INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT

ISSN 2278 – 0211 (Online)
ISSN 2278 – 7631 (Print)

Integration of Indian Markets with Select Global Markets: Changing Paradigms and Dynamics

Deepak R.
Assistant Professor, M. P. Birla Institute of Management, Bangalore, India
Sandeep M.
Student, M. P. Birla Institute of Management, Bangalore, India

Abstract:
Globalization and integration of the international markets has been responsible for inseparable co-existence of time management and money flow across the world. Today it is very difficult for survive without the knowledge of our economic environment which is dynamic. The first principal of investments is to diversify and hold a well diversified portfolio in different stocks, not only in India but to have international diversification. International diversification is sought due to differences in the levels of economic growth and timing of business cycles among various countries. But due to growing international trade, investment flows, deregulation of the financial systems and growth in international capital flows, national economies have become more closely linked. . A comprehensive study on stock market integration carries a lot of importance in the present day Situation keeping into consideration both retail and institutional investors. Thus the study tries to understand the intensity of the stock market integration for diversification motives of both retail and institutional investors. The study was conducted considering five major indices of the world namely BSE 30, NSE CNX NIFTY, HANG SANG index, S&P 500, and KLSE COMPOSITE for the period 2002-13. From the study it was observed that correlation among the returns of the indices has increased over the period of time. It may be seen as first indication for the increasing interdependency and integration of the markets. All the indices considered were found to be co-integrated emphasizing the existence of long term relationship. Granger causality test show one-way and two-way integration between the indices which have considerably changed over the time period.

Key words: *Co-integration, Granger-Causality, Integration, Retail investors, indices*

1. Introduction

Globalization and integration of the international markets has been responsible for inseparable co-existence of time management and money flow across the world. Today it is very difficult for survive without the knowledge of our economic environment which is dynamic. Knowledge of the international stock market structure is crucial for both retail investors and Institutional investors. The first principal of investments is to diversify and hold a well diversified portfolio in different stocks, not only in India but to have international diversification. International diversification is sought due to differences in the levels of economic growth and timing of business cycles among various countries. But, if the stock markets of different countries move together, then investing in different national stock markets would not generate any long term gain to portfolio diversification. For an investor, International Portfolio Diversification is always considered beneficial on the assumption of low Correlations/integration among different national stock markets. But due to growing international trade, investment flows, deregulation of the financial systems and growth in international capital flows, national economies have become more closely linked. A comprehensive study on stock market integration carries a lot of importance in the present day Situation. when Indian economies are among fastest growing economies in the world. Policymakers need to understand the emerging stock market interdependence. Such an understanding will provide a better grasp of the functioning of the Indian stock markets, and allow investors and policy makers to ask various questions regarding the actual trend (i.e., constant, increasing, or decreasing) of interdependence among them. Thus the study tries to understand the extent of integration of stock markets and intensity of the stock market integration keeping in point the diversification goal of investors, portfolio managers and institutional investors.

2. Literature Review

The literature review points towards the fact that studies have been done on integration of various markets throughout the world. The studies try to consider the integrations among the developed countries mostly. Only recently do we observe studies leaning towards understanding the integration level among major developed and developing nations considering the impact of informational technology.

Saif siddique (2009) examined the association between S & P CNX Nifty and selected Asian and US stock markets. The author tries to examine the integration of stock markets in longitudinal rather than cross sectional, thus adding to the literature. Interdependency among global stock markets is studied primarily through correlation of returns, Co-integration and the Granger Causality tests in this study. The study considers thirteen indices for the study which are analyzed over two time frames mainly 1999-2004 and 2004-2009. No very clear direction of relationships was found to exist in the sense of Granger Causality indicating the fact that influence of few markets, especially that of the US, has eroded over a period of time.

