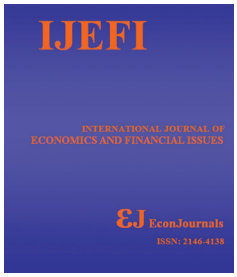

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Long-run Overseas Portfolio Diversification Benefits and Opportunities of Asian Emerging Stock Markets and Developed Markets

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ABSTRACT

The international portfolio diversification is a function of correlation of equity markets across countries and the amount of correlation one market has with another, decides the scope of portfolio diversification. The market having high correlation with other markets generally has less scope for portfolio diversification. This research study investigated the existence of long run portfolio diversification benefits and opportunities of eight emerging stock markets in Asia and three top, benchmark index of developed markets. Models such as factor analysis, principal component and maximum likelihood, correlation matrix and graphical price movement diagram were used for estimating the portfolio diversification opportunity and benefits. It is suggested from overseas portfolio diversification analysis that in Asian emerging stock markets (especially China, India, Malaysia, Taiwan, Indonesia and Thailand), there are good opportunities for overseas portfolio diversification and the investors may earn high return.

Keywords: Asian Emerging Stock Markets, Developed Markets, Principal Component Method; Maximum Likelihood, Overseas Portfolio Diversification Opportunities and Benefits
JEL Classifications: F21, F37, G11, G15

1. INTRODUCTION

The overseas portfolio diversification is an effective strategy which is based on the standard financial theories. The empirical studies in the area of portfolio diversification were essentially focused on diversifying the risk of investments through portfolio diversification. But less attention has been paid on the investment perspective and the behavior of optimum portfolios in different investment patterns. There are two major portfolio investment theories in the field of finance. The modern portfolio theory, introduced by Markowitz (1952; 1959), maintained that greater benefits would be available when lower correlation does exist between assets returns. The international portfolio theory, developed by Solnik (1974), asserts that more benefits from diversification could be achieved if the investors invested in the securities across borders. During the last few decades, there has been a growing interest among portfolio managers in the emerging capital markets as they provided opportunities for higher returns compared to those of the developed markets (Constantinou et al., 2006).

The study on international portfolio diversification, in both developed and emerging countries, found that international diversification of portfolio investment was superior in terms of risk and returns of a domestically formed portfolio (Abidin, 2006). Potential but long-run benefits exist from diversifying the investment portfolios internationally to reduce the associated systematic risks across countries (Valadkhani and Chancharat, 2008). The higher integration between developed markets led to the study of the important potential of emerging markets for international portfolio diversification (Fadhlaoui et al., 2009). However, after introduction of globalization and liberalization

policies during last two decades, the financial markets have been characterized by an increasing movements and interdependence, which caused correlations between markets to increase. This could partially explain the investors' tendency to opt for emerging markets in Asia which remain characterized by high earnings and a low correlation with developed stock markets. The low movements between developed and emerging equity markets explain the benefits from international portfolio diversification to be considerable for overseas investors (Grubel, 1968; Syriopoulos, 2004; Hourvouliades, 2009).

The international portfolio diversification is a function of correlation of equity markets across countries. The amount of correlation one market has with another, decides the scope of portfolio diversification. The markets having high correlation, have less scope for portfolio diversification benefits and opportunities. The international diversification indicates that low correlations between international stock markets result in lower risk for a given level of return. Hence low correlations between developed and emerging markets have attracted the attention of international investors to the emerging markets (Onay, 2012; Ray, 2013). The main determinant for the superiority of the domestic-based portfolio was the correlation among international stock market indices in the portfolio (Kanakarajammal et al., 2014). Another potentially important influence on foreign investment is the risk-return profile of available assets. The returns and risk and their correlations with each other are key inputs in the construction of a diversified portfolio into overseas markets. International diversification strategy brings more profits while insuring a reduction in risk (Lingaraja et al., 2015).

2. REVIEW OF LITERATURE

An attempt has been made to review the earlier research study undertaken in the area of overseas portfolio diversification among international stock markets, to understand research break-up, tools used and findings of earlier studies.

