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Abstract

The study at hand examined financial cointegration of emerging economies and explored the diversification opportunities which are available for investors of developed countries. For the long run and causal relationship, Johanson cointegration and Granger Causality test are employed respectively. Analysis revealed evidence of cointegration between the markets of UK and Egypt. Granger Causality test indicated causality and most emerging stock markets were detected to be the followers of established capital markets. Findings implied that investors should consider the cointegration relationship before making investment decisions

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as it can minimize potential paybacks of prospective international portfolio diversification. Further, policy makers are recommended to consider keep an eye on the stock markets which are strongly cointegrated also having high bilateral trade volume while framing fiscal and monetary policies.

Keywords: Financial Cointegration, Emerging Markets, Johansen, Granger Causality.
JEL Classification*:* C58, E44, G11, G15, L25

1. Introduction

The emerging countries always headed to attain economic development and to improve the economic growth. In addition to other factors, investment plays a vital role for achieving this purpose. Modern economist Keynes (1936) equalized savings to investment and referred the capital markets as best a place to utilize investments in an efficient and effective way. Capital market is usually categorized into primary and secondary market. Equity market and stock market are the other names of secondary market where second hand long term financial instruments are bought and sold. Comovement of equity market indicates the parallel or similar movement of stock markets (Alvi, Chughtai, & Haq, 2015). Focusing this research on foreign portfolio investment, portfolio diversification is concerned with having equity/stock in different markets, countries, or regions. "*Don't put all your eggs in one basket*" is a famous proverb that provides the basis for portfolio diversification to national as well as international investors. Investors search investments opportunities all over the world for hedging risk and earning superior risk adjusted returns. Moreover, globalization, improvement in communication networks (Khan, 2011), information technology boom (Menon, Subha, & Sagaran, 2009), deregulation of markets, and relaxation of trade terms (Hussain, Hussain, Bhatti, & Hassan, 2012) have also encouraged the investors to chase international potential investment opportunities. These factors have not only improved capital mobility across geographical boundaries and resulted in more economically and financially unified but also caused the stock

markets to be dependent on movement or behaviors of other equity markets that might restrict possible gains from international diversification of investment. That is why, the concept of financial cointegration of equity markets has been the curiosity of research scholars, investors, and policy makers for its knock-on effects on macroeconomic policies and hunting for diversification opportunities. Emerging economies are a source of attraction for the foreign investors because they need foreign capital inflow to develop their economy. That is why, this study has investigated the pairwise stock markets' financial cointegration of six emerging economies: Indonesia, Pakistan, Mexico, South Korea, Turkey and Egypt with three developed economies: Japan, United States (US) and United Kingdom (UK).

Many researchers have explored the stock markets' financial cointegration of member countries in trading or economic blocs like Ciner (2006) and Agrawal and Kyaw (2005) studied North American Free Trade Area (NAFTA), Click and Plummer (2005) and Ibrahim (2006) scrutinized the Association of South East Asian Nations (ASEAN) countries, and Tahai, Rutledge, and Karim (2004) investigated Group of Seven (G7) countries. Some scholars frequently studied the impact of any event, financial crises or market crash on the cointegration relationship among countries (Assidenou, 2011; Demian, 2011; Wang, Yang, & Bessler, 2003; Yang, Kolari, & Min, 2003; Yang, Khan, & Pointer, 2003). Emerging economies have been a part of various studies on the financial cointegration such as (Alvi et al. 2015; Hoque, 2007; Khan & Aslam, 2014; Rajwani & Mukherjee, 2013; Yu, Fung, & Tam, 2010).

Review of literature provided the basis for the identification of research gap. Earlier, researchers have made Indonesia, Pakistan, Mexico, South Korea, Turkey, and Egypt as part of their broad sample, but neither of them has concentrated their studies on these members of Next Eleven (N-11) emerging economies for reconnoitring cointegration dynamics of equity markets. Further, N-11 countries have rising growth, and environmental score (GES) that is calculated based on thirteen factors including external debt, investment rate, inflation, fiscal

debt, openness of the economy, political stability, rule of law, corruption, penetration of internet, computers, and mobile phones, average years of secondary education, and life expectancy (O'Neill, 2011). The mounting GES provides a solid ground for exploring investment opportunities in these countries. This paper has specifically aimed at emerging economies for investigating their cointegration relationship and lead lag connection with established stock markets. Hence, this study will add to current literature on cointegration dynamics within the context of emerging or developing countries by bringing a fresh perspective to matter.