Silvio John Camilleri (2006) examined the "stylized facts", which are nothing but distinct characteristics of stock market data. The author examines the stylized facts such as non-stationary of price levels, autocorrelation and heteroskedastic behavior of stock prices. For the study, nine emerging market indices namely BOLSA (Argentina), CASE 30(Egypt), BSE 500 (India), JSE Index (Jamaica), LITIN (Lithuania), SBI 20 (Slovenia), MSE Index (Malta), SEMDEX (Mauritius), and TSEC 50 (Total Return) (Taiwan) were considered. The results do not disclose asymmetry in the tails of log return distributions in any particular direction. In addition, it is not confirmed that high volatility tends to follow large negative returns. The empirical results confirmed that stock price levels are often non-stationary and that it is more reasonable to transform the data into logarithms.

Debjiban Mukherjee (2007) examined the integration of Indian stock markets with select few international indices by examining the trends, similarities and patterns in activities and movements. For the study, five stocks markets based on specific qualitative attributes were classified namely Market capitalization, Number of listed securities, Listing agreements, circuit filters and settlement. The stock exchanges considered were NSE, NYSE, Hang sang, Russian and Korean. The study was conducted for the period 1995-2006. To test for integration of the markets, statistical methods such as correlation analysis, exponential trend analysis and the risk-return analysis was used. It was observed that when compared to Russian stock markets, NSE was observed to be more volatile in nature. NSE mainly rose because of tech boom till mid of 2000 which detrended back by 2001. Interest rate regimes and other macroeconomic factors were found to be responsible for consistent uptrend of NSE. From the study it was found that Hang Seng though very volatile in nature had less correlation with the Indian markets uptil 2003. Hang seng rose during 1996 because of east asian miracle. By year 2000, the index had crashed due to fear of recession. But, it was found that hangsang index and NSE were reacting almost identically after 2003 which means larger integration of the Indian economy in the foreign market and impact of investments by FIIs and other foreign investors. NSE and NYSE markets were found to be highly correlated after mid 2000 reflecting the beneficial effect of tech boom on both the markets. NSE and Korean stock exchanges are found to be highly correlated though east asian crisis had more impact on Korean stock exchange due to its integration with east asian economies. The study find conclusive evidence of integration of the Indian markets with the global markets much more in the recent years (maily after 2006) than the previous years as India before 2000 was in its inception stage as a globalized economy, thus being directly protected from foreign exposure.

Masih, M.M. Abul and Masih, Rumi (1997) examined the dynamic linkage patterns among national stock exchange prices of four Asian newly industrializing countries - Taiwan, South Korea, Singapore and Hong Kong. The sample consisted on closing daily share price indices data of the four stock markets from January 1982 to June 1994. They concluded that the study of these markets are not mutually exclusive of each other and significant shortrun linkages appear to run among them.

Agarwal, R N (2000) examined the impact of financial integration on Indian capital markets in terms of growth, volatility, and market efficiency. The study mainly concentrates on the major regulatory and macroeconomic factors which were responsible for the growth of Indian primary and secondary markets in India mainly after the economic reforms in 1990. The study also examines the market efficiency and random walk theory of Indian stock markets by considering a sample of nine major industries and Reserve Bank of India (RBI) monthly index of ordinary shares for the entire industrial sector as a representative of market behavior for the period April 1994 to March 1999. The study considers the Capital asset pricing model (CAPM) to analyze the theory of random walk. Government Treasury bill for 91 days is used as a riskless rate of return. The study finds significant differences in the beta values before and after the economic reforms of 1990 among many sector industries. The beta values which were significantly high in textiles, cement and electricity generation sectors during 1988-89 to 1990-91 is found to disappear with beta values being seen higher in metal & metal products, finance and investments industries. The author explains this phenomenon by the impact of southeast Asian financial crisis on other developing countries. The study concludes that Indian stock markets are still poorly integrated with the developed international capital markets , hence providing huge opportunity for investors to diversify their portfolio.

3. Problem Statement

From the literature review we can conclude that the level of integration of Indian stock markets with the other developed and developing countries after economic reforms in 1990 has significantly improved. Advent of information technology and telecommunications industry has significantly diminished the chances of finding arbitrage opportunities for making profits in both primary and secondary markets for investors. The recession caused due to sub-prime crisis had its impact throughout the globe. If Indian markets integration with rest of world has significantly improved during recent times then the impact of recession will percolate into Indian stock markets. Thus the study concentrates on understanding the level of integration of Indian stock markets with global indices and the cause and effect relationship that exists between the markets.