Grubel (1968) found that between 1959 and 1966, US investors could have achieved superior risk and return opportunities by investing part of their portfolio in foreign equity markets. Gilmore and McManus (2002) examined the short - and long-term relationships between the US stock market and three Central European markets. It was suggested that US investors could obtain benefits from international diversification into these markets. Illueca and Lafuente (2002) provided additional insights into this issue from a data set of main international stock markets. It is suggested that risk-averse investors who seek portfolio diversification must take into account a large number of assets and the portfolio management strategy needs to consider a large number of assets that were negotiated in most stock exchanges around the world. Abidin et al. (2004) evaluated the potential gains from international portfolio diversification from a Malaysian perspective. There was evidence on gains from international portfolio diversification for Malaysian investors after considering currency risk and price volatility. This study concluded that the Malaysian stock markets index (KLSE) was gradually correlated with each other. Hui (2005) determined the co-movements of the matured US market together with Asian markets; namely, Australia, Hong Kong, Japan, New Zealand, Philippines, Singapore, South Korea, Taiwan and Thailand. Abidin (2006) studied the relationship (by correlation coefficient) between Malaysia and other selected countries during different sub-periods, classified as pre, during and post-crisis stock market crash. Valadkhani and 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, Philippines, Singapore, Taiwan, UK and US). It is found from the results that there was bidirectional granger causality between the stock returns in Thailand and the three of its neighboring countries (i.e. Malaysia, Singapore and Taiwan). Fadhlaoui et al. (2009) examined the short and long-term relationships between the seven developed equity markets of United States, Canada, United Kingdom, France, Germany, Italy, Japan and three Central European emerging equity markets of Czech Republic, Hungary and Poland in order to study their implications for the potential gains from international diversification. It is found that the sample equity markets did not provide adequate evidence for long-term movements with the G7 developed market. Modi et al. (2010) explored co-movement pattern in risk and return in terms of long run relationship among the eight stock markets and studied the components of eight stock markets using principal components analysis (PCA) during the study period. It is observed that the eight stock markets are fragmented into two major components - American Region (DJIA, NASDAQ, MXX and BVSP) and second is other emerging markets (BSE, HANGSENG and RTS). Lee (2012) investigated the contagion in International Stock Markets during the subprime mortgage crisis July, 2007. It is clear that any contagion effect occurred across international markets after the subprime financial mortgage crisis in USA. It is found that the benefits of portfolio diversification will be severely limited during periods with high volatility and increased cross-market correlation, when, in fact, international portfolio diversification is needed most. Harper and Jin (2012) analyzed the co-movements and portfolio diversified benefits by using PCA to compute monthly index returns of 11 countries. The investor was able to adopt diversified portfolios to increase expected returns and reduce systemic risk. Mansourfar (2013) evaluated the potential advantages of international portfolio diversification for East Asian international investors while investing in the Middle Eastern emerging markets. The study brought out the potential role of the Middle Eastern equity markets in providing international portfolio diversification benefits for East Asian investors. The study also found that long and short-term efficient frontiers in any of the intra or inter-regionally diversified portfolios did not provide similar benefits. El Wassal (2013) provided a framework for the main determinants of stock market development and investigated the important issues in foreign portfolio investment and it is clear that foreign investors need assurance that they can repatriate their funds and profits. It is found that economic growth, financial liberalization and foreign portfolio investments were the leading factors in the expansion of stock markets. Lingaraja et al. (2014a) examined the inter linkages and co-movements among the emerging markets and developed markets in Asia. It was found that the five emerging markets, namely, China, Indonesia, Korea, Malaysia and Thailand, recorded higher risk than India, Taiwan

and Philippines. Shadkam (2014) examined the optimal portfolio with regard to relations among stock returns of companies which are active in Tehran's stock market. By using multivariate analysis to reduce the unsystematic risk, a financial portfolio was formed. The results focused on the optimal portfolio rather than randomly choosing a portfolio. Lingaraja et al. (2014b) analyzed the market efficiency and the performance among the emerging stock markets in Asia. It was found that the four emerging Asian countries indices, namely, India, Indonesia, Malaysia and Philippines recorded random distribution at 95% confidence level and these markets were highly efficient during the study period.

All the above literature were used to identify the research gap. Few studies have already investigated the benefits from overseas portfolio diversification. But no comprehensive literature was focused on Asian emerging markets. Hence an attempt has been made to analyse the long run overseas portfolio diversification benefits and opportunities, both in Asian emerging stock markets and developed markets.

3. RESEARCH METHODS

3.1. Statement of the Problem

The emerging stock markets have been experiencing significant growth and achieved high performance but with low correlation with the developed markets. This fact prompted many researchers to analyze and find out the reasons behind this fact. The overseas portfolio diversification is an effective strategy which provides risk minimization and return maximization. The diversification and overseas portfolio investment decisions are based on several factors. The sound knowledge about market performance and relationship between emerging stock markets and developed markets is significant enough to be taken into account while developing overseas portfolio diversification strategy and making smart investment decision to get maximum return with minimum risk.

There are many common risk factors, with any investment avenue in any country such as investing in overseas stock market, identification of market stability, performance, policies and regulations. Further, other problems such as market price fluctuation, transparency, liquidity, contagion, governance, and corruption, as well as their impact on pricing, etc., are to be understood by overseas investors before they invest their funds in emerging markets in Asia and other developed countries. The risk factors and other investment - related issues are all generally understood, though their rate of variations across countries and inadequate research about regions remain to be explored.

Normally the overseas investors are, to some extent, aware of trade-off between risk and return but they face some challenges in identifying the amount of risk involved in every stock market and benefits of overseas portfolio diversification. Investors generally prefer to earn excess return than risk. But it is not an easy task, without intensive research on overseas portfolio, consisting of difference stocks, to take effective investment decision. The international investors could identify the different portfolios pertaining to emerging markets like Asian stock markets. There is no secret code which may direct the investors to earn excess return.

In order to address the difficulties outlined above, more intensive research on portfolio diversification benefits and opportunities in emerging markets, compared with benchmark of developed markets, is needed to understand the basic nature of emerging stock markets, and the risk-return opportunity prevailing in these markets. Hence the current research to quantify and assess the impact of Asian emerging markets and developed stock markets upon one another.

3.2. Scope of the Study

There is still lack of research in the area of portfolio diversification, focusing on opportunities and benefits. A case study gives a practical view for portfolio investors who are looking for opportunities of diversification. It would, no doubt, demonstrate and point out factors that have significant effect on portfolio allocation since each market has unique strength and weaknesses. Portfolio investors may take into consideration these pieces of information. Moreover, by analyzing emerging stock market indices, it also covers some part of dynamic relationship with portfolio diversification opportunities. In fact, emerging markets become a separate asset class for the overseas investors. During the last few decades, a lot of attention was given to emerging markets. However, studies covering potential benefits and opportunities in emerging Asian markets in recent times, are rare. This research tries to fill up this gap in research. This study proposes to analyze the changing movements of Asian emerging markets in relation to developed markets and its impact on overseas portfolio diversification strategy. The study employed the Factor analysis that provides evidence for excess stock returns in Asian emerging stock markets, which were highly suitable for overseas portfolio diversification.

