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**JOURNAL AND OTHER ARTICLES**

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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**A STUDY ON RETURNS AND VOLATILITY OF FMCG AND IT SECTORS OF NIFTY**

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**ABSTRACT**

*This paper is a modest attempt to dwell on the returns and volatility of the Fast Movers Consumer Goods (FMCG) and Information Technology (IT) sectors of Nifty, during pre and post recession period. FMCG and IT indices are constructed using index construction methodology of Nifty companies for a period of 12 years. Analysis of data is made by taking daily log returns of the indices, with the help of Mean, Skewness, Kurtosis, Jarque Bera Statistics, Standard Deviation, Co-efficient of Variation, Autocorrelation, Augmented Dickey Fuller-Unit Root Test, Auto Regressive Conditional Heteroskedasticity and its generalized form of Generalized Auto Regressive Conditional Heteroskedasticity. It is found that a significant difference in returns between the FMCG and IT sectors of Nifty, and also it found that the significance volatility clustering and volatility persistence between FMCG and IT indices of Nifty during pre and post recession period. It concluded that IT index is reported high volatility persistence during pre and post recession period whereas; the FMCG index is reported low volatility persistence. Investors have to give appropriate weight to the sectors to minimize the risk and maximize the return.*

**KEYWORDS**

recession, volatility persistence, heteroskedasticity.

**I. INTRODUCTION**

Understanding the dynamics of the Indian stock market may be of use to traders, investors and policy makers. The sector-based index is designed to provide a single value for the aggregate performance of a number of companies representing a group of related industries or a sector of the economy.<sup>1</sup> The index is based on a statistical compilation of the share prices of a number of representative stocks. These market indices are convenient gauges of the stock market that also indicate the direction of the market over a period of time. This segmentation tends to put companies with similar operating characteristics and industry fundamentals into the same sector. The economic cycle and interest rate environment also tend to impact companies of a given sector in a similar manner. These factors cause the performance of sectors to vary significantly—relative to the market as a whole, and to other sectors. Companies are classified based upon the nature of their major business line and tend to remain in their sector. Volatility of stock returns/Index returns have been mainly studied with the help of Autoregressive Conditional Heteroskedasticity (ARCH) model and its generalized form (GARCH).

The Great Recession<sup>2</sup> which started in December of 2007 in the US had substantial negative impact on the world economy. On account of the Great Recession, the SENSEX and Nifty tumbled from more than 20,000 and 6000 points in Dec 2007 to little over 8000 and 2600 points in March 2009 respectively. In this study, it is proposed to analyze the changes in FMCG and IT indices of Nifty during the pre and the post-recession period.

**II. REVIEW OF LITERATURE**

Several research studies have been undertaken on stock market return and volatility in India. However, their results have been mixed in nature and at certain time contradictory with each other. Some of the major studies and their summarized findings are as follows:

Engle (1982)<sup>1</sup> “Autoregressive Conditional Heteroskedasticity with estimates of the variance of United Kingdom inflation” designed the autoregressive conditional Heteroskedasticity i.e. ARCH model to estimate the mean and variance of inflation in the United Kingdom. The author found that the ARCH effect is significant and useful in estimating the volatility more accurately.

De Santis and Imrohorglu (1997)<sup>2</sup> “Stock Returns and Volatility in Emerging Financial Markets” Study focused on the emerging markets relationship between stock return and volatility, they found that there is high level of volatility found in emerging stock markets as compared to developed markets. Conditional volatility is very high and the frequency is also higher for the large price changes i.e. fat tails for emerging markets. In another set of model, they relaxed the assumption of full market segmentation and observed the relationship between expected return and market risks; they also found that the liberalization is not beneficial for all types of countries and it may lead to the increase in volatility of domestic stock market of emerging nations.

Robert Engle (2001)<sup>3</sup> in his paper “The Use of ARCH/GARCH Models in Applied Econometrics” presented an example of risk measurement that could be the input to a variety of economic decisions. He analyzed the ARCH and GARCH models and their many extensions.

M.T. Raju, Anirban Ghosh (SEBI Working Paper)(2004)<sup>4</sup> in the paper on Stock market Volatility- An International Comparison found that the daily average return and daily volatility across markets vary over time and space. Their divergencies are highly demonstrable. Some countries (US) provide as high as 0.04 percentage return while some of the emerging markets such as Indonesia recorded negative returns of -0.01 percentages. India is a bright spot. In the sample period Indian investors obtained as high as 0.04 percentage return with a moderate volatility of 1.89percent Volatility or rather the lack of it.

Hourvouladiades (2007)<sup>5</sup> studied the Athens FTSE 20 index futures contract data to understand the volatility forecasting ability of various models. The basic objective of the study is to gain an insight into the stylized facts such as volatility clustering, leverage effects for domestic derivative market in Greece. The various models which were analyzed in terms of their forecasting abilities were simple regression, single exponential smoothing, holt-Winter’s multiplicative smoothing, GRACH (1.1) and EGARCH (1.1) models. The data analysis showed that the return is normally distributed and it showed the presence of volatility clustering. The forecasting ability of exponential smoothing was found to be superior to the GARCH models.

Arindam Mandal and Prasun Bhattacharjee (2012)<sup>6</sup> in their study on “The Indian stock market and Great Recession” found a substantial change in behavior of the SENSEX following the outbreak of the recession. Prior to the Great Recession, the Indian market was characterized by positive daily returns, but such returns turned negative after the recession. But they did not find any significant statistical difference between the pre and post-recession daily mean returns. Major changes were observed in terms of volatility of returns.

<sup>1</sup> <http://www.nseindia.com/products/content/equities/indices/indices.htm>2014

<sup>2</sup> Arindam Mandal and Prasun bhattacharjee article titled “The Indian Stock Market and the Great Recession” published in “Theoretical and Applied Economics” Volume XIX 2012 No. 3(568) pp, 59-76, USA.



