

STOCK MARKET MOVEMENTS AND LINKAGES BETWEEN EMERGING MARKETS IN ASIA AND DEVELOPED MARKET INDICES: SHORT RUN AND LONG RUN ANALYSIS

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Abstract

This research paper investigates the stock market movements and linkages between the Asian emerging markets (China, India, Indonesia, Korea, Malaysia, Philippines, Taiwan and Thailand) and two developed markets (i.e. USA and Japan). This study employs the statistical application of descriptive statistics, unit root test, correlation and pairwise granger causality test. The study used daily data from 01st January, 2005 to 31st December, 2014, to examine both short-run (year wise) and long-run (whole study period) movements and linkages between Asian emerging stock markets and two developed stock markets. The presence of short-run relationship and absence of a strong long-run relationship, among these markets, were found. The short run (year wise) and long run movements and linkages have important implications for investors, risk managers and regulators. It is found that Indian stock market experienced less movements with developed markets (USA and JAPAN). This study also suggested that India's stock market is largely protected from global events i.e., 2007-2008. The sample stock markets of these eight countries of Asian emerging markets provide attractive diversification opportunities, for international portfolio investors during the long run period. All the eight countries of Asian emerging markets provide attractive diversification opportunities for international portfolio investors, over a long period.

Keywords: Stock Market Movements and Linkages; Asian Emerging Markets; Developed Markets; Short Run and Long Run; Correlation Matrix and Pairwise Granger Causality Test.

JEL Classification: B26; C12; C22; C58; G11; G15

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INTRODUCTION

Capital Market plays an important role in the economy of a country because among many functions, it serves two main functions. First, Capital Market serves as an alternative for a company's capital resources. The capital gained from the public offering, could be used for the company's business development, expansion, and so on. Second, it serves as an alternative for public investment. The people could invest their hard earned money, according to their preferred returns and risk characteristics of each instrument (Napitupulu, T.A and Wijaya, Y. B., 2013). Capital Market is the market system in which long term financial instruments, such as bonds, equities, mutual funds and derivative instruments, are traded. It serves as an alternative for a company's capital resources and public investment which could be used for infrastructures needed for the development of the firms in the long run. Over the past few decades, the infrastructure development has been playing an increasingly important role in promoting sustainable economic development. The development of capital markets has also been recognized as important for sustaining the economic development (Masahiro Kawai and Andrew Sheng, 2012).

The emerging capital markets, evolved significantly over the last three decades and they have adopted constant innovation, to

improve liquidity and market microstructure. Similar to developed markets, the system of emerging capital market also facilitates the allocation of available fund, the raising of capital and the risk sharing, both at national and international levels, through their linkages to world capital markets (Mohamed E1 Hedi Aroui et al., 2010). The concept of "Emerging Markets", used in the beginning of the 1980s, was initially developed to designate financial markets located in developing countries. The term "Emerging Markets" was coined by World Bank economist, Antoine W. Van Agtmael (1981) and it refers to nations undergoing rapid economic growth and industrialization. The term is often used interchangeably with 'emerging and developing economies and describe it as economies with low to middle per capita income (Economy Watch, 2010). According to the modern portfolio theory, the evaluation of the co-movement is of striking importance for international investors who are engaged in a continuous search for benefits arising from a well-diversified global portfolio. The co-movement and linkages of stock returns are not stable over time. Longin, F and Solnik, B., 1995 emphasized the importance of examining co-movement dynamics. The co-movement is the tendency of two variables, e.g. the returns from two investments to move in parallel. It could be measured by using correlation coefficient. The degree of

international co – movements in stock price indices, has changed significantly since the crash of UK, German and French stock markets, being related with the U.S. market, only after the crisis (Arshanapalli, B and Doukas, J., 1993). International diversification strategy brings more profits while insuring a reduction in risk (Kasilingam Lingaraja et al., 2015_b).

REVIEW OF LITERATURE OF THE STUDY

An attempt has been made to review the earlier research works undertaken in the area of stock market movement and linkages of emerging stock markets with developed markets, to test the investment opportunities, portfolio diversification and benefits, and also to understand research gaps, tools used and findings of earlier studies

Harvey Arbelaez et al. (2001) examined the short-term and long-term linkages among the several stock indices of the Medellin Stock Exchange, Colombia, through causality and cointegration methodologies. It was observed that the short-term and long-term linkages, among the sample indices, became stronger over time. It was found that the national markets of USA, Europe, and Asia, were more integrated with each other during the study period. Gong-meng Chen et al. (2002) studied the behavior of stock prices in six major Latin American stock exchanges, using univariate and multivariate approaches. The sample stock exchanges included Brazil, Mexico, Chile, Argentina, Colombia and Venezuela markets. It was found that investing in various Latin American stock markets, offered limited risk diversification, until 1999. Manuel Illueca and Juan Angel Lafuente (2002) provided additional insights into the issue from a data set of main international stock markets. It is suggested that risk-averse investors, who sought portfolio diversification must take into account a large number of assets. Orawan Ratanapakorn and Subhash C. Sharma (2002) investigated the short-term and long-term relationships in five regional stock indices (USA – S&P 500 Index, European Index, Asian-Pacific index, Latin American index and Eastern European-Middle East index), during the pre-Asian crisis (January 1, 1990 to December 31, 1996) and Asian crisis (July 2, 1997 to March 10, 2000) periods. Statistical tools like Unit Root Test (ADF and PP), Co integration, Granger Causality and Vector Error Correction Model (VECM) were used. It was found that the US stock market was the most influential one among regional markets during the study period. Eiji Fujii (2005) analyzed the causal linkages among several emerging stock markets (Hong Kong, Malaysia, Philippines and Thailand) in Asia and Latin America (Argentina, Brazil and Chile), using the daily observations. It was found that there were indeed considerable causal interactions across the emerging stock markets. In other words, within each region as well as across the two regions, the stock markets appeared to become more interdependent with each other. Szali Zainal Abidin (2006) studied the relationship (by correlation coefficient) between Malaysia and other sample countries, during different sub-periods, broken by pre, during and post-crisis or stock market crash. The MSCI country indices and domestic-based stocks moved together during crisis periods and the least during non-crisis periods. Ming-Shiun Pan et al. (2007) demonstrated the dynamic linkages between the foreign exchange and stock markets of seven East Asian countries (Hong Kong, Japan, Korea, Malaysia, Singapore, Taiwan, and Thailand). The findings indicated that the linkages could vary across economies, with respect to exchange rate regimes, the trade size, the degree of capital control, and the size of equity market. Abbas Valadkhani and Surachai Chancharat (2008) investigated the long-run and short-run relationships between the Thai stock market and its major trading partner countries (Australia, Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, the UK and the US). It was found from the results that there was bidirectional Granger causality between the stock returns in Thailand and three of its

