Does developed market upbeat developing markets? Evidence from Indian, Brazil and US Data

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ABSTRACT **- The Indian stock markets are influenced by different reason a portion of the worldwide components influences the Indian stock markets. The Indian market is associated with Global market this connection will assist the speculator in predicting the market by knowing the Global market. The data from 2009 to 2018 the daily returns are determined. The unit root test was led to change over non - stationary to stationary. Johansen co-integration test was led to know the long run connection between the Indices, the outcome says that there is a long run relationship between the indices. Granger causality test was led to know the causality between the two variable in that test says the IBOVESPA and NASDAQ cause the NIFTY.**

Keywords**: co-integration test, Granger casualty, IBOVESPA, NASDAQ, NIFTY, Unit root test.**

I. INTRODUCTION

Indian stock market is one of the stock market attracting in the greater part of the investors in putting resources into Indian stock exchange in that the Indian Economy is a developing economy and these day's Indian individuals are preferring to investing stock market. Indian stock exchange is one of the most established stock exchange in the Asian market. In the Indian stock market, there is two Major stock exchange are there that is the Bombay Stock Exchange (BSE) and National Stock Exchange (NSE). BSE is the most established and greatest stock exchange in the Indian stock market. BSE is having around 5600 organizations it is the one stock exchange having the most noteworthy number of recorded organizations on the world. NSE is the trade having the Highest Technical advancement contrasted with the BSE. In NSE around 1750 organizations are recorded.

NASDAQ is the one of the second biggest stock exchange on the world by its market capitalization. NASDAQ 100 stock market has a place with the American stock exchange. NASDAQ is the world's first Electronic stock exchange. NASDAQ 100 is the one indices having a 100 biggest non-financial related organizations in the list of NASDAQ 100, it depends on their market capitalization. It doesn't include any monetary organizations in the NASDAQ 100. It starts in the year1985. NASDAQ 100 is otherwise called the capitalization weighted index.

The Brazilian stock exchange IBOVESPA is the stock exchange has the fourth biggest market capitalization in America's stock trade and thirteenth biggest on the world stock exchange, the IBOVESPA stock trade is otherwise called BOVESPA or B3 exchange. Brazil is having the estimated 201.1 million population, in the IBOVESPA indices permits other foreign organizations (Non-Brazilian) listed utilizing the Brazilian Depository Receipts (BDR). The Brazilian stock exchange exchanged the Brazilian Real is RBL.

II. LITERATURE REVIEW

Khan Masood Ahmad, Shahid Ashraf and Shahid Ahmed (2006) "is the India market integrated with US and Japanese Markets" They utilize the data from 1999 to 2004, Using daily closing returns, data they applied the Johansen co-reconciliation test to know the long run relationship, they additionally utilize the Granger casualty test to know the short run connection. The outcome says that there is a no relationship between these indexes and furthermore they state the stock exchange doesn't tend to move together over the long run.

Stuart Hyde, Don Bredin and Nghia Nguyen (2007) "correlation elements between Asia-pacific, EU and US Stock returns" they use the GARCH model, for now, the correlation between the indices. The use the data from 1991 to 2006 the weekly returns. They find that there is significant variation in the correlation between markets through time.

Prashant Joshi (2008) "Market Integration and Efficiency of Indian Stock market: A study of NSE" In this paper, they use to examination co-movement of India, USA, Mexico, Brazil, and China. From the period 1196 to 2007 they use the daily returns of all stock exchanges are recorded for the examination. They use the econometrics for the examination. The examination says that there is a coIntegration between all the markets.

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Vanita Tripathi and Shruti Sethi (2010) "Integration of Indian stock market with world markets" they utilize the data from 1998 to 2008 for the examination purpose. They use Japan, UK, USA, and China. They use the EVIEWS for the examination. They use the daily returns of the market and results says the Indian market follows the US stock market.

Ruchika Gahlot and Saroj Kumar Datta (2012) "Impact of Future Trading on Stock market volatility: A Study of BRIC Countries". They utilize the daily returns of each index (Brazil, Russia, India, and China). GARCH M model utilized for the impact. The futures trading in Indian market that reduces the volatility in the market.

Ranjan Dasgupta (2014) "Integration and Dynamic linkages of the Indian stock market with BRIC- an empirical study". They utilize the daily closing prices of the BRIC Indices, in the paper, they utilize the data from 2003 to 2012. Based on the results the Indian market will follow the Brazilian and Russian market.