Main research objectives were: 1) to examine financial cointegration relationship of proposed emerging markets with each of the developed markets, 2) to investigate the lead lag relations, and 3) to identify possible diversification opportunities in emerging countries for the investors of developed economies. For this, Johanson cointegration approach will be used for testing long run relationship while Granger causality will be used for short run relationship.

Following this introduction, this study starts by reviewing the literature which is followed by describing data and methodology used. This study concludes with presentation and discussion of results and policy implications.

2. Literature Review

Cointegration estimations are normally used to find the long run comovement among the various equity markets. According to Engle and Granger (1987), when two or more series or variables have a root unit and their linear combination is found stationary, then those variables or series are supposed to be cointegrated with each other. One important difference to consider here is between correlation and cointegration. Both concepts do measure the co-movements in returns, but cointegration method is valuable to evaluate the co-movement between returns in long run and correlation is a short term measure. Also, correlation indicates the presence of similar direction between return series, however high

correlation does not necessarily guarantees high level cointegration in returns of stock markets (Alexander, Giblin, & Weddington, 2002).

Economies have now become more open, trading terms have relaxed, and investors are more eager for international investment opportunities for better returns, so economists, investors, financial analysts, and fund managers take keen interest in the study of cointegration. Cointegration approach was first developed by Kasa (1992) to identify similar stochastic trends among stock markets.

Many studies have been conducted to explore the cointegration relationship within the context of trading or regional blocs, financial crises, emerging economies, and developed countries. We will discuss the brief review of relevant literature. Aggarwal and Kyaw (2005) documented the presence of cointegration among USA, Canada and Mexico after NAFTA formation. Lamba (2005) scrutinized stock markets' cointegration relationships of Pakistan, India and Sri Lanka with Germany, UK, Japan, France, and USA. He found the Pakistani and Sri Lankan equity market to be independent and Indian stock market is more influenced by UK, USA and Japan after 9/11 terrorist incident in America. The Impact of US stock market (S&P500) was studied on the Turkish stock market (ISE) by Berument and Ince (2005) and concluded that ISE is **s**timulated by S&P500 and its own historical prices. Khan and Aslam (2014) investigated the financial cointegration relationship of the Pakistani capital market with Asian stock markets of India, Singapore, Malaysia, Japan, China and Indonesia and found a Pakistani equity market to be independent of Chinese and Japanese stock market only. Causal and cointegration links of the Pakistani stock market with some emerging markets: Hong Kong, China, Thailand, Brazil, India, Malaysia, Turkey and with few established economies: France, USA, UK and Japan were estimated by Hamid and Hasan (2011). The results indicated that the equity market of Pakistan is influenced by the stock markets of India, Thailand, China, Indonesia, Malaysia, Brazil, Turkey and Japan and put its effect on capital markets of Hong Kong,

Malaysia, Indonesia and Thailand. Agyei-Ampomah (2011) studied Egypt, Morocco, Nigeria, South Africa, Kenya, Ghana, Ivory Coast, Mauritius, Botswana and Tunisia. The researcher estimated financial cointegration linkage of these countries with global index of S&P Global 1200 Index and regional equity index of S&P/IFCG Middle East and Africa index and discovered a lower degree of correlation among these African stock markets while observed unlinked with regional and global stock market indices. Yu, Fung, and Tam (2010) explored integration level in the Asian region with countries involved are China, Taiwan, Hong Kong, Philippines, Indonesia, Malaysia, Singapore, South Korea, and Thailand. Dynamic Conditional Correlation (DCC) model indicated weak cointegration of China, Philippines, and Japan with Asian region while other stock markets showed a strong correlation level. Hoque (2007) investigated the emerging market of Bangladesh with USA, India, and Japan for examining the same and realized that equity market of Bangladesh is more responsive to shock in USA capital market, weak responding to the Indian stock market and non-reactive to Japanese equity market. Rajwani and Mukharjee (2013) explored financial cointegration of Indian stock market with South Korea, Malaysia, China, Hong Kong, Japan, Taiwan, and Indonesia and found the absence of its cointegration link with seven Asian stock markets. In their latest study Parakash, Nauriyal, and Kaur (2017) examined the cointegration relationship among the stock markets of Brazil, Russia, India, China, and South Africa (BRICS) using monthly data over the period 2005-2014. Johansen cointegration test exhibited the long run but weak relationship among these equity markets.

