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## RETURN AND VOLATILITY ANALYSIS OF THE INDIAN SECTORAL INDICES –WITH SPECIAL REFERENCE TO NATIONAL STOCK EXCHANGE

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### ABSTRACT

The Sector-based index is designed to provide a single value for the aggregate performance of a number of companies representing a sector of the economy. This study is an attempt to provide an empirical support to identify the volatility in sectoral indices and CNX Nifty index. The indices selected for the study are CNX Nifty index, CNX Auto index, CNX Bank index, CNX Energy index, CNX Finance index, CNX FMCG index, CNX Information Technology index, CNX Media index, CNX Metal index, CNX Pharma index, CNX PSU Bank index, and CNX Realty index for the period from January 2013 to June 2014. The study found that the correlation is significant for most of the indices except the CNX Metal index, CNX Pharma index, CNX PSU Bank index, and CNX Realty index and further found that the indices CNX Pharma index and CNX PSU Bank index have more impact on Nifty.

**KEY WORDS:** CNX Nifty, Sectoral Indices and Exponential Trend, Auto correlation.

**JEL Classification code:** G1, G11

### INTRODUCTION

Over the past two decades in India, a number of actions have been taken for economic liberalization. At the same time, large number of steps has been taken to toughen the stock market such as opening of the stock markets to worldwide

investors, policy, increased power of Securities Exchange Board of India (SEBI) and trading activities in derivatives. A stock market index is created by selecting a group of stocks that are representative of the whole market or a specified

sector or segment of the market. An Index is used to give information about the price movements of products in the financial, commodities or any other markets. Financial indices are constructed to measure price movements of stocks, bonds, T-bills and other forms of investments. Stock market indices are meant to capture the overall behaviour of equity markets.

### STATEMENT OF THE PROBLEM

The motives for introducing indices in India had been to contain the stock market volatility. There is an important issue of great concern and observation of the stock market volatility in the National Stock Exchange. This paper examines the response for the stock market volatility during the study period January 2013 to June 2014. The volatility has been done for the CNX Nifty indices during 10 days after the return values. The actual returns of the stock market are calculated with the expected closing price of the stock market. It attempts to present an analysis of the stock market volatility of the whole CNX Nifty and 11 Sectoral indices.

### REVIEW OF LITERATURE

- ▲ **Dr.G.Shanmugasundram and DJohn Benedict (2013)**, "*Volatility of the Indian sectoral indices- A study with reference to National Stock Exchange*" the study is an attempt to provide an empirical support to identify the risk factors in sectoral indices and CNX Nifty index and also to see the risk relationship in different time intervals. The results shows the two sample T-tests and one-way ANOVA between the subjects has been used to identify is there any differences in risk factor across the sectoral indices both the results show that there is no significant difference in the risk and the one-way ANOVA within the groups has used to identify is there any differences in risk by taking various time intervals and the results show that there is a significant difference of risk.

- ▲ **Dr.C.Nateson (et, al) (2013)**, "*Spillover Effect of Volatility in BSE Sensex on BSE Sectoral indices*" the study found that not much attention has been given on volatility transmission to the sectoral indices from the major indices, that has contributed to find the spillover effect of volatility in Sensex on BSE sectoral indices. It results in the study that there is volatility transmission from BSE Sensex to the select sectors. On the other hand shocks to the stock returns in BSE Sensex do not transmit to BSE power and BSE tech.

### OBJECTIVES OF THE STUDY

- ◆ To analyze the returns of S&P CNX Nifty index and its sectoral indices.
- ◆ To examine the level of volatility prevailing in S&P CNX Nifty index and its sectoral indices.

### SCOPE OF THE STUDY

This study is an attempt to provide an empirical support to the return factors across the sectoral indices and S & P CNX Nifty index. It attempts to cover the level of volatility from S&P CNX Nifty index and its sectoral indices.

### RESEARCH METHODOLOGY

#### ■ Sources of data:-

The present study is based on the secondary data. The data have been collected from daily reports of CNX Nifty and 11 Sectoral Indices through National Stock Exchange Official websites and Journals. The study period is from January 2013 to June 2014.

#### ■ Tools used for Analysis:-

For analyzing the data, the researcher has used Descriptive Statistics, Daily Return and Volatility, Auto Correlation and Exponential Trend.