P. Bhanu Sireesha (2014)<sup>7</sup> "Volatility on the Indian Stock Market a Study", the sample return series was estimated through GARCH (1, 1) model. On the whole, the analysis of 20 year data starting from January 1993 to December 2012 established two phases in volatility in Nifty, namely, the boom and subsequent crash of the Indian stock market during 1999-2000 and the subprime financial crisis that cropped up across the globe during 2008-2009. The 28 day persistence in volatility of Nifty return series indicates that volatility in the Indian stock market reacts intensely to the market movements and takes long time to die out the shocks it faces from the market movements. Examine the impact of select macro economic Variables on stock, gold and silver returns by using linear regression technique.

### III. PERIOD OF STUDY

The study covers a time period of twelve years from 2002 to 2014. Pre recession period is from 1-4-2002 to 24 -10- 2008, (Nifty melt down above 13% on 23/10/2008 is a cut-off date for pre and post period) post recession period is from 27-10-2008 to 31-03-2014

### IV. SCOPE OF THE STUDY

The study is restricted to the NSE listed companies which are part of CNX Nifty50 of FMCG and IT companies only

### V. RESEARCH GAP

Stock market returns and volatility and its comparison over the world stock markets have been analyzed by many studies. Some of the studies were focused on the impact of financial crisis on major stock indices in terms of return and volatility by applying various models of econometrics. Few studies in respect of returns and volatility of sectoral Indices are found but they are unique in nature whereas, in this study analyses of FMCG and IT indices of Nifty. These indices are constructed by using listed companies of Nifty, which are representing the FMCG and IT sectors, by applying stock index construction methodology. This study breaks up into pre and post-recession period for the purpose of analysis of returns and volatility of returns over the time span of 2002 to 2014. This becomes a comprehensive study in the perspectives of time and factor.

### VI. NEED FOR AND IMPORTANCE OF THE STUDY

Stock market volatility has been a major cause of concern for policy makers, investors and academia throughout the world, especially for the last two decades. The global economic slowdown, the US real estate decline, the credit crisis and the reversal in the resource trend created a great deal of turbulence and worry in the capital markets. Hence, volatility plays a significant role in determining a portfolio's compound return, which ultimately affect the value of the portfolio. Sector exposure has been a major determinant of stock market returns, and is widely considered the second-largest return factor, after individual security selection. Also sectoral stock indices provide a yardstick, with which investors can compare the performance of their individual stocks pertaining to that sector. Thus, thorough analysis of FMCG and IT sector fundamentals is important for determining the potential for outperformance. This includes valuation analysis that looks at whether a sector is outperformed or underperformed, and expensive or cheap relative to its own history, and relative to other sectors. So the study is aimed at a detailed analysis of the sectoral FMCG and IT indices of the Nifty, to find out the returns and the risk associated with the sectors. IT sector is highly sensitive for the global factors as well, and FMCG sector is not much sensitive as IT sector, because it is defensive in nature. Hence, study evaluates current level of volatility in historical perspective and examines the various themes of volatility involved in the sectoral of FMCG and IT indices of Nifty at pre and post recession period. The findings of this study have important implications for the securities analysts, equity investors and market regulators

### VII. STATEMENT OF THE PROBLEM

However, returns and volatility may have important consequences for investors and policy makers if the same increases, investors may equate greater risk with higher volatility and may alter their investment decisions due to increased volatility. In this context the following question emerge

- What is the pattern of returns of FMCG and IT indices of Nifty?
- What is the pattern of volatility of FMCG and IT indices of Nifty?

### VIII. OBJECTIVES OF THE STUDY

The objectives of the study are:

1. To study the returns of FMCG and IT indices of Nifty during pre and post-recession period
2. To examine the Volatility of FMCG and IT Indices of Nifty using GARCH(1,1) Model during pre and post-recession period

### IX. HYPOTHESES

In order to ascertain the objectives of the following hypotheses are formulated and tested

#### Objective-I

- H01= There is no significant difference in the returns of FMCG and IT indices of Nifty

#### Objective -II

- H02= There is no significant difference in Volatility FMCG and IT indices of Nifty.
- H03= There is no significant leverage effect of FMCG and IT indices of Nifty
- H04= There is no significant volatility clustering of FMCG and IT indices of Nifty

### X. DATA SOURCE AND METHODOLOGY

The present study is analytical in nature and relies mostly on secondary data. It is based on the closing time series data Nifty companies of NSE. The study covers a period of 12 years from 2002 to 2014 covering both pre (2002 to 2008) and post-recession period (2008 to 2014). The required data will be collected from the NSE Fact Book year wise and NSE website. The total time period of the study covers the time span from April, 2002 to March 2014, it is divided into two parts for the purpose of analysis. The first part starts from April, 2002-03 to 24-10-2008 and 27-10-2008 to 31-3-2014 which is in sample period and it is used to estimate the various parameters of volatility. The data is collected in daily frequency. The time span spread over 12 years and it covers not only 2008 financial crises but also some years before and after the financial crises. The daily data series has 3000 observations for the all companies FMCG and IT companies of listed in Nifty.

#### Price Index Calculations Formula

Market Capitalization = Equity Capital \* Price

Free Float Market Capitalization = Equity Capital \* Price \* IWF

Index Value = Current Market Value / Base Market Capital \* Base Index Value (1000)

#### The logarithmic return

$$R_{t+1} = \ln \left( \frac{P_{t+1}}{P_t} \right) = \ln(P_{t+1}) - \ln(P_t)$$

Variance: the variance is equal to the second moment about mean. Thus, we can state that the equation represent variance is

$$\sigma^2 = \frac{\sum(X - \bar{X})^2}{N - 1}$$

$\sigma^2$ =Variance

**Skewness**

$$\beta_1 = \frac{\mu_3^2}{\mu_2^3}$$

Where  $\mu_3$  is the third moment about mean and  $\mu_2$  is the second moment about the mean. It can tell us whether the distribution is symmetrical or not.

