



A STUDY ON THE IMPACT OF DERIVATIVES IN INDIAN CAPITAL MARKET

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Abstract Derivative business is a new segment of trade introduced in stock market in the year 2000 mainly to bring liquidity into the market. People who are doing business in derivatives are not genuine buyers and sellers and they do only speculative trading. The excess speculation and open position in the derivative market have influenced Spot Market Prices. The objective of this study is to find out the real impact of derivatives on Spot Market and overall capital market. The study result indicates that volume of trade increased tremendously after the introduction of derivatives. During 2010-2011, Index Option contributes 63 per cent to the overall derivatives business. Though there is a fluctuation in share price, the deviation in price is less after introduction of derivatives. In fact, the volatility is reduced after the introduction of derivatives. The open interest positions which arise because of Futures Trading are having effect on share price.

Key Words: Impact of derivatives on Spot Price, Impact of Index Futures on Index Spot

INTRODUCTION

Derivatives trading in stock market consists of Stock Futures, Stock Options, Index Futures and Index Options. Derivatives trading introduced in the market mainly to offer liquidity. The excess trading in derivatives has resulted in excess speculation. The speculation in the derivatives market has infused speculation in the Spot Market also. If there is excess fluctuation in price then the investor will go away from the market. The objective of this study is to find out the impact of derivatives in the capital market. The study first analyses the growth of business in each derivative segment. The next analysis is about impact of Futures Price on Spot Price. The study also analyses the impact of Futures Index and volume on Nifty Spot Index by using GARCH (1, 1) model.

REVIEW OF LITERATURE

Shenbagaraman (2003) has investigated the impact of the introduction of derivatives trading on cash market and it shows the result of no change in volatility. He has examined the association between the greater Futures Trading activity with greater Spot Market Volatility. The study results with no evidence between the trading activity in Futures market and Spot Market Volatility. These results became important to stock brokers for contract specifications, etc.

Thenmozhi (2002) studied the change in the volatility of Nifty Index due to the introduction of Nifty Futures and it shows the inception of Futures Trading have reduced the volatility of Spot Index Returns.

Naliniprava Tripathy, S.V. Ramana Rao, A. Kanagaraj (2009) have studied the impact of derivatives instruments and



leverage and asymmetric effect on Spot Market Volatility (Nifty) in India during the period from October 1995 to December 2006 and the outcome of the study shows a fall in Spot and hike in market efficiency after introduction of derivatives on the Spot Market due to increased impact of recent news.

Sathya Swaroop Debasish (2009) examined the impact of the introduction of Nifty Index Futures on the volatility of the Indian Spot Markets. The study results with no changes after the introduction of Futures Trading and this is the outcome of GARCH Analysis. The Spot Return Volatility is found to be less important in explaining Spot Returns after the advent of Futures Trading in NSE Nifty.

Vipul (2006) has studied the changes in volatility in the Indian Stock Market after the introduction of derivatives and it results with the fall in volatility of the underlying shares after the introduction of derivatives. However, the inter-day unconditional volatility of the Equity Index increases. This contradiction is explained by an increased correlation between the prices of its constituent shares caused by arbitrage transactions in the cash market.

METHODOLOGY

The type of research design used in this study is Descriptive. This study is based on secondary data only. The analysis is done only for 10 Nifty listed companies which are selected based on alphabetical order. The closing price from 10th November 1996 to 9th November 2006 i.e., 8 years is taken to find out the standard deviation in prices. The standard deviation is calculated for the prices before introduction and after introduction of derivatives to ascertain change in volatility. Both Futures Closing Price and Spot Closing Price are taken from 3 months contract starts from 01 July 2011 to 29 September 2011.

GARCH (1, 1) MODEL: GARCH (Generalised Auto Regressive Conditional Heteroskedasticity) evaluates the conditional volatility. GARCH (1, 1) estimates current volatility as a function of long run average variance, a single lagged return and single lagged variance. Here, Heteroskedasticity refers to unequal variance in the regression errors, in other words, time varying variance. The simple variance of the past Spot Price gives measure of volatility, but it will not give the correct market volatility. In GARCH there will be two equations – conditional mean equation given below:

$$r_t = \gamma + \varepsilon_t$$

and the conditional variance equation shown below,

$$\sigma_t^2 = \omega + \alpha \cdot \varepsilon_{t-1}^2 + \beta \cdot \sigma_{t-1}^2$$

The parameters in both the equations are estimated simultaneously using maximum likelihood methods once a distribution for the innovations ε_t has been specified. Generally, it is assumed that they are Gaussian.