• **Daily Return:-**

The return series for the indices selected for this study is first measured by the first difference of logarithm of respective indices. The return of any stock price index at time is calculated as:

$$R_t = \log(X_e) - \log(X_e - 1)$$

Where  $X_e$  and  $R_t$  denotes the closing value of stock price index and return respectively on the  $T^{th}$  day.

• **Volatility:-**

A statistical measure of the dispersion of returns for a given security or market index. Volatility can either be measured by using the standard deviation or variance between returns from that same security or market index. The higher the volatility, the riskier the security.

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (r_i - r)^2}{N - 1}}$$

Where N = Number of observation, r = return,  $r_i$  = return of period i.

• **Auto Correlation:-**

A mathematical technique, also called serial correlation, is the cross correlation of a signal with itself. Informally, it is the similarity between observations as a function of the time lag between them. It is often used in signal processing for analysing functions or series of values, time domain signals.

**LIMITATIONS OF THE STUDY**

The major limitations of the study are:

- ↗ The study is based on secondary data
- ↗ The study is applicable only to S&P CNX Nifty index and its sectoral indices.

**Table 1- Descriptive Analysis of CNX Nifty and Sectoral Indices**

	NIF RET	NIFVOL	AUTORET	AUTOVOL	BANKRET	BANKVOL	ENERGYRET	ENERGYVOL
Mean	0.000647	0.152278	0.000869	0.172131	0.000515	0.253696	0.000622	0.204309
Median	0.000622	0.141085	0.001377	0.162241	0.000684	0.239336	0.000230	0.185929
Maximum	0.037380	0.401558	0.058084	0.372512	0.090373	0.667779	0.053226	0.418260
Minimum	-0.041685	0.039583	-0.033356	0.055733	-0.059117	0.065242	-0.04526	0.064478
Std. Dev.	0.010443	0.063117	0.011594	0.061814	0.017528	0.105213	0.013774	0.074518
Skewness	-0.092742	1.293281	0.281522	0.926025	0.294369	1.195594	0.144632	0.990917
Kurtosis	4.762707	4.991053	4.513730	4.247496	5.886739	5.276483	3.784838	3.332181
Jarque-Bera	48.17027	163.3704	39.99541	76.45713	133.0914	167.1357	10.72787	61.91611
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.004682	0.000000
Sum	0.238200	56.03848	0.319942	63.34430	0.189461	93.36010	0.228794	75.18565
SumSq.Dev.	0.040021	1.462050	0.049328	1.402305	0.112757	4.062591	0.069632	2.037941
Observations	368	368	368	368	368	368	368	368

Source: Calculated

	FINRET	FINVOL	FMCGRET	FMCGVOL	ITRET	ITVOL	MEDIARET	MEDIAVOL
Mean	0.000501	0.234937	0.000327	0.166773	0.001251	0.199348	0.000397	0.214834
Median	0.000277	0.224883	0.000868	0.139756	0.001187	0.166359	0.000910	0.208462
Maximum	0.075311	0.655967	0.052434	0.467738	0.089220	0.669410	0.046961	0.410518
Minimum	-0.063555	0.062554	-0.047434	0.053845	-0.124903	0.056623	-0.045755	0.082370
Std. Dev.	0.016107	0.095583	0.011861	0.075616	0.014513	0.111255	0.013969	0.064336
Skewness	0.128754	1.266892	-0.181677	1.420061	-1.165188	2.169363	-0.133799	0.625604
Kurtosis	5.506235	5.806182	5.766983	5.113245	22.09618	8.761446	3.428272	3.469861
Jarque-Bera	97.32872	219.1857	119.4194	192.1588	5674.785	797.6218	3.910394	27.38980
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.141537	0.000001
Sum	0.184277	86.45669	0.120237	61.37235	0.460443	73.36019	0.145985	79.05909
Sum Sq. Dev.	0.095218	3.352969	0.051634	2.098407	0.077301	4.542626	0.071609	1.519041
Observations	368	368	368	368	368	368	368	368

