International Journal of Business and General Management (IJBGM)
ISSN(P): 2319-2267; ISSN(E): 2319-2275
Vol. 3, Issue 3, July 2014, 117-124

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

RELATIONSHIP BETWEEN THE SELECTED SECTORAL INDICES AND NIFTY

ARUN KUMAR SHARMA

Assistant Professor, GGDSD College, Chandigarh, Punjab, India

ABSTRACT

The stock market indexes are important indicators of performance of an economy. More information can be obtained about the economy if the performance of various sectoral indices is studied. There may be certain relationship between the movement of various sectoral indexes and major index representing the whole market. The present study attempts to explore the relationship between the CNX Nifty and various sectoral indexes. The results confirmed that there was no long term association among these indexes.

KEYWORDS: Granger Causality, Johansen Cointegration, Stationarity, Unit Root

INTRODUCTION

A stock market index represents the virtual value of group of stocks which are representative of overall market. This single value helps to understand the performance of the stock market as a whole. Similarly, the sector based index helps to provide the information about a particular sector by taking into account a group of companies representing that particular sector. The stock market indexes help to capture the price movements of the market. They help in assessing the historical movements in values of securities.

They can be helpful in comparison of performance of particular sector with other sectors. Many times these indexes help as leading indicator of performance of a given sector which they represent or overall economy if they represent overall economy. There have been many studies which have reported the information about various market indexes and sectoral indexes. Lakshmi P (2013) reported the volatility of eleven sectoral indices of National Stock Exchange. Barben and Jansen (2001) investigated the changes in correlation pattern of returns of various sectors. Richards (1996) reported the cointegration between various market indexes. Nagayasu (2000) also studied various sectoral indexes and reported the relationship between them. The present study attempts to study the relationship between various sectoral indexes of National Stock Exchange and Nifty. These sectroal indexes include CNX Auto, CNX Bank, CNX Energy, CNX IT, CNX Metal.

RESEARCH METHODOLOGY

Data for the study was for a period of four years starting from April 1, 2010 to March 31, 2014. Data was collected for closing values of CNX Auto, CNX Bank, CNX Energy, CNX IT, CNX Metal, CNX Nifty from official website of National Stock Exchange. First, all the observations of all the indices were checked for non stationarity of data using Augmented Dickey-Fuller unit root test. After that, the Vector Autoregression model was run to further confirm the lag length criteria for Johansen cointegration test in order to check the long term association among the closing values of indices. In the last, Granger Causality test was run to check the direction of relationship.

Analysis and Interpretation

Table 1 presents the descriptive statistics for closing values of all the indices. From the table it can be seen that the data was not normal as the p-values of Jarque-Bera

Table 1: Descriptive Statistics

	AUTO	BANK	ENERGY	IT	METAL	NIFTY
Mean	4144.033	10781.69	8235.074	6792.267	3157.298	5589.843
Median	4070.410	10744.90	7984.200	6447.250	2882.400	5571.400
Maximum	5803.200	13317.10	10195.42	10338.55	5017.330	6704.200
Minimum	2997.510	7798.550	6875.800	5087.650	1628.200	4544.200
Std. Dev.	588.0432	1117.299	791.3434	1130.817	877.7155	430.2365
Skewness	0.518827	-0.010010	0.709963	1.471625	0.400821	-0.020419
Kurtosis	2.523791	2.408640	2.478438	4.392932	1.832167	2.242636
Jarque-Bera	54.47544	14.63158	95.62836	443.1164	83.85353	24.04142
Probability	0.000000	0.000665	0.000000	0.000000	0.000000	0.000006
Observations	1003	1003	1003	1003	1003	1003

Statistics for all the values were less than 0.05. Further, the skewness and kurtosis inform about the structure of non normal. The closing values for CNX Bank and nifty were negatively skewed but closing values of all other indices were positively skewed. Similarly, the kurtosis for closing values of IT was more than three. But it was less than three for closing values of all other indices.