**Autocorrelation coefficient**  $\rho(k) = \frac{cov(r_t, r_{t-k})}{var(r_t)}$

Where  $\rho(k)$  is the autocorrelation coefficient of the time series, and  $r_t$ , and  $r_{t-k}$  are the logarithmic return at time t and t-k where k is the lag of the period.

GARCH Model: Mean equation

$$r_t = \gamma + \epsilon_t$$

Where  $\gamma$  is a constant,  $\epsilon_t$  is conditional on the past information set and with time varying variance term and further assumption is that it follows normal distribution.

Variance equation

$$\sigma_t^2 = \omega + \sum_{i=1}^p \alpha_i \epsilon_{t-i}^2 + \sum_{j=1}^q \beta_j \sigma_{t-j}^2$$

Where,  $\sigma_t^2$  is the conditional variance,  $\epsilon_{t-i}^2$  is the previous days squared error and  $\sigma_{t-j}^2$  is the previous time period volatility.

**XI. ANALYSIS, DISCUSSION AND FINDINGS**

**FMCG INDEX OF NIFTY**

From the Table 1 presents the summary statistics for the daily Nifty based FMCG Index returns for the pre and post recession outbreak period. The mean return during the pre recession period is lower than the post recession and study period. Mean return of post recession period is higher than pre recession period and even entire study period. It resembles that FMCG Index is slightly affected by recession signals in times of recession period. Whereas, in the times of relatively stable economic conditions i.e. post recession period it is reported higher return. Even in economic booms and busts for study period. Nifty based Pharma Index is posted good return it is higher than pre recession period return, and lower than post recession period. Maximum return per day and maximum loss per day at pre recession period are lower than the post recession period that is why the FMCG Index is called the defensive sector because this Index is merely affected by the recession shocks, when we compare to Nifty50 (-13.43)<sup>3</sup>. Volatility of the returns as measured by standard deviation is more during pre recession period rather than post recession period. The coefficient of Variation is also more during pre recession period than the post recession and also study period. It indicates that more risk and volatility in returns is associated during pre recession period, that the volatility in return is muted by recession shocks. In the long run FMCG Index is nullifying the recessionary effect that is proved by above statistics of study period. It is a result of risk return trade-off between two periods. We reject null hypothesis that the returns of Pharma Index are not normally distributed, for both the pre and post recession period. The same fact is observed in Jarque-Bera test where the null hypothesis of normality is rejected for all the series as it viewed by observing the zero p-values for all the series. It also reported the skewness in Table 1 in order to shed light on the asymmetry of the probability distribution of the FMCG Index, return is negatively skewed during pre and post recession periods. The spread of the distribution of returns as measured by Kurtosis declines slightly in the post recession period. Higher Kurtosis would imply fatter tail, and thus higher risk because of higher probability of observing an extreme event. Sum of the total accumulated returns of this Index is posted during pre recession period, is lower than the post recession period, for the study period it is posted 252 per cent (See Table 1)

**TABLE 1: FMCG INDEX OF NIFTY AT DIFFERENT PERIODS**

FMCG Index	Pre-recession period (1-4-2002 to 24-10-2008)	Post-recession period (27-10-2008 to 31-3-2014)	Total Period (2002-2014)
Mean	0.068021	0.103911	0.084163
Median	0.002	0.054391	0.031171
Maximum	15.69626	9.347645	15.69626
Minimum	-10.9644	-7.02427	-10.96443
Std. Dev.	1.771375	1.432136	1.627402
Coefficient of Variation	26.04	13.78	19.33
Skewness	0.36905	0.352234	0.362935
Kurtosis	9.456429	6.058873	8.927987
Jarque-Bera	2901.571	553.4091	4454.031
Probability	0	0	0
Sum	112.1658	140.0715	252.2373

Source: Compiled Data Analysis

**IT INDEX OF NIFTY**

Table 2 presents the summary statistics for the daily Nifty based IT Index returns for the pre and post-recession outbreak periods. The mean return during the pre-recession period is lower than the post-recession and study period also. Whereas, Mean return of post-recession period is higher than pre-recession period and even study period. It resembles that IT Index is tuned by economic crisis during recession period. Whereas, in the times of relatively stable economic conditions i.e. post-recession period, it is reported higher return. Even in economic booms and busts for the total study period IT Index is posted normal return, it is higher than pre-recession period return and lower than post-recession period. Maximum return per day during pre-recession period is lower than the post-recession period and maximum loss per day during pre-recession period is more than the post-recession period, that the sector is strongly affected by the recession shocks while compare to Nifty50 (-13.43)<sup>4</sup>. Volatility of the returns as measured by standard deviation is more during pre-recession period rather than post-recession period. The coefficient of Variation is also more at pre-recession period than the post-recession and also study period. It indicates that more volatility in returns is associated during pre-recession period. Volatility in return is muted by recession shocks. Moreover, in the long run effects of economic busts are nullified, that is proved by above statistics of study period. It is a result of risk return trade-off between two periods. The Jarque Bera test clearly fails to accept the null hypothesis of normally distributed daily IT Index return, for both the periods of pre and post-recession. It also reported the Skewness in Table 2 in order to shed light on the asymmetry of the probability distribution of the Nifty based IT Index return is negatively skewed, in the pre and post-recession periods. The spread of the distribution of returns, as measured by Kurtosis declines slightly in the post-recession period. Higher Kurtosis would imply fatter tail and thus higher risk because of higher probability of observing an extreme event. Sum of the accumulated log returns for the period of pre recession is posted lower than the post recession period, and the entire study period posted 191 per cent. (See Table 2)