Source: Calculated

	METRET	METVOL	PHARRET	PHARVOL	PSURET	PSUVOL	REALTYRET	REALTYVOL
Mean	0.000359	0.240932	0.000794	0.147544	3.060060	0.316158	-0.000256	0.365088
Median	0.000447	0.222096	0.000914	0.139230	-0.000515	0.296149	0.000270	0.345127
Maximum	0.072704	0.598804	0.030067	0.329632	0.083058	0.657604	0.065337	0.695203
Minimum	-0.056275	0.073863	-0.038103	0.050117	-0.058737	0.117789	-0.077635	0.079193
Std. Dev.	0.016728	0.097416	0.009844	0.050612	0.021435	0.109456	0.024629	0.119046
Skewness	0.292845	1.310335	-0.136716	0.922754	0.405400	1.060554	-0.178287	0.292012
Kurtosis	4.382522	5.385484	3.856034	4.445002	4.467499	3.902829	3.400447	2.737524
Jarque-Bera	34.56744	192.5629	12.38257	84.24024	43.10125	81.48439	4.408378	6.286341
Probability	0.000000	0.000000	0.002047	0.000000	0.000000	0.000000	0.110340	0.043146
Sum	0.132061	88.66305	0.292082	54.29619	0.011261	116.3463	-0.094049	134.3523
Sum Sq.Dev.	0.102691	3.482793	0.035564	0.940098	0.168618	4.396898	0.222609	5.201111
Observations	368	368	368	368	368	368	368	368

Source: Calculated

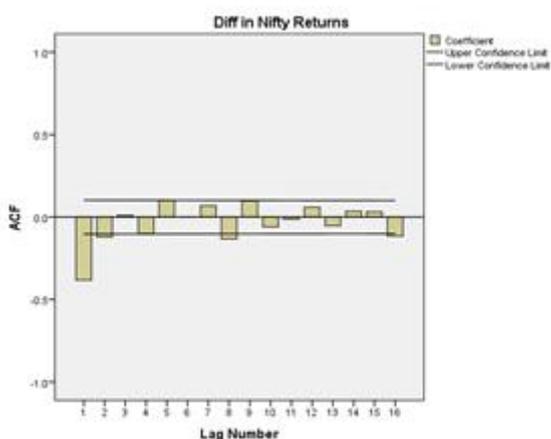
It is inferred from the table 1 that the mean value of return on sectors stood high in CNX PSU Bank index and volatility in CNX Realty index and low return in CNX Realty index and in volatility at Pharma. The returns of CNX Realty index cannot be predicted as it gets highly deviated and volatile in nature. Whereas the returns of CNX Energy index is less deviated. The return of CNX Pharma index is less volatile in nature.

The skewness for volatility was all positive and for return the negative skewness occurred for S&P CNX Nifty, CNX FMCG, CNX IT, CNX Media, CNX Pharma and CNX Realty. There was leptokurtosis for all sectors in return except in Realty (Volatility) that has platykurtosis. The Jarque Bera statistics tests that the hypothesis of normal distribution is rejected at a very high level.

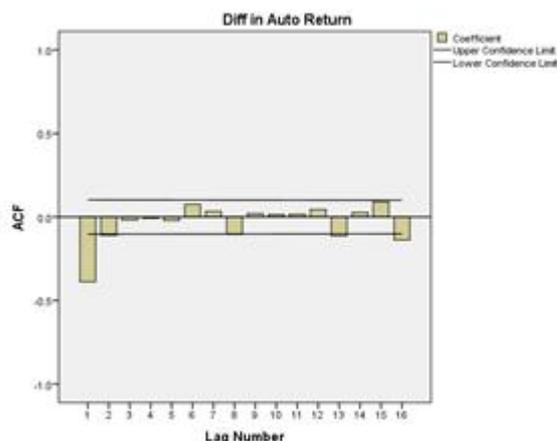
**Test of Randomness for Difference in Returns of S & P CNX Nifty index and its sectoral indices:-**

Auto Correlation had been used to test the randomness for difference in Returns of S & P CNX Nifty index and its sectoral indices.

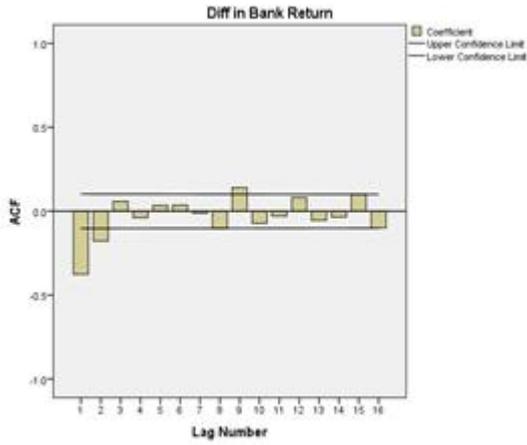
H<sub>0</sub>: The returns are independently distributed.