3.3. Importance of the Study

The overseas diversification could provide immense benefits to stock markets integration across the globe investment internationally provides not only increased stability to a portfolio but also potentially higher yields, with less risk. Though there have been adequate literature available in this area, comprehensive study on developed stock markets and portfolio diversification is still limited. Hence this study applied two models under the factor analysis (PCA and maximum likelihood [ML] model) to test the long run overseas portfolio diversification benefits and opportunities of Asian emerging stock markets and developed markets.

3.4. Objectives of the Study

To investigate the overseas portfolio diversification benefits and opportunities among selected sample indices of developed and Asian emerging stock markets.

3.5. Hypotheses of the Study

The present study tested the following two null hypotheses.

NH01: There is no correlation coefficient between Asian emerging stock markets and developed markets during the study period.

NH02: There is no long run overseas portfolio diversification benefits and opportunities of Asian emerging stock markets and developed markets during the study period.

3.6. Data Source and Estimation Techniques

3.6.1. Sample section

For achieving the above objectives, this study covered the eight Asian emerging equity markets and three developed markets (one market from USA and top two markets from Asia) as identified by the Morgan Stanley Capital International (MSCI). MSCI methodology has been used in previous studies by Kasa, 1992; Richards, 1995; Meric and Meric, 1997; Hamori and Imamura, 2000; Ahlgren and Antell, 2000; Climent and Meneu, 2003; Worthington et al., 2003; Guesmi and Nguyen, 2011; Graham et al., 2012; Narayan et al., 2014; Lingaraja et al., 2014b; Su, 2015. The study used daily returns data of the composite indices of respective Asian emerging stock markets and developed markets. The index of USA (DJIA) was selected as it is the benchmark index in the world. In addition, two top developed markets in Asia (Nikkei 225 - Japan and Straits Times Index [STI] - Singapore) were taken as benchmark. The Asian emerging equity market indices used in the study were Shanghai Stock Exchange Composite Index (China), S&P CNX Nifty (India), Jakarta Composite Index (Indonesia), Kospi Index (Korea), KLSE (Malaysia), Philippine Stock Index (PSI) (Philippines), TSEC Weighted Index (Taiwan) and SET Index (Thailand). A list of the selected countries, stock exchanges and stock market indices are presented in Table 1.

3.6.2. Sources of data

The study used the values of composite leading stock market indices of the sample emerging stock markets of Asian and developed markets. The daily adjusted closing values of each of the sample indices were collected from MSCI emerging market database, Yahoo finance database, Global stock market database, KtStock Feeder (Global Markets Database), Equity Index Data from EconStats database and website of National Stock Exchange (NSE). Data were also collected from various books, journals and research databases. The daily stock market index return data were transformed by taking natural logarithm of the raw index return data.

3.6.3. Period of study

The research study covered a period of 10 years from January 01st, 2005 to December 31st, 2014.

3.6.4. Details of statistical tools used for analysis

For the purpose of analyzing overseas portfolio diversification and testing the null Hypotheses of this study, the followings tools were used:

a. Number of positive changes to negative changes
b. Graphical exposition
c. Correlation analysis, and
d. Factor analysis
    i. Kaiser-Meyer-Olkin (KMO)
    ii. PC method and ML method.

The computation of data for this study was made by using E-views (version 7.0), MS excel and SPSS (version 21.0).

3.7. Limitations of the Study

The following were the select limitations of the study

- Sample markets were selected only from MSCI
- The limitations associated with various statistical tools, may also apply to this study.

4. RESULTS OF OVERSEAS PORTFOLIO DIVERSIFICATION BENEFITS AND OPPORTUNITIES ANALYSIS

As said already, the main aim of this study was to analyse the overseas portfolio diversification benefits and opportunities among selected sample indices of developed and Asian emerging stock markets. The analysis is presented as follows.

4.1. Breakup of Number for Positive Changes to Negative Changes

The changes in the indices returns were used for testing portfolio diversification. Table 2 shows the details of the breakup of number from positive change to negative change in respect of sample indices, during the study period from January 01st, 2004 to December 31st, 2014. It is to be noted that as eight developing sample stock market indices and three sample developed stock markets indices were considered for this study. It is clear that the highest ratio of 1.3031 was recorded for Jakarta Composite Index - Indonesia, i.e. number of positive signs in Jakarta Composite Index was 30.31%, which was more than that of negative signs for all other sample indices used for this study during the study period. According to the rank of positive changes to negative changes for indices, Jakarta Composite Index - Indonesia ranked first (with 30.31%), followed by SSE Composite Index - China (second rank with 23.33%), KLCI - Malaysia (third rank with 20.73%), DJIA - USA (fourth rank with 19.74%) and S&P CNX Nifty - India (fifth rank with 17.81%). The ratio of positive to negative changes was minimum for Nikkei 225 Index - Japan (9.70%), followed by PSI - Philippines (14.12%) and SET Index - Thailand (15.05%) during the study period. The Table 2 clearly explains the fact that all the sample emerging markets in Asia performed better than the developed market namely, Nikkei 225 Index - Japan (1.1974) in respect of ratio of positive change to negative change during the study period. In other words, all the eight emerging Asian markets provided good diversified portfolio opportunities to the investors during the study period. As per the ratio of positive changes to negative changes, the sample indices, namely, SSE Index - China (1.2333), S&P CNX Nifty - India (1.1781), Jakarta Composite Index - Indonesia (1.3031), KOSPI - Korea Index (1.1558), KLCI - Malaysia (1.2073), PSI - Philippines (1.1412), TSEC Index - Taiwan (1.1517) and SET Index - Thailand (1.1505) earned higher number of the positive signs. One of the basic criteria used for taking investment decision in stock markets by investors is the amount of stock return earned. One could clearly observe that the index returns have generally provided huge information content that could be used in financial analysis for forecasting the indices returns by overseas investors. The overall analysis of this Table 2 indicates the fact that the above eight sample emerging markets recorded low movements with developed markets. Besides, there was high degree of overseas portfolio diversification opportunities and benefits to invest in Asian emerging stock market for a long period.