Table 2: Results of Unit Root Test for Closing Value of Auto Sector

Null Hypothesis: AUTO has a Unit Root				
			t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic			-2.304582	0.4305
Test critical values	1% level		-3.967243	
	5% level		-3.414309	
	10% level		-3.129275	
*MacKinnon (1996) One-Sided p-Values				
Augmented Dickey-Fuller Test Equation				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
AUTO(-1)	-0.011885	0.005157	-2.304582	0.0214
D(AUTO(-1))	0.115087	0.031554	3.647354	0.0003
C	39.07640	17.20240	2.271567	0.0233
@TREND (4/01/2010)	0.024712	0.010421	2.371355	0.0179

Table 2 shows the results of Augmented Dickey-Fuller unit root test for closing values of CNX Auto at level with constant and trend. The coefficient of lagged nifty was negative. Also, its p-value was less than 0.05. This confirmed that these results could be used to ascertain the stationarity of the data.

The p-value of Augmented Dickey-Fuller test was 0.4305 which was more than 0.05. It did not reject the null hypothesis that CNX Auto closing price had unit root. Hence, it was confirmed that data was non stationary and it could be used for Johansen Cointegration test.

Table 3: Results of Unit Root Test for Closing Value of CNX Bank

Null Hypothesis: BANK has a Unit Root				
			t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic			-2.514675	0.1122
Test critical values	1% level		-3.436663	
	5% level		-2.864216	
	10% level		-2.568247	
*MacKinnon (1996) One-Sided p-Values				
Augmented Dickey-Fuller Test Equation				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
BANK(-1)	-0.012155	0.004834	-2.514675	0.0121
D (BANK(-1))	0.113147	0.031464	3.596074	0.0003
C	133.7144	52.37848	2.552850	0.0108

Table 3 presents the results of Augmented Dickey-Fuller unit root test for closing values of CNX Bank at level with constant only. The coefficient of lagged nifty was negative. Also, its p-value was less than 0.05. This confirmed that unit root test model was valid and it was suitable to ascertain the stationarity of the data. The p-value of Augmented Dickey-Fuller test was 0.1122 which was more than 0.05. It did not reject the null hypothesis that CNX Auto closing price had unit root. Hence, it was confirmed that data for closing values of CNX Bank was non stationary and it could be used for Johansen Cointegration test.

Table 4: Results of Unit Root Test for Closing Value of CNX Energy

Null Hypothesis: ENERGY has a Unit Root				
			t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic			-2.134294	0.2313
Test critical values	1% level		-3.436657	
	5% level		-2.864213	
	10% level		-2.568245	
***MacKinnon (1996) One-Sided P-Values**				
Augmented Dickey-Fuller Test Equation				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ENERGY (-1)	-0.008503	0.003984	-2.134294	0.0331
C	69.29788	32.95970	2.102503	0.0358

Table 4 shows the results of Augmented Dickey-Fuller unit root test for closing values of CNX Energy at level with constant only. The coefficient of lagged nifty was negative. Also, its p-value was less than 0.05. This confirmed that these results could be used to ascertain the stationarity of the data. The p-value of Augmented Dickey-Fuller test was 0.2313 which was more than 0.05. It did not reject the null hypothesis that CNX Energy closing price had unit root. Hence, it was confirmed that data for closing values of CNX Energy was non stationary and it could be used for Johansen Cointegration test.

Table 5: Results of Unit Root Test for Closing Value of CNX IT

Null Hypothesis: IT has a Unit Root				
			t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic			1.012287	0.9184
Test critical values	1% level		-2.567272	
	5% level		-1.941139	
	10% level		-1.616487	
*MacKinnon (1996) One-Sided p-Values				
Augmented Dickey-Fuller Test Equation				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
IT(-1)	0.000439	0.000434	1.012287	0.3116

Table 5 shows the results of Augmented Dickey-Fuller unit root test for closing values of CNX IT at level without constant and trend. The coefficient of lagged nifty was negative. But, its p-value was more than 0.05. This confirmed that unit root test model was valid and it was suitable to ascertain the stationarity of the data. The p-value of Augmented Dickey-Fuller test was 0.9184 which was more than 0.05. It did not reject the null hypothesis that CNX IT closing price had unit root. Hence, it was confirmed that data for closing values of CNX IT was non stationary and it could be used for Johansen Cointegration test.