neighboring countries (i.e. Malaysia, Singapore and Taiwan). Panayiotis F. Diamandis (2009) examined the dynamic behaviour of stock market volatility, among four sample Latin American stock markets (i.e., Argentina, Brazil, Chile and Mexico). The mature stock market of US had got changed during the last two decades. Zeynel Abidin Ozdemira et al. (2009) analyzed the dynamic linkages between the equity markets of a center (US) and its periphery emerging markets (Argentina, Brazil, Chile, China, Indonesia, Malaysia, Mexico, Peru, Philippines, Singapore, South Korea, Taiwan, Thailand, Turkey and Venezuela). This study found significant causal relation between S&P 500 and all emerging stock markets, by using Unit Root Test, Multivariate Co Integration Test and Pair wise Granger-Causality Test. Ashwin G. Modi et al. (2010) explored the co-movement pattern of risk and return (long run) among the eight stock markets, using Principal Components Analysis, during the study period. It was observed that the eight stock markets were fragmented into two major components – American Region (DJIA, NASDAQ, MXX and BVSP) and emerging markets (BSE, HANGSENG and RTS). According to Rakesh Gupta and Francesco Guidi (2012), there was linkage between stock market of India and three developed markets through integration methodologies and correlation. It was observed that there was a short-run relationship and absence of a strong long-run relationship among these markets and it was suggested that the absence of long-run linkages among these markets, may provide potential benefits for the investors that look at emerging markets, to enhance their risk adjusted returns by including emerging markets in their portfolios. Cristiana Tudor and Carmen Popescu – Dutaa (2012) investigated the issue of Granger causality between stock prices and exchange rates movement for developed (Australia, Canada, France, Hong Kong, Japan, United Kingdom, and United States) and emerging financial markets (Brazil, China, India, Korea, Russia and South Africa). Kasilingam Lingaraja et al. (2014_a) studied the indices of eight Asian emerging markets and one developed market, namely, Singapore. The inter linkages and co-movements of markets were tested, by using 12 year period time series data. It was pointed out that the retail investors may use this information for making efficient investment decisions while investing in the indices of emerging stock markets in Asia. Kasilingam Lingaraja et al. (2014_b) investigated the efficiency of stock market and volatility behavior of eight Asian emerging market indices. This paper provided significant evidences, for market efficiency and randomness distribution, in these emerging Asian markets. Kasilingam Lingaraja et al. (2014_c) investigated the inter linkages and co-movements among Asian emerging stock market indices in general and CNX Nifty index of India in particular. It was found that the four emerging Asian markets (China, Malaysia, Philippines and Thailand) did not record inter linkages and co-movements with India during the study period. According to Kasilingam Lingaraja et al. (2015_a), there was correlation among the returns of six select Asian stock market indices of India, China, Japan, Hong Kong, Singapore, and Taiwan, over a longer time period. It was found that the correlation between the markets, provided useful information, to the foreign institutional investors, portfolio managers, regulators, and policy makers, in designing appropriate strategies to maximize risk adjusted returns. Kasilingam Lingaraja et al. (2015_b) investigated the existence of long run portfolio diversification benefits and opportunities of eight emerging stock markets in Asia and three top, benchmark indices of developed markets. It was suggested, from overseas portfolio diversification analysis, that in Asian emerging stock markets (especially China, India, Malaysia, Taiwan, Indonesia and Thailand), there were good opportunities for overseas portfolio diversification and the investors may earn high return. Kasilingam Lingaraja et al. (2015_c) investigated the dynamic linkages between emerging Asian stock market indices and developed stock market index over the period. It was found that

the emerging stock market indices of Asia, namely, S&P CNX Nifty (India), FTSE Bursa (Malaysia) and Philippine Stock Index (Philippines), recorded dynamic linkages with Dow Jones Industrial Average (USA) and the other five Asian emerging market indices (i.e., SSE Composite Index (China), Jakarta Composite Index (Indonesia), Korea Stock Exchange Index (Korea), TSEC Weighted Index (Taiwan) and SET Index (Thailand)) did not develop dynamic linkages with USA (DJIA), a developed country.

The above literature provides an overview of some empirical studies already undertaken on the same lines of the present research. It is found that only few studies focused on the stock market movements and linkages of emerging stock markets of Asia with developed markets. Besides, the review of earlier studies clearly reveals the fact that there was no comprehensive study, exclusively covering the stock market movements and linkages of emerging stock market indices in Asia with developed markets, both short and long run. Therefore, the present study is an attempt to investigate the stock market movements and linkages for sample indices of eight emerging Asian stock markets, with two developed markets and it may partially fill this research gap.

RESEARCH METHODS

Statement of the Problem

Some of the emerging stock markets in regions like America and Europe, have been extensively researched in the past. But markets like Asia and Africa, have not attracted much academic attention. It is important to note that Asian Region has been considered significant by the international investors, for international portfolio diversification, as the diversification strategy provides effective risk minimization and return maximization. The fluctuations in the Asian emerging markets were attributed heavily to cross border capital flows in the form of FIIs (Debjan Mukherjee, 2007). It is significant to note that the emerging stock markets in Asia, have been experiencing significant growth and achieved high performance but with low correlation with the developed markets. This fact prompted the academic researchers to analyze and find out the reasons behind this fact. The study, on the co-movements (using daily return) between the emerging markets in Asia and developed markets, found correlations to be low and there was less market movements (Udai Lal Paliwa, 2013 and Bodie, et al., 2008). The diversification and overseas portfolio investment decisions are based on several factors. Sound knowledge about stock market performance, movements and linkages between emerging stock markets and developed markets, is essential while developing overseas portfolio diversification strategy and making smart investment decision (Ibrahim, M.H and A.H. Baharom, 2011). There is no secret code, to help the international investors, to identify different portfolios, pertaining to emerging markets like Asian stock markets. Intensive research on portfolio diversification opportunities in emerging markets, is needed to understand the volatility of emerging stock markets and the risk-return opportunity, both short and long run period. Against this background, an attempt has been made in this study, to examine stock market movements and linkages between emerging markets in Asia and developed market indices.

Need and Importance of the Study

The present study examines the stock market movements and linkages, among the indices of selected emerging stock markets in Asia, with two benchmark indices from developed stock markets. It is useful for international portfolio managers, in taking asset allocation decision. In other words, movements and linkages of Asian emerging stock markets with developed markets, provide vital information to international equity investors, both in terms of managing the risk and maximizing the returns. This study would help the investors to identify the best

Asian markets for their investment and decide on a good diversification strategy. The study of this nature could reduce the time of domestic as well as Foreign Institutional Investors (FIIs) for taking better diversification strategy.

Scope of the Study

This study provides a detailed analysis of stock market movements and linkages of emerging equity stock markets in Asia with developed markets. As pointed out earlier, the research studies, covering potential benefits and opportunities in emerging Asian markets in recent times, are limited. Hence this research study tries to fill up this gap in research. An attempt has been made in this study, to find the portfolio diversification opportunities, in Asian emerging markets. Besides, this study tests the normality and stationarity for data adequacy, using descriptive statistics and unit roots. Further, the present study would identify co-movements and dynamic linkages between Asian emerging markets indices and developed markets, using correlation and pairwise granger causality.

Objectives of the Study

The following are the objectives of this research study.

1. To analyse the normality and stationarity of sample emerging Asian markets and developed markets indices, during short and long run periods.
2. To examine the co-movements and dynamic linkages between sample indices of emerging stock market in Asia with selected developed markets, during short and long run periods.

Null Hypotheses of the Study

The following null hypotheses were developed and tested in the study.

NH01: There is no normality among the indices of emerging Asian stock markets and developed markets during short and long run periods.

NH02: There is no stationary among the sample indices of emerging Asian stock markets and developed markets during short and long run periods.

NH03: There is no co-movements between indices of emerging Asian stock markets and developed markets during short and long run periods, and

NH04: There is no bidirectional/ unidirectional linkages between the indices of emerging Asian stock markets with the developed stock markets during short and long run periods.

Methodology of the Study

Sample Selection

In order to examine the stock market linkages and movements between the sample indices of emerging stock markets in Asia and developed markets, the study focused on eight Asian emerging equity markets and two benchmark indices, as identified by the Morgan Stanley Capital International (MSCI). For the purpose of this study, all the eight Asian emerging market indices and two top developed markets were selected on the basis of market capitalization. A total of eight emerging market indices and two indices from developed markets, were selected as the sample. MSCI methodology has been widely used by previous research studies.

