futures on spot form its inception in the year 2000,covering the span of twelve years e from 2001-02 to 2011-12.

II. Review Of Literature

Minho Kim, Andrew C. Szakmary and Thomas V. Schwarz (1999) studied trading costs and price discovery across stock index futures and cash markets by adapting the impulse response functions to examine how an innovation in one market transmits across different markets. The tools applied in this study are Johansen Cointegration and Vector Autoregressive techniques

Joshua Turkinton and David Walsh (1999) conducted a study on price discovery and causality in the Australian share price index futures markets. The tools applied in this study were simple cost and carry method, cointegration test, ARMA model and Granger Causality tests. The results suggested a bi directional causality among the variables identified .

Jae H. Min and Mohammad Najand (1999) invested the lead –lag relationship between the spot markets and stock index evidence from Korea by applying Dynamics Simultaneous Equation Model (SEM) and Vector Auto Regression Models (VAR). The results of the tests of simultaneous equation model give a clear picture of the futures leading the spot market by at least 30 minutes in the Korean futures market. The perfection of the model and also the relationship between futures and spot is very clearly depicted by the Wald statistics.

Alex Frino, Terry Walter and Andrew West (2000) investigated the lead lag relation which exist between the equity market and stock index futures market around information releases from the Australian stock exchange & Sydney stock exchange. This study proved that the index futures are influenced by the release of the macroeconomic and stock specific information

Joachim Grammig, Michael and Christian Schlag (2000) addressed to the question of price discovery using Cointegration and Vector models were used for the analysis. Leo Chan and Donald Lien (2001) examined the cash settlement and price discovery in futures market in USA by adopting Vector Auto Regression model

with Error Correction for analysing the data. Mathew Roope and Ralf Zurbruegg (2002) studied the intra –day price discovery mechanism between the Singapore Exchange and Taiwan Futures Exchange using tools like Error Correction Model, Granger Causality and ARIMA models.Quentin C. Chu and Wen- Liang Gideon Hsieh (2002) probed into the pricing efficiency of the S&P 500 index markets.They came up with a conclusion that there exists a close relationship between SPDR 's and S&P 500 index fututes.

K. Kiran Kumar and Chiranjith Mukhopadyay (2002) analysed the short term dynamic linkage between NSE Nifty and US stock market by employing two stages GARCH Model and ARMA – GARCH Model. The results of Granger Causality suggested unidirectional Granger causality running from the US stock market to the Indian stock market.

Kedar Nath Mukherajee and K. Mishra (2004) took a peep into the lead lag relationship between equity and stock index futures market and its variation around information release from India.VAR model and the Granger Causality test among the return series of the spot and the future market in India revealed that a symmetric spillover among the stock return volatility in India spot and future markets

Sathya Saroop Debasish (2007) made a study on an econometric analysis of the lead lag relationship between Indian's NSE Nifty and its derivatives contracts employing the Cointegration and ARMA models. Suchismitha Bose (2007) investigated the contribution of Indian index futures to the price formulation in the stock markets. Kapil Gupta and Balwinder Singh (2008) studied the price discovery and arbitrage .The research work applied Johansen Co-integration procedure, Vector Error Correction Model and Granger Causality Methodology.

Thenmozhi and Manish Kumar (2008) studied the dynamic interaction among mutual funds flows, stock marker retunes and volatility with a view of analysing whether the information on mutual funds flows can be used to predict the changes in market returns and volatility.

Ulkem Basdas (2009) studied the lead lag relationship between the spot index and futures price for the urkish derivatives exchange by using ISE30 and compare the forecasting abilities of ECM, ECM with COC, ARIMA, VAR model.

Kapil Gupta and Balwinder Singh (2009) investigated information memory and pricing efficiency of futures markets to examine the information dissemination efficiency of Indians equity futures markets using GARCH and EGARCH econometrics models, the results implied that previous information shock plays significant role in the return generation process.