4. Objectives of the Study

- To examine the long run relationship between the Indian stock markets with global markets.
- To examine whether Indian stock markets have causal effect with global markets.
- To analyze the impact of global recession on Indian stock markets.

5. Hypotheses of the Study

- For the study, following hypotheses were tested namely;
- H_{01} = There is no change in the short run relationship between NIFTY and global markets.
- H_{02} = There is no long run relationship between Nifty and global indices
- H_{03} = There is causality effect between NIFTY and global markets.
- H_{04} = There is no significant increase in volatility of NIFTY returns after recession.

5. Data Collection

For the study, data of five major market indices namely India, USA, Malaysia and Hong Kong were considered for the study. A representative market index from each country was chosen for the study. The indices considered were BSE Sensex, NSE Nifty, Hang Sang index, S& P 500 and KLSE composite index. The daily closing prices of all indices were collected from YAHOO.COM and respective market stock markets websites for a period from January 2002 to January 2013.

6. Research Methodology

The overall period 2002-2013 was divided into two sub-periods namely period-I which designates the stock markets before recession (January 2002-January 2007) and period II which designates the stock markets after the recession (January 2007- January 2013).
The returns of daily closing prices for the period are computed as shown below:

$$r_t = \ln (Pt/Pt\text{-}1)$$

Where r_t refers to returns on the closing prices, p_t refers to closing prices of indices on day t and p_{t-1} are the closing prices on the indices on day t-1
Descriptive statistics mainly the mean, standard deviation, skewness, kurtosis was examined was each indices. Jarqua-Bera statistic and Durbin Watson statistic were examined to observe if the indices considered were normally distributed and whether or not serially correlated respectively.
To understand the short run relationship between Indian markets and global markets, correlation between the indices was computed using the following equation:

$$\rho_{X,Y} = \frac{\operatorname{cov}(X,Y)}{\sigma_X \sigma_Y} = \frac{E[(X-\mu_X)(Y-\mu_Y)]}{\sigma_X \sigma_Y}$$

Where Cov(X,Y) represents covariance between the two indices and σ represents the standard deviation. Correlation coefficients vary between -1 to +1 indicating the level of integration between the indices over a short period of time.
To examine if there exists long run relationship between the indices, co-integration method was followed.

Economically speaking, the two variables (X and Y) are said to be co-integrated if they have a long-term, or equilibrium, relationship between them. (Damodar Gujarati, 2004). The test involves estimating the following pair of equations

$$Y_t = \beta_1 + \beta_2 X_t + \mu_t \quad \text{.....(1)}$$

$$\mu_t = Y_t - \beta_1 - \beta_2 X_t \quad \text{.....(2)}$$

As observed in the co-integrating regression in equation-1, Yt and Xt are the times series considered and ' β2' is the coefficient parameter. μt is the 'noise' term reflecting other factors that influence dependent variable. We considered the all the time series to be integration to order 1, i.e. I(1). If μt is subjected to unit root analysis and if we find it is stationary, that is, it is I(0), we can conclude that the linear combination cancels out the stochastic trends in the variables considered and the two variables are co-integrated. Thus, long term relationships between all the indices were calculated.
Although regression analysis indicates nature of relationship, it does not necessarily imply causation or direction of influence. Thus in order to understand the causal effect, Granger-causality test was conducted. Granger causality test assumes that the information relevant to the predication of the variables is solely contained in the data collected. (Damodar Gujarati, 2004)
The test involves estimating the following pair of regressions

$$X_t = \sum_{i=1}^{n} \alpha_i Y_{t-i} + \sum_{j=1}^{n} \beta_j X_{t-i} + \mu_{1t} \quad \text{.....(3)}$$

$$Y_t = \sum_{i=1}^{n} \lambda_i Y_{t-i} + \sum_{j=1}^{n} \delta_j X_{t-i} + \mu_{2t} \quad \text{..... (4)}$$

Where it is assumed that disturbances μ1t and μ2t are uncorrelated. Thus the equation 3 postulates that variable X is related to past values of itself as well as that of variable Y and equation 4 postulates the similar behavior for variable Y. From the regression analysis, we distinguished the relationships by four cases namely;