Selection of Sample Indices

For the purpose of examining the stock market movements and linkages between sample indices of emerging stock markets in Asia and two benchmark indices from developed stock markets, as pointed out earlier, it was decided to select one index from each sample market. Accordingly, the sample indices (emerging markets in Asia), used in the study, were Shanghai Stock Exchange Composite Index (China), NSE Nifty (India), Jakarta

Composite Index (Indonesia), KOSPI Index (Korea), KLCI (Malaysia), Philippine stock Index (Philippines), TSEC weighted Index (Taiwan) and SET Index (Thailand), while indices of the developed markets were Dow Jones Industrial Averages – DJIA

(USA) and Nikkei 225 (Japan). The details about the names of sample indices, names of sample stock markets, study period and observations used, are given in **Table -1**.

Table -1: The Details of Sample Asian Emerging and Developed Countries and Sample Stock Market Indices

	S.No	Country	Name of the Stock Exchange	Name of the Index	Study Period	No of Obs
Emerging Asian Stock Markets	1	China	Shanghai Stock Exchange	SSE Composite Index	1 st Jan, 2005 to 31 st Dec, 2014	2508
	2	India	National Stock Exchange	S&P CNX Nifty Index	1 st Jan, 2005 to 31 st Dec, 2014	2483
	3	Indonesia	Indonesia Stock Exchange	Jakarta Composite Index	1 st Jan, 2005 to 31 st Dec, 2014	2439
	4	Korea	Korea Stock Exchange	Korea Stock Exchange Index (KOSPI)	1 st Jan, 2005 to 31 st Dec, 2014	2477
	5	Malaysia	Malaysia Stock Exchange	FTSE Bursa Malaysia Kuala Lumpur Composite Index (KLCI)	1 st Jan, 2005 to 31 st Dec, 2014	2470
	6	Philippines	The Philippine Stock Exchange	Philippine Stock Index (PSI)	1 st Jan, 2005 to 31 st Dec, 2014	2441
	7	Taiwan	Taiwan Stock Exchange	Taiwan Stock Exchange (TSEC Weighted Index)	1 st Jan, 2005 to 31 st Dec, 2014	2468
	8	Thailand	Stock Exchange of Thailand	Stock Exchange of Thailand Index (SET Index)	1 st Jan, 2005 to 31 st Dec, 2014	2443
Developed Markets	1	USA	New York Stock Exchange	Dow Jones Industrial Averages (DJIA)	1 st Jan, 2005 to 31 st Dec, 2014	2516
	2	Japan	Tokyo Stock Exchange	Nikkei 225 Index	1 st Jan, 2005 to 31 st Dec, 2014	2464

Source: Morgan Stanley Capital International (MSCI) <http://www.msci.com> retrieved on 15.01.2015

Source of Data

The study used daily adjusted closing prices of each of the sample indices, collected from MSCI Emerging Market Database, Bloomberg database, World Federation of Exchanges (WFE), Yahoo Finance database, available online at www.finance.yahoo.com, Global stock market database online at www.quandl.com, KtStock Feeder (Global Markets Database), Equity Index Data from EconStats database available at www.econstats.com and website of National Stock Exchange (NSE). The other required data were also collected from various books, journals and research databases. Finally, the daily index return were transformed by taking natural logarithm of the raw index return data. The returns, used in each of the time series, were computed as follows:

$$r_t = \log \frac{P_t}{P_{pt}}$$

Where: r_t : the day return, P_t : the value of the index, P_{pt} : the value of the index the previous working day

Period of the Study

The study covered a period of ten years, from January 1, 2005 to December 31, 2014.

Tools used for Analysis

For the purpose of analysis of this study, statistical tools such as descriptive statistics, ADF and PP test, person correlation test, pairwise granger causality and graphs, were used.

Limitations of the study

The study suffers from the following limitations.

- This study considered only eight indices of Asia from emerging market and two indices from developed markets (as identified by MSCI).

- Only four tests (descriptive statistics, unit root test, correlation and pairwise granger causality) were used in this study. There are still many other relevant tests that could have been used to identify the co-movements and linkages of stock markets.
- There are many other elements that may influence the market fluctuation but this study used only one index of the respective country.
- This research work was limited to a ten year period from 01st January, 2005 to 31st December, 2014.
- As the study was based on secondary data, it is beset with certain limitations which are bound to arise dealing exclusively with secondary data.
- All the limitations, associated with the statistical tools used, are applicable to this study also.

RESULTS AND DISCUSSION

Normality for Asian Emerging Stock Markets and Developed Markets

In order to test the normality, for eight Asian emerging stock market and two Developed Markets (both at long run and short run), the descriptive statistics was used. The results of descriptive statistics (Mean, Standard Deviation, Skewness, Kurtosis, Jarque-Bera and Probability) values, for the sample stock market indices (emerging Asian stock markets and developed markets), during short run (year wise) and long run (whole period), are given in **Table -2**. It is noted from the analysis of **short run (year wise)** that the highest mean average returns for sample indices like India (Nifty Index) and Japan (Nikkei 225 Index), were recorded at 0.00123 and 0.00141 respectively, in 2005. Similarly, two indices, namely, Indonesia (Jakarta Composite Index) and Philippines (PSI) in 2006 earned values of 0.00186 and 0.00151 respectively, while China (SSE Composite Index) and India (Nifty Index) earned values of 0.00298 and 0.00184 respectively, in 2007. In the year 2008, all the sample indices recorded negative mean return due to the Global Financial Crisis. Further, in 2009, two countries, namely, India (Nifty Index) and Indonesia (Jakarta Composite Index)

earned values of 0.00245 and 0.00245, respectively. In addition, Indonesia (Jakarta Composite index) in 2010 earned a value of 0.00156 while Indonesia (Jakarta Composite index) and USA (DJIA) in 2011 had earned values of 0.00021 and 0.00027 respectively. But India (Nifty Index) and Philippines (PSI), in 2012, earned values of 0.00101 and 0.00119 respectively while USA (DJIA) and Japan (Nikkei 225 Index) earned values of 0.00086 and 0.00184 respectively, in 2013. China (SSE Composite Index) and India (Nifty Index) recorded the values of 0.00171 and 0.00115 respectively, in 2014. The analysis of the **long run** (2005-2014) period indicated that two indices, namely, India (Nifty Index) and Indonesia (Jakarta Composite Index)

recorded high mean values of 0.00067 and 0.00078 respectively, among the sample indices. The analysis of skewness clearly shows that the values of all sample indices were significantly skewed, i.e., the values of all sample indices were recorded between -3 to +3, both during short as well as long run period. It is significant to note from the **Table - 2** that all the sample indices of emerging Asian markets and two developed markets earned values of kurtosis larger than three and values of Jarque-Bera (JB) were greater than five for all indices, except USA (DJIA Index) in 2005, Taiwan (TWII) in 2008, Indonesia (Jakarta Composite Index) in 2009, Japan (Nikkei 225 index) in 2010 & 2012 and India (Nifty Index) in 2014.