Table 1: The details of sample exchange and stock market indices

Countries	Name of the stock exchange	Name of the index	Study period	Number of observation
Emerging Asian stock markets				
China	Shanghai Stock Exchange	SSE Composite Index	January 1st, 2005 to December 31st, 2014	2508
India	NSE	S and *P* CNX Nifty	January 1st, 2005 to December 31st, 2014	2483
Indonesia	Indonesia Stock Exchange	Jakarta Composite Index	January 1st, 2005 to December 31st, 2014	2439
Korea	Korea Stock Exchange	Korea Stock Exchange KOSPI Index	January 1st, 2005 to December 31st, 2014	2477
Malaysia	Malaysia Stock Exchange	FTSE Bursa Malaysia KLCI	January 1st, 2005 to December 31st, 2014	2470
Philippines	The Philippine Stock Exchange	Philippine Stock Index	January 1st, 2005 to December 31st, 2014	2441
Taiwan	Taiwan Stock Exchange	TSEC Weighted Index	January 1st, 2005 to December 31st, 2014	2468
Thailand	Stock Exchange of Thailand	Thailand SET Index	January 1st, 2005 to December 31st, 2014	2443
Developed markets				
USA	New York Stock Exchange	Dow Jones Industrial Averages	January 1st, 2005 to December 31st, 2014	2516
Japan	Tokyo Stock Exchange	Nikkei 225	January 1st, 2005 to December 31st, 2014	2464
Singapore	Singapore Exchange	Straits Times Index	January 1st, 2005 to December 31st, 2014	2532

Source: Morgan Stanley Capital International (MSCI). Available from: http://www.msci.com. [Last retrieved on 2015 January 15].

Table 2: Breakup of number for positive change to negative change in the sample indices during the study period from January 01, 2005 to December 31, 2014

Sample markets	Statistical results					
	Number of positive sign from last day	Number of negative sign from last day	Total number of observations	Ratio of positive changes to negative changes	Percentage of more than the negative	Rank
Emerging markets in Asia						
China (SSE Index)	1385	1123	2508	1.2333	23.33	2
India (S&P CNX Nifty)	1343	1140	2483	1.1781	17.81	5
Indonesia (Jakarta Index)	1380	1059	2439	1.3031	30.31	1
Korea (KOSPI Index)	1328	1149	2477	1.1558	15.58	7
Malaysia (KLCI)	1351	1119	2470	1.2073	20.73	3
Philippines (PSI)	1301	1140	2441	1.1412	14.12	10
Taiwan (TSEC Index)	1321	1147	2468	1.1517	15.17	8
Thailand (SET Index)	1307	1136	2443	1.1505	15.05	9
Developed markets						
USA (DJIA)	1371	1145	2516	1.1974	19.74	4
Japan (Nikkei 225)	1289	1175	2464	1.0970	9.70	11
Singapore (STI)	1368	1164	2532	1.1753	17.53	6

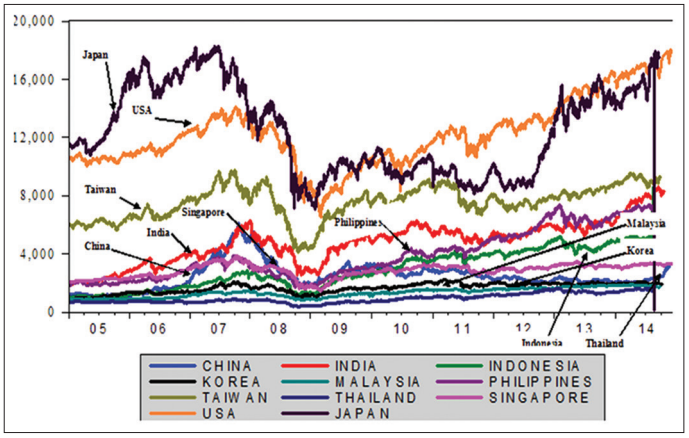
Source: http://finance.yahoo.com and computed using MS excel

4.2. Graphical Exposition

The graphical exposition shows how far during the effect of time different indices tend to reflect each other in tune with the stock market ups and downs. Besides, the graphical representation is useful to all types of investors who could easily identify their best investment avenues and riskless markets.