- Unidirectional Causality from X to Y is indicated if the estimated co-efficients on the lagged X in equation-3 are statistically different from zero as a group and the set of estimated coefficients on the lagged Y in equation-4 is not statistically different from zero.
- Conversely, unidirectional causality from Y to X exists if the set of lagged X coefficients in equation-3 is not statistically different from zero and the set of the lagged Y coefficients in equation-4 is statistically different from zero.
- Feedback, or bilateral Causality is suggested when the sets of X and Y variables coefficients are statistically significant different from zero in both regressions.
- Finally, independence is suggested when the sets of X and Y variables coefficients are not statistically significant in both the regressions.

Thus, if variable X (Granger) causes Variable Y, then changes in X should precede changes in Y. Therefore, in a regression of Y on other variables (including its own past values) if we include past or lagged values of X and it significantly improves predication of Y, then we can say that X (granger) causes Y And Vice verse.

7. Data Analysis And Interpretation

The descriptive statistics for the period-I (2002-2007) and period-II (2008-2013) for all the indices is shown in Table 1. We can observe clearly that the returns in the period –II has drastically reduced after the recession. The returns of all the indices show a large variation. The volatility, in terms of standard deviation has shown significant decrease indicating the heavy losses suffered by the investors and therefore lost interest in the stock markets. Thus the period-II shows increased activity from centralized, institutional major players. The significant changes in the returns and volatility, points towards impact of recession which originated in USA to have an impact on all the stock markets returns as a whole. Considering the Jarque-Bera Statistic and its probability, the returns seem to be not normally distributed which points towards considering the issues of stationarity mainly autocorrelation and heteroscedasticity. It was thus necessary to determine whether the return series of the indices were stationary or not. In Figures 1 to 5 we plot the closing prices and returns of all the indices. At first glance, the return series appears to be stationary in nature with zero mean but with variability in the intensity of the returns.

As a formal test of stationarity, we use Augmented Dickey-Fuller (ADF) test. The ADF test which is common for determining unit roots. The ADF test which consists of regressing the first difference of the series against a constant, the series lagged one period, the differenced series at n lag lengths and a time trend (pindyck and Rubinfeld, 1998, p. 509) rejects the null hypothesis of non-stationarity at 1 percent level of significance. The ADF test statistic values are well below the critical values at 1 percent level of significance and also showing consistency with different lag structures and to the presence of the intercept or intercept and trend.

To understand if there existed long term relationship between the indices, co-integration test was conducted. Co-integration is a property of two or more variables moving together through time, and despite following their own individual trends will not drift too far apart since they are linked together in some sense. The results of the unit root test show that the time series of indices of share prices related to various stock exchanges under study are I (1). Therefore, co-integration will be a suitable means for correctly testing hypotheses concerning the long-term relationship among the time series under the study. It tests a set of null hypothesis that there exist no co-integrating equations among variables. The results of co-integration test for the period-I and period-II are shown in Table 3 and Table 4.

From the cointegration results, we can interpret that there exists long term relationship between the indices considered. But, we wanted to analyse what kind of causal relationship exists between these indices. Does clues from Indian markets impact other markets or is it the other way round. For the analysis considering the series as stationary, the test was performed on the level values of all the indices. The number of lags to be considered is decided based on Schwarz information criteria and Akaike information criteria. To the null hypothesis of no granger causality between the indices, the following results were obtained as shown in Table 5. We can infer that Indian markets are definitely impacted by the clues from US markets and Hong Kong market which are the major stock markets. Malaysian markets does not seem to have an impact on Indian markets as information is already assimilated from the Hong Kong

market. We can observe that with growing importance of Hong Kong market in the asia pacific region, the effect of American markets on Indian markets is diminishing which is reflected in no casual effect in period-II.