Sriram .M (2014) "co-integration NIFTY and NASDAQ composite- an Empirical Investigation". The study was conducted from the year 2000 to 2014. They utilize the different econometric tools to analyze the results was the data is normally distributed in the unit root test the stationary was fund at 1st difference not at level. Using JCIT they got that there is long term association between both indices. After applied Granger causality test says there is a unidirectional relationship between the two indices.

Thangamuthu Mohanasundaram and Parthasarathy Karthikeyan (2015) "CoIntegration and stock market interdependence: Evidence from South Africa, India, and The USA". The primary objective of the paper is to know the short run and long-run relationship between the indices. They utilize the monthly return of the indices from 2004 to 2014. The paper results say that there is a strong correlation between this indices.

Ravleen Kaur (2017) compare with the major stock exchange in the worlds in both the qualitative and quantitative. There are many guidelines are with their respective stock exchange. The utilization of the data analysis by using Mean, standard Error, median, Standard Deviation, sample Variance, kurtosis, Skewness, Range Max, min. In their Research, they got know that the Sensex is showing a positive relationship with all Indices. There is highly correlated with Hang Sang Indices (93.59%) and least correlated Shanghai Composites (71.32%).

Pradeep chougala and Srivatsa H S (2017) "Analytical Study of correlation between India and international Stock market" the fundamental objectives of the paper is to know the Indian Indices and other selected global Indices they utilize the data from 2011 to 2016. The monthly returns of the indices are collected from the stock exchange. The result of the study says that there is a high positive correlation between Indian indices and other global indices.

III. OBJECTIVE OF THE STUDY

1. To know the Dynamic short term linkage Between in INDIA (NIFTY), US (NASDAQ) and Brazil (IBOVESPA.)
2. To explore the presence of long term linkage between NIFTY, NASDAQ, and IBOVESPA.
3. To capture the linear interdependences among the Indices.

IV. NEED OF THE STUDY

Global Indices have made the integration with the Indian indices, to know how much that Influence with Indian indices. The main objective of the paper is to know how much global indices are correlated with Indian indices.

V. SCOPE OF THE STUDY

This paper contains the three major stock exchange for the analysis data from 2009 to 2018. The data are collected is secondary data.

Following are the indices are used in the analysis

- NIFTY
- IBOVESPA
- NASDAQ

VI. DATA AND METHODOLOGY

The Indian stock market was influenced by the many factors, the investigation is the relationship between the NIFTY, IBOVESPA and NASDAQ. The analysis was established on time serious from 2009 to 2018 with the 10 years of secondary data was obtained from their site. Data were collected and were analyzed by applying economic tool and technics from the use of the Eview statistical package. The compressed of data sets with testing the stationary of data using graphical analysis that are combined with augmented Dickey-fuller (ADF) Unit root test method and co-Integration test between the variables. Johansen's was familiar and proceeding towards the analysis of the causal relationship between the variables. Granger causality is to use to know the causality between the variables.

- Sample size: 10 years
- Source of the data: NSE, IBOVESPA, NASDAQ
- Type of data: secondary data
- This study from secondary data
- This study data serious from 2009-2018

Data analysis and Interpretation

Graphical method

The first impression obtained from the figures 1-4 is all NIFTY, NASDAQ, and IBOVESPA, in the year 2009 the nifty has the highest returns with compared to the other two. When compared with all three there all the indices are moves in the same directions except some cases. When

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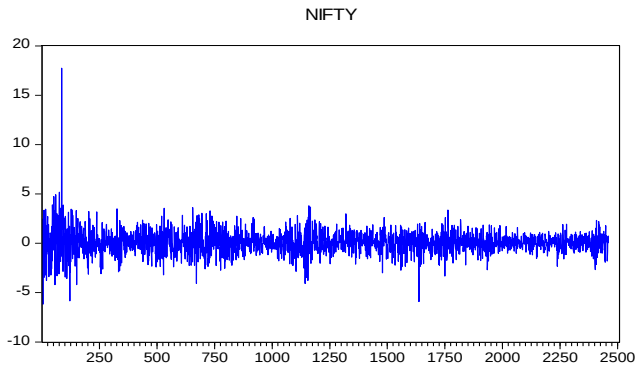
that index comes to Ibovespa will have more volatility. It creates doubts about the stationary or non-stationary of all the Indices, hence the further test has to be conducted.