<sup>3</sup>[http://www.nseindia.com/products/content/equities/indices/historical\\_index\\_data.htm](http://www.nseindia.com/products/content/equities/indices/historical_index_data.htm) 23/10/2008 and 24/10/2008 of Nifty

<sup>4</sup>[http://www.nseindia.com/products/content/equities/indices/historical\\_index\\_data.htm](http://www.nseindia.com/products/content/equities/indices/historical_index_data.htm) 23/10/2008 and 24/10/2008 of Nifty

TABLE 2: SUMMARY STATISTICS OF IT INDEX OF NIFTY

IT Index	Pre-recession period (1-4-2002 to 24-10-2008)	Post-recession period (27-10-2008 to 31-3-2014)	Total Period (2002-2014)
Mean	0.042664	0.08984	0.063883
Median	0.04947	0.090565	0.065128
Maximum	10.5107	12.3866	12.3866
Minimum	-28.1396	-15.8202	-28.13963
Std. Dev.	2.240162	1.815261	2.059727
Coefficient of Variation	52.50	20.20	32.24
Skewness	-1.18538	-0.59192	-1.027776
Kurtosis	20.19695	14.74359	19.56386
Jarque-Bera	20705.65	7824.764	34788.54
Probability	0	0	0
Sum	70.35347	121.1046	191.4581
Observations	1649	1348	2997

Source: Compiled Data Analysis

**STEPS USED FOR GARCH (1, 1) MODEL**

- Test of Stationarity -ADF- Augmented Dickey-Fuller Unit Root Test
- Test of Autocorrelation of squared residuals
- Volatility clustering and Leverage effect
- ARCH Effect
- Application of GARCH (1,1) model to estimate volatility

**TEST OF STATIONARITY**

The series is non-stationary in the presence of unit root in the series. This unit root can be tested by using Augmented Dickey Fuller (ADF) test. The null hypothesis of unit root representing non-stationarity is rejected for all Sectoral Indices using ADF test where p-value is close to zero in all cases as reported (Table 3). All series are stationary and we can proceed further to the next step is to find out presence of Heteroskedasticity in the series

TABLE 3: TEST FOR STATIONARITY: NIFTY BASED SECTORAL INDICES DAILY DATA

ADF- Augmented Dickey-Fuller Unit Root Test						
Null Hypothesis: Indices are unit root						
Name of the Indices	Pre recession Period		Post recession Period		Total Period	
	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*
FMCG Index	-41.24779	0.0	-37.75	0.001	-56.11469	0.001
IT Index	-30.8677	0.0001	-27.899	0.0001	-41.71297	0.0
Test critical values:	1% level		-3.4323			
	5% level		-2.8623			
	10% level		-2.5672			

Source: Compiled Data Analysis

From the Table 3 is exhibited ADF- Augmented Dickey-Fuller Unit Root Test result using E-views software that the Nifty Based sectoral indices at pre and post recession period. Here we reject the Null hypothesis because the t-statistic value of all series are more than the test critical value at all levels and the corresponding p-value at all the levels of 1%, 5% and 10% are showing less than 5 per cent, so we reject the Null hypothesis that Indices are unit root meaning that we fail to accept all series are Non-Stationary. Hence, we accept the Alternative hypothesis at all the levels of 1%, 5% and 10% that Indices are not in unit root, as the t-statistic p-value is less than 5 per cent so we conclude that all the series are Stationary so we can proceed further

**Volatility clustering and Leverage effect of sectoral Indices of Nifty for 12 years**

**Volatility Clustering:** It means large return changes are followed by large changes and small changes are followed by small changes

**Leverage Effect:** The conditional variance responds to the positive and negative shocks asymmetrically, higher volatility is observed after negative shocks