8. Finding Of The Study

- The standard deviation of all the major indices considered were found to be significantly reduced in terms of volatility which points towards effective information assimilation among the major economies and impact of recession on major stock markets. This is one way of understanding globalization and integration of global markets.
- Correlation among the returns of the indices under study has increased in all possible correlations. It may be seen as first indication for the increasing interdependency among them.
- All the indices considered were found to be non stationary in nature and thus required treatment of ADF test to make it stationary. Thus the indices were integrated to the order one.
- Co-integration/Long run relationship exists between Indian markets with other major markets mainly the US and Hong Kong Market. But it is evident that the influence of US markets is diminishing due to raising popularity of Hong Kong markets throughout the world as a major market in asia-pacific region.
- It was observed that though there exists long run relationship between Indian markets with other markets, the influence of Hong Kong market is gaining ground as a major market in asia-pacific region.

9. Conclusion

The study aimed at understanding the level of integration of the Indian stock markets with the major global markets. The study also aimed at understanding the causality effects in various indices across the world in context of globalization and increased improvements in information technology. The study definitely finds aspects of efficiency in the Indian stock markets on a stand alone basis. It is clearly evident that Indian stock markets are integrated with global markets, more so in the recent time, i.e, post-2007 but it is observed that the impact of US stock markets directly on Indian markets is fading away which is replaced by Hong Kong market. The increased integration of Indian markets with the global markets may be due to Globalization, Advent of information technology and mainly increased cross-holding (Debjiban Mukherjee, 2007) maybe also the reason. Cross-Holding is basically a situation in which a publicly-traded corporation owns stock in another publicly-traded company. So, technically, listed corporations own securities issued by other listed corporations. Thus, increasing the degree of integration in different dimensions in the recent times. Information technology also has played a very key role in integration of the markets throughout the world. The automation of the exchanges has played a vital role in making the financial markets integrated in the long run. The integration of the markets is also amplified by the issuing of ADRs and GDRs, along with increased liberalization of the various economies across the globe. Increased trade and the rise of Multinational corporations have contributed immensely to the integration process. Thus, from the study we can conclude that from an investor perspective, the strategy of diversification globally to make abnormal profits is slowly losing importance. With integration of the markets by automation, global markets today are operating seamlessly for 24 hours a day with opening of the markets in different time zones at various points of time. Thus we can conclude that global markets have definitely integrated to a larger extent with Indian stock markets. The magnitude of movement in Indian stock markets as a result of global clues is definitely a fact to be considered seriously by all the investors.

10. References

1. Silvio John Camilleri, “AN ANALYSIS OF STOCK INDEX DISTRIBUTIONS OF SELECTED EMERGING MARKETS”, Bank of Valletta Review, Vol. 33, pp. 33-49, Spring 2006
2. Debjiban Mukherjee, “Comparative Analysis of Indian Stock Market with International Markets”, Great Lakes Herald – April 2007 Volume 1, Issue 1, pp 39-71
3. Dr Saif Siddiqui, “Examining Associations between S&P CNX Nifty and selected Asian & US Stock Markets”, NSE Research papers, 2009
4. Mohamed El Hedi Arouri, “Are Stock Markets Integrated? Evidence from a Partially Segmented ICAPM with Asymmetric Effects”, Frontiers in financial economics, vol 3, issue 2, pp 70-94, 2009
5. Masih, A.M.M. & Masih, R.. A comparative analysis of the propagation of stock market fluctuations in alternative models of dynamic casual linkages. Applied Financial economics, vol 7, issue 1, pp 59-74, 1997
6. Agarwal, R N, “ Financial integration and capital markets in developing countries: A study of growth, volatility and efficiency in the Indian capital market’, mimeo, Institute of economic growth, Delhi. vol 2, 2000
7. Damodar N Gujarati, Basic Econometrics, Fourth Edition, (International Edition, 2003), McGraw-Hill publication
8. Maddhala G.S., Introduction to Econometrics, Third Edition, 2005, Wiley-India Edition, New Delhi,
9. www.yahoo.com retrieved on May 28th 2013
10. www.bseindia.com retrieved on May 28th 2013
11. www.nseindia.com retrieved on May 28th 2013.