Business Growth in Derivatives segment (NSE)

Before analysing the Spot Market Volatility before and after the introduction of derivatives, it is better to study the growth in derivatives segment in National Stock Exchange from the year of introduction of derivatives. The Table 1 shows the number of contracts traded in derivatives, turnover and average daily turnover of derivatives from 2001 to 2011.

TABLE 1: Overall Trading of nse F&O Segment

Year	No. of Contracts	Turnover (Rs. Cr)	Avg. Daily Turnover (Rs. Cr)
2000-01	90580	2365	11
2001-02	4196873	101926	410
2002-03	16768909	439862	1752
2003-04	56886776	2130610	8388
2004-05	77017185	2546982	10107
2005-06	157619271	4824174	19220
2006-07	216883573	7356242	29543
2007-08	425013200	13090477	52153
2008-09	657390497	11010482	45310
2009-10	679293922	17663664	72392
2010-11	1034212062	29248221	115150

(Source: NSE Business Growth in Derivatives segment)

There is continuous increase in the number of contracts in derivatives trading. In the initial period, the growth rate is more than 100 per cent. In the year 2005, the growth rate is 35 per cent and again in 2006-2007, it has achieved more than 100 per cent growth. Even during the bearish period, the number of contracts has not come down. This indicates the acceptability of derivatives among the public. In the turnover also, there is a continuous rise in business. In the year 2009, there is a little drop in turnover. Though the growth rate is not 100 per cent as like the number of contracts, still there is a substantial growth in derivatives turnover year by year.

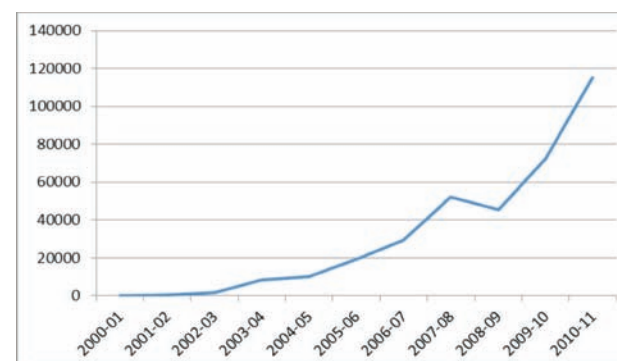


Fig 1: Overall Avg. Daily Turnover of nse F&O Segment

From the above Fig. 1, the average daily turnover of derivatives market in the beginning year (2000-2001) is 11 Crore, from then it is increased to 115150.48 Crore in 2010-2011. Even though there was weak global market, there was only a 13 per cent fall in the average daily turnover from the previous year in 2008-2009 which shows the strength of derivatives segment.

Table 2: Product-Wise Contract Traded and Turnover in nse

Year	STOCK FUTURES		STOCK OPTIONS		INDEX FUTURES		INDEX OPTIONS	
	No. of Contracts	Turnover (Rs. Cr)	No. of Contracts	Turnover (Rs. Cr)	No. of Contracts	Turnover (Rs. Cr)	No. of Contracts	Turnover (Rs. Cr)
2000-01	-	-	-	-	90580	2365	-	-
2001-02	1957856	51515	1037529	25163	1025588	21483	175900	3765
2002-03	10676843	286533	3523062	100131	2126763	43952	442241	9246
2003-04	32368842	1305939	5583071	217207	17191668	554446	1732414	52816
2004-05	47043066	1484056	5045112	168836	21635449	772147	3293558	121943
2005-06	80905493	2791697	5240776	180253	58537886	1513755	12935116	338469
2006-07	104955401	3830967	5283310	193795	81487424	2539574	25157438	791906
2007-08	203587952	7548563	9460631	359136	156598579	3820667	55366038	1362110
2008-09	221577980	3479642	13295970	229226	210428103	3570111	212088444	3731501
2009-10	145591240	5195246	14016270	506065	178306889	3934388	341379523	8027964
2010-11	186041459	5495756	32508393	1030344	165023653	4356754	650638557	18365365