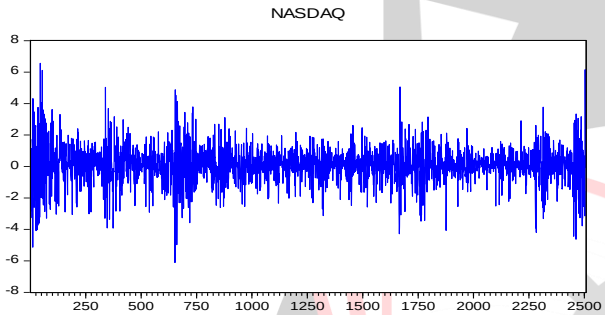
Figure 1



NIFTY (DAILY RETURNS), 2009-2018

Source: Eviews graphs analysis (2019)

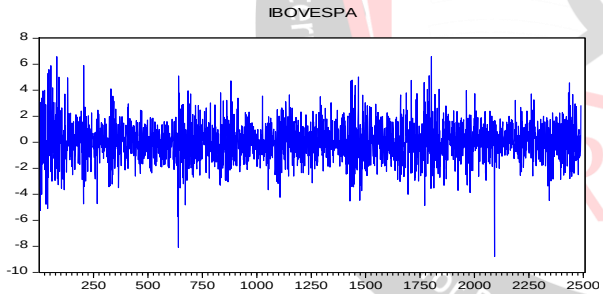
FIGURE 2



NASDAQ (DAILY RETURNS), 2009-2018

Source: Eviews graphs analysis (2019)

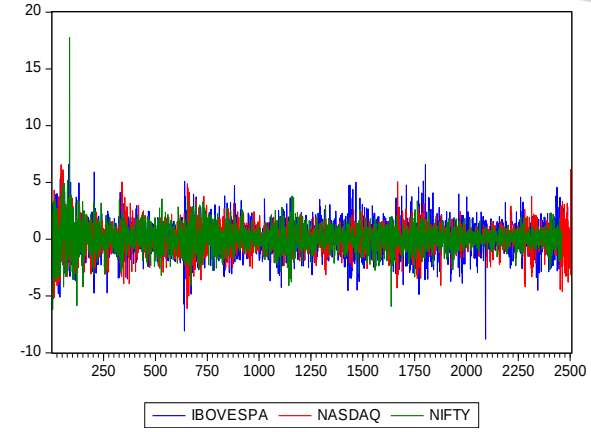
FIGURE 3



IBOVESPA (DAILY RETURNS), 2009-2018

Source: Eviews graphs analysis (2019)

FIGURE 4



NIFTY, IBOVESPA, NASDAQ (daily returns), 2009-2018

Source: Eviews graphs analysis (2019)

A. Unit Root Test

TABLE – 1
ADF Unit Root Test for NIFTY, NASDAQ, IBOVESPA, 2009-2018

Indices	Particulars	t- statistic	Critical value 5%	P-value
NIFTY	At level	-46.8753	-2.862515	0.0001
	At first difference	-20.8895	-2.862523	0.0000
NASDAQ	At level	-52.1267	-2.862493	0.0001
	At first difference	-20.5033	-2.862502	0.0000
IBOVESPA	At level	-51.0649	-2.862501	0.0001
	At first difference	-20.8101	-2.86251	0.0000

Table 01 shows the results of the ADF Unit Root Test for NIFTY, NASDAQ and IBOVESPA. The results depict that the Null Hypothesis H1, H2, and H3 that NIFTY, NASDAQ and IBOVESPA have unit roots can be rejected since the critical t-value is less than 0.05 respectively at first difference (I (1)) at 5 percent significance level. For NIFTY, the T-valve is -20.8895, which is lower than the computed ADF critical value (-2.862523) at 5 percent of significance.

Source: Eviews software analysis results (2019)

Similarly, in the case of NASDAQ, The T-Value is -20.5033, which is also smaller to the calculated ADF critical (-2.862502) at 5 percent significance. And, in case of IBOVESPA, the T-Value is -20.8101, which also smaller to the calculated ADF critical (-2.86251) at 5 percent significance. It was there four conclude that the NIFTY, NASDAQ and Ibovespa time series do not have unit root problem and the data good enough to proceed to coIntegration.

B. Johansen's Co-integration Test

Table 2 presents the results of the JCIT which was conducted to establish whether there was any long-run equilibrium between NIFTY, NASDAQ, and IBOVESPA over the period of 2009-2018. The null hypothesis (H4): There is no co-integration between the NIFTY and NASDAQ, is rejected at 5 percent level significance since p-value (0.0001) is lower than 0.05. In trace test at most one also indicate that reject the null hypothesis at a 5 percent level of significance since the p-value is (0.0000) is lower than the 0.005. Also, the results of the Johansen's Co-integration test presented in table 2 shows that the trace statistics for the Max. Eign value (979.13) is more than the critical value (15.495) indicates that variables are bound together by long-run equilibrium relationships and follow the long run path. Similarly the Max. Eign test confirms that t-statistical value (512.92) is more than the critical value (14.265).