Table - 2: Results of Descriptive Statistics among the Sample Indices during Short and Long Run Period

Sample Markets		Emerging Sample Stock Markets in Asia								Developed Markets	
Years	Statistics	China	India	Indonesia	Korea	Malaysia	Philippines	Taiwan	Thailand	USA	Japan
2005	Mean	0.00025	0.00123	0.00068	0.0018	-0.00001	0.00058	0.00029	0.00021	0.00002	0.00141
	Std. Dev.	0.01329	0.01108	0.01137	0.01049	0.00488	0.0112	0.00813	0.00879	0.00648	0.00855
	Skewness	1.19646	-0.47351	-0.40406	-0.21474	0.26489	-0.2651	-0.0587	-0.12635	0.00822	-0.21129
	Kurtosis	8.7632	3.52961	5.50973	3.35446	4.05474	3.62655	3.76815	4.16299	3.03783	4.66145
	Jarque-Bera	421.855	12.31301	70.38664	5.21714	14.33771	6.90515	6.21445	14.45911	0.01787	30.00223
	Probability	0	0.0021	0	0.0472	0.0008	0.0317	0.0447	0.0007	0.9911	0
2006	Mean	0.0033	0.00148	0.00186	0.0002	0.00085	0.00151	0.00083	-0.0001	0.00057	0.00029
	Std. Dev.	0.01304	0.01645	0.01311	0.01148	0.00522	0.01248	0.01026	0.01556	0.00617	0.01249
	Skewness	-0.2637	-0.5105	-0.90186	-0.4115	-0.47978	0.10491	-0.7095	-2.0832	-0.0837	-0.1017
	Kurtosis	5.71214	5.56663	7.99247	3.68872	5.11063	5.00628	5.32069	45.8188	4.24895	3.40213
	Jarque-Bera	82.7012	79.4784	286.4781	11.8513	55.3227	41.8786	76.1523	18739.5	16.6067	2.09803
	Probability	0	0	0	0.0027	0	0	0	0	0.0002	0.3503
2007	Mean	0.00298	0.00184	0.00172	0.00124	0.00109	0.00094	0.00038	0.00116	0.00005	-0.0004
	Std. Dev.	0.02215	0.01601	0.0148	0.01449	0.01035	0.0168	0.01329	0.0122	0.00989	0.01162
	Skewness	-0.9374	-0.1672	-0.42282	-0.5901	-0.73112	-0.0271	-0.6932	0.06779	-1.2692	-0.4463
	Kurtosis	4.67533	4.4852	7.12962	6.19896	6.52301	9.26556	5.40838	4.0847	8.57658	4.88348
	Jarque-Bera	63.7433	24.0459	185.092	119.167	150.954	400.78	78.1914	12.1486	394.192	44.3469
	Probability	0	0	0	0	0	0	0	0.0023	0	0
2008	Mean	-0.0038	-0.0026	-0.00259	-0.0017	-0.0019	-0.0025	-0.0022	-0.0023	-0.0013	-0.0016
	Std. Dev.	0.02827	0.02792	0.02461	0.02455	0.01358	0.02093	0.02129	0.021	0.02384	0.02907
	Skewness	0.40563	-0.1364	-0.27043	-0.0781	-1.19355	-0.8238	0.08801	-0.5861	0.42522	0.01217
	Kurtosis	4.14636	4.33608	6.18577	7.45403	11.7347	8.35387	3.55528	7.83509	7.15106	7.02919
	Jarque-Bera	20.6267	19.0598	105.2864	204.421	843.851	321.626	3.50628	254.743	189.271	165.732
	Probability	0	0.0001	0	0	0	0	0.1732	0	0	0
2009	Mean	0.00232	0.00245	0.00245	0.00161	0.00151	0.0019	0.00236	0.00188	0.00068	0.00079
	Std. Dev.	0.01836	0.02182	0.0151	0.01543	0.01403	0.01316	0.01531	0.01535	0.01516	0.01752
	Skewness	-0.5498	1.93627	0.19529	-0.3126	0.93057	0.02816	-0.1312	-0.4116	0.16595	0.01908
	Kurtosis	4.44158	19.0768	3.52455	4.80206	58.8661	3.82229	5.34052	3.48255	5.36179	3.53782
	Jarque-Bera	35.475	2768.78	4.33056	38.2024	32546.7	6.79325	57.3176	9.22025	59.7262	2.94345
	Probability	0	0	0.1147	0	0	0.0335	0	0.01	0	0.2295

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STOCK MARKET MOVEMENTS AND LINKAGES BETWEEN EMERGING MARKETS IN ASIA AND DEVELOPED MARKET INDICES: SHORT RUN AND LONG RUN ANALYSIS

Table - 2 (Continued ...)

2010	Mean	-0.0005	0.00068	0.00156	0.00081	0.00098	0.00145	0.00041	0.00149	0.00041	-0.0001
	Std. Dev.	0.01372	0.01023	0.01266	0.0095	0.02356	0.01089	0.01038	0.01124	0.01023	0.01317
	Skewness	-0.5778	-0.23	0.43469	-0.5035	2.1997	-0.0435	-0.7533	-0.0084	-0.1154	-0.1699
	Kurtosis	4.75288	3.62099	7.62183	3.57951	60.45813	3.98131	4.80475	6.00413	5.0474	3.0244
	Jarque-Bera	47.5673	6.2714	225.7796	14.0039	34314.85	9.7458	57.5712	91.0028	43.8664	1.185
	Probability	0	0.0435	0	0.0009	0	0.0077	0	0	0	0.5529
2011	Mean	-0.0009	-0.0011	0.00021	-0.0004	0.00002	0.0002	-0.0009	0.00003	0.00027	-0.0007
	Std. Dev.	0.01142	0.01322	0.01465	0.01663	0.00723	0.01149	0.01374	0.01418	0.01321	0.01476
	Skewness	-0.2399	0.31101	-1.24449	-0.2736	-0.33307	-0.4736	-0.2176	-0.0914	-0.4409	-1.4041
	Kurtosis	3.60677	3.05243	9.66481	4.40047	4.11524	6.0425	4.5179	5.79654	5.4044	13.9885
	Jarque-Bera	6.23212	4.01033	520.91	23.1718	17.2264	104.078	25.5567	79.8496	69.1384	1313.12
	Probability	0.0443	0.1346	0	0	0.0002	0	0	0	0	0
2012	Mean	0.00024	0.00101	0.0005	0.00041	0.00046	0.00119	0.00046	0.00124	0.00025	0.00084
	Std. Dev.	0.01094	0.00956	0.00854	0.00971	0.00432	0.00908	0.00977	0.008	0.00736	0.01021
	Skewness	0.65922	0.11595	-0.29719	-0.0373	-0.65393	-0.1916	-0.0447	-0.25	0.05568	-0.0723
	Kurtosis	4.78654	3.62995	5.0388	4.03479	4.07344	4.18498	3.71181	3.43418	3.94688	2.84828
	Jarque-Bera	49.9161	4.71259	45.8513	11.1224	29.224	15.7682	5.29687	4.4773	9.50643	0.45361
	Probability	0	0.0948	0	0.0038	0	0.0004	0.0708	0.1066	0.0086	0.7971
2013	Mean	-0.0002	0.0003	0.00002	-0.00001	0.00046	0.00013	0.00044	-0.0002	0.00086	0.00184
	Std. Dev.	0.01159	0.01137	0.01382	0.00769	0.0056	0.0146	0.00732	0.01316	0.00624	0.01678
	Skewness	-0.3036	-0.0495	-0.20466	0.27174	0.30573	-0.7141	-0.1276	-0.0808	-0.327	-0.662
	Kurtosis	5.19935	4.4332	4.76067	4.07619	9.61766	6.61399	3.5113	4.37304	4.0566	5.0155
	Jarque-Bera	51.6245	21.4984	32.4027	14.9595	454.554	152.892	3.33397	19.512	16.2118	60.0897
	Probability	0	0	0	0.0006	0	0	0.1888	0.0001	0.0003	0
2014	Mean	0.00171	0.00115	0.00082	-0.00009	-0.0002	0.00081	0.00034	0.00083	0.00034	0.00045
	Std. Dev.	0.0103	0.00798	0.00849	0.00623	0.00497	0.00765	0.0069	0.00744	0.00684	0.01255
	Skewness	-0.1642	0.04435	-0.32006	-0.0604	-0.79556	-0.4543	-0.5191	-0.0255	-0.3134	0.01834
	Kurtosis	7.34186	3.55617	5.40104	3.33169	6.3796	4.05381	4.43537	4.31488	4.14364	4.44299
	Jarque-Bera	188.016	3.22482	62.262	1.2772	142.441	19.6017	32.2959	17.6759	17.8584	21.8773
	Probability	0	0.1994	0	0.528	0	0.0001	0	0.0001	0.0001	0
2005-2014 (Whole Period)	Mean	0.00051	0.00067	0.00078	0.0004	0.00033	0.00065	0.00025	0.00041	0.00028	0.00029
	Std. Dev.	0.01644	0.01572	0.01446	0.01365	0.01111	0.01343	0.01243	0.01345	0.01266	0.0157
	Skewness	-0.1889	0.2436	-0.48458	-0.3622	2.04523	-0.5535	-0.2979	-0.7235	0.52812	-0.3251
	Kurtosis	6.84707	13.1429	9.41007	10.8636	140.9703	10.1269	6.47813	15.8041	32.5261	11.2099
	Jarque-Bera	1561.51	10668.3	4271.11	6436.17	19608	5290.65	1280.52	16901.5	91509.7	6963.45
	Probability	0	0.001	0.002	0.001	0	0.001	0	0	0.001	0