Previous studies have come with mixed results of cointegration relationships. For example, Lamba (2005) discovered the Pakistani equity market to be independent of stock markets of Japan, USA, and UK. Similarly Aslam, Hussain, and Altaf (2012) also indicated no cointegration relationship between these. Further, Indonesian equity market (JKSE) was spotted to have financial cointegration with S&P500 in the study conducted by Gosh, Saidi, and Johnson (1999). Yu and Hassan (2008) noted the existence of long run financial cointegration between equity

markets of Egypt and US and also between Turkey and USA but not found this relationship of UK, USA and Japan with Mexico. Aggarwal and Kyaw (2005) discovered significant cointegration between the stock markets of Mexico and USA.

Literature reviewed above clearly depicted that relationship between emerging and developed equity markets is not consistent. This variation in results may be due to different time period, sample, data frequency, or level of aggregation indicated in stock market indices. This study does not claim to reconcile the contradictory findings, rather it is aimed to enhance the current evidence of financial cointegration of emerging economies. Previously, authors have made the Next Eleven emerging countries a part of their broad sample, but none of them has specifically targeted these to provide evidence on chosen issue despite their increasing GES. This research would fill the gap by compiling the emerging economies from N-11 countries to investigate their individual cointegration relationship with each of the chosen developed market so that portfolio diversification opportunities can be found for their needed capital inflow.

Our suggested hypotheses are:

H_O: There is no financial cointegration between each emerging economy-developed economy pair.

H_1: There is financial cointegration between each emerging economy-developed economy pair.

3. Data and Methods

Our sample dataset comprised of daily closing stock market prices of seven emerging counties: Turkey, Pakistan, Indonesia, Philippines, Mexico, Egypt, and South Korea and three developed countries: United States, United Kingdom and Japan.

Table 1: Information on Stock Market Indices and Data Source

Country	Equity Market Index	Variable	Variable in log Form	Variable as Returns	Data Source
Pakistan	KSE100	KSE	LKSE	RKSE	Yahoo Finance
Egypt	EGX30	EGX	LEGX	REGX	Egyptian Stock Exchange
Indonesia	JKSE composite	JKSE	LJKSE	RJKSE	Yahoo Finance
Philippines	PSE composite	PSE	LPSE	RPSE	Yahoo Finance
Turkey	BIST100	BIST	LBIST	RBIST	Yahoo Finance
South Korea	Korea Composite Stock Price Index (KOSPI)	KOSPI	LKOSPI	RKOSPI	Yahoo Finance
Mexico	Indice de Precios y Cotizaciones (IPC)	IPC	LIPC	RIPC	Yahoo Finance
United Kingdom	FTSE100	FTSE	LFTSE	RFTSE	Yahoo Finance
United States	S&P500	S&P	LS&P	RS&P	Yahoo Finance
Japan	Nikkei225	Nikkei	LNikkei	RNikkei	Yahoo Finance

Selected emerging economies are members of Next Eleven (N-11) emerging markets and characterized by rising Growth Environmental Score (GES) (Tandon & Shome, 2009). We used convenience sampling method for choosing countries of interest because this method provides flexibility and saves time and cost (Marshall, 1996). Data for EGX30 was downloaded from the Egyptian stock exchange and for rest of the stock markets, the source was Yahoo Finance. Sample period covers 5810 observations and expands over si`xteen years from 1st January

2000 to 4th December 2015. For each stock market index, daily compounded returns R_t were calculated using the formula:

$$R_t = \ln (P_t/P_{t-1}) \quad \textbf{(1)}$$

Where P_t and P_{t-1} represent the closing stock prices at two consecutive days. For analysis of the data, this study employed unit root tests for stationarity testing. A time series variable with constant variance, covariance, and mean is said to be stationary. We employed Augmented Dickey Fuller (ADF) test by Dickey and Fuller (1979) and Phillips and Perron (PP) test by Phillips and Perron (1988) for unit root analysis. There are three models given for applying ADF test.