(Source: NSE Business Growth in Derivatives segment)

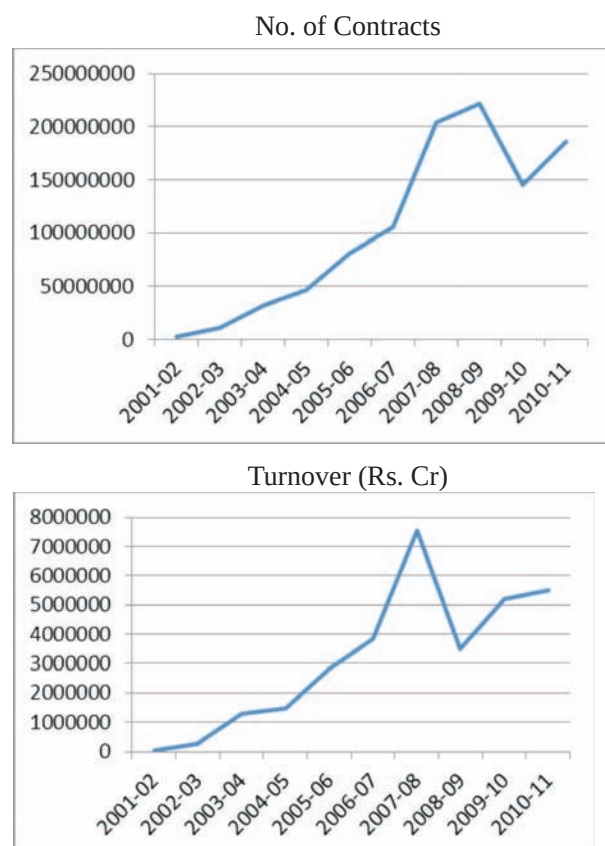
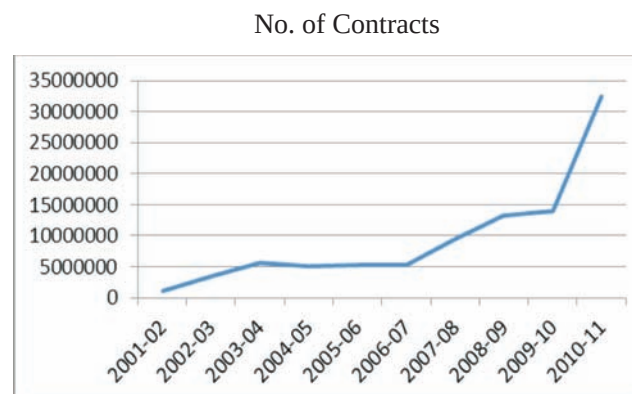


Fig 2: Stock futures contracts traded and its turnover in nse

DERIVATIVES PRODUCT

In F&O segment, there are four types of trading available viz., Stock Futures, Index Futures, Stock Options and Index Options. In the earlier section, it is stated that there is growth in overall derivatives trading. Now it is necessary to analyse the growth in business segment by segment.

From Fig. 2, it can be inferred that from 2001-2002 there is a gradual increase in the number of Futures Contracts traded till 2008-2009. In the year 2009, there is a fall but it has increased in the very next year. The increase in number of contracts resulted in the increase in turnover. In the year 2009, there is fall to the extent of 53 per cent. In the initial years, the rise is more than 100 per cent. During 2011, there is a rise in turnover but it is not substantial. The increase in turnover brings liquidity to the market.



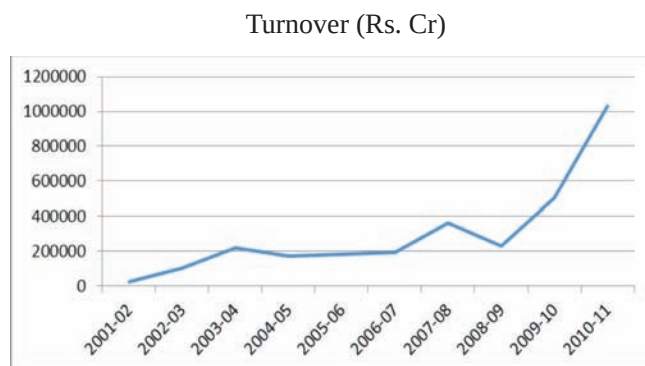


Fig 3: Stock options contracts traded and its turnover in nse

There is a steady and continuous rise in the number of contracts in Stock Options till 2010. In the year 2011, there is steep rise in the number of contracts. In the turnover, there is fall in the year 2008-09. In the next two years, there is more than 100 per cent increase in business in option market. This shows that option market has picked up very recently.