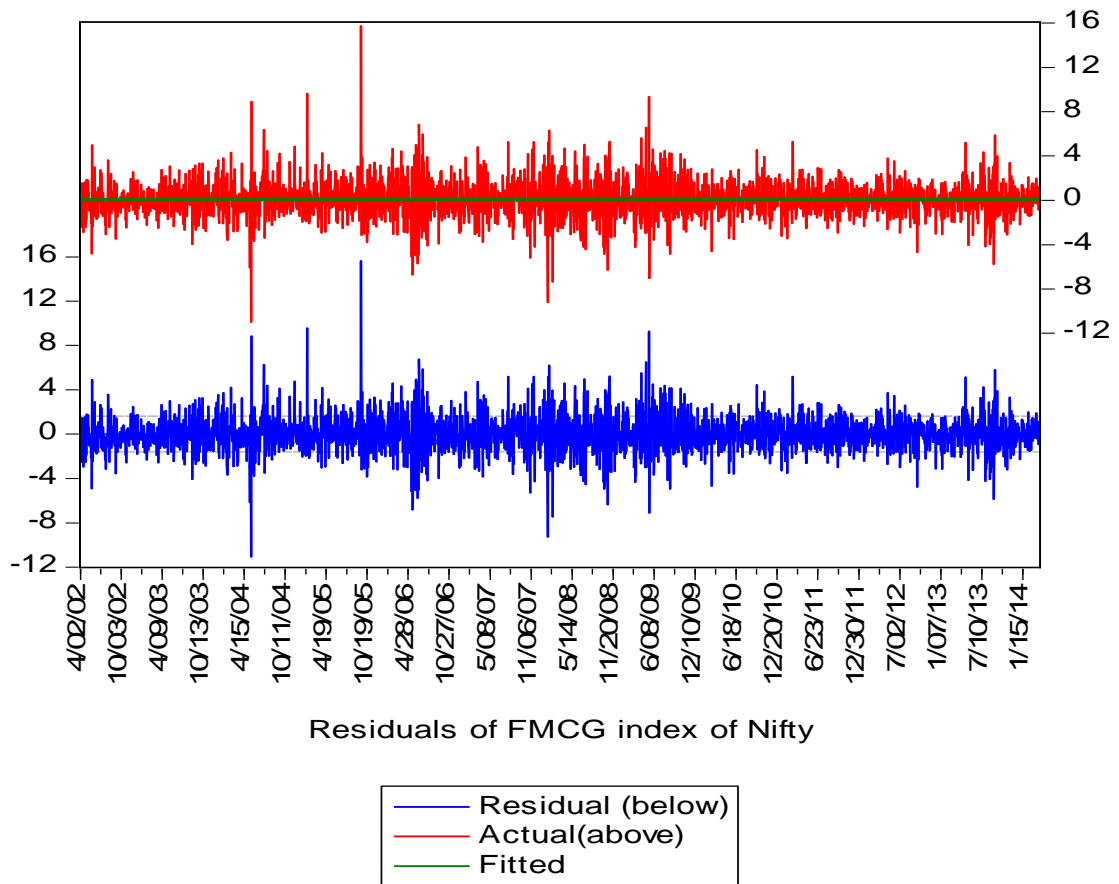
**FMCG INDEX OF NIFTY**

TABLE 3.1: NIFTY BASED FMCG INDEX- AUTOCORRELATION OF SQUARED RETURNS

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
*	*	1	0.198	0.198	118.15	0
*		2	0.106	0.07	152.07	0
*		3	0.104	0.074	184.4	0
*		4	0.099	0.063	213.89	0
*		5	0.088	0.049	237.4	0

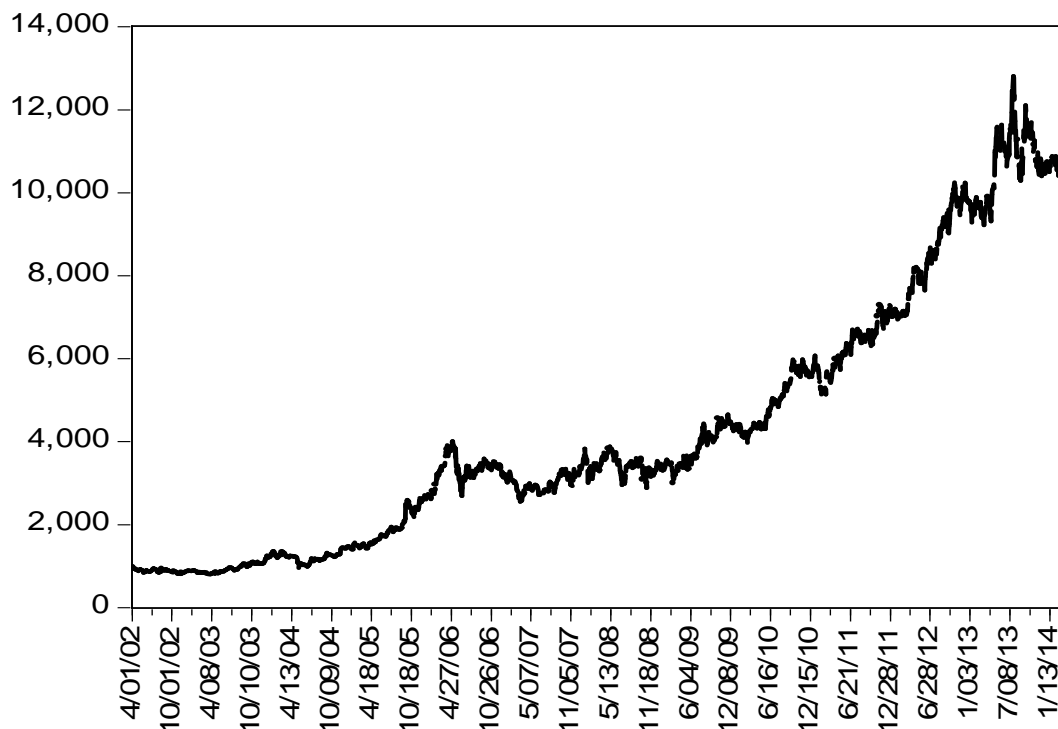
Source: Compiled Data Analysis

FIGURE 1



GRAPH 1

Nifty Based FMCGs Index- Daily Value



The significant autocorrelation is found in all cases for squared returns computed up to 5 lags as shown in Table 3. The five lags are chosen because the series is being analyzed daily, and it has five working days in week. Taking the data beyond five days would not make any meaningful interpretation of the results. All the asterisk marks are placed right side of the straight line; it indicates that the squared residuals are positively correlated. These autocorrelations are all positive for the week it is a strong indication of volatility clustering. It means high volatility is followed by high volatility and low volatility is followed by low volatility. It see from figure 1 that there is prolonged period of high volatility from 2007 to 2009, and also there exist a prolonged period of low volatility from 2009 to mid of 2014. In other words, period of low volatility is followed by period of low volatility and period of high volatility tend to be followed by period of high volatility. The volatility is higher after negative shocks as compared to the situation of positive shocks is nothing but leverage effect that is reflect in Graph 1. The above Graph 1 and Figure 1 are shown together to the movement of Index price, and Index return changes, that are helpful to study the effect of price rise and fall on level of volatility. This suggests that residuals or error term is conditionally heteroskedasticity, and it can be represented by ARCH and GARCH Model