The results of graphical (GROUP) representation of the selected (eight) Asian emerging market indices and developed (three) stock market indices, over the period of study from January 01st, 2005 to December 31st, 2014, are given in Graph 1. It is interesting to find from the Graph 1 that lines of all the 11 sample indices were falling during 2007 due to the subprime crisis in USA from 2007 to 2008. A co movement of all the sample indices was observed during the subprime period and it indicates that subprime crisis of USA affected the sample countries. However, it is clearly observed that there was visible (Major) downfall during the period 2007-2008 in the indices of SSE Composite Index - China, KOSPI Index - Korea, KLCI - Malaysia, TSEC Weighted Index - Taiwan, Nikkei 225 - Japan and STI - Singapore while minor downfall was noticed during the period 2007-2008 in the case of indices like S&P CNX Nifty - India, Jakarta Composite Index - Indonesia, PSI - Philippines, SET Index - Thailand and DJIA - USA. Graph 2 shows the graphical

Graph 1: Graphical expression for sample indices (closing prices) of Asian emerging stock markets and developed markets during the study period from January 01, 2005 to December 31, 2014 (grouped)



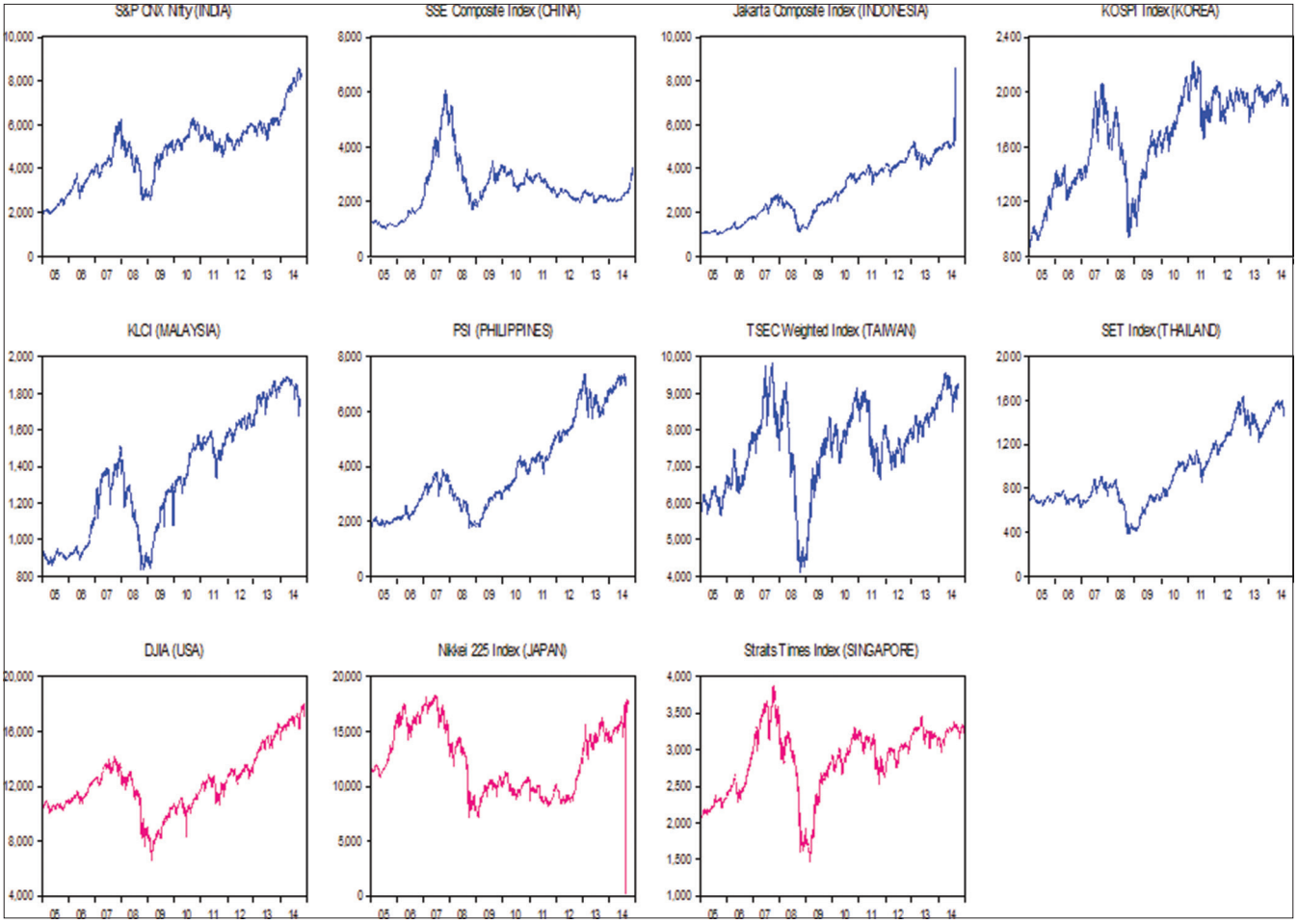
Source: http://finance.yahoo.com and computed using E-Views (Version - 7)

view (SEPARATE) for all the 11 sample indices (indices of eight Asian emerging markets and three developed markets) during the study period from January 01st, 2005 to December 31st, 2014. It is clearly observed that the sample indices of emerging Asian markets (like KOSPI Index - Korea and PTI - Philippines) closely moved (with high degree of closeness) with developed stock market indices (STI - Singapore and DJIA - USA) during the study period. The other six emerging stock market indices in Asia (SSE Composite Index - China, S&P CNX Nifty - India, Jakarta Composite Index - Indonesia, KOSPI Index - Korea, KLCI - Malaysia, TSEC weighted index - Taiwan and SET index - Thailand) recorded low degree of relationship with developed sample stock market indices during the study period. The overall analysis of Graphs 1 and 2 reveals that six stock markets indices in Asia (SSE Composite Index - China, S&P CNX Nifty - India, Jakarta Composite Index - Indonesia, KOSPI Index - Korea, KLCI - Malaysia, TSEC Weighted Index - Taiwan and SET Index - Thailand) did have possible degree of portfolio opportunities and return benefits for the international investors during the study period. The retail investors may use this opportunity to earn better return in future too.