First equation includes constant but no trend.

$$\Delta y_t = \gamma y_{t-1} + \alpha + \sum_{i=1}^{k} \beta_i \Delta y_{t-i} + \varepsilon_t \quad \textbf{(2)}$$

Second equation accounts for both constant and trend.

$$\Delta y_t = \gamma y_{t-1} + \alpha + \delta t + \sum_{i=1}^{k} \beta_i \Delta\, y_{t-i} + \varepsilon_t \quad \textbf{(3)}$$

Third equation is without constant as well as trend.

$$\Delta y_t = \gamma y_{t-1} + \sum_{i=1}^{k} \beta_i\, \Delta\, y_{t-i} + \varepsilon_t \quad \textbf{(4)}$$

Graph of the log price series determines the form of equation (2, 3, or 4) to be used (Verbeek, 2008). Intercept/constant term α is included if graph does not start from the origin, and trend term δ will be used when graph shows any trend (upward or downward). ADF assumes the errors to be independent and identically distributed, however, PP test relaxes this rigid assumption. Both tests produced similar results of a unit root. Lag order for these unit root tests is selected by default in E-views. Further, if all series were found to be non-stationary at level, but stationary at first difference, then we proceed with Johansen (1988) cointegration method for examining long term relationship between the pairs of emerging and established

market. This study has estimated the pairwise unrestricted Vector Autoregressive (VAR) models for determining the optimal number of lags for bivariate cointegration analysis. Akaike Information Criterion (AIC) was used for lag selection. Cointegration analysis was based on the trace statistics. Two stock markets do not have the long run relationship if trace test statistic value is lower than the corresponding critical value. Absence of long run financial cointegration between stock market can lead to the situation where those equity markets may be related in short run (Egert & Kocenda, 2007). So, in such case the Granger Causality test is carried out to investigate the short run relationship. Results are based on the significance of the test statistics values for rejection of null hypothesis. Pairwise Granger Causality analysis is also used for determining short run lead lag linkage. There can exist unidirectional causality, bidirectional causality, or no causality between the pairs of equity markets.

4. Results and Discussion

Descriptive statistics of all ten stock markets are given in Table 2 which indicated the highest daily average stock return of 0.0061% of Pakistan with moderate risk of 0.12%. Turkey was featured to have the highest risk that is standard deviation of 0.17%. UK stock market had the lowest and negative mean return of 0.0001%. Results of Jarque Bera test rejected the null hypothesis of normal distribution for all countries as its corresponding probability values were less than 0.05.

First of all, we tested the log form of stock prices for stationarity. We conducted unit root analysis through Augmented Dickey Fuller test and Phillips Perron test. Akaike Information Criterion (AIC) determined the optimal lags. Results indicated all the variables/series except Philippines to be non-stationary at level but stationary at first difference (see Table 3).

Table 2: Descriptive Statistics of Daily Returns of All Stock Indices

	REGX	RIPC	RKOSPI	RJKSE	RBIST	RPSE	RKSE	RNikkei	RS&P	RFTSE
Mean	0.00004	0.000033	0.00002	0.00004	0.000025	0.000025	0.0001	0.000002	0.00001	-0.000001
Median	0.00007	0.000040	0.000041	0.000043	0.000007	0.000000	0.00005	0.000024	0.00003	0.000000
Minimum	-0.016	-0.009	-0.020	-0.015	-0.022	-0.011	-0.008	-0.013	-0.013	-0.011
Maximum	0.014	0.010	0.016	0.009	0.019	0.011	0.009	0.011	0.015	0.009
Std. Dev.	0.002	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.001
Skewness	-0.421	0.099	-0.631	-0.348	0.389	-0.043	-0.350	-0.924	-0.137	-0.265
Kurtosis	11.077	11.854	15.833	11.542	20.225	11.897	9.633	15.674	15.463	12.629
Jarque-Bera	15966.25	18986.58	40252.62	17781.6	71969.06	19162.28	10767.8	39712.54	37622.6	22512.47
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs.	5810	5810	5810	5810	5810	5810	5810	5810	5810	5810