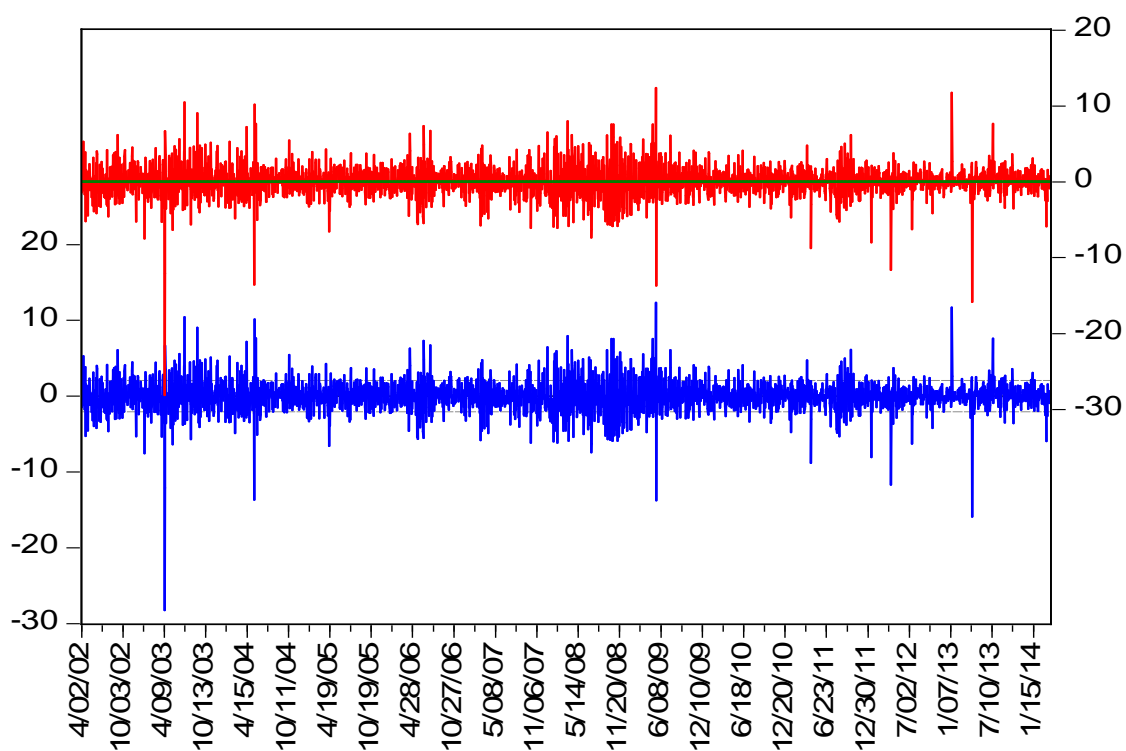
IT INDEX OF NIFTY

TABLE 4: NIFTY BASED IT INDEX- AUTOCORRELATION OF SQUARED RETURNS

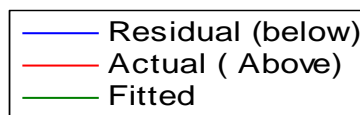
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
*	*	1	0.19	0.19	108.54	0
		2	0.06	0.025	119.43	0
		3	0.022	0.007	120.94	0
		4	0.031	0.025	123.89	0
		5	0.028	0.017	126.26	0

Source: Compiled Data Analysis

FIGURE 2

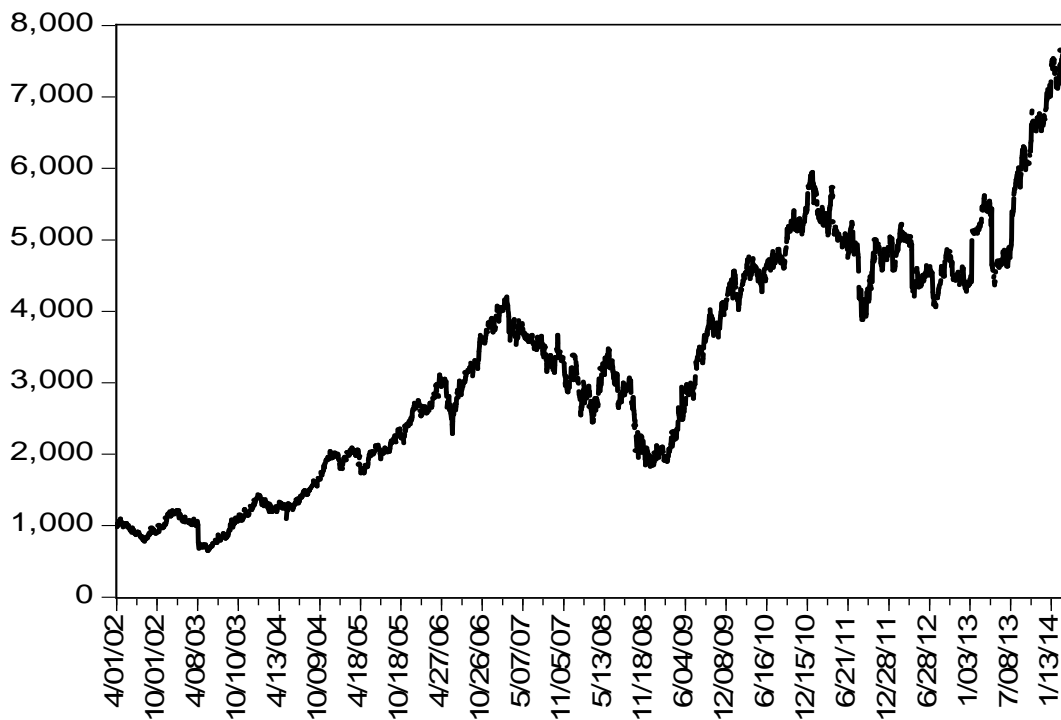


Residuals of IT index of Nifty



GRAPH 2

Nifty Based IT Index- Daily Value



The significant autocorrelation is found in all cases for squared returns computed up to 5 lags as shown in Table 4. The five lags are chosen because the series is being analyzed daily, and it has five working days in week. Taking the data beyond five days would not make any meaningful interpretation of the results. All the asterisk marks are placed right sided of the straight line; it indicates that the squared residuals are positively correlated. These autocorrelations are all positive for the week it is a strong indication of volatility clustering. It means high volatility is followed by high volatility and low volatility is followed by low volatility. We see from figure 2 that there is prolonged period of high volatility from 2007 to 2009, and also there exist a prolonged period of low volatility from 2009 to mid of 2014. In other words, period of low volatility is followed by period of low volatility, and period of high volatility tend to be followed by period of high volatility. The volatility is higher after negative shocks, as compared to the situation of positive shocks is nothing but leverage effect that is reflect in Graph 2. The above Graph 2 and Figure 2 are shown together to the movement of Index price, and Index return changes, that are helpful to study the effect of price rise and fall on level of volatility. This suggests that residuals or error term is conditionally heteroskedasticity, and it can be represented by ARCH and GARCH Model