4.3. Correlation Analysis of Asian Emerging Stock Markets and Developed Markets

The correlation was used to study long-term correlation between sample indices of Asian emerging markets and developed markets. Table 3 shows the results of correlation matrix for sample emerging stock market indices (eight) in Asia and developed markets indices (three) during the study period from January 01st, 2005 to December 31st, 2014. It is to be noted that the numerical value of correlation coefficients may generally have ranged from 1.0 to −1.0. According to the results of the Table 3, the sample index of DJIA index - USA was highly correlated with STI - Singapore, with correlation coefficient value of 0.162 at 99% confident level. The other stock market indices of S&P CNX Nifty - India, Jakarta Composite Index - Indonesia and TSEC - Taiwan Index were significantly correlated with SSE Index – China, with values of 0.059, 0.043 and 0.045, respectively during the study period. Further, the remaining four stock market indices, namely, S&P CNX Nifty - India, Jakarta Composite Index - Indonesia, KOSPI Index - Korea and PSI - Philippines were also correlated with developed markets of DJIA - USA, Nikkei 225 index - Japan and STI - Singapore, with values of 0.059, 0.065, −0.041 and −0.042, respectively, at 1% and 5% significant levels. The other Asian emerging stock market indices (SSE Index - China, KLCI Index - Malaysia, TSEC Index - Taiwan and SET Index - Thailand) did not have significant level of correlation with developed markets, namely, DJIA - USA, Nikkei 225 Index - Japan and STI - Singapore. It is to be noted that the level of diversification benefits depends upon the level of correlation among the stock indices i.e. low correlation indicates a high potential for

Graph 2: Graphical expression for sample indices (closing prices) of Asian emerging stock markets and developed markets during the study period from January 01, 2005 to December 31, 2014 (individually)



Source: http://finance.yahoo.com and computed using E-Views (Version - 7)

Table 3: Correlation matrix of Asian emerging stock markets and developed markets during the study period from January 01, 2005 to December 31, 2014

Sample markets	China	India	Indonesia	Korea	Malaysia	Philippines	Taiwan	Thailand	USA	Japan	Singapore
China	1										
India	0.059**	1									
	(0.003)										
Indonesia	0.043*	0.028	1								
	(0.033)	(0.167)									
Korea	0.015	0.023	0.002	1							
	(0.466)	(0.252)	(0.919)								
Malaysia	−0.007	0.029	−0.029	0.015	1						
	(0.718)	(0.144)	(0.151)	(0.461)							
Philippines	−0.002	−0.007	0.009	0.114**	0.018	1					
	(0.913)	(0.718)	(0.649)	(0)	(0.387)						
Taiwan	0.045*	−0.009	0.018	−0.038	0.003	−0.031	1				
	(0.026)	(0.67)	(0.366)	(0.057)	(0.892)	(0.127)					
Thailand	−0.005	0.005	0.078**	−0.011	0.038	−0.011	0.019	1			
	(0.789)	(0.805)	(0.000)	(0.571)	(0.064)	(0.575)	(0.347)				
USA	−0.028	0.03	−0.006	−0.041*	−0.018	−0.026	0	0.001	1		
	(0.165)	(0.131)	(0.785)	(0.04)	(0.363)	(0.194)	(0.987)	(0.953)			
Japan	0.001	0	0.065**	−0.006	−0.013	−0.042*	0.001	0	0.009	1	
	(0.973)	(0.961)	(0.001)	(0.771)	(0.505)	(0.036)	(0.955)	(0.978)	(0.641)		
Singapore	−0.011	0.059**	−0.004	0.007	0.012	0.019	−0.024	0.029	0.162**	0	1
	(0.593)	(0.003)	(0.845)	(0.74)	(0.537)	(0.345)	(0.237)	(0.148)	(0.000)	(0.987)	

*Correlation is significant at the 0.05 level (two-tailed) and **Correlation is significant at the 0.01 level (two-tailed). Source: (http://finance.yahoo.com/) and computed using IBM SPSS (Version - 21). Values in "()" represents, the *P* value for level of significant

diversification benefits through reduction in investment risk. According to the results of the Table 3 which shows the correlation between the returns of 11 sample indices, a total of 54 correlations among sample indices was observed. Out of 54 sets, R-values for only 10 sets were significantly correlated at 95% and 99% confident levels. The R-values for remaining 44 sets were not significantly correlated with each other indices considered for this study. Hence the null hypothesis (NH01), namely, there is no correlation coefficients between indices of emerging Asian stock markets and developed markets, was accepted.