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Further, results of co-integration test denote that the null hypothesis (H4): There is no co-integration between the NIFTY and NASDAQ is rejected at 5 percent significance since trace and Maximum Eigen Test indicates at most 2 co-Integration equation at the 0.05 level. Therefore it leads to acceptance of the alternative hypothesis.

Table 2
Results of Johansen's Co-integration Test on NIFTY, NASDAQ, IBOVESPA, 2009-2018

Indices	Co-integration test	Level	t-statistics	C.V.at 5%	Probability
NIFTY & NASDAQ	Trace Test	H0: r=0(none)*	979.13	15.495	0.0001
		H1: r=<1 (at most 1)*	466.2	3.8415	0.0000
	Max.Eign	H0: r=0(none)*	512.92	14.265	0.0001
		H1: r=<1 (at most 1)*	466.2	3.8415	0.0000
NIFTY &IBOVESPA	Trace Test	H0: r=0(none)*	989.84	15.495	0.0001
		H1: r=<1 (at most 1)*	409.87	3.8415	0.0000
	Max.Eign	H0: r=0(none)*	579.97	14.265	0.0001
		H1: r=<1 (at most 1)*	409.87	3.8415	0.0000
IBOVESPA & NASDAQ	Trace Test	H0: r=0(none)*	962.38	15.495	0.0001
		H1: r=<1 (at most 1)*	461.24	3.8415	0.0000
	Max.Eign	H0: r=0(none)*	501.15	14.265	0.0001
		H1: r=<1 (at most 1)*	461.24	3.8415	0.0000

Note: Trace and Maximum Eigen Test indicates at most 2 co-Integration equation at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level.

Source: Eviews software analysis (2019)

The null hypothesis (H5): There is no co-integration between the NIFTY and IBOVESPA, is rejected at 5 percent level significance since p-value (0.0001) is lower than 0.05. In trace test at most one also indicate that reject the null hypothesis at a 5 percent level of significance since the p-value is (0.0000) is lower than the 0.005. Also, the results of the Johansen's Co-integration test presented in table 2 shows that the trace statistics for the Max. Eign value (989.84) is more than the critical value (15.495) indicates that variables are bound together by long-run equilibrium relationships and follow the long run path. Similarly the Max. Eign test confirms that t-statistical value (579.97) is more than the critical value (14.265).

Further, results of co-integration test denote that the null hypothesis (H5): There is no co-integration between the NIFTY and IBOVESPA is rejected at 5 percent significance since trace and Maximum Eigen Test indicates at most 2 co-Integration equation at the 0.05 level. Therefore it leads to acceptance of the alternative hypothesis.

The null hypothesis (H6): There is no co-Integration between the NASDAQ and IBOVESPA, is rejected at 5 percent level significance since p-value (0.0001) is lower than 0.05. In trace test at most one also indicate that reject the null hypothesis at a 5 percent level of significance since the p-value is (0.0000) is lower than the 0.005. Also, the results of the Johansen's Co-integration test presented in table 2 shows that the trace statistics for the Max. Eign value (962.38) is more than the critical value (15.495) indicates that variables are bound together by long-run equilibrium relationships and follow the long run path. Similarly the Max. Eign test confirms that t-statistical value (501.15) is more than the critical value (14.265).

Further, results of co-integration test denote that the null hypothesis (H6): There is no co-Integration between the NASDAQ and IBOVESPA, is rejected at 5 percent significance since trace and Maximum Eigen Test indicates at most 2 co-Integration equation at the 0.05 level. Therefore it leads to acceptance of the alternative hypothesis.

C. Vector Error Correction Model (VECM)

Since Co-integration between NIFTY, NASDAQ, and IBOVESPA was empirically established, the next level of analysis involved fitting the series into VECM and the results, as shown in table 3 based on the first normalized eigenvector, Indicates the

Table 4

Pair of Indices	Long run causality					Wald Test
	Dependent	Coefficient C(1)	Std. Error	t-Statistic	Prob.	Chi-square prob.
NIFTY & NASDAQ	NIFTY 50	-0.26	0.02	-13.56	0	0.001
	NASDAQ	-0.80	0.03	-25.51	0	0.001
NIFTY & IBOVESPA	NIFTY 50	-0.42	0.03	-15.99	0	0.001
	IBOVESPA	-0.77	0.03	-24.75	0	0.001
IBOVESPA & NASDAQ	IBOVESPA	-0.56	0.03	-19.58	0	0.001
	NASDAQ	-0.54	0.03	-18.93	0	0.001

Presence of a long-run relationship between those Indices.