Source: <http://finance.yahoo.com/>, Bloomberg Database and Computed using E-Views (Version - 7).

The results of mean return (%) based on trading days among the sample indices during short and long run period, are shown in **Table - 3**. The mean returns of all the sample indices, earned during short and long run period, ranged from -96.13 percent to 190.97 percent. But the average daily mean return of Indonesia (Jakarta Composite Index) was higher than that of other sample stock markets, with 190.97 percent, for 2439 trading observations, for **long run** (2005-2014), followed by India (Nifty) with 167.11 percent, for 2483 trading days and Philippines (PSI) with 158.67 percent, for 2441 trading days. At the same time, during the **short run** (year wise) period, the SSE composite index of China received 85.83 percent, for 260 trading days in 2006 and 72.21 percent, for 242 trading observations in 2007 and Korea (KOSPI Index) received 44.80 percent for 249 trading days in 2005. It is inferred that China (SSE Composite Index) recorded the least mean return value of -96.13 percent, for 251 observations in 2008.

Table - 4 shows the results of descriptive statistics and hypothetical test - based probability value (P-Value), among the

sample indices, during short and long run period. All the sample indices of Asian emerging markets and developed markets, except USA (DJIA) in 2005, Japan (Nikkei 225 Index) in 2006, Taiwan (TWII) in 2008, Indonesia (Jakarta Composite Index) and Japan (Nikkei 225) in 2009, India (Nifty Index) and Japan (Nikkei 225 Index) in 2010, China (SSE Composite Index) and India (Nifty Index) in 2011, India and Taiwan in 2012 & 2013, India and Korea in 2014, were distributed normally. At the same time, all sample indices were normally distributed at 99% confident level, based on probability (P-Value) in the **long run** (2005-14) period. In other words, all the sample indices were moderately volatile, both short and long run period. It is found from the overall result of the **Tables - 2, 3 & 4** that all the sample indices were less volatile and the distribution of return data, for all the sample indices, was normal. Hence the null hypothesis (NH01) - **there is no normality among sample Indices of Emerging Asian Stock Markets and developed markets during the short run and long run periods**, was rejected.

Table - 3: Results of Mean Return (%) based on Trading Days among the Sample Indices during Short and Long Run Period

Year	Emerging Stock Markets in Asia								Developed Markets	
	China	India	Indonesia	Korea	Malaysia	Philippines	Taiwan	Thailand	USA	Japan
2005	-6.42%	30.90%	16.55%	44.80%	-0.16%	14.19%	7.21%	5.12%	0.42%	34.47%
	(260)	(251)	(243)	(249)	(247)	(246)	(247)	(245)	(252)	(245)
2006	85.83%	36.95%	45.38%	4.82%	20.87%	37.40%	20.43%	-3.50%	14.36%	7.07%
	(260)	(250)	(244)	(247)	(247)	(247)	(247)	(243)	(251)	(248)
2007	72.21%	45.87%	43.00%	30.50%	27.09%	23.05%	9.28%	28.18%	1.24%	-10.88%
	(242)	(249)	(250)	(246)	(249)	(245)	(243)	(244)	(252)	(245)
2008	-96.13%	-63.35%	-62.61%	-42.46%	-46.98%	-60.29%	-53.82%	-57.21%	32.46%	-40.18%
	(251)	(246)	(242)	(247)	(247)	(246)	(248)	(247)	(253)	(245)
2009	59.96%	59.58%	59.54%	40.45%	37.75%	45.67%	58.50%	45.71%	17.24%	19.10%
	(259)	(243)	(243)	(252)	(250)	(240)	(248)	(243)	(252)	(243)
2010	-11.97%	17.24%	38.29%	20.12%	24.18%	34.95%	10.25%	35.94%	10.27%	-1.96%
	(259)	(252)	(245)	(249)	(248)	(241)	(250)	(242)	(248)	(245)
2011	-22.80%	-26.48%	5.19%	-9.15%	0.46%	5.26%	-22.07%	0.80%	6.78%	-17.98%
	(250)	(247)	(247)	(246)	(245)	(246)	(246)	(244)	(253)	(245)
2012	5.93%	25.33%	12.13%	10.09%	11.20%	28.94%	11.39%	30.31%	6.22%	20.71%
	(243)	(251)	(244)	(248)	(245)	(244)	(247)	(245)	(251)	(248)
2013	-5.74%	7.38%	0.59%	-0.25%	11.26%	3.09%	10.83%	-5.93%	21.67%	45.68%
	(238)	(250)	(238)	(247)	(247)	(243)	(245)	(245)	(252)	(248)
2014	40.67%	28.13%	19.77%	-2.18%	-4.78%	19.63%	8.35%	20.31%	8.67%	11.24%
	(238)	(244)	(242)	(246)	(245)	(243)	(247)	(245)	(252)	(252)
2005-2014 (whole period)	127.66%	167.11%	190.97%	99.33%	81.76%	158.67%	60.71%	100.65%	70.95%	71.95%
	(2508)	(2483)	(2439)	(2477)	(2470)	(2441)	(2468)	(2443)	(2516)	(2464)

Source: The results of **Table - 2**

Note: Mean Return (%) = Mean Value X Total Number of Observations

Table - 4 Results of Descriptive Statistics among the Sample Indices during Short and Long Run Period

Year	Emerging Stock Markets in Asia								Developed Markets		Hypothesis (NH01)
	China	India	Indonesia	Korea	Malaysia	Philippines	Taiwan	Thailand	USA	Japan	
2005	S	S	S	S	S	S	S	S	NS	S	Rejected
2006	S	S	S	S	S	S	S	S	S	NS	Rejected
2007	S	S	S	S	S	S	S	S	S	S	Rejected
2008	S	S	S	S	S	S	NS	S	S	S	Rejected
2009	S	S	NS	S	S	S	S	S	S	NS	Rejected
2010	S	NS	S	S	S	S	S	S	S	NS	Rejected
2011	NS	NS	S	S	S	S	S	S	S	S	Rejected
2012	S	NS	S	S	S	S	NS	S	S	NS	Rejected
2013	S	S	S	S	S	S	NS	S	S	S	Rejected
2014	S	NS	S	NS	S	S	S	S	S	S	Rejected
2005-2014 (Whole Period)	S	S	S	S	S	S	S	S	S	S	Rejected

Source: The results of Table - 2.