Table 3: Unit Root Analysis

	Phillips Perron		Augmented Dickey Fuller	
Series / Variables	**At Levels**	**At 1st Difference**	**At Levels**	**At 1st Difference**
LJKSE	-2.42	-55.71	-2.62	-10.06
LBIST	-2.79	-63.59	-2.97	-12.53
LKSE	-1.62	-58.76	-1.64	-12.22
LIPC	-1.43	-57.10	-1.48	-17.00
LKOSPI	-3.14	-61.50	-2.95	-45.43
LEGX	-0.86	-51.95	-1.02	-15.41
LPSE	-3.63	-56.19	-3.63	-30.30
LS&P	-1.96	-69.20	-1.89	-14.72
LFTSE	-2.83	-67.89	-2.37	-12.41
LNikkei	-1.78	-65.03	-1.80	-64.87
Critical Values				
1% Level	-3.63	-3.63	-3.63	-3.63
5% Level	-2.95	-2.95	-2.95	-2.95
10% Level	-2.61	-2.61	-2.61	-2.61

Table 4: Bivariate Cointegration Rank Test (Trace statistic)

Series	Hypothesis	Trace Statistic	Critical Value 5%	Prob.**	Cointegration Yes/No
LNikkei and LEGX	None	8.209	15.495	0.443	No
	At most 1	2.685	3.841	0.101	
LS&P and LEGX	None	6.172	15.495	0.675	No
	At most 1	2.647	3.841	0.104	
LFTSE and LEGX	None*	16.264	15.495	0.038	Yes
	At most 1	2.362	3.841	0.124	
LNikkei and LBIST	None	8.853	15.495	0.379	No
	At most 1	3.081	3.841	0.079	
LS&P and LBIST	None	10.142	15.495	0.270	No
	At most 1	3.285	3.841	0.070	
LFTSE and LBIST	None	15.278	15.495	0.054	No
	At most 1	2.431	3.841	0.119	
LNikkei and LJKSE	None	8.599	15.495	0.404	No
	At most 1	2.530	3.841	0.112	
LS&P and LJKSE	None	8.815	15.495	0.383	No
	At most 1	2.278	3.841	0.131	
LFTSE and LJKSE	None	10.267	15.495	0.261	No
	At most 1	0.677	3.841	0.411	

Series	Hypothesis	Trace Statistic	Critical Value 5%	Prob.**	Cointegration Yes/No
LNikkei and LIPC	None	9.210	15.495	0.346	No
	At most 1*	4.078	3.841	0.043	
LS&P and LIPC	None	10.296	15.495	0.259	No
	At most 1*	4.104	3.841	0.043	
LFTSE and LIPC	None	11.196	15.495	0.199	No
	At most 1	2.813	3.841	0.094	
LNikkei and LKSE	None	10.301	15.495	0.258	No
	At most 1	2.056	3.841	0.152	
LS&P and LKSE	None	8.737	15.495	0.390	No
	At most 1	1.245	3.841	0.264	
LFTSE and LKSE	None	11.589	15.495	0.178	No
	At most 1	1.506	3.841	0.220	
LNikkei and LKOSPI	None	8.797	15.495	0.385	No
	At most 1*	3.914	3.841	0.048	
LS&P and LKOSPI	None	6.169	15.495	0.676	No
	At most 1	2.404	3.841	0.121	
LFTSE and LKOSPI	None	7.453	15.495	0.526	No
	At most 1	1.463	3.841	0.226	

Notes: * denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Cointegration analysis can only be performed when all variables become stationary at first difference. Hence, stock market of Philippines (PSE) is dropped before proceeding with financial cointegration analysis. We will not test long run relationship of Philippine stock market (PSE) with equity markets of US, UK and Japan. Unrestricted VAR was run to determine optimal lags for applying Johansen (1988) method for bivariate cointegration analysis over selected time horizon. Results are presented in Table 4.