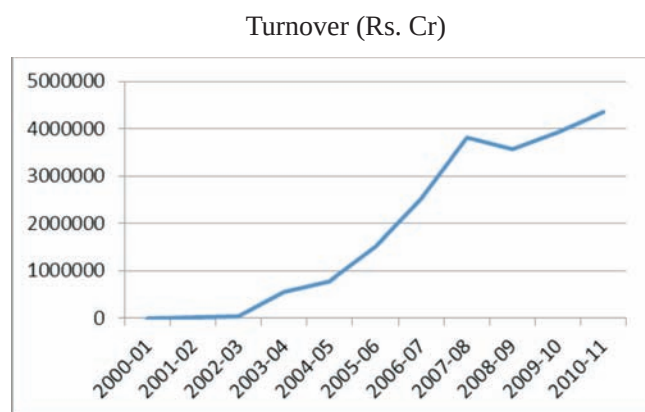
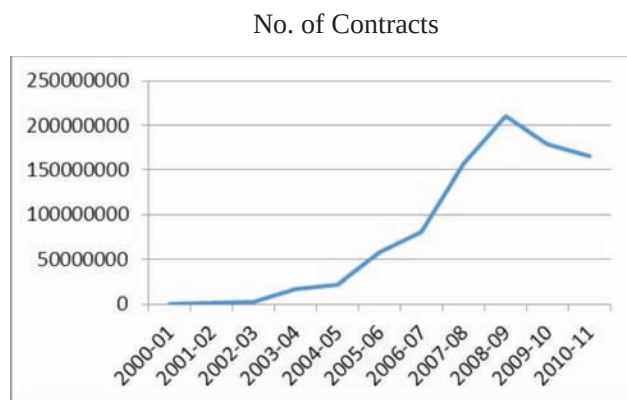


Fig 4: Index Futures Contracts Traded and its Turnover in nse

The number of contracts entered in Index Futures segment increased tremendously till 2008-2009. But there is a steep fall from that year; this is due to increase in trading in Index Options and the turnover in Index Futures segment gradually rose to its peak level in the year 2010-2011. This shows that Index Futures provide higher leverage than any other stocks.

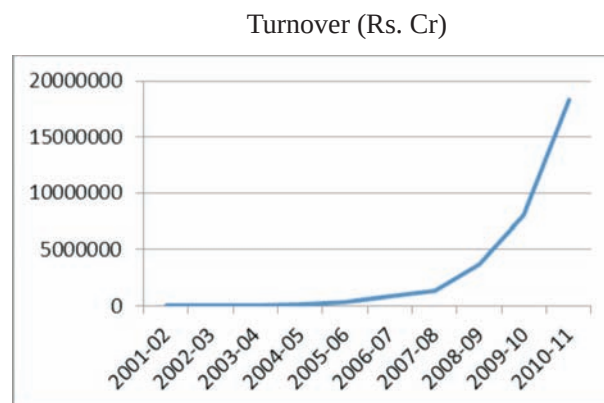
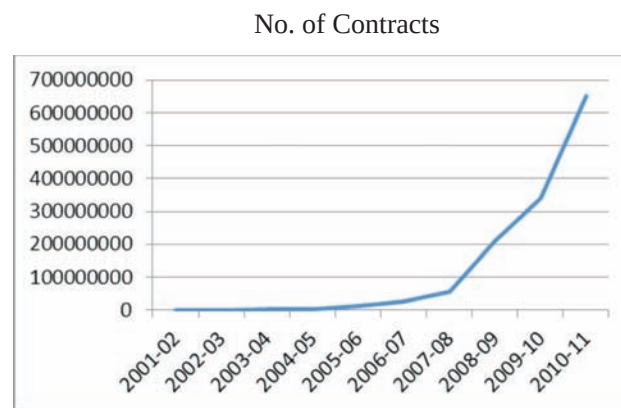