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Table 3 Co-integrating Equation			
NIFTY & NASDAQ	NIFTY50	NASDAQ	Constant
	1.000000	1.789384	-0.186935
		(0.07028)	
		[25.4605]	
	NASDAQ	NIFTY50	Constant
	1.000000	0.558851	-0.104469
		-0.03624	
		[15.4205]	
NIFTY & IBOVESPA	NIFTY50	IBOVESPA	Constant
	1.000000	-0.988456	-0.016857
		-0.03649	
		[-27.0878]	
	IBOVESPA	NIFTY50	Constant
	1.000000	-1.011679	0.017054
		-0.04501	
		[-22.4759]	
IBOVESPA & NASDAQ	IBOVESPA	NASDAQ	Constant
	1.000000	-1.279333	0.052591
		-0.05811	
		[-22.0153]	
	NASDAQ	IBOVESPA	Constant
	1.000000	-0.781658	-0.041108
		-0.03481	
		[-22.4540]	
Standard errors in ( ) & t-statistics in [ ]			

Source: Eviews software analysis (2019)

As shown in table 4, the lower t- statistical value -13.5564 and -25.506 respectively are both less than probability value (0) at 5% significance level, thus evidencing the absence of long-run equilibrium relation between NIFTY and NASDAQ. NASDAQ influenced by the current year NIFTY and NIFTY influenced by the current year NASDAQ at less than 5% probability. From the VECM results, it is evidence that NASDAQ and NIFTY, NIFTY and NASDAQ has no long-run negative co-relation. The lower t-statistical value -15.986 and -24.7489 respectively are both less than probability value (0) at 5% significance level, thus evidencing the absence of long-run equilibrium relation between NIFTY and IBOVESPA. IBOVESPA influenced by the current year NIFTY and NIFTY influenced by the current year IBOVESPA at less than 5% probability. From the VECM results, it is evidence that IBOVESPA and NIFTY, NIFTY and IBOVESPA has no long-run negative co-relation. The lower the t-statistical value -19.5794 and -18.927 respectively are both less than probability value (0) at 5% significance level, thus evidencing the absence of long-run equilibrium relation between IBOVESPA and NASDAQ. NASDAQ influenced by the current year IBOVESPA and IBOVESPA influenced by the current year NASDAQ at less than 5% probability. From VECM results, it is evidence that NASDAQ and IBOVESPA, IBOVESPA and NASDAQ has no long-run negative co-relation.

C (1) is significant because it is less than 5% and the coefficient is negative. There is long-run causality between the NIFTY, NASDAQ and IBOVESPA. C (1) = Speed not adjusted towards long-run equilibrium but it must be significant (significant is negative) and there is no long-run causality.

D. Short Run Causality

Table 5 Granger Causality Test

Null Hypothesis	Obs	F-Statistic	Prob.
NASDAQ does not Granger Cause NIFTY	2458	3.13614	0.0436
NIFTY does not Granger Cause NASDAQ		0.70407	0.4947
IBOVESPA does not Granger Cause NIFTY	2458	4.70353	0.0091
NIFTY does not Granger Cause IBOVESPA		15.4110	0.0002
NASDAQ does not Granger Cause IBOVESPA	2487	0.28378	0.7530
IBOVESPA does not Granger Cause NASDAQ		0.51499	0.5976

C (4) and C (5) = 0 is null hypothesis.

Wald statistics to check NIFTY, NASDAQ and IBOVESPA

C (4) = C (5) = 0 hence there is a short run causality running from NIFTY, NASDAQ, and IBOVESPA, the probability is less than 5% (Table 4) therefore,

- There is a long run causality between the NIFTY, NASDAQ and IBOVESPA.
- There is a short run causality between NIFTY, NASDAQ, and IBOVESPA.

Source: Eviews software analysis (2019)

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The null hypothesis H7: NASDAQ does not Granger Cause NIFTY, is rejected at the 5 percent significant the p-Value (0.0436), therefore the alternative hypothesis is accepted.