According to results of bivariate cointegration trace statistics, none of the stock markets of Japan, US and UK have long run relationship with KSE as their probabilities values are greater than 0.05 and trace statistics are lower than critical values at 5%. Our findings for Pakistani stock market were in consistent with previous studies. Lamba (2005) found the stock market of Pakistan to be independent of equity markets of Japan, UK and

USA. Aslam, Hussain, and Altaf (2012) also indicated the similar outcomes.

Further, the only cointegration relationship, we observed was between Egyptian stock market (EGX) and UK's capital market (FTSE100) and UK (FTSE100) and Turkey (BIST100) as their trace statistics value was greater than critical value at 5% while considering 10% level there are other cointegrated markets like USA (S&P500) and Turkey (BIST100), Japan (Nikkei225) and Indonesia (JKSE), USA (S&P500) and Mexico (IPC) and Japan (Nikkei225) and South Korea (KOSPI). Study by Gosh, Saidi and Johnson (1999) opposed our results where JKSE was spotted to have financial cointegration with S&P500. Furthermore, BIST, IPC and KOSPI were noticed for no cointegration relationship with any of the three developed equity markets being their trace statistics value was lower than corresponding critical value at 5% level (see Table 4). Some previous researches oppose and few favour our findings like Yu and Hassan (2008) noted the existence of long run financial cointegration between equity markets of Egypt and US and also between Turkey and USA but not found this relationship of UK, USA and Japan with Mexico. Aggarwal and Kyaw (2005) discovered significant cointegration between the stock markets of Mexico and USA. Overall, none of the equity markets confirmed cointegration relationship with Japanese and American stock markets. Two pairs of stock markets that are EGX and FTSE, FTSE and BIST were detected to have long run relationship. These results suggested that international investors of any of the three developed countries can diversify their portfolio by investing in any of the six emerging economies which do not have long run cointegration relationship. Hence, potential benefits from international portfolio diversification can be reaped by making long term investment.

According to the results of Table 5, our proposed null hypothesis was accepted for all market pairs of emerging economy – developed economy at 5% except for UK and Egypt which is unidirectional at 10% level.

Table 5: Pairwise Granger Causality Test

Null Hypothesis:	Obs.	F-Statistic	Prob.	Direction
RNIKKEI does not Granger Cause RIPC	5808	1.34	0.26	Unidirectional
RIPC does not Granger Cause RNIKKEI		415.87	0.00	
RFTSE does not Granger Cause RIPC	5808	1.01	0.37	Unidirectional
RIPC does not Granger Cause RFTSE		149.34	0.00	
RS&P does not Granger Cause RIPC	5808	2.52	0.08	Unidirectional
RIPC does not Granger Cause RS&P		2.18	0.11	
RNIKKEI does not Granger Cause RKOSPI	5808	1.23	0.29	Unidirectional
RKOSPI does not Granger Cause RNIKKEI		12.45	0.00	
RFTSE does not Granger Cause RKOSPI	5808	207.37	0.00	Unidirectional
RKOSPI does not Granger Cause RFTSE		0.05	0.95	
RS&P does not Granger Cause RKOSPI	5808	360.38	0.00	Unidirectional
RKOSPI does not Granger Cause RS&P		1.67	0.19	
RNIKKEI does not Granger Cause RBIST	5808	0.73	0.48	Unidirectional
RBIST does not Granger Cause RNIKKEI		52.39	0.00	
RFTSE does not Granger Cause RBIST	5808	7.78	0.00	Unidirectional
RBIST does not Granger Cause RFTSE		1.39	0.25	
RS&P does not Granger Cause RBIST	5808	90.37	0.00	Unidirectional
RBIST does not Granger Cause RS&P		1.43	0.24	
RNIKKEI does not Granger Cause RKSE	5808	6.00	0.00	Unidirectional
RKSE does not Granger Cause RNIKKEI		1.86	0.16	
RFTSE does not Granger Cause RKSE	5808	17.69	0.00	Unidirectional
RKSE does not Granger Cause RFTSE		1.65	0.19	
RS&P does not Granger Cause RKSE	5808	22.41	0.00	Unidirectional
RKSE does not Granger Cause RS&P		0.32	0.73	
RNIKKEI does not Granger Cause RJKSE	5808	4.18	0.02	Bidirectional
RJKSE does not Granger Cause RNIKKEI		11.98	0.00	
RFTSE does not Granger Cause RJKSE	5808	58.73	0.00	Unidirectional
RJKSE does not Granger Cause RFTSE		0.06	0.94	
RS&P does not Granger Cause RJKSE	5808	199.43	0.00	Unidirectional
RJKSE does not Granger Cause RS&P		0.73	0.48	
RNIKKEI does not Granger Cause REGX	5808	2.92	0.05	Bidirectional
REGX does not Granger Cause RNIKKEI		9.94	0.00	
RFTSE does not Granger Cause REGX	5808	35.25	0.00	Unidirectional
REGX does not Granger Cause RFTSE		0.23	0.79	
RS&P does not Granger Cause REGX	5808	98.65	0.00	Unidirectional
REGX does not Granger Cause RS&P		0.52	0.59	