Fig 5: Index Options Contracts Traded and its Turnover in nse

No. of contracts and turnover in Index Options is very negligible in the beginning period after that it has increased tremendously till 2010-2011 and there is a 292 percent increase in contracts traded and 177 percent in turnover from 2004-05 to 2005-06, where as in Stock Options it is just 6.7 percent increase in turnover from 2004-05 to 2005-06. This shows that investors interested in participating in the market without trading or holding a large quantity of stock. Index Option is popular in foreign countries few years ago but it has gained popularity in India very recently. Its share in total derivatives business is less than 10 per cent in the initial period now it accounts for more than 63 per cent.

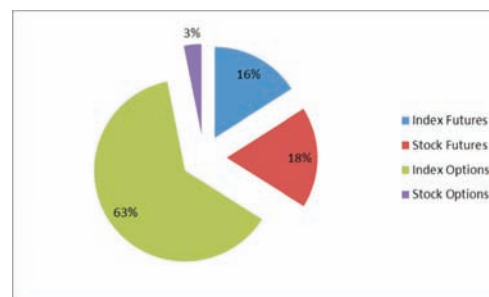


Fig 6: Product-Wise trading volumes during 2010-2011

Fig. 6 shows product-wise contribution of all four products in year 2010-2011. The graph also shows that out of the total

contracts traded, 63 per cent of the contracts are traded on Index Options followed by Stock Futures which account for 18 per cent and number of contracts traded on Index Futures is 16 per cent and 3 per cent of the total contracts are traded on Stock Options.

Impact of Futures Price on Underlying Price

To find out the impact of Futures Price on underlying Stock Price Correlation and Regression analysis is used.

Table 3: Relationship Between Futures Price and Underlying Stock Price

Security	Correlation Coefficient	Sig. (2-tailed)
ACC Ltd	.988	.000
Ambuja Cements Ltd	.987	.000
Axis Bank Ltd	.987	.000
Bajaj Auto Ltd	.994	.000
BHEL	.998	.000
BPCL	.892	.000
Bharti Airtel Ltd	.938	.000
Cairn India Ltd	.993	.000
Cipla Ltd	.971	.000
Coal India Ltd	.997	.000

The correlation between Futures Price and Spot Price is carried out to check the relationship between the two variables. If the significant is above 0.05, there is no significant relationship between two variables. Table 3 indicates that there is a positive and significant relationship between Futures Contract Price and Underlying Stock Price. The positive and significant relationship between Stock Price and Futures Price exist for all securities. Therefore, it can be stated that the changes in the Futures price will get reflected directly on the Underlying Stock Price.

Table 4: Impact of Futures Price on Underlying Price

Security	R Square	Adj. R Square	α	β	Sig. (2-tailed)
ACC Ltd	.976	.975	123.090	.882	.000
Ambuja Cements Ltd	.974	.974	6.620	.957	.000
Axis Bank Ltd	.973	.973	96.479	.911	.000
Bajaj Auto Ltd	.988	.988	-28.534	1.016	.000
BHEL	.995	.995	55.734	.969	.000
BPCL	.796	.793	-37.185	1.064	.000
Bharti Airtel Ltd	.881	.879	26.143	.928	.000
Cairn India Ltd	.985	.985	6.140	.974	.000
Cipla Ltd	.943	.942	72.556	.746	.000
Coal India Ltd	.994	.994	12.986	.963	.000

R Square value is degree of determination, which means extent to which variability in dependent variable can be determined by using independent variable. The value of β depicts that there is a strong impact of Futures Price in the Underlying Stock Price of all securities. The significant value is less than 0.05 which means that there is a significant relationship. The β value for ACC LTD is 0.882 which indicates that there is 88.2 per cent variability in Spot Price due to Futures Price. This indicates that fluctuation in Futures market will have impact on Share Price.