III. Research Problem

The present study is undertaken with a view to probe into the research problem which can be detailed as to analyze the price discovery mechanism in the futures market with respect to spot market in Indian Derivative Segment and also to measure the market efficiency of futures market by comparing the relationship between futures and spot market in Indian Derivative Segment. For accomplishing the objectives of the study, the hypotheses framed is - H_{01}: There is no significant lead –lag effect between spot and futures markets and H_{02}: There is no significant relationship between spot and futures in long term and short term period

IV. Methodology

The study undertaken can be categorized as a descriptive study as well as analytical study. The methods of data collection used for this study is from secondary sources. For the purposes of achieving the cited objectives, NSE has been considered as the bench mark for measuring the extent of derivative trades in India since nearly 100 percent of the derivative trade is taking place in NSE. Secondary data has been collected from the annual reports of SEBI, NSE , various registered stock exchanges, journals, publications and books on the related matters. Studies conducted by different researchers have been extensively referred to for this study.

The study covers a period of twelve years comprising of the years from 2001-02 to 2011-2012. S&P CNX Nifty futures and its underlying Nifty spot are variables used for the study. The daily closing prices of the select companies at NSE –both in F&O segment as well as in spot market, have been analyzed for the study period. Near month daily closing prices of S&P CNX Nifty futures and its underlying values are considered for the study. For this purpose, 19 companies which satisfy the conditions as it should be from the introduction of derivatives being continuously traded during the study period which is a part of Nifty have been selected. 19 individual companies which are included in the sample of the study are – ACC,AMBUJA,BHEL,BPCL,CIPLA,GRASIM,HDFC,HINDALCO,HINDUNILVR,INFOSYSTCH,ITC,M&M,RANBAXY,RELIANCE,RELINFRA,SBIN,TATAMOTORS,TATAPOWER,TATASTEEL. Individual stock price series of 19 stocks are transmitted into log form for the purposes of smoothing the data. The data series collected is auto regressed at first order AR(1). Descriptive statistics and line graphs of the variables depict the behavior and trend pattern of data series. Preliminary analysis of futures market and spot market is done with summary statistics. The movement and trend of the market is analyzed through the line graph.

Stationarity properties of time series data is tested by using Augmented Dickey Fuller test, length of the model has been fixed through the Akaike Information Criterion (AIC) lag selection criteria.

V. Results And Discussion

Table 1: Descriptive Statistics for the Whole Study Period

	Futures	Spot
Mean	6.272640922	6.274224463
Standard Error	0.004285496	0.004249876
Median	6.277113304	6.277488996
Standard Deviation	0.951389842	0.943482101
Sample Variance	0.905142632	0.890158474
Kurtosis	-0.074635737	-0.729900804
Skewness	-0.023504682	0.081035878
Range	8.687104728	5.058780144
JB	1146.991	1148.314
Observations	49285	49285

Table 1 shows the summary statistics of variables considered for the period of the study. In order to understand the raw data series included in the study ,mean, median, standard deviation ,skewness, kurtosis and Jarque – Bera are measured and presented .During the whole study period ,the futures and spot variable means are 6.272640922 and 6.2742244463 respectively. It shows the average of this data set is about 6 and the median value drawn shows the mid value of the series. Standard deviation shows the dispersion of the variables, 0.951389842 and 0.943482101 respectively for futures and spot market. Futures market is negativel skewed and spot market is positively skewed and kurtosis values are -0.074635737 and 0.729900804 respectively for futures and spot market. The results of Jarque – Bera test value and the probability reveal that both the distributions from spot and futures market are not normal.