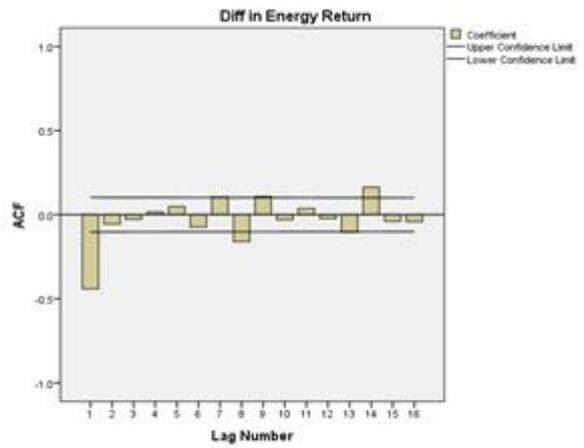
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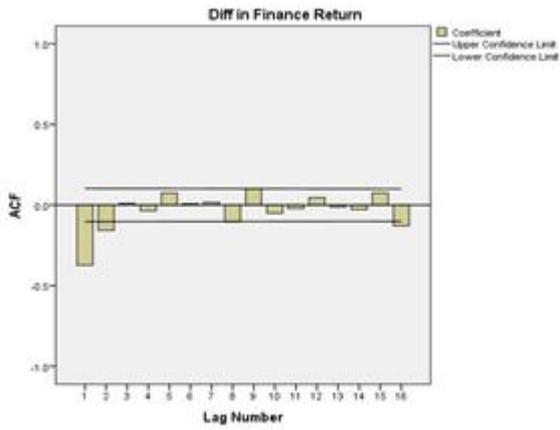
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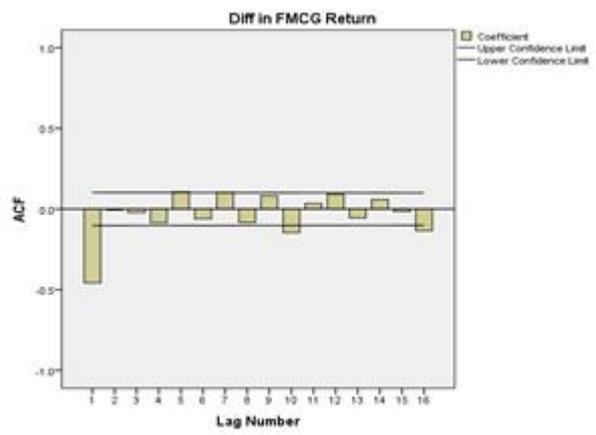
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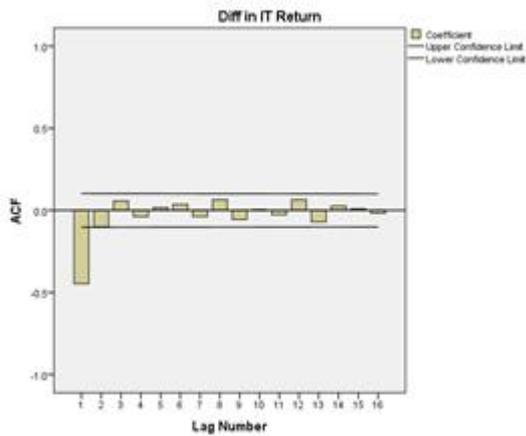
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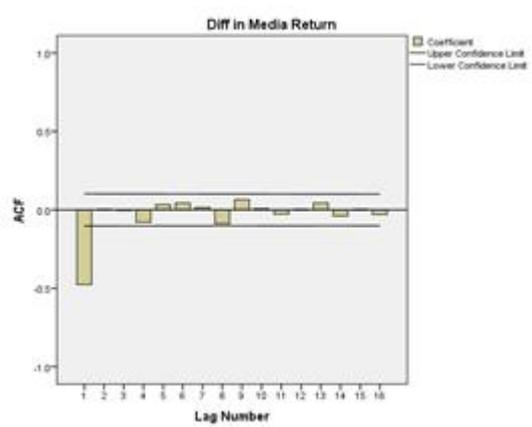