Impact of Nifty Spot Index on its Underlying Stock Price and Impact of Nifty Spot Index on Stock Futures Price

To find out the impact of Nifty Spot Index on its Underlying Stock Price and the impact of Nifty Spot Index on Stock Futures Price, Correlation and Regression Analysis is used. To find out the relationship between the Open Interest and Stock Price, Correlation is used.

TABLE 5: RELATIONSHIP BETWEEN nifty spot index & stock price, nifty spot INDEX & FutureS Price and Open interest & Stock Price

Security	Market & Stock Price		Market & Futures Price		Open interest & Stock Price	
	Correlation Coefficient	Sig. (2-tailed)	Correlation Coefficient	Sig. (2tailed)	Correlation Coefficient	Sig. (2-tailed)
ACC Ltd	-.603	.000	-.687	.000	.693	.000
Ambuja Cements	-.615	.000	-.652	.000	.783	.000
Axis Bank Ltd	.923	.000	.941	.000	-.747	.000
Bajaj Auto Ltd	-.575	.000	-.567	.000	.926	.000
BHEL	.890	.000	.883	.000	-.650	.000
BPCL	-.305	.016	-.394	.002	-.077	.550
Bharti Airtel Ltd	.345	.006	.520	.000	-.352	.005
Cairn India Ltd	.947	.000	.951	.000	-.669	.000
Cipla Ltd	.936	.000	.935	.000	-.776	.000
Coal India Ltd	.461	.004	.477	.003	-.378	.021

To find out the influence market movements in share price, Correlation Analysis is performed. Correlation Co-efficient shows that there is a relationship between market movements and Share Price movements. This indicates that there is strong relationship between Index and Share Price. This can be further inferred that the change in the Nifty is reflected directly in the Securities Price.

The Correlation also performed between Futures Price and Spot Index. The significance level is less than 0.05 for all securities. This indicates that there is a significant relationship between Nifty Index and Securities Futures Price. This can be further inferred that the change in the Nifty is reflected directly on Securities Futures Price. So market is having impact on Futures Price as well as Spot Price, and Futures Price is having impact on Spot Price. Therefore, it can be concluded that the changes in Spot Price is not due to change in Futures Price but due to change in market.

Correlation Analysis shows that there exists a relationship between the Open Interest of Futures and the Underlying Stock Price. Open Interest means the people have not closed their position. Out of 10 stocks, the share price 9 stocks except BPCL is influenced by Open Interest in Futures. This implies Open Interest leads to speculation in Spot Price.

Table 6: Impact of Nifty Spot Index on its Underlying Stock Price

Security	R Square	Adj. R Square	α	β	Sig. (2-tailed)
ACC Ltd	.363	.353	1410.336	-.076	.000
Ambuja Cements Ltd	.378	.368	222.157	-.017	.000
Axis Bank Ltd	.852	.850	-534.322	.329	.000
Bajaj Auto Ltd	.331	.319	2301.459	-.153	.000
BHEL	.792	.789	-136.954	.370	.000
BPCL	.093	.078	745.280	-.014	.000
Bharti Airtel Ltd	.119	.104	298.954	.019	.006
Cairn India Ltd	.897	.895	-57.692	.067	.000
Cipla Ltd	.876	.874	-6.393	.058	.000
Coal India Ltd	.212	.190	115.132	.053	.004

R Square is degree of determination which is very high for few securities. This means that Securities Prices are heavily influenced by changes in market. The value of β depicts that there is an impact of Nifty in determining the Stock Price. With the help of α and β , the equation to find Stock Price can be written. The price of Coal India Ltd = $115.132 + .053 \times \text{Nifty}$.

Table 7: Impact of Nifty Spot Index on Stock Futures Price

Security	R Square	Adj. R Square	α	β	Sig. (2-tailed)
ACC Ltd	.472	.464	1515.921	-.098	.000
Ambuja Cements	.426	.416	229.592	-.018	.000
Axis Bank Ltd	.885	.883	-702.265	.363	.000
Bajaj Auto Ltd	.321	.310	2277.928	-.147	.000
BHEL	.780	.776	-178.861	.378	.000
BPCL	.155	.141	746.014	-.016	.002
Bharti Airtel Ltd	.271	.259	249.361	.029	.000
Cairn India Ltd	.905	.904	-64.574	.069	.000
Cipla Ltd	.874	.871	-93.409	.075	.000
Coal India Ltd	.228	.206	97.310	.056	.003

By taking Stock Futures Price as dependent variable and Index as independent variable Regression Analysis is carried out. The results show that the Stock Futures Price is influenced by market movements. By using α and β values equation to estimate Stock Futures Price can be written. For example, Price Coal India Futures = $97.310 + .056 \times \text{Nifty}$.