11. Appendix

	BSE	NIFTY	HANGSENG (MALAYSIA)	KLSE COMPOSITE	S&P 500
Mean	0.026075	0.024580	0.010461	0.009296	0.005938
Median	0.033088	0.030208	0.011297	0.012245	0.010538
Maximum	0.157417	0.163752	0.088349	0.114077	0.086449
Minimum	-0.1583448	-0.173988	-0.096742	-0.103112	-0.110024
Std.Dev	0.064470	0.067000	0.043252	0.039434	0.034670
Skewness	-0.562310	-0.545848	-0.517908	-0.000601	-0.676850
Kurtosis	3.132509	3.315848	2.795055	3.736749	4.775400
Jarque-Bera	3.205824	3.228883	2.787288	1.357000	12.46138
Probability	0.201309	0.199002	0.248169	0.507378	0.001968

Table 1: Descriptive Statistics of Five Indices for the Period 2002-2007
Source: Authors

	BSE	NIFTY	HANGSENG (Malaysia)	KLSE Composite	S&P 500
Mean	0.007901	0.008409	0.004461	0.003852	0.001690
Median	0.003071	0.005519	0.013479	0.009061	0.009603
Maximum	0.282551	0.280660	0.170737	0.135454	0.107723
Minimum	-0.238901	-0.264103	-0.224661	-0.152226	-0.169425
Std.Dev	0.081608	0.082737	0.076608	0.042670	0.052092
Skewness	0.098322	-0.050199	-0.332126	-0.481395	-0.610765
Kurtosis	4.634993	4.924611	3.448506	5.437353	3.607230
Jarque-Bera	7.909623	10.83311	1.873634	20.03067	5.427525
Probability	0.019162	0.004442	0.391873	0.000045	0.066287

Table 2: Descriptive Statistics of the Major Indices for the Period 2008-2013
Source: Authors