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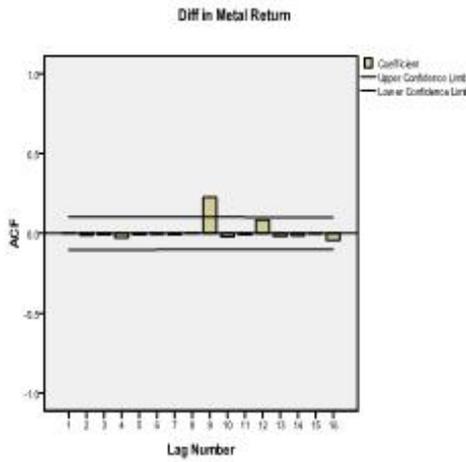
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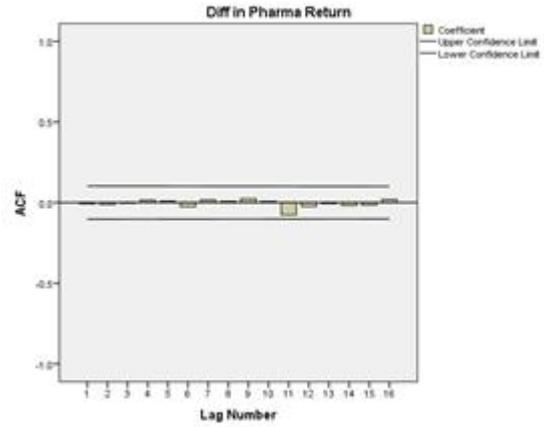
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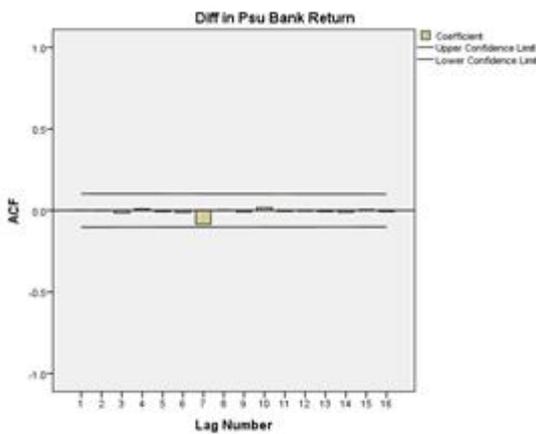
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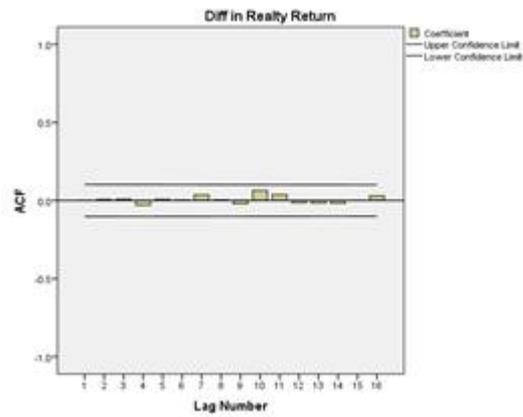
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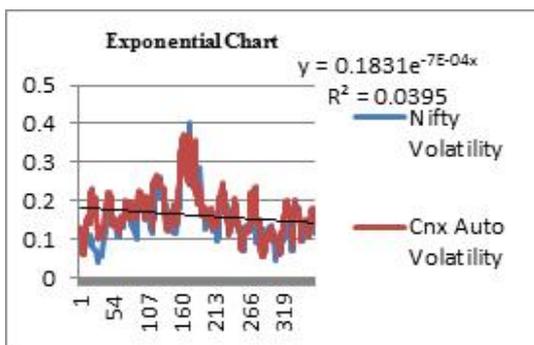
Source: Calculated