Table 6: Results of Unit Root Test for Closing Value of CNX Metal

Null Hypothesis: METAL has a Unit Root				
			t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic			-1.864409	0.0594
Test critical values	1% level		-2.567272	
	5% level		-1.941139	
	10% level		-1.616487	
*MacKinnon (1996) One-Sided p-Values				
Augmented Dickey-Fuller Test Equation				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
METAL(-1)	-0.000965	0.000518	-1.864409	0.0626

Table 6 presents the results of Augmented Dickey-Fuller unit root test for closing values of CNX Metal at level without constant and trend. The coefficient of lagged nifty was negative. And, its p-value was more than 0.05. This confirmed that unit root test model was valid and it was suitable to ascertain the stationarity of the data. The p-value of Augmented Dickey-Fuller test was 0.0594 which was more than 0.05. It did not reject the null hypothesis that CNX Metal closing price had unit root. Hence, it was confirmed that data for closing values of CNX Metal was non stationary and it could be used for Johansen Cointegration test.

Table 7: Results of Unit Root Test for Closing Value of CNX Nifty

Null Hypothesis: NIFTY has a Unit Root				
			t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic			0.616491	0.8494
Test critical values	1% level		-2.567272	
	5% level		-1.941139	
	10% level		-1.616487	
*MacKinnon (1996) One-Sided p-Values				
Augmented Dickey-Fuller Test Equation				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
NIFTY(-1)	0.000211	0.000342	0.616491	0.5377

Table 7 shows the results of Augmented Dickey-Fuller unit root test for closing values of CNX Nifty at level without constant and trend. The coefficient of lagged nifty was negative. But, its p-value was more than 0.05. This confirmed that unit root test model was valid and it was suitable to ascertain the stationarity of the data. The p-value of Augmented Dickey-Fuller test was 0.8494 which was more than 0.05. It did not reject the null hypothesis that CNX Nifty closing price had unit root. Hence, it was confirmed that data for closing values of CNX Metal was non stationary and it could be used for Johansen Cointegration test.

Table 8: Results of Lag Selection Criteria for Closing Value of Indices

Endogenous Variables: AUTO BANK ENERGY IT METAL NIFTY						
Exogenous Variables: C						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-43974.07	NA	9.10e+30	88.31339	88.34294	88.32462
1	-31891.74	23994.83	2.84e+20*	64.12397*	64.33076*	64.20258*
2	-31863.33	56.07129	2.89e+20	64.13922	64.52325	64.28521
3	-31833.37	58.78275	2.92e+20	64.15135	64.71262	64.36471
4	-31811.73	42.19985	3.01e+20	64.18017	64.91869	64.46092
5	-31772.09	76.80938	2.99e+20	64.17287	65.08863	64.52099
6	-31744.50	53.11994*	3.04e+20	64.18977	65.28277	64.60527
7	-31725.92	35.56225	3.15e+20	64.22474	65.49499	64.70762
* indicates lag order selected by the criterion						

Table 8 shows the results for lag length selection criteria to be used for Johansen Cointegration test to check the long run association among the indices. Up to seven lags were taken to select the lags for Johansen Cointegration test. All the criteria, except sequential modified LR test statistic criteria, namely, final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion suggested that one lag should be taken for Johansen Cointegration test. However, the results of the sequential modified LR test statistic criteria were ignored.

Table 9: Results of Johansen Cointegration Test for Closing Values of Indices

Trend Assumption: Linear Deterministic Trend				
Series: AUTO BANK ENERGY IT METAL NIFTY				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		**Trace**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None	0.034469	89.71701	95.75366	0.1211
At most 1	0.027878	54.60481	69.81889	0.4357
At most 2	0.013619	26.30276	47.85613	0.8793
At most 3	0.007326	12.57626	29.79707	0.9100
At most 4	0.003910	5.216149	15.49471	0.7855
At most 5	0.001293	1.294908	3.841466	0.2551
Trace test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		**Max-Eigen**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None	0.034469	35.11220	40.07757	0.1632
At most 1	0.027878	28.30204	33.87687	0.1999
At most 2	0.013619	13.72650	27.58434	0.8410
At most 3	0.007326	7.360113	21.13162	0.9384
At most 4	0.003910	3.921242	14.26460	0.8675
At most 5	0.001293	1.294908	3.841466	0.2551
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 9 presents the results for Johansen Cointegration test using one lag as suggested by lag length selection criteria. The Trace statistics for none cointegration equation in the model was 0.1211 which was more than 0.05. Hence, the null hypothesis that there was none cointegration equation in the model; was not rejected. Further, the trace statistics for at the most one or more than one but upto five cointegration equations were more than 0.05. Here, also the null