SPOT PRICE VOLATILITY

The daily closing index of nifty spot for eight years i.e., four years before November 9, 2001 and four years after November 9, 2001 (i.e., after introduction of derivatives) for all selected securities is collected. The standard deviation is calculated for prices before and after the introduction of derivatives with the help of descriptive statistics.

Table 8: Changes In Relative Volatility After F&O Trading Introduction in Nov 9, 2001

Security	Standard Deviation		Change in Relative Volatility
	Before Introduction of Derivatives	After Introduction of Derivatives	
ACC Ltd	5.8383E2	2.4224E2	Decreased
Ambuja Cements	9.6800E1	1.0940E2	Increased
Axis Bank Ltd	-	-	-
Bajaj Auto Ltd	-	-	-
BHEL	9.2107E1	6.7976E2	Increased
BPCL	9.5170E1	8.4297E1	Decreased
Bharti Airtel Ltd	-	-	-
Cairn India Ltd	-	-	-
Cipla Ltd	5.8712E2	3.6945E2	Decreased
Coal India Ltd	-	-	-

From Table 8, it is clear that there is a statistically significant decrease in the relative volatility after introduction of derivatives for three securities and there is significant increase in two securities. From which it can be inferred that the introduction of derivatives trading doesn't produce any significant impact on the volatility of underlying Spot Market. There is no data available for Axis Bank Ltd, Bajaj Auto Ltd, Bharti Airtel Ltd, Cairn India Ltd and Coal India Ltd at that particular period.

Testing of variables for GARCH (1,1) model fitness

To ensure the GARCH (1, 1) model fitness variables such as Futures Index, Nifty spot Index and Futures volume has been tested by using Augmented Dickey-Fuller Test. From this test we can identify the structural pattern which affects the model.

Table 9: Testing of Futures Index

Null Hypothesis: D(LFCLOSING) has a unit root				
Exogenous: Constant				
Lag Length: 1 (Automatic - based on AIC, maxlag=10)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-6.167170	0.0000
Test critical values:	1% level		-3.546099	
	5% level		-2.911730	
	10% level		-2.593551	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LFCLOSING,2)				
Method: Least Squares				
Date: 12/16/11 Time: 08:06				
Sample (adjusted): 4 62				
Included observations: 59 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFCLOSING(-1))	-1.111095	0.180163	-6.167170	0.0000
D(LFCLOSING(-1),2)	0.199891	0.132848	1.504655	0.1380
C	-0.002340	0.001978	-1.182953	0.2418
R-squared	0.477830	Mean dependent var		0.000330
Adjusted R-squared	0.459182	S.D. dependent var		0.020191
S.E. of regression	0.014849	Akaike info criterion		-5.532299
Sum squared resid	0.012347	Schwarz criterion		-5.426662
Log likelihood	166.2028	Hannan-Quinn criter.		-5.491063
F-statistic	25.62243	Durbin-Watson stat		2.014103
Prob(F-statistic)	0.000000			

Table 10: Testing Of Nifty Spot Index

Null Hypothesis: D(LSCLOSING) has a unit root				
Exogenous: Constant				
Lag Length: 1 (Automatic - based on AIC, maxlag=10)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-6.240132	0.0000
Test critical values:	1% level		-3.546099	
	5% level		-2.911730	
	10% level		-2.593551	

*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LSCLOSING,2)				
Method: Least Squares				
Date: 12/16/11 Time: 09:43				
Sample (adjusted): 4 62				
Included observations: 59 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LSCLOSING(-1))	-1.074890	0.172254	-6.240132	0.0000
D(LSCLOSING(-1),2)	0.242426	0.131058	1.849761	0.0696
C	-0.002096	0.001865	-1.123825	0.2659
R-squared	0.460435	Mean dependent var		0.000292
Adjusted R-squared	0.441164	S.D. dependent var		0.018775
S.E. of regression	0.014035	Akaike info criterion		-5.644945
Sum squared resid	0.011032	Schwarz criterion		-5.539307
Log likelihood	169.5259	Hannan-Quinn criter.		-5.603708
F-statistic	23.89362	Durbin-Watson stat		2.025338
Prob(F-statistic)	0.000000			