The above charts depict the autocorrelation function for the difference in returns of S & P CNX Nifty index and its sectoral indices. There is dependency in returns of NIFTY and some sectoral indices like, Auto, Bank, Energy, Finance, FMCG, IT and Media as the Box-Ljung statistic values are less than the

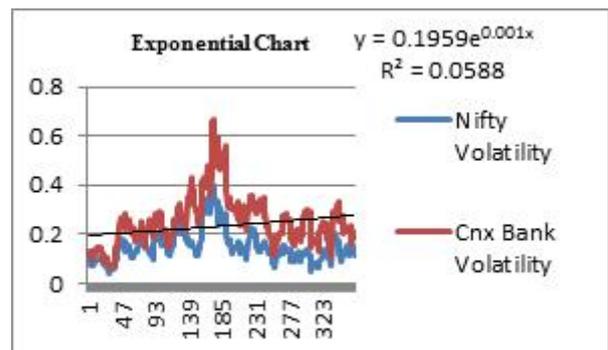
significance level. But for Metal, Pharma, PSU bank and Realty sectors have no dependency with the past, as the box-Ljung statistic value was more than 5% level of significance. This shows that the future returns can be predictable with the help of past returns.

**IMPACT OF SECTORAL INDICES ON NIFTY**

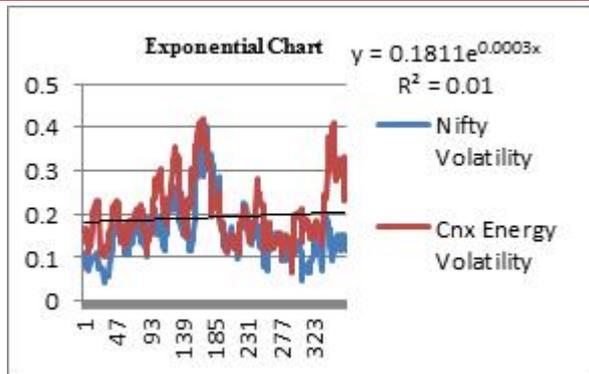
The below charts depicts the impact of the sectoral indices on Nifty.