**ARCH EFFECT**

**TEST OF THE PRESENCE OF HETEROSKEDASTICITY IN SELECTED ARMA MODELS**

The autoregressive Conditional Heteroskedasticity- test is used to test the heteroskedasticity. Here the null hypothesis is of no ARCH effect, it means homoscedasticity. The results as shown in table 5 exhibit the presence of heteroskedasticity in the residuals of ARMA Model for the all sectoral Indices. The t-statistics, and the Observed R squares probability is showing the zero meaning that, all the sectoral indices are rejected the null hypothesis and accept the alter native hypothesis that the presence of heteroskedasticity in sectoral indices returns

TABLE 5

Heteroskedasticity Test:		ARCH						
Null Hypothesis: There is no ARCH effect								
Name of the Indices	Pre recession Period				Post recession Period			
	f-Statistic	Prob.*	Obs*R-squared	Prob. Chi-Square(1)	f-Statistic	Prob.*	Obs*R-squared	Prob. Chi-Square(1)
FMCG Index	57.01	0.0011	55.17	0.0045	80.14	0.0015	75.74	0.0026
IT Index	62.99	0.0004	60.74	0.0026	40.50	0.00012	39.38	0.0011

Source: Compiled Data Analysis

As reported in the table 5 that the F-statistics is significant for all the indices at 5% as well as 1% level of significance. Thus we reject the null hypothesis of no ARCH effects for all the indices. The presence of ARCH effects means that the series is heteroskedasticity and we should use the GARCH model to estimate the volatility for various indices as this model is capable of capturing volatility clustering.

**GARCH (1, 1) MODEL FOR NIFTY BASED SECTORAL INDICES AT PRE AND POST RECESSION PERIOD**

When the assumption of homoscedasticity is violated it is appropriate to use the model of volatility which takes into consideration time varying feature of volatility, one such model is GARCH model. ARCH Model daily data-Pre recession period 1649 observations and Post-recession period observations are 1348 Total observations are 2997

$$GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)$$

all indices are significant at 5% level of confidence

**FMCG INDEX OF NIFTY**

TABLE 6: GARCH MODEL OUTCOME

Nifty Based FMCG	Pre recession period			Post recession period		
	ARCH	GARCH	Volatility persistence	ARCH	GARCH	Volatility persistence
FMCG Index	0.21474*	0.66903*	0.883785	0.065222*	0.89848*	0.96371

Source: Compiled Data Analysis

Pre recession period the ARCH term coefficient 0.214746 and the GARCH term coefficient is 0.669039 it shows high persistence. The sign of both the coefficients is positive as require by GARCH model. The most of the information (66.90%) comes from the previous day's volatility. The sum of the above two coefficient is 0.883785, the closer the sum of parameters to the unity, the greater is the volatility persistence

Post recession period the ARCH term coefficient 0.065222 and the GARCH term coefficient is 0.898488 it shows high persistence. The sign of both the coefficients is positive as require by GARCH model. The most of the information (89.84%) comes from the previous day's volatility. The sum of the above two coefficient is 0.963710, the closer the sum of parameters to the unity, the greater is the volatility persistence

**IT INDEX OF NIFTY**

**TABLE 7: GARCH MODEL OUTCOME**

Nifty Based IT	Pre recession period			Post recession period		
	Name of the Index	ARCH	GARCH	Volatility persistence	ARCH	GARCH
IT Index	0.16780*	0.8130*	0.980874	0.32326*	0.54358*	0.866844

Source: Compiled Data Analysis

\*=Indicates that significant at 5 per cent level of confidence

Pre recession period the ARCH term coefficient 0.167806 and the GARCH term coefficient is 0.813068 it shows high persistence the sign of both the coefficients is positive as require by GARCH model. The most of the information (81.30%) comes from the previous day's volatility. The sum of the above two coefficient is 0.980874, the closer the sum of parameters to the unity, the greater is the volatility persistence

Post recession period the ARCH term coefficient 0.323261 and the GARCH term coefficient is 0.543583 it shows high persistence. The sign of both the coefficients is positive as require by GARCH model. The most of the information (54.35%) comes from the previous day's volatility. The sum of the above two coefficient is 0.866844, the closer the sum of parameters to the unity, the greater is the volatility persistence

**RISK RETURN RELATIONSHIP BETWEEN FMCG AND IT INDICES OF NIFTY**

Table 8 exhibits that pre recession period FMCG Index log return per day is higher than the IT Index, during post recession period FMCG index of Nifty is reported more return than the IT index of Nifty. Volatility persistence of IT Index is more during pre recession period than the FMCG Index, but in the post recession period IT index is reported lower volatility persistence in the relative stable economic period than the FMCG index. Whereas, IT Index reported Standard Deviation is higher than the FMCG Index under both the conditions it resembles that the IT Index have more risk than FMCG index. During pre and post recession periods IT index reported higher fluctuations as higher Coefficient of Variation, It clears that IT Index higher volatile than FMCG Index, but in the long run, log returns of the FMCG index reported more than the IT index of Nifty, it clears that there is significant difference in returns between FMCG and IT sectors of Nifty. Hence, it rejects the null hypothesis. (see table 8)