Table 2: Summary Statistics of Individual Stocks included in Sample

Name of Company		Mean	Median	SD	Kurtosis	Skewness	JB	Observations
ACC	FUT	6.220967	6.459748	0.721493	1.822639	-0.53936	275.4879	2593
	SPOT	6.220894	6.458103	0.723153	1.823504	-0.543278	277.0993	2593
AMBUJA	FUT	4.974830	4.921804	0.493702	2.794560	0.464018	102.4815	2593
	SPOT	4.974262	4.925440	0.493175	2.710663	0.464927	102.4606	2593
BHEL	FUT	6.859251	7.273405	0.961857	1.980481	-0.69008	318.1047	2593
	SPOT	6.858515	7.273648	0.962512	1.984239	-0.69346	319.2958	2593
BPCL	FUT	5.974697	5.943324	0.332429	2.589164	-0.07840	20.89195	2593
	SPOT	5.974492	5.946075	0.332130	2.608649	-0.09736	20.64345	2593
CIPLA	FUT	5.916079	5.732046	0.598633	2.329924	0.856988	365.9062	2593
	SPOT	5.913989	5.728800	0.597626	2.333007	0.858355	366.4743	2593
GRASIM	FUT	7.228937	7.510020	0.747919	2.721717	-0.96375	409.7714	2593
	SPOT	7.227637	7.506399	0.748598	2.725838	-0.96738	412.5484	2593
HDFC	FUT	6.951152	6.681795	0.627366	1.771236	0.233180	186.6261	2593
	SPOT	6.950835	6.685611	0.626962	1.769444	0.233639	187.1948	2593
HINDALCO	FUT	5.647971	5.223594	0.958241	1.905238	0.315874	172.6085	2593
	SPOT	5.646300	5.220086	0.958433	1.904222	0.317680	173.3433	2593
HINDUNILVR	FUT	5.366026	5.386328	0.277723	2.712751	-0.03140	9.340828	2593
	SPOT	5.366497	5.388615	0.277064	2.702668	-0.04157	10.29852	2593
INFOSYS	FUT	7.842523	7.874777	0.372218	2.431658	0.087417	38.20133	2593
	SPOT	7.841814	7.874435	0.372099	2.433718	0.087039	37.92035	2593
ITC	FUT	5.830531	5.358471	0.791509	1.776407	0.616344	325.9290	2593
	SPOT	5.829799	5.354225	0.791927	1.779874	0.617984	325.8885	2593
M&M	FUT	6.092131	6.342561	0.708995	3.162548	-1.19360	618.5628	2593
	SPOT	6.091803	6.350711	0.709147	3.168367	-1.19683	622.1041	2593
RANBAXY	FUT	6.276007	6.202131	0.452407	2.689211	-0.10928	15.59663	2593
	SPOT	6.274580	6.202131	0.452341	2.692862	-0.11046	15.46518	2593
RELIANCE	FUT	6.720887	6.789816	0.678010	2.110634	-0.09108	89.04262	2593
	SPOT	6.718121	6.785983	0.677723	2.105192	-0.08853	89.89398	2593
RELIANCEINFRA	FUT	6.352926	6.349663	0.568790	2.640798	-0.10519	18.72225	2593
	SPOT	6.350865	6.345812	0.568027	2.639184	-0.10840	19..14383	2593
SBIN	FUT	6.859303	6.948993	0.792348	2.025169	-0.41201	176.0312	2593
	SPOT	6.857351	6.946687	0.793381	2.022802	-0.41227	176.6243	2593
TATAMOTORS	FUT	6.068588	6.194813	0.701956	2.013215	-0.47443	202.4785	2593
	SPOT	6.069934	6.194405	0.701722	2.009641	-0.47434	203.2052	2593
TATAPOWER	FUT	6.133855	6.243196	0.906329	1.843944	-0.39640	212.3021	2593
	SPOT	6.133810	6.249598	0.907681	1.844268	-0.40020	213.5289	2593
TATASTEEL	FUT	5.908985	6.066920	0.586294	2.728892	-0.84191	314.2686	2593
	SPOT	5.907491	6.065760	0.586591	2.728758	-0.84170	314.2277	2593

Table 2 shows the summary statistics of the variable considered for the study for the index spot and futures and 19 individual companies spot and futures series. S&P CNX Nifty futures series and spot series are taken for the analysis and mean value , median ,standard deviation ,skewness ,kurtosis and range measures are presented in the table .The spot and future variables of HINDUNILVR,ITC,RELIANCE,RELINFRA are positively skewed and that of ACC,AMBUJA,BHEL,BPCL,CIPLA,GRASIM,HDFC,HINDALCO,M&M,RANBAXY,SBIN,TATAMOTORS,TATAPOWER,TATASTEEl are negatively skewed. The negatively skewed distribution of the individual stock suggests that futures market is backwardation,offering significant arbitrage opportunities to traders(Vipul 2005). Jarque-Bera statistics of all the companies variables indicate that there is no possibility to accept the null hypothesis and the probability value of JB test also supports the result .In order to get more clarity on the basic structure of the variables line graphs are presented.