Note: 'S' indicates levels of significance at 1% and 5% and 'NS' indicates not significant.

Table - 5: Results of ADF and PP Test among the Sample Indices during Short and Long Run Periods

Year	Emerging Stock Markets in Asia								Developed Markets		Hypothesis (NH02)
	China	India	Indonesia	Korea	Malaysia	Philippines	Taiwan	Thailand	USA	Japan	
2005	S	S	S	S	S	S	S	S	S	S	Rejected
2006	S	S	S	S	S	S	S	S	S	S	Rejected
2007	S	S	S	S	S	S	S	S	S	S	Rejected
2008	S	S	S	S	S	S	S	S	S	S	Rejected
2009	S	S	S	S	S	S	S	S	S	S	Rejected
2010	S	S	S	S	S	S	S	S	S	S	Rejected
2011	S	S	S	S	S	S	S	S	S	S	Rejected
2012	S	S	S	S	S	S	S	S	S	S	Rejected
2013	S	S	S	S	S	S	S	S	S	S	Rejected
2014	S	S	S	S	S	S	S	S	S	S	Rejected
2005-2014 (Whole Period)	S	S	S	S	S	S	S	S	S	S	Rejected

Source: <http://finance.yahoo.com/>, Bloomberg Database and Computed using E-Views (Version - 7).

Note: 'S' indicates levels of significance at 1%, 5% and 10%.

Stationarity for Asian Emerging Stock Markets and Developed Markets

The Unit Root Test (ADF and Phillips-Perron Test), for sample indices of both Asian emerging stock markets and developed stock markets, was used to measure the stationarity of the return series. A Unit Root Test examines whether a time series data (daily closing value) attained stationarity or non-stationarity, both during short and long run periods. The results of ADF and PP test, for sample indices (return series) of eight Asian Emerging Stock Markets and two Developed Stock Markets, during long run and short run periods, are presented in **Table - 5**. It is evident from the results of the above Table (Augmented Dickey Fuller - ADF Test and Phillips Person - PP Test) that the values of test critical, for all sample indices of emerging markets in Asia, were analyzed at three significant levels of 1%, 5% and 10%. The probability values, for all the eight sample Asian emerging market indices and two developed market indices, were zero. It is clear from the analysis of ADF and PP Test that the statistical value was less than the critical value, for all the ten sample indices, both during short run (year wise) and long run (whole year) period. Besides, the analysis of ADF and PP Test shows that the returns of all sample indices, during short run

period (year wise) and long run (2005-14) period, attained stationarity at 1%, 5% and 10% significance levels. Hence the null hypothesis (NH02), namely, **there is no stationarity among the sample Indices of Emerging Asian Stock Markets and developed markets during the short run and long run periods**, was rejected.

Co-Movements between Asian Emerging Stock Markets and Developed Markets

One of the factors that contributes to the portfolio risk is the co-movements among individual stock indices returns. An attempt has been made to study the co-movements of eight Asian emerging stock markets, with two developed stock markets indices (Dow Jones Industrial Averages – DJIA (USA) and Nikkei 225 (Japan)). The positive and high correlation indicate low scope for portfolio diversification benefits while negative and low correlation indicate high scope for portfolio opportunity and also high scope for diversification benefits. The correlation matrix analysis was used to study the relationship (co-movements) between Asian emerging stock markets and developed markets. The analysis of correlation matrix was used in this study, to study co-movements, between sample indices of Asian emerging markets and developed markets.

Table – 6: Results of Correlation between Asian Emerging Markets and Developed Market (DJIA- USA) during Short and Long Run Period

Year Sample Emerging Markets	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2005-2014 (Whole Period)
China	-0.048	-0.049	0.017	0.032	-0.119	0.101	0.115	0.057	0.118	-0.011	-0.028
India	0.118	0.09	0.081	-0.119	0.087	0.115	-0.029	0.071	0.084	0.075	0.030
Indonesia	0.034	0.185**	0.017	0.108	0.182**	0.254**	-0.089	0.087	0.008	-0.013	-0.014
Korea	0.072	0.206**	0.240**	-0.007	0.228**	0.276**	0.014	0.317**	0.193**	-0.019	-0.041*
Malaysia	0.032	0.115	0.118	-0.057	0.058	-0.017	-0.029	0.075	0.017	-0.087	-0.018
Philippines	0.091	0.008	0.052	-0.026	0.069	0.033	0.056	0.112	0.196**	0.033	-0.026
Taiwan	0.083	0.011	-0.054	-0.119	0.028	-0.022	-0.002	-0.137*	0.033	0.131*	0.0073
Thailand	0.071	0.078	-0.028	-0.025	0.171**	-0.083	-0.032	0.003	-0.023	0.018	0.001
Hypothesis (NH03)	Accepted	Partially Accepted	Accepted	Accepted	Partially Accepted	Partially Accepted	Accepted	Partially Accepted	Partially Accepted	Accepted	Accepted

Source: <http://finance.yahoo.com/>, Bloomberg Database and Computed using E-Views (Version - 7).

Note: **. Correlation is significant at the 0.01 level (2-tailed) and *. Correlation is significant at the 0.05 level (2-tailed).

The results of correlation, between emerging Asian markets and developed market (DJIA - USA), during long run (whole year) and short run (year wise), are presented in **Table-6**. The sample developed stock market index (**DJIA**) of USA was significantly correlated with KOSPI Index of Korea in 2006, 2007, 2009, 2010, 2012 and 2013, with correlation coefficient values of 0.206, 0.240, 0.228, 0.276, 0.317 and 0.193 respectively, at 95% confident level, followed by Jakarta Composite Index of Indonesia, with values of 0.185, 0.182 and 0.254, in 2006, 2009 and 2010 respectively. At the same time, TSEC Weighted Index (Taiwan), with correlation coefficient values of -0.137 and 0.131, in 2012 and 2014 respectively. Further, Philippines Stock Price Index (Philippines) and SET Index (Thailand) were significantly correlated with values of 0.196 and 0.171, in 2013 and 2009 respectively. The remaining three markets, namely, China, India and Malaysia were not significantly correlated with DJIA (USA), both at short run and long run period.

Table – 7 shows the results of correlation, between emerging Asian markets and developed market (**Nikkei 225 Index –**

Japan), during long run (whole year) and short run (year wise) periods. It is clear that the sample Asian emerging stock market indices, namely, SSE Composite Index of China, Jakarta Composite Index of Indonesia, PSI index (Philippines) and TSEC Weighted Index (Taiwan), significantly moved (correlated) with developed market of Nikkei 225 Index (Japan), with values of 0.068, 0.097, -0.042 and 0.054 respectively, during long run (whole sample) period. In the short run (year wise) period, Jakarta Composite Index of Indonesia significantly moved in 2006, 2007, 2009 and 2012, with correlation coefficient values of 0.204, -0.149, 0.163 and 0.248 respectively. At the same time, KOSPI Index of Korea significantly correlated in 2008, 2011, 2012 and 2014, with values of 0.320, 0.247, 0.280 and -0.131 respectively. Further, the other six sample Asian emerging market namely, China, India, Malaysia, Philippines, Taiwan and Thailand did not move fully with the developed market of Nikkei 225 Index, during short run periods. The analysis of correlation, between Asian emerging markets and developed markets (USA and Japan), during short run period (year wise) and long run (2005-14) period, did not confirm correlation.