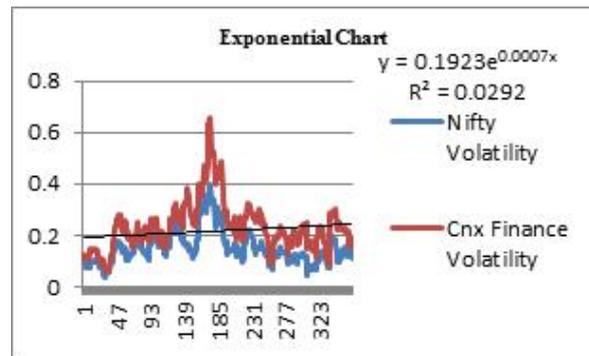
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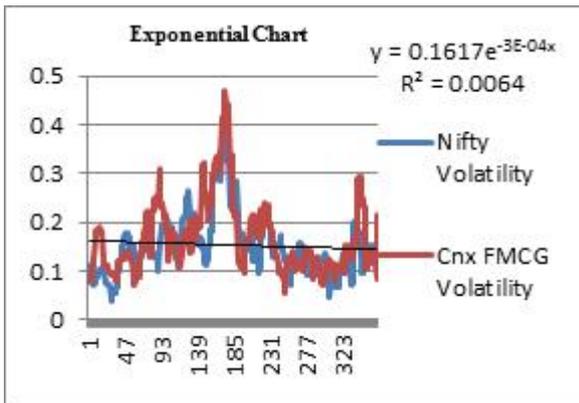
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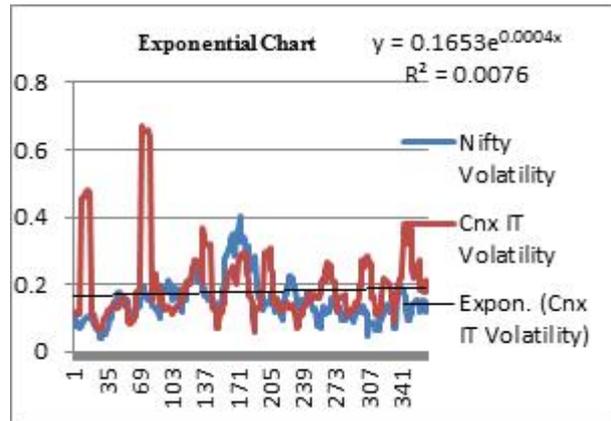
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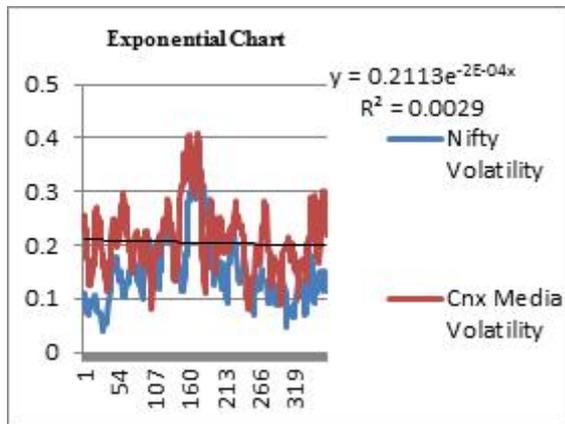
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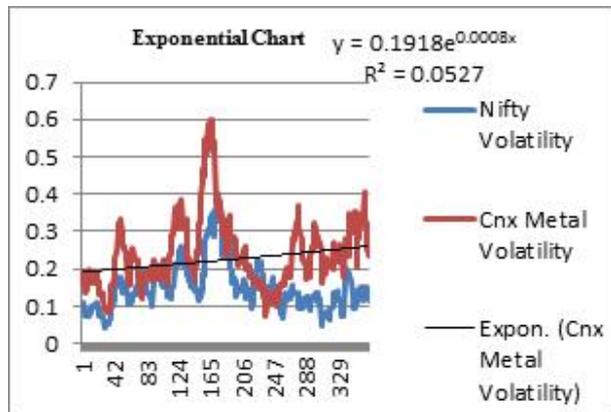
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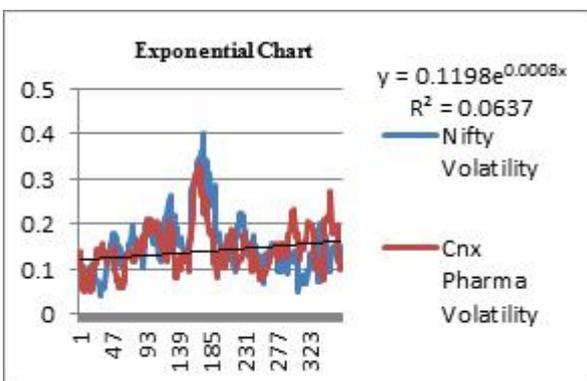
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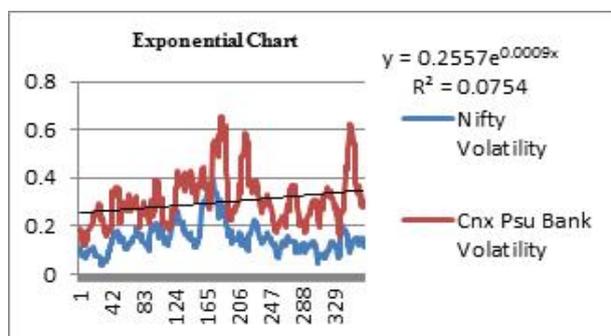
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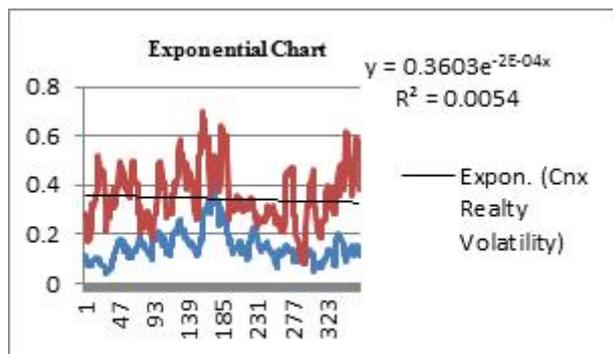
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The above charts show the impact of select sectors on Nifty. It is inferred that the Nifty and selected sectors exponential trend has been able to capture the trend for one and a half year from 1.1.2013 to 23.6.2014. The R-square values show the PSU Bank sector and Pharma have more impact on Nifty. Media, FMCG and IT sectors have very low impact on Nifty during the study period.

## CONCLUSION

The interrelationship among sectoral indices received a substantial attention in financial literature. This study is an attempt to provide the return and volatility across the sectoral indices and CNX Nifty index. The data used for the study has daily closing values of the stock indices covering a period of one and a half years starting from Jan 2013 to June 2014. The study found that the correlation is significant for most of the indices except the CNX Metal index, CNX Pharma index, CNX PSU Bank index, and CNX Realty index and further found that the indices CNX Pharma index and CNX PSU Bank index have more impact on Nifty. The results exhibit important implications to individual investors and portfolio managers in terms of reducing portfolio risk and enhancing their returns.



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