Line Graphs of 19 Individual Stocks

Figure 1: ACC

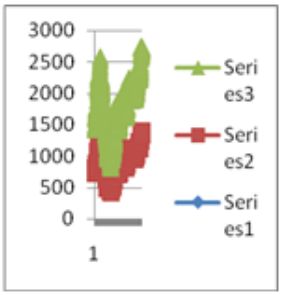


Figure 2: AMBUJA

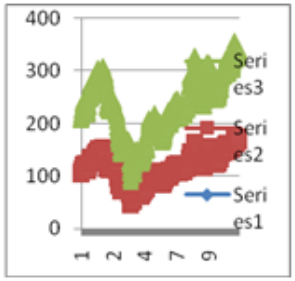


Figure 3: BHEL

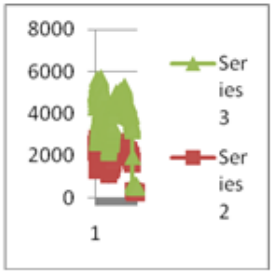


Figure 4 : BPCL

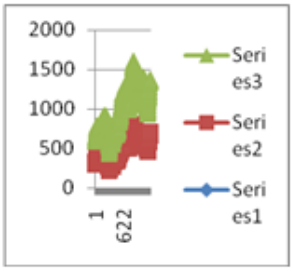


Figure 5 :CIPLA

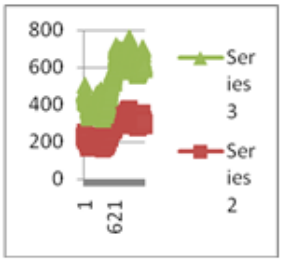


Figure 6 :GRASIM

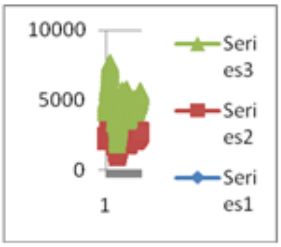


Figure 7 : HDFC

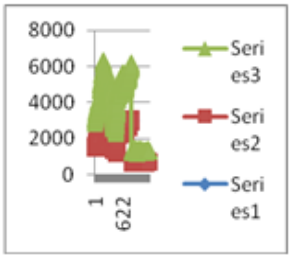


Figure 8 :HINDALCO

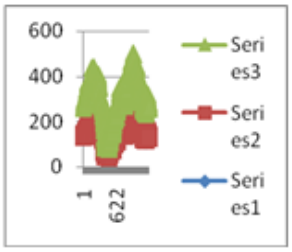


Figure 9 :HINDUNLVR

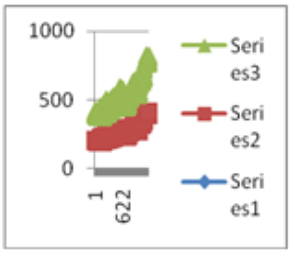


Figure 10: INFY

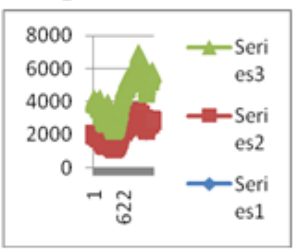


Figure 11: ITC

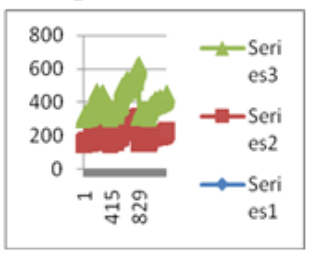


Figure 12: M&M

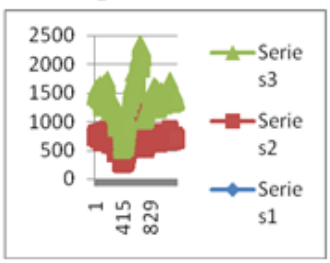


Figure 13: RANBAXY

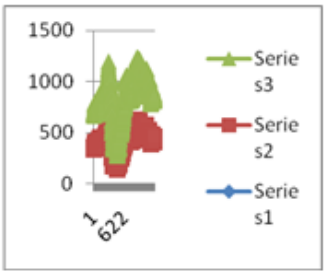


Figure 14: RELIANCE

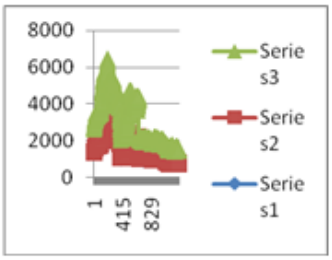


Figure 15: RELINFRA

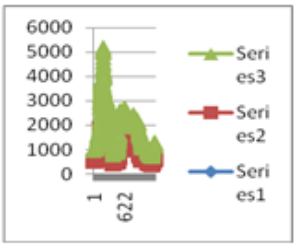


Figure 16: SBIN

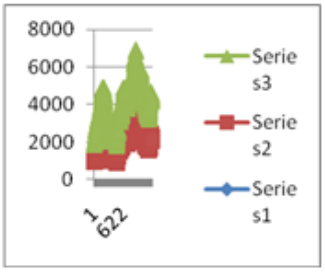


Figure 17: TATAMOTORS

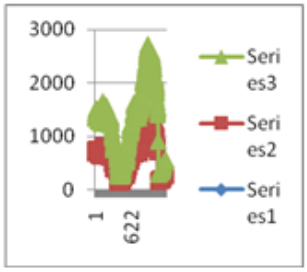


Figure 18: TATAPOWER

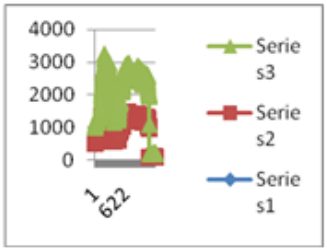
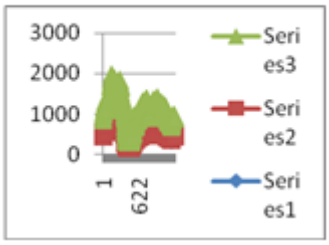


Figure 19: TATASTEEL



The stationarity of the market return shows the strong arbitrage opportunities between Futures and spot market. It is the symbol of efficiency of one market to another market. In order to check the stationarity properties, popular unit root test namely ADF is used.The results of the tests are given in Table 3.The tests are done after regressing the time series at first order.

Since the results of ADF tests are found to be too sensitive of the lag length, the Akaike Information Criterion (AIC) is used to determine the appropriate lag length (Akaike,1969). It searches for the appropriate lag length k that minimises the value of AIC, The k_{th} lag that minimises AIC is 4 for all observations..The hypothesis that the given time series is stationary is not rejected if the absolute value of the ADF-statistic exceeds the MacKinnon critical values at 5% level of significance. Since the time series is found to be non stationary at level form,it is auto regressed at first order.With the help of coefficient of determination R^2,Adjusted R^2, the relationship between futures and spot prices are established.