Table - 7: Results of Correlation between Asian Emerging Markets and Developed Market (Nikkei 225 Index- Japan) during Short and Long Run Period

Year Sample Emerging Markets	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2005- 2014 (Whole Period)
China	0.009	-0.108	-0.143*	-0.001	-0.087	-0.119	0.033	-0.015	0.135*	0.016	0.068**
India	-0.003	0.202**	0.071	0.059	0.134*	0.012	-0.052	-0.088	-0.072	-0.075	-0.022
Indonesia	0.115	0.204**	-0.149*	0.085	0.163*	0.011	0.031	0.248**	0.007	-0.025	0.097**
Korea	0.099	0.084	0.117	0.320**	0.001	0.008	0.247**	0.280**	-0.025	-0.131*	-0.024
Malaysia	0.084	0.113	0.172**	-0.136*	0.062	-0.012	0.107	-0.021	-0.004	0.051	0.027
Philippines	0.104	-0.074	-0.012	0.198**	0.046	0.191**	-0.066	0.029	-0.023	-0.016	-0.042*
Taiwan	-0.004	0.045	-0.007	0.165**	0.016	0.045	0.007	-0.057	-0.095	-0.062	0.054**
Thailand	0.082	0.061	0.245**	-0.095	0.005	-0.009	-0.064	0.053	0.119	-0.187**	-0.002
Hypothesis (NH03)	Accepted	Partially Accepted	Partially Rejected	Partially Rejected	Partially Accepted	Accepted	Accepted	Partially Accepted	Accepted	Accepted	Partially Rejected

Source: <http://finance.yahoo.com/>, Bloomberg Database and Computed using E-Views (Version - 7).

Note: **. Correlation is significant at the 0.01 level (2-tailed) and
*. Correlation is significant at the 0.05 level (2-tailed).

Hence the null hypothesis (NH03), namely, there is no co-movements between selected indices of emerging stock market in Asia with selected developed markets during short and long run periods, was partially accepted. As pointed out earlier, the level of portfolio diversification benefits depends upon the level of correlation between emerging and developed stock market indices i.e., low correlation indicates a high potential for diversification benefits through reduction in investment risk and vice versa.

Bidirectional/ Unidirectional Dynamic Linkages for Asian Emerging Stock Markets with Developed Markets

The Pairwise Granger Causality Test was used, to study the stock market linkages among the eight Asian emerging stock markets indices with two developed markets indices, during short and long run periods. There are three forms of dynamic linkages for sample indices such as unidirectional ("→" and "←") or one way linkage, bidirectional ("↔") or two way linkage and no causality linkage ("----"). The level of significance (linkage) was tested at two levels (i.e., 1% and 5%), using Granger Causality (Granger, 1969). As per the norms of Granger Causality Test, the value of F-Statistics i.e., higher than 3.01, indicates 5% level of significance while a value greater than 4.63, indicates 1% level of significance.

The results of Pairwise Granger Causality Test, revealing the three forms of dynamic linkages (bidirectional, unidirectional and no causality), between sample indices of eight sample emerging stock markets and DJIA Index (USA), during short and long run periods, are exhibited in Table - 8. It is evident from the above Table that among the sample indices of eight Asian emerging markets, only three sample indices, namely, India (Nifty Index) for 2007 and 2010, Korea (KOSPI) in 2012 and 2014, Philippines (PSI) for 2011, registered bidirectional (↔) or two way causality linkage with the developed market of DJIA (USA). At the same time, no sample Asian emerging market index registered bidirectional (↔) or two way causality linkage, with the developed market of DJIA (USA), in the long run (2005-14). Further, the five sample emerging markets in Asia, namely, India (Nifty Index), Indonesia (Jakarta Composite Index), Korea (KOSPI), Malaysia (KLCI) and Philippines (PSI) recorded unidirectional (→ and ←) or one way linkage, with the developed market of DJIA (USA), during short run periods. At the same time, the remaining three sample Asian emerging markets i.e., China (SSE Composite Index), Taiwan (TWII) and Thailand (SET Index) registered large number of no causality linkage (---), with the developed market index of DJIA (USA), during short run periods.

Table - 8: Results of Pairwise Granger Causality Testing the Dynamic Linkages of Eight Emerging Asian Markets with Developed - DJIA Index (USA) during Short and Long Run Period

Asian Emerging Markets		China	India	Indonesia	Korea	Malaysia	Philippines	Taiwan	Thailand	Hypothesis (NH04)
Year										
Dow Jones Average (DJIA) - USA	2005	---	→	---	←	---	---	←	---	Partially Rejected
	2006	←	←	←	→	←	→	---	---	Rejected
	2007	---	↔	→	→	←	→	---	←	Rejected
	2008	---	---	←	---	←	←	---	---	Partially Rejected
	2009	→	→	←	→	←	---	---	---	Rejected
	2010	---	↔	---	→	---	---	---	---	Partially Accepted
	2011	---	←	→	---	---	↔	---	---	Partially Rejected

	2012	---	---	←	↔	---	→	---	←	Partially Rejected
	2013	---	→	---	---	←	←	---	---	Partially Rejected
	2014	---	---	---	↔	---	---	---	→	Partially Accepted
	2005-2014 (Whole Period)	←	←	---	---	---	→	---	---	Partially Rejected

Source: <http://finance.yahoo.com/>, Bloomberg Database and Computed using E-Views (Version - 7).

Note: "→" and "←" indicates unidirectional causality
 "↔" indicates bidirectional causality and
 "---" indicates no causality.

Table - 9: Results of Pairwise Granger Causality Testing the Dynamic Linkages of Eight Emerging Asian Markets with Developed - Nikkei 225 Index (Japan) during Short and Long Run Periods

Asian Emerging Markets		China	India	Indonesia	Korea	Malaysia	Philippines	Taiwan	Thailand	Hypothesis (NH04)
Nikkei 225 Index - JAPAN	Year									
	2005	---	↔	---	→	---	---	←	---	Partially Rejected
	2006	←	←	→	→	←	---	---	---	Rejected
	2007	---	→	---	→	→	→	---	←	Rejected
	2008	---	→	↔	↔	→	→	←	↔	Rejected
	2009	---	---	→	→	→	---	---	↔	Partially Rejected
	2010	---	→	→	→	---	←	←	←	Partially Rejected
	2011	---	→	---	→	---	---	←	---	Partially Rejected
	2012	---	---	---	←	↔	→	←	↔	Partially Rejected
	2013	---	←	---	---	→	---	←	---	Partially Rejected
	2014	---	---	---	---	---	---	---	---	Accepted
2005-2014 (Whole Period)	←	→	↔	---	→	↔	↔	←	Rejected	

Source: <http://finance.yahoo.com/>, Bloomberg Database and Computed using E-Views (Version - 7)

Note: "→" and "←" indicates unidirectional causality
 "↔" indicates bidirectional causality and
 "---" indicates no causality.