The null hypothesis H8: NIFTY does not Granger Cause NASDAQ, is accepted at the 5 percent significant the p-value (0.4947), therefore the alternative hypothesis is rejected.

The null hypothesis H9: IBOVESPA does not Granger Cause NIFTY, is rejected at the 5 percent significance the p-value (0.0091), therefore the alternative hypothesis is accepted.

The null hypothesis H10: NIFTY does not Granger Cause IBOVESPA, is rejected at the 5 percent significance the p-value (0.0002), therefore the alternative hypothesis is accepted.

The null hypothesis H11: NASDAQ does not Granger Cause IBOVESPA, is accepted at the 5 percent significance the p-value (0.7530), therefore the alternative hypothesis is rejected.

The null hypothesis H12: IBOVESPA does not Granger Cause NASDAQ, is accepted at the 5 percent significance the P value (0.5976), therefore the alternative hypothesis rejected.

VII. CONCLUSION

The Indian market are highly volatile because of that investor are not able to invest the money in the stock market. If the investor are able to predict the market that will help the investor to invest money in the market. That will only know after knowing that Indian market will dependent on any other market. This paper infers that their Indian market has highly unpredictable it changes due to some reason, to know the purpose behind that the day by day returns of NSE are gathered and compare and other two market returns (USA and Brazil showcase). The Indian market are more invested by the foreign investors, if the other country face any problem that will also impact on the Indian market. The NIFTY has increasingly dependent on the NASDAQ and IBOVESPA market. All the three indexes are a progressively positive connection with the exception of some cases. By watching those two indices we can foresee the up to some degree of Indian records. Those lists are associated with all things considered the financial specialist can predict the Indian market by watching those two indices. The Indian indices will more dependent on the USA and Brazil market. In case any problem in the USA and Brazil that will directly impact on the Indian market because of the Indian market and other two are positively correlated. And in India any things happens that will affects the ibovespa (Brazil) market.

REFERENCE

[1] Ahmad, Ashraf, and Ahmed (2005), "Is the Indian Stock Market Integrated with the US and Japanese

[2] Markets? An Empirical Analysis", South Asia Economic Journal, Vol.6 (2), pp.193-206.

[3] Oque (2007), "Co-movement of Bangladesh stock market with other markets-coIntegration and error

[4] Correction approach", Managerial Finance, Vol.33 (10), pp. 810-820.

[5] Johansen, S. (1991), "Estimation and Hypothesis Testing of Co-integration Vector in Gaussian Vector

[6] Autoregressive Models." Econometrics vol. 5, 1551-1580.

[7] Khan Masood Ahmad (2005), "Is the Indian Stock Market Integrated with the US and Japanese

[8] Markets?" South Asia Economic Journal, Vol.6 (2), pp. 193-206.

[9] Nair Abhilash S. and Dr. A. Raman than (2003), "Analysis of Co-Movements of Select US & Indian

[10] Stock Price Indexes", pp. 1-19.

[11] Wong and Ng, (1992), "Interactions between the U.S. and Japan Stock Market Indices", Journal of

[12] International Financial Markets, Institutions and Money, Vol2 (2), pp. 51-69.

[13] Chaitanya, C., 2015. Comparative analysis of international stock markets.IRACST–International Journal of Commerce, Business and Management (IJCBM), 4(1), pp.996-998.

[14] Gupta, N. and Agarwal, V., 2011. Comparative study of the distribution of Indian stock market with other Asian markets. International Journal of Enterprise Computing and Business Systems, 1(2), pp.1-20.

[15] Mukherjee, D., 2007. Comparative analysis of Indian stock market with international markets. Great Lakes Herald, 1(1), pp.39-71.2

[16] Patel, R.J. and Patel, D., 2012. The study on comovement& interdependency of Indian stock market with selected foreign stock markets. International Refereed Research Journal, 3(2), pp.30-42

[17] Atil, P.C. and Rajib, P., 2011. Intraday return dynamics and volatility spillover between NSE S&P CNX Nifty stock index and stock index futures. Applied Economics Letters, 18(6), pp.567-574.

[18] Sharma, J.L. and Kennedy, R.E., 1977. A comparative analysis of stock price behavior on the Bombay, London, and New York stock exchanges. Journal of Financial and Quantitative Analysis, 12(03), pp.391-413.

[19] Srikanth, P. and Aparna, K., 2012. Global stock market integration-a study of select world major stock markets. Researchers World, 3(1), pp.203.

 DOI : 10.18231/2454-9150.2019.0469