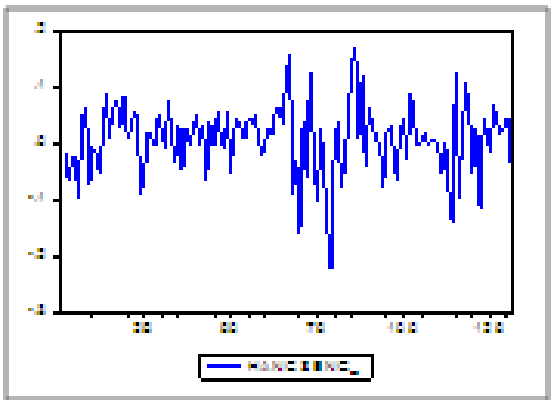

Figure 1: Returns Of Hang Seng For Period 2008-13

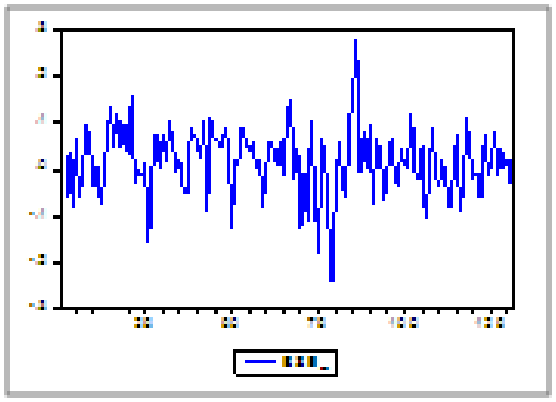

Figure 2: Returns Of BSE Sensex For Period 2008-13

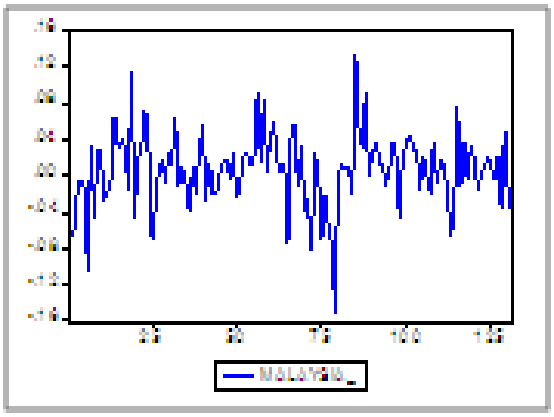

Figure 3: Returns Of Hang Seng For Period 2008-13

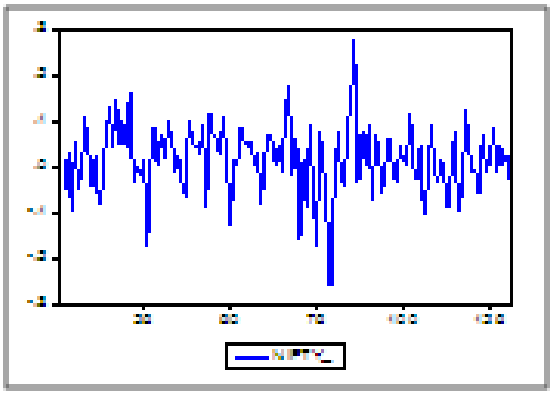

Figure 4: Returns Of BSE Sensex For Period 2008-13

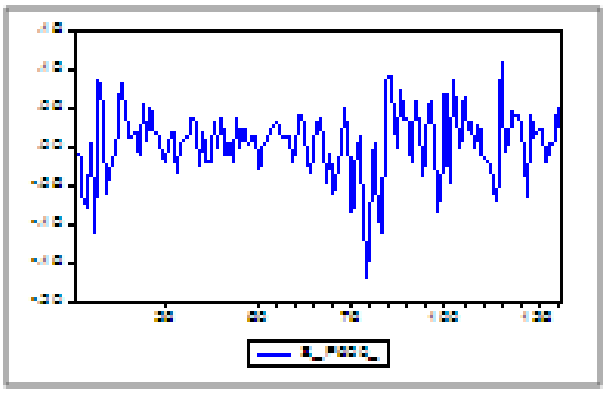

Figure 5: Returns Of S&P 500 For The Period 2008-13

Figure 1-5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.637013	124.3224	69.81889	0.0000
At most 1 *	0.421503	66.55929	47.85613	0.0004
At most 2 *	0.258708	35.36196	29.79707	0.0103
At most 3 *	0.211384	18.29840	15.49471	0.0184
At most 4 *	0.080154	4.762294	3.841466	0.0291

Trace test indicates 5 cointegrating eqn(s) 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 No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.637013	57.76313	33.87687	0.0000
At most 1 *	0.421503	31.19733	27.58434	0.0164
At most 2	0.258708	17.06356	21.13162	0.1690
At most 3	0.211384	13.53610	14.26460	0.0649
At most 4 *	0.080154	4.762294	3.841466	0.0291

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 3: Co-Integration Test Results For the Period –I

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.574026	137.5319	69.81889	0.0000
At most 1 *	0.329522	77.79548	47.85613	0.0000
At most 2 *	0.295703	49.81197	29.79707	0.0001
At most 3 *	0.200768	25.27313	15.49471	0.0012
At most 4 *	0.127978	9.585858	3.841466	0.0020

Trace test indicates 5 cointegrating eqn(s) 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 No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.574026	59.73646	33.87687	0.0000
At most 1 *	0.329522	27.98351	27.58434	0.0445
At most 2 *	0.295703	24.53883	21.13162	0.0159
At most 3 *	0.200768	15.68727	14.26460	0.0296
At most 4 *	0.127978	9.585858	3.841466	0.0020

Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 4: Co-Integration Test Results for the Period-II

	HANGSENG		MALAYSIA		NIFTY		S_P500		BSE	
Symbol	I	II	I	II	I	II	I	II	I	II
HANGSENG	--	--	0	0	⟷	0	0	0	⟷	0
MALAYSIA	→	0	--	--	0	0	0→	0	0	0
NIFTY	⟷	→	0	0	--	--	⟷	0	0	0
S_P500	0	0	0	0	⟷	0	--	--	⟷	0
BSE	⟷	0→	0	0	0	0	⟷	0	--	--

Table 5: The Results of Granger-Causality Test For the Period I and Period II Respectively For All Indices

Note. 1: → denotes Causality from one side /market having impact on other markets, whereas ⟷ means Causality from both sides and '**0'** is put for no causality between the indices.
Note 2: The precise table is formed from the analysis of Granger Causality between the indexes