According to Arouri et al., 2010; Mighri and Mansouri, 2013, the international portfolio offered higher risk – adjusted return than a portfolio composed of only domestic market. Further, risk diversification could be achieved only through investing in uncorrelated or less correlated markets. It could be observed from the analysis of the Table 3 that eight emerging stock markets did not have significant correlation with developed stock markets. The correlation values for major developed markets were either near to zero or negative (less correlation) with emerging markets. This shows that Asian emerging markets provided better scope for portfolio diversification for overseas investors. Therefore, the overseas investors could consider emerging stock market indices in Asia for framing optimum portfolio and to enjoy diversification benefits and opportunities.

4.4. Factor Analysis

4.4.1. KMO

The KMO analysis is the first step in the factor analysis to measure the sampling adequacy. According to KMO measure (as cited by Norusis, 2008; Harper and Jin, 2012), its value of 0.90s is healthy, the value of 0.80s is good, while the value of 0.70s is middling, 0.60s are mediocre, 0.50s miserable, and below 0.50 are unacceptable. The results of KMO measure and Bartlett's test for the sample indices, during the study period from January 01, 2005 to December 31, 2014, are given in Table 4. It is clear from the Table 4 that the value of KMO test was recorded at 0.5098, which was quite good. Based on the results of KMO test, the factor analysis was taken as advisable for analyzing the sample indices of Asian emerging stock markets and developed markets. According to Bartlett's test of sphericity, Chi-square value was also fairly high (213.69) at degree of freedom of 55 at 0.000 significance level. The results of both tests were in favor of using factor analysis to test the overseas portfolio diversification and benefits in respect of the 11 sample indices.

4.4.2. PCA and ML methods for Asian emerging stock markets and developed markets

The PCA and ML methods are popular models used to examine any discernable patterns of stock market portfolio diversification (Valadkhani et al., 2008; Fat and Dezsi, 2012).

The results of factor analysis models (PCA and ML method) for Asian emerging stock markets and developed markets (daily log returns), during the study period from January 01st, 2004 to December 31st, 2014, are presented in Table 5. As per the results of first component, only four sample indices from Asian emerging markets (S&P CNX Nifty - India, Jakarta Composite Index - Indonesia, KLCI – Malaysia and SET Index - Thailand) moved closely with the values of 0.2979, 0.0172, 0.0038 and 0.1588, respectively, during the study period. But component 2 clearly explains that only five emerging markets in Asia (SSE Composite Index - China with a value of 0.3581, S&P CNX Nifty - India with a value of 0.0324, Jakarta Composite Index - Indonesia with a value of 0.3795, TSEC Weighted Index - Taiwan with a value of 0.4514 and SET Index - Thailand with a value of 0.2242) were highly influenced and this indicates portfolio diversification opportunities to international investors.

In the ML, there are two factor models. The results of first factor clearly show that the residual values for four stock market indices (S&P CNX Nifty - India, KLCI - Malaysia, PSI - Philippines and SET Index - Thailand) were 0.1016, 0.0002, 0.0149 and 0.0271, respectively, during the study period. This indicates that the above four emerging markets recorded portfolio opportunity based on result of Factor - I. But, the results of Factor - 2 in the ML method show that the four sample indices (S&P CNX Nifty - India with value of 0.0295, KOSPI Index - Korea recorded 0.3253, KLCI - Malaysia - 0.0438 and Philippines Stock Index - Philippines – 0.3227) were highly related groups. Under the two models, only two indices, namely, DJIA - USA and STI - Singapore were placed in component-1 and factor-1.

It is significant to note that the results of the Table 5 were robust and consistent for both the PCA and ML techniques and totally three groups were found. In the Group - 1, the seven stock markets (India, China, Indonesia, Malaysia, Taiwan, Thailand and Japan) were found. The two developed stock markets indices (DJIA - USA and STI - Singapore) were found under Group - 2, while the remaining two emerging stock markets in Asia (KOSPI Index - Korea and PSI - Philippines) were found under Group - 3. The overall analysis of PCA and ML shows that the seven stock markets (S&P CNX Nifty - India, SSE Composite Index - China, Jakarta Composite Index - Indonesia, KLCI - Malaysia, TSEC Weighted Index - Taiwan, SET index - Thailand and Nikkei 225 index – Japan) provided overseas portfolio diversification benefits and opportunities for the international investors in the longer period. hence the null hypothesis (NH02), namely, there is no long run overseas portfolio diversification benefits and opportunities of Asian emerging stock markets and developed market during the study period, is rejected.

Table 4: KMO measure and Bartlett's test for the sample indices during the study period from January 01, 2005 to December 31, 2014

KMO and Bartlett's test	
KMO measure of sampling adequacy	0.509845
Bartlett's test of sphericity	
Approximately Chi-square	213.687389
df	55
Significant	0.000000

KMO: Kaiser-Meyer-Olkin. Source: (http://finance.yahoo.com/) and computed using IBM SPSS (Version - 21)

Table 5: Rotated varimax factor analysis under PCA and ML method for sample indices during the study period from January 01, 2005 to December 31, 2014