hypothesis that there was at the most one or more than one but up to five cointegration equations in the model; was not rejected. Next, Max-eigenvalue statistics for none cointegration model was 0.1632 which was again more than 0.05. Hence, the null hypothesis that there is none cointegration equation in the model; was not rejected. Further, the Max-eigenvalue statistics for at the most one or more than one but up to five cointegration equations were more than 0.05. Here, also the null hypothesis that there is at the most one or more than one but up to five cointegration equations in the model; was not rejected. So, the results of both Trace statistics and Max-eigenvalue statistics for Johansen Cointegration test showed that the closing values of selected indices were not cointegrated.

Table 10: Results of Granger Causality Test for Closing Values of Indices

Null Hypothesis:	Obs	F-Statistic	Prob.
BANK does not Granger Cause AUTO	1001	3.69096	0.0253
AUTO does not Granger Cause BANK		0.52992	0.5888
ENERGY does not Granger Cause AUTO	1001	1.26685	0.2822
AUTO does not Granger Cause ENERGY		0.60437	0.5466
IT does not Granger Cause AUTO	1001	0.23694	0.7891
AUTO does not Granger Cause IT		2.08031	0.1254
METAL does not Granger Cause AUTO	1001	2.52921	0.0802
AUTO does not Granger Cause METAL		0.81326	0.4437
NIFTY does not Granger Cause AUTO	1001	1.40931	0.2448
AUTO does not Granger Cause NIFTY		1.64822	0.1929
ENERGY does not Granger Cause BANK	1001	1.51001	0.2214
BANK does not Granger Cause ENERGY		2.65936	0.0705
IT does not Granger Cause BANK	1001	0.22920	0.7952
BANK does not Granger Cause IT		1.10027	0.3332
METAL does not Granger Cause BANK	1001	2.43468	0.0881
BANK does not Granger Cause METAL		5.32024	0.0050
NIFTY does not Granger Cause BANK	1001	0.93576	0.3926
BANK does not Granger Cause NIFTY		2.98844	0.0508
IT does not Granger Cause ENERGY	1001	0.24270	0.7846
ENERGY does not Granger Cause IT		2.11348	0.1214
METAL does not Granger Cause ENERGY	1001	0.62290	0.5366
ENERGY does not Granger Cause METAL		0.16411	0.8487
NIFTY does not Granger Cause ENERGY	1001	2.01598	0.1337
ENERGY does not Granger Cause NIFTY		2.30621	0.1002
METAL does not Granger Cause IT	1001	3.25877	0.0388
IT does not Granger Cause METAL		0.82894	0.4368
NIFTY does not Granger Cause IT	1001	1.57517	0.2075
IT does not Granger Cause NIFTY		1.04209	0.3531
NIFTY does not Granger Cause METAL	1001	2.37047	0.0940
METAL does not Granger Cause NIFTY		3.73865	0.0241

Table 10 presents the results of Granger Causality test of thirty hypotheses. From the above table it was confirmed that there was one way Granger Causality between following pairs – CNX Bank and CNX Auto, CNX Bank and CNX Metal, CNX Metal and CNX IT and in the last CNX Metal and CNX Nifty. For rest of the hypotheses, no Granger Causality was found.

CONCLUSIONS

The study concluded that there was no cointegration among closing prices of CNX Auto, CNX Bank, CNX Energy, CNX IT, CNX Metal, CNX IT and CNX Nifty. Further, the Granger Causality was also not observed among many pairs of the above mentioned indices except a few pairs with one way causality.

REFERENCES

1. Berben, R. P., & Jansen, W. J. (2005). Comovement in international equity markets: A sectoral view. Journal of International Money and Finance, 24(5), 832-857.
2. Lakshmi P S. (2013). Volatility Patterns in Various Sectoral Indices in Indian Stock Market. Global Journal of Management and Business Studies. 3(8). 879-886.
3. Nagayasu, J. (2002). Currency crisis and contagion: evidence from exchange rates and sectoral stock indices of the Philippines and Thailand. Journal of Asian Economics, 12(4), 529-546.
4. Richards, A. J. (1995). Comovements in national stock market returns: Evidence of predictability, but not cointegration. Journal of monetary Economics, 36(3), 631-654.