**TABLE 8: SUMMARY STATISTICS OF FMCG AND IT INDICES**

Name of the sector	Pre recession				Post recession			
	Volatility Persistence (GARCH)	S.D	Mean return	C.V	Volatility Persistence (GARCH)	S.D	Mean Return	C.V
FMCG Index	0.883785	1.771	0.068021	26.04	0.96371	1.43	0.103911	13.78
IT Index	0.980874	2.240	0.042664	52.50	0.866844	1.815	0.08984	20.20

S.D= Standard Deviation, C.V= Coefficient of Variation, GARCH=GARCH and ARCH terms

Source: Compiled Data Analysis

**XII. CONCLUSION AND SUGGESTIONS**

The main goal of investment analysts is to manage the risk of investment, which requires a better understanding, measurement and forecasting of risk. It depends on a suitable volatility model that can forecast volatility accurately and give a scope to set off the risk. The study concludes that financial crisis were severely affected the IT Index but not FMCG index as such. At the end it can be asserted that investors should give proportionate weight to the industry to their investment for minimizing risk and maximize the return under the recession time by diversifying funds among sectors to hedge the risk.

**XIII. SCOPE FOR FURTHER STUDY**

Research is a continuous process. It is a never ending process. In other words, no research study is considered complete as new developments occur, new policies have a bearing, new ways of looking at the same objects emerge, and new tools of analysis emerge impacting the way research is conducted. Hence, there will always be a scope for further study in the same theme or problem. In the course of conducting the research, it was realized there are areas where further research could be conducted.

They are:

1. An attempt could be made to compare the sectoral indices of Nifty with other country sectoral indices
2. The impact of volatility spillovers, leverage effect, contagion effect may be taken up for a closer analysis by taking the macroeconomic indicators.
3. The impact of FIIs on sectoral indices can be taken up as an independent study
4. A scrip level analysis, inter sector analysis and inter market analysis may be useful to capture specific influences

**XIV. LIMITATIONS**

1. This study pertains to Nifty listed companies only
2. Factors that are external to the companies (uncontrollable) such as IIP, Bank Rate, Inflation Rate, Currency Rate, GDP Rate etc., and Factors which are internal to the companies (Controllable) such as fundamentals of the company are not considered in this study.
3. The analyses were based on the secondary data any limitations pertaining to them would significantly affect the accuracy of the results.
4. The pattern of return and volatility of sectoral stock indices of Nifty in India is studied only for the pre and post recession period 2002 to 2014

**REFERENCES**

1. Engle, R.F. "Autoregressive Conditional Heteroskedasticity with estimates of the variance of United Kingdom inflation" *Econometrica*, 1982 page no. 987-1008.
2. De Santis, G.D and Imrohorglu. S "Stock Returns and Volatility in Emerging Financial Markets" *Journal of International Money and Finance*, 1997: page no.561-579.
3. Robert Engle "The Use of ARCH/GARCH Models in Applied Econometrics" *Journal of economic perspectives*-Volume 15, Number 4- fall 2001- Pages 157-168.
4. M.T. Raju, Anirban Ghosh " Stock market Volatility- An International Comparison" SEBI WORKING PAPER-2004
5. Hourvoulades, L.N. "Clustering in the Greek Futures Market: Curse or Blessing?" *international Journal of Finance and Economics*, 2007: 41-52.
6. Arindam Mandal and Prasun Bhattacharjee "The Indian Stock Market and the Great Recession". *Theoretical and Applied Economics* Vol. XIX 92012), No. 3(568). Pp. 59-76.
7. P. Bhanu Sireesha (2014) "Volatility on the Indian Stock Market a Study", Ph.D thesis submitted to Department of Commerce, Osmania University, Hyderabad
8. NSE Website- nseindia.com
9. <http://shodhganga.inflibnet.ac.in/mydspace>

APPENDIX

**TABLE 9: FMCG COMPANIES REPRESENTING TO NIFTY**

Name of the Sector	Year	Companies represented to CNX NIFTY			
FMCG	2002-03	BRITANIA		DABUR	
		DABUR		HUL	
		HUL		ITC	
		ITC			
	2003-04				DABUR
					HUL
		BRITANIA			ITC
		DABUR			DABUR
	2006-07		HUL		
			ITC	2009-10	HUL
			DABUR		ITC
			HUL		
2007-08		ITC	2010-11	HUL	
				ITC	
		HUL			
		ITC	2011-12	HUL	
2008-09				ITC	
			2012-13	HUL	
		HUL		ITC	
		ITC	2013-14	HUL	
				ITC	

**TABLE 10 PART 1: IT COMPANIES REPRESENTING TO NIFTY**

Name of the Sector	Year	Companies represented to CNX NIFTY			
IT INDEX	2002-03		2005-06		
		HCL TECH		HCL TECH	
		NIIT		INFOSYS	
		INFOSYS		SATYAM COMP	
		SATYAM COMP		TCS	
		WIPRO		WIPRO	
	2003-04			2006-07	
		HCL TECH		HCL TECH	
		INFOSYS		INFOSYS	
		SATYAM COMP		SATYAM COMP	
		WIPRO		TCS	
				WIPRO	
	2004-05				
		HCL TECH	2007-08		
		INFOSYS		HCL TECH	
		SATYAM COMP		INFOSYS	
		WIPRO		SATYAM COMP	
				TCS	
			WIPRO		

**TABLE 10 PART II: IT COMPANIES REPRESENTING TO NIFTY**

2008-09		2011-12	
	HCL TECH		HCL TECH
	INFOSYS		INFOSYS
	TCS		TCS
	WIPRO		WIPRO
2009-10		2012-13	
	HCL TECH		HCL TECH
	INFOSYS		INFOSYS
	TCS		TCS
	WIPRO		WIPRO
2010-11		2013-14	
	HCL TECH		HCL TECH
	INFOSYS		INFOSYS
	TCS		TCS
	WIPRO		TECH MAHINDRA
			WIPRO



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