Table 11: Testing Of Futures Volume

Null Hypothesis: D(LFVOLUME) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on AIC, maxlag=10)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-8.701598	0.0000
Test critical values:	1% level		-3.544063	
	5% level		-2.910860	
	10% level		-2.593090	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LFVOLUME,2)				
Method: Least Squares				
Date: 12/16/11 Time: 09:47				
Sample (adjusted): 3 62				
Included observations: 60 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFVOLUME(-1))	-1.132682	0.130169	-8.701598	0.0000
C	0.118280	0.049165	2.405801	0.0193
R-squared	0.566251	Mean dependent var		-0.000175
Adjusted R-squared	0.558772	S.D. dependent var		0.550904
S.E. of regression	0.365938	Akaike info criterion		0.860058
Sum squared resid	7.766805	Schwarz criterion		0.929870
Log likelihood	-23.80174	Hannan-Quinn criter.		0.887365
F-statistic	75.71781	Durbin-Watson stat		1.942154
Prob(F-statistic)	0.000000			

Regression Analysis is done by taking Nifty Spot Index as dependent variable and Futures Index as independent variable by using GARCH (1, 1) model. The equation used for Regression Analysis is “LSCLOSING = C + LFCLOSING” where LSCLOSING is dependent variable, C is constant and LFCLOSING is independent variable.

To find out the impact of Futures Index volume on Nifty Spot Index the Regression Analysis is done by taking Nifty Spot Index as dependent variable and Futures Index volumes as independent variable by using GARCH (1,1) model. The equation used for Regression Analysis is “LSCLOSING C LFVOLUME” where LSCLOSING is dependent variable, C is constant and LFVOLUME is independent variable.

Table 13: Impact of Futures Volume on Nifty Spot Index

Dependent Variable: LSCLOSING				
Method: ML - ARCH (Marquardt) - Normal distribution				
Date: 12/15/11 Time: 12:41				
Sample (adjusted): 1 62				
Included observations: 62 after adjustments				
Convergence achieved after 22 iterations				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	8.761015	0.005075	1726.234	0.0000
LFVOLUME	-0.018179	0.000464	-39.20734	0.0000
Variance Equation				
C	7.85E-05	6.93E-05	1.132650	0.2574
RESID(-1)^2	0.935513	0.518107	1.805636	0.0710
GARCH(-1)	-0.015634	0.226274	-0.069093	0.9449
R-squared	0.784340	Mean dependent var		8.561424
Adjusted R-squared	0.780746	S.D. dependent var		0.056145
S.E. of regression	0.026289	Akaike info criterion		-5.024697
Sum squared resid	0.041468	Schwarz criterion		-4.853154
Log likelihood	160.7656	Hannan-Quinn criter.		-4.957345
Durbin-Watson stat 0.271789				

The coefficient of LFVOLUME shows that there is indirect relationship between Futures Index volume and Nifty Spot Index. As the Durbin Watson Statistic is less than 2, it indicates that there is evidence of positive serial correlation. This means that volume traded in Futures is having impact on Nifty Spot. From the analysis it is clear that not only Futures Index but also Futures volume is having impact on Spot Price.

CONCLUSION

From the analysis, it can be concluded that after the introduction of derivatives, the trading volume in the market has increased bringing liquidity to the market. The changes in Futures Price of securities result in increase in Spot Price. This indicates that Futures market is having influence on Spot Market. But the change in Index is having impact on not only Spot Price but also on Futures Price. This means that the change in price is mainly due to changes in Index rather than changes in Futures Price. The standard deviation in prices is more before derivatives than standard deviation after derivatives. This means that volatility has come down after introduction of derivatives. The open interest in derivatives is having impact on Spot Price. Therefore, close monitoring on open interest is essential. The analysis also shows that Futures Index Price and volume is having impact on Nifty Spot. This shows interconnectivity of market.

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