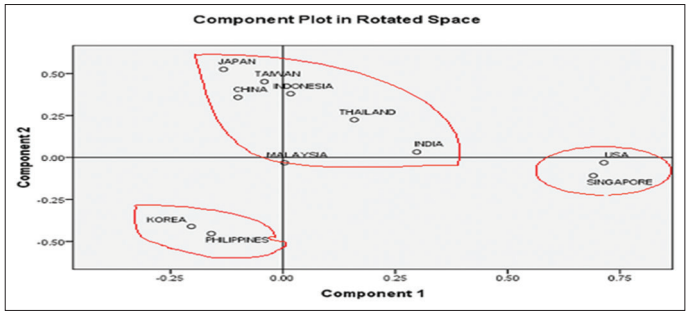
Countries stock markets	PCA		ML	
	Component - 1	Component - 2	Factor - 1	Factor - 2
China	−0.0998	0.3581	−0.0587	−0.0274
India	0.2979	0.0324	0.1016	0.0295
Indonesia	0.0172	0.3795	−0.0232	−0.0383
Korea	−0.2035	−0.4113	−0.0141	0.3253
Malaysia	0.0038	−0.0316	0.0002	0.0438
Philippines	−0.1592	−0.4537	0.0149	0.3227
Taiwan	−0.0410	0.4514	−0.0535	−0.1350
Thailand	0.1588	0.2242	0.0271	−0.0362
USA	0.7144	−0.0314	0.4231	−0.1067
Japan	−0.1319	0.5251	−0.0875	−0.1247
Singapore	0.6905	−0.1084	0.3874	0.0232

Extraction method: PCA and ML, Rotation method: varimax with kaiser normalization, [a]Rotation converged in three iterations. Source: (http://finance.yahoo.com/) and computed using SPSS (Version - 21). PCA: Principal component analysis, ML: Maximum likelihood

Figure 1 shows the plot for results of PCA (rotated two components) for Asian emerging stock markets and developed markets, during the study period from January 01, 2005 to December 31, 2014. From the Figure 1, it is clearly observed that the results for components, taken from the Table 5, were grouped into three (11 sample markets were divided into three groups). It is to be noted that out of the 11 sample market indices, four market indices (DJIA - USA, STI - Singapore, KOSPI Index - Korea and Philippines Stock Index - Philippines) did not present portfolio diversification opportunities. The remaining seven sample indices (SSE Composite Index - China, S&P CNX Nifty - India, Jakarta Composite Index - Indonesia, KLCI - Malaysia, TSEC Weighted Index - Taiwan, SET Index - Thailand and Nikkei 225 index - Japan) did have good portfolio diversification benefits during the study period.

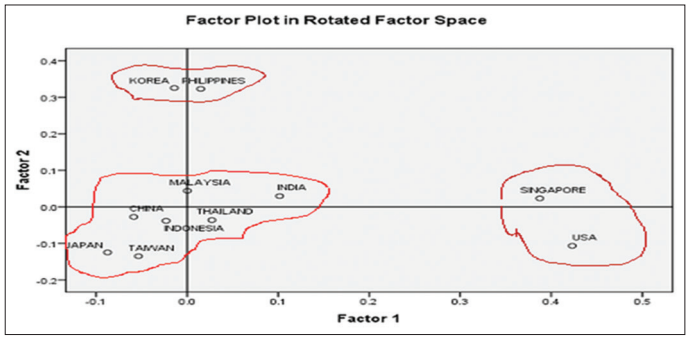
Figure 2 shows plots of bi-dimensional for sample stock market indices and score of two factor results for ML, during the study period from January 01st, 2005 to December 31st, 2014. The plots

Figure 1: Plot for the results of principal component (rotated two dimension) for Asian emerging stock markets and developed markets during the study period from January 01, 2005 to December 31, 2014



Source: (http://finance.yahoo.com/) and Computed using SPSS (Version - 21)

Figure 2: Plot for the results of maximum likelihood (rotated two factors) for Asian emerging stock markets and developed markets during the study period from January 01, 2005 to December 31, 2014



Source: (http://finance.yahoo.com/) and Computed using SPSS (Version - 21).

were used to distinguish developed markets from the sample Asian emerging markets. The plots, as revealed by the Figure 2, exhibit two distinct clusters. It is interesting to note that only six emerging market indices in Asia (S&P CNX Nifty - India, SSE Composite Index - China, Jakarta Composite Index - Indonesia, KLCI - Malaysia, TSEC Weighted Index - Taiwan and SET Index - Thailand) were found in the middle cluster. Another two indices (DJAI – USA and STI - Singapore) were found in top cluster in factor - 1 while remaining two indices (KOSPI Index - Korea and PSI - Philippines) were found in top cluster in Factor - 2.

The overall analysis of Figures 1 and 2 clearly shows that international investors could achieve substantial portfolio diversification benefits by using opportunities from six emerging markets in Asia. The overseas investors, who seek to maximize the benefits associated with portfolio diversification, could do so by investing their funds in the Asian emerging stock markets, namely, S&P CNX Nifty - India, SSE Index - China, KLCI Index - Malaysia, TSEC Weighted Index - Taiwan, Jakarta Composite Index - Indonesia and SET Index - Thailand.

5. CONCLUSION

The sample emerging stock markets in Asia were segmented into different groups for the purpose of this study. If the sample indices closely moved with each other, it is difficult to construct a portfolio which is superior in for risk reduction purpose. The findings of the present study confirmed the results of Abidin et al., 2004; Harper and Jin, 2012. It is good for the international investors to diversify portfolios globally because it would offer improved stability of their financial profile as well as higher yields, with less risk. Investors could switch their investments into other different emerging markets in Asia that have sufficiently low correlation to developed markets. It is important that the overseas investors, with the availability of quality information, may take best investment decision in their favor. Therefore, it could be concluded that Asian emerging stock markets, especially China, India, Malaysia, Taiwan, Indonesia and Thailand, provide good opportunities for overseas portfolio diversification and high return to the international investors over a longer period.

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