Note: Level of significance is 5%

On the contrary, there might exist short term relationship between those pairs of emerging and developed stock markets where Johansen method found no long run relationship. Pairwise Granger Causality test accomplished this purpose to investigate the short term lead lag relationship. Decision to reject or accept the null was grounded on the significance or insignificance of F statistics values. Granger Causality test is performed on stationary data so we run the test on returns of respective stock markets.

According to outcome of pairwise Granger Causality test, stock returns of IPC and S&P indicated no causality for its F test values being insignificant, while bidirectional causality was found between returns of Nikkei and BIST and Nikkei and JKSE. Remaining pairs of capital markets' returns displayed unidirectional causality. The stock markets of UK and USA were observed to Granger cause the equity markets of Pakistan, Turkey, Indonesia, Korea, and Egypt as their related probability value was less than 0.05 that rejected the null hypotheses. Japanese stock market Granger caused KSE but other stock markets of BIST, KOSPI and IPC granger causes Nikkei.

For emerging markets of Pakistan, Indonesia, Korea, Turkey and Egypt, established countries such as UK and USA were detected to be leaders and emerging economies were the followers. Oppositely, Mexico, Turkey and Korea were exposed to be leaders of Japanese stock market. These statistics were interesting as it is unlikely for the developed markets to use stock prices variations of emerging economies to predict their future stock prices movements. These emerging markets are not large enough to be used for such estimation of established stock markets. The real economic relationship might differ from these statistics provided in Table 5. Paradoxically, Aslam, Hussain, and Altaf (2012) found KSE to be the leader of equity markets of UK and USA while Yu and Hassan (2008) concluded that stock returns of USA Granger causes Egyptian and Turkish stock returns which also confirmed our findings. Additionally, Muhammad and Hussain (2011), Maneschiöld (2006) and

Syriopoulos (2011) also verified the leading role of developed equity markets.

5. Conclusion

This study aimed at exploring the long run and short run relationships of six emerging markets with three established stock markets for the period from 2000 to 2015. We achieved our research objectives by employing pairwise Johansen cointegration test for long run cointegration relationship analysis and pairwise Granger causality analysis for determining short run lead lag connection. Findings revealed presence of cointegration relationship between stock markets of Egypt (EGX) and UK (FTSE). However, for the Egypt and UK, this study has accepted alternative hypothesis which states that there is financial cointegration. Rest of selected pairs of emerging and developed markets revealed no financial cointegration. Outcomes of Granger Causality indicated no causality between equity markets of USA (S&P500) and Mexico (IPC) while most of developed economies were found to be leaders in the unidirectional Granger Causality analysis. Our results indicated the mixed results but consistent with literature review. Absence of cointegration relationship between pairs of emerging and developed countries suggests that investment in emerging economies could have portfolio diversification benefits. Policy makers would be benefited for framing fiscal and monetary policies as growing integration and openness in the world could cause more risk to country's economic or financial position. Future studies can be directed towards investigating the same concept for bonds and real estate market. Short term relationship can be examined using Vector Auto Correction Model (VECM).

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