Table - 9 examines the results of Pairwise Granger Causality Test, revealing the three forms of dynamic linkages (bidirectional, unidirectional and no causality), between sample indices of eight Asian emerging stock markets and Nikkei 225 Index (Japan), during short and long run period. It is seen from the short run analysis, as given in the above Table that out of eight sample indices of Asian emerging market, five sample indices, namely, S&P CNX Nifty index (India) in 2005, Jakarta Composite index (Indonesia) in 2008, KOSPI (Korea) in 2008, KLCI (Malaysia) in 2012, and SET Index (Thailand), in 2008, 2009 and 2012 experienced bidirectional (↔) or two way causality linkage, with the developed market index of Nikkei 225 (Japan), in short run period. Besides, the long run (2005-14) analysis shows that only three indices, namely, Jakarta Composite Index (Indonesia), PSI (Philippines) and TSEC Weighted index (Taiwan) recorded bidirectional (↔) or two way

causality linkage, with the developed market index of Nikkei 225 (Japan), in the long run (2005-2014) period. However, the seven sample indices (Viz., S&P CNX Nifty - India, Jakarta Composite Index - Indonesia, KOSPI - Korea, KLCI - Malaysia, PSI - Philippines, TSEC Weighted Index - Taiwan and SET Index - Thailand), revealed unidirectional (→ and ←) or one way linkage, with the developed market index of Nikkei 225 (Japan), both short and long run periods. But the sample index of china revealed large number of no causality linkage (---) with the developed market index of Nikkei 225 (Japan) both during short and long run period. It is interesting to note that, all the eight sample emerging markets showed no causality linkage (---), with the developed market index of Nikkei 225 (Japan), in 2014. Hence the null hypothesis (NH04) - there is no bidirectional/ unidirectional linkages between the indices of emerging Asian

stock markets with the developed stock markets both short and long run periods, was partially rejected.

Graphical Expression for Indices of Emerging Stock Markets in Asia and Developed Markets

The results of Price Fluctuation (Closing Value and Return Value), among the Sample Indices of Asian emerging markets and

developed markets, during the study period from 01st January, 2005 to 31st December, 2014, are exhibited individually in Figure -1. It is interesting to discover from the above figure that the lines of all the ten sample indices, had declined during 2007 – 2008, due to the subprime crisis of USA (2007 – 2008

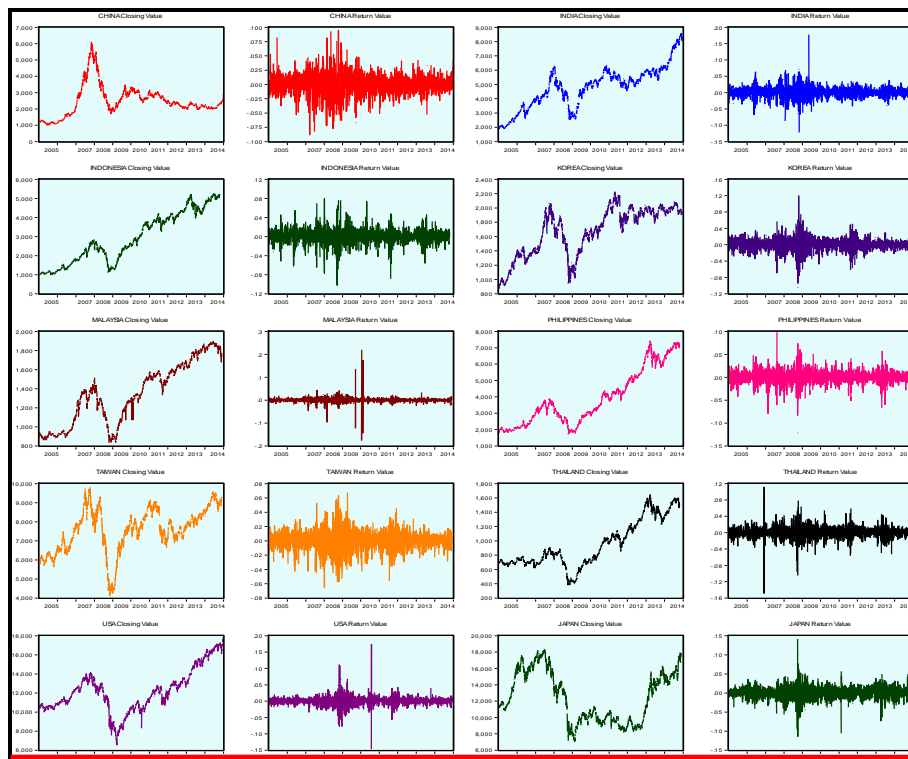


Figure – 1: Results of Price Fluctuation (Closing Value and Return Value) among the Sample Indices during the study period from 01st January, 2005 to 31st December, 2014.

Source: <http://finance.yahoo.com/>, Bloomberg Database and Computed using E-Views (Version - 7)

According to this study, the movements of all the sample indices were affected by the subprime crisis of USA equally, both at emerging markets and developed markets. However, it is clearly observed that visible (major) downfall was noticed for the period 2007 – 2008, in the movement of indices of (SSE Composite Index – China, KOSPI Index – Korea, KLCI – Malaysia, TSEC Weighted Index – Taiwan and Nikkei 225 – Japan) while minor downfall was noticed, in the case of indices like S&P CNX Nifty – India, Jakarta Composite Index – Indonesia, Philippine Stock Index – Philippines, SET Index – Thailand and DJIA – USA. In short, all the eight Asian emerging market indices performed equally (moved upward) from 2009 to 2014.

CONCLUSION

The purpose of this research paper was to examine the short-run and long-run movements and linkages among the Asian emerging markets and two developed markets. The data correspond to daily price for the eight indexes of the Asian emerging markets in general and two developed markets in particular, for the time period January 1, 2005 to December 31, 2014. The tools like descriptive statistics, unit root test, correlation and pair wise granger causality tests, were used to test the normality, stationarity, movements and linkages respectively, for both short-term and long-term periods.

Diversification opportunities are available for emerging stock markets in Asia in the long-run. At the same time, the domestic

investors can still achieve normal profits through portfolio diversification in the short-run. In addition, there are portfolio diversification opportunities for international investors, to obtain long-run profits, in Asian emerging markets. It is found that the two emerging markets in Asian region, namely, Jakarta Composite Index (Indonesia) and S&P CNX Nifty Index (India), recorded maximum return (mean) and minimum risk (Standard Deviation). The global investors may note this information about these two emerging markets (Jakarta composite index – Indonesia and S&P CNX Nifty Index - India) of Asian region for investment purpose, in the long run time horizon.

Besides, the diversification of risk could be achieved, only through market investment in uncorrelated or less correlated markets with developed markets. Hence the global investors could consider the three Asian emerging stock market indices, namely, S&P CNX Nifty Index (India), KLCI Index (Malaysia) and SET Index (Thailand), which are suitable for framing optimum portfolio and to enjoy diversification benefits and opportunities in the long run. At the same time, the SSE Composite index (China) was found to experience higher standard deviation (risk) than that of other emerging markets, during the study period. High degree of risk is not generally good for retail investors but the speculators may play their game to their advantage. Hence it is suggested that the Shanghai Stock Exchange (China) is suitable for investment by the speculators. The findings of the present study, relating to international portfolio diversification, confirmed the results of **Abidin, S.Z. et al., 2004**. The results of

this study, particularly those of the econometric tests, have provided important information for the retail investors, governments, portfolio managers and policy regulators, in respect of the above sample countries. It is found that Indian stock market experienced less movements with developed markets (USA and JAPAN). This study also suggested that India's stock market is largely protected from global events i.e., 2007-2008. This important characteristic of our stock markets, may be attractive for international investors. Further, stock markets of these eight countries of Asian emerging markets provide attractive diversification opportunities for international portfolio investors, over a long period. Lastly, this study found that all the markets provided short run pains and long run gains. Hence there was high degree of international portfolio diversification opportunities and benefits, to invest in Asian emerging stock markets, during the long run period.

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