Table 3 Results of tests of the variables included in the study

Sl No	Name of Company	Variables	ADF	Log likelihood Ratio	Durbin Watson statistic	R^2	Adj R^2	SE of Regression
1	ACC	FUT	-22.70376	6077.409	2.000	0.486276	0.485481	0.023117
		SPOT	-22.64695	6130.932	2.000	0.481895	0.481093	0.022644
2	AMBUJA	FUT	-22.68107	4270.668	1.999	0.512928	0.512173	0.046477
		SPOT	-22.61346	4289.198	1.999	0.512921	0.512167	0.046146
3	BHEL	FUT	-23.41687	4479.306	1.999	0.483365	0.483365	0.042876
		SPOT	-23.49370	4482.862	1.999	0.485286	0.484489	0.042817
4	BPCL	FUT	-22.74320	5725.658	1.999	0.483516	0.482716	0.026484
		SPOT	-22.59569	5750.870	1.999	0.488533	0.487741	0.026227
5	CIPLA	FUT	-22.78192	4572.021	1.999	0.490814	0.490025	0.041367
		SPOT	-22.95260	4581.254	1.999	0.491041	0.490252	0.041219
6	GRASIM	FUT	-20.23311	6148.197	1.998	0.488740	0.487948	0.022493
		SPOT	-20.03954	6208.489	1.999	0.485062	0.484264	0.021975
7	HDFC	FUT	-23.70975	4550.745	2.000	0.507918	0.507156	0.041708
		SPOT	-23.78392	4542.369	2.000	0.508929	0.508168	0.041844
8	HINDALCO	FUT	-22.83335	3924.839	1.999	0.494101	0.493317	0.053125
		SPOT	-22.82704	3931.265	1.999	0.493262	0.492477	0.052993
9	HINDUNILVR	FUT	-24.01610	6549.713	1.997	0.500335	0.499561	0.019260
		SPOT	-24.12961	6513.997	1.998	0.497925	0.497148	0.019527
10	INFOSYS	FUT	-23.34931	4823.892	1.998	0.502104	0.501333	0.037529
		SPOT	-23.42421	4801.374	2.000	0.502516	0.501745	0.037857
11	ITC	FUT	-23.05272	3740.830	1.999	0.499225	0.498449	0.057041
		SPOT	-22.95197	3755.082	1.999	0.497729	0.496950	0.056728
12	M&M	FUT	-23.52110	5194.985	1.996	0.468891	0.468069	0.032514
		SPOT	-23.77914	5202.549	1.996	0.468242	0.467418	0.032419
13	RANBAXY	FUT	-22.34949	5387.951	1.998	0.485296	0.484499	0.030177
		SPOT	-22.09901	5427.083	1.999	0.480817	0.480013	0.029724
14	RELIANCE	FUT	-24.04538	5613.705	1.993	0.495558	0.494777	0.027655
		SPOT	-24.23202	5622.604	1.994	0.491990	0.491203	0.027560
15	RELINFRA	FUT	-23.47771	5135.189	1.999	0.495290	0.494508	0.033274
		SPOT	-23.36431	5199.333	1.999	0.488216	0.487423	0.032459
16	SBIN	FUT	-24.21644	5884.732	2.004	0.473099	0.0472282	0.024905
		SPOT	-24.2796	5955.446	2.004	0.461758	0.460924	0.024233
17	TATAMOTORS	FUT	-23.64990	4463.457	1.999	0.471084	0.470265	0.043140
		SPOT	-23.70925	4467.746	1.999	0.468186	0.467362	0.043068
18	TATAPOWER	FUT	-22.72101	3940.548	1.999	0.502290	0.501519	0.052803
		SPOT	-22.68456	3954.084	1.999	0.501797	0.501026	0.052528
19	TATASTEEL	FUT	-22.71014	5283.446	1.999	0.478930	0.478123	0.031421
		SPOT	-22.59488	5323.990	1.999	0.467145	0.466319	0.030934

AIC criterion is used to select lag length. Results are at 5% level of significance. The MacKinnon critical values for 5% level of significance is - 0.1.94 .

Table 3 shows the results of stationarity test of the variables considered for the period of study relating to the sample companies. The return series of the variables are stationery at first order.The Durbin Watson static for the variables is found to be ideal ranging around the value 2. R^2 and Adjusted R^2 indicates there exists a moderate correlation between futures and spot prices. Moderate values of R^2 presence of multi collinearity and absence of auto correlation among the variables of the study. Stationarity shows the strong lead-lag relationship between spot and future variables of the individual stock, existence of stationarity suggests that returns on both futures and spot market are significantly predictable. Presence of mutli collinearity in the time series gives hint towards price discovery as it is a favourable condition for forecasting prices, thereby indicating strongly the possibility of efficient price discovery mechanism in Indian futures and spot market.

VI. Conclusion

From the study, it can be seen that there exists a bidirectional relationship linkage between spot and futures market in Indian Derivative Market. The concept of multi co-linearity and auto correlation strongly suggests impact of futures on spot to be very high. This situation provides the opportunities to the traders to make profit through arbitrage process. Informational linkage between stock index spot and future market implies that the investors use these markets to explore significant arbitrage profit and hedging opportunities. By rejecting both the null hypotheses formulated for the study, it is again proved that there exists a lead lag relationship between spot and futures market and also these markets provide an efficient price discovery mechanism.

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