

ORIGINAL SCIENTIFIC PAPER

THE DYNAMICS OF INTERNATIONAL EQUITY MARKETS IN ASIA, EUROPE AND AMERICA IN TERM OF ECONOMIC GLOBALIZATION

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ABSTRACT

This research explore the cause and effect dynamics of Pakistan Stock Exchange (PSX-100) with the international equity markets from all over the world including 4 from Asia, 3 from Europe and 2 from America for the period starting from January 1, 2006 to July 26, 2018. PSX-100 has international investment financial integration with all the markets of Asian, European and American Equity markets. Hang-Seng was showing the cointegration with PSX-100 and provides more opportunities of returns for investors. KLSE and BSX were found to be a cointegration effect; there exist relationship of NASDAQ with PSX-100 and American equity markets. There found Bivariate Causality of S&P500 with PSX-100 and S&P500 with IPC. A short run relationship of FTSE with PSX-100 and PSX-100 with IPC exist. The global investment rate of return can have implications to income and economic growth. The economic growth can have best implication for value of assets of the country. This study will support while decision making on escalation process which is dependent on transmission patterns at economic globalization.

KEY WORDS: diversification, co integration, portfolio theory, risk and return

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INTRODUCTION

The cause and effect at international equity markets are more interested area for international investors. There is a big literature available regarding to risk, volatility, investment opportunity and linkage of equity markets. America and Europe are included in developed equity market and Asia is considered as emerging economies. Cimen (2013) explored the causality analysis of equity markets.

David (2011) documented about the cause and effect relationship of S&P-500 and FTSE-100. There was no effect of HANG SENG and NIKKEI-225. America and Europe are comparatively more stable economies with reference to investment opportunities for investors in international markets. The risk behavior and volatility are less escalated with moments of international equity markets. Asia is considered as emerging markets with higher escalation process due to lower and upper side with volatility of equity markets. Investors are the key players of equity market due to control and right of investment decision making. Investors have country risk while investing in home country. Risk can be reduced through diversified investing into other international countries. International investments can have better implications to utilize best resources and minimize the cost of capital. Idris & Cheowg (2004) found stochastic trends among equity markets to prove a predictability level and enhanced utilization of information equity prices. The capital markets are also the key concern to outperform due to encouraging savings, utilization and allocating resources for the economic development and growth. This study is used to find the dynamic causal effect of PSX-100 with international markets of Asia, Europe and America. Kim (2005) showed a significant effect on markets in Asia than market of Japan. Ocran (2007) explore to search a dynamic trend and contradicted, Nieh and Yau (2006) also found no long run relationship. Sakthivel and Kamaiah (2012) indicate the relationship of US equity markets and Indian equity markets. Subramanian (2008) studied that East Asian, the five equity markets are cointegrated. Shmiri & Isa (2010) explored that United States - US equity market has impact on Asia Pacific but have no on Japan. Menon, Subha & Sagar (2009) studied about that the STI and NSE both have cointegration effect. Rehman, Zaheer Butt & Ali (2011) revealed that the equity market in Pakistan had no relation to United Kingdom -UK, United States of America-USA, Taiwan, Singapore and Malaysia and have relation to India, China, Japan and Indonesia. Suchismita & Mukherjee (2005) analyzed the markets at US which were not showed the co-integration effect to markets at Asia. This study is also an attempt to explain; the economic events at level have cause and effect relation to international equity markets. Ergun & Nor (2010) supported the dynamic linkages of ISE-Istanbul Stock Exchange and NASDAQ while Europe and Turkey signed a Custom Union agreement. Febrian and Herway (2008) proved that there exist positive signals to trade activities for investors. The causal effect of international equity markets provide positive signal to the investors, because it causes the economic growth and investors can easily know how to minimize the effect of financial crises. The flow of funds from all over the world would be affected by the markets' measures and would provide a place to the investors for introducing new financial products.

DATA & METHODOLOGY

This particular study is used to examine the integration and causality relation among the nine equity markets of different region in the world i.e., 4 from Asian equity markets: PSX-100, Hang Seng, KLSE, NIKKI-225; 3 from European equity markets: CAC-40 FTSE and NASDAQ and 2 from American equity markets: IPC- Mexico and S&P 500 simultaneously for the period starting from January 1, 2006 to July 26, 2018 using index of daily returns. The return can be calculated on continuous on daily basis as follows:

$$R_t = \text{Ln} \left(\frac{IP_t}{IP_{t-1}} \right)$$

R_t is the return and "t" is the period, IP_t is the end price at current date and IP_{t-1} is the end price at past date. The stationarity of data series through a ADF (Augmented Dickey Fuller -1981) and PP (Philip-Perron test -1988) are applied to test a unit root of series. These can be explained as

$$y_t = p y_{t-1} + \varepsilon_t \quad (2)$$

Where y_t a dependent variable, t time length period, p a coefficient and ε_t is the term of error. Three regressions equations for unit root are tested. If there is no constant and trend, then equation as follows:

$$\Delta y_t = \delta y_{t-1} + \varepsilon_t \quad (4)$$

If there is constant, α is a constant then equation as follows:

$$\Delta y_t = \alpha + \delta y_{t-1} + \varepsilon_t \quad (5)$$

If constant and trend is concerning then equated according to the following:

$$\Delta y_t = \alpha + \beta_1 t + \delta y_{t-1} + \varepsilon_t \quad (6)$$

To explore the long term relation, the Johanson and Juselius, 1990 where α_0 as constant, β_1 as coefficient of Z_t and ε_t as error term

$$y_t = \alpha_0 + \beta_1 Z_t + \varepsilon_t \quad (7)$$

The cointegration equations, λ_{trace} statistics is used as.

$$\lambda_{trace} = -Q \sum_{i=r+1}^j \text{Ln} (1 - \lambda_t) \quad (8)$$

The cointegration equations, Max Eigen value of $\lambda_{Maximum}$ statistics is used as

$$\lambda_{Max} = -Q \text{Ln}(1 - \lambda_t) \quad (9)$$

Bivariate Autoregressive (Pair wise) process will be used for a particular sample. Particular equation will be used for the determination of long run effect.

$$\alpha_0 + \sum_{i=1}^n Q \omega_{t-1} + \sum_{i=1}^n \kappa_i \omega_{t-1} + \varepsilon_t \quad (10)$$

$$\kappa_t = b_0 + \sum_{i=1}^n L_i \kappa_{t-1} + \sum_{i=1}^n \kappa_t \omega_{t-1} + \varepsilon_t \quad (11)$$

Where ω_1 and ω_2 are based on the assumption about the two series have not been cointegrated and Δ indicated at first difference. If both the series are to be cointegrated then an additional test would be applied for error correction model. The suitable test for the series will be used as follows.

$$\Delta \omega_{2t} = b_0 + \delta_2 (\omega_{1t-1} - L \omega_{2t-1}) \sum_{i=1}^n b_{1i} \Delta \omega_{1t-i} + \sum_{i=1}^n b_{2i} \Delta \omega_{2t-i} + \varepsilon_{2t} \quad (12)$$

To find out the relationship between ω_1 and ω_2 , the term $\omega_{1t-1} - L \omega_{2t-1}$ is a term of an error correction term.

EMPIRICAL RESULTS

ADF (Augmented Dickey Fuller) and PP (Philip Perron Test) are the tests of stationary. Table-1, the results indicates that the Asia, Europe and America equity markets were reflecting stationarity of data at level.

Table 1: ADF and PP Tests

Equity Markets	Augmented Dickey Fuller Test at Level of 5%	Philip - Perron Test at Level
PSX-100	-50.6523	-51.798
Hang Seng	-56.5083	-56.509
KLSE	-61.2125	-61.0119
NIKKIE-225	-57.2613	-57.4502
CAC-40	-27.2866	-57.9332
FTSE-100	-26.7592	-58.651
NASDAQ	-42.6144	-58.0078
IPC	-39.7887	-50.6455
S&P 500	-43.8304	-61.3499

Table 2: Critical Values

Probabilities	1%	5%	10%
ADF at Level	-3.43228	-2.86228	-2.56721
PP at Level	-3.43228	-2.86228	-2.56721

Table 3 reveals that the results of Johanson cointegration of Trace Statistics of equity markets of Asia, Europe and America. A co integration relation exist due to each series of returns trace statistics values > critical values.

Table 3: Johanson Multivariate Cointegration of Asian, European, American Equity Market (Trace Statistics)

Equity Markets.	Hypothesis No. of CE(s)	Eigen Value	Trace Statistic	At 5% Critical Value	Critical Remarks
PSX-100 WITH ASIAN EQUITY MARKETS.					In this there exist 4 Co-Integration Vector at Critical level of 5%.
PSX-100	None	0.2248	7410.6650	NA	
Hang Seng	At most 4 *	0.1887	4442.3630	197.3709	
KLSE	At most 6 *	0.1751	3171.3630	125.6154	
NIKKIE-225	At most 8 *	0.1533	2009.7190	69.8189	
PSX-100 WITH EUROPE EQUITY MARKETS.					In this there exist 4 Co-Integration Vector at Critical level of 5%.
PSX-100	None *	0.2767	5287.7940	159.5297	
CAC-40	At most 3 *	0.1991	2666.9890	69.8189	
FTSE-100	At most 4 *	0.1744	1981.6750	47.8561	
NASDAQ	At most 5 *	0.1648	1390.1690	29.7971	
PSX-100 WITH AMERICAN EQUITY MARKETS.					In this there exist 3 Co-Integration Vector at Critical level of 5%.
PSX-100	None *	0.2023	1754.2600	29.7971	
IPC	At most 1 *	0.1772	1056.4610	15.4947	
S&P 500	At most 2 *	0.1369	454.5332	3.8415	

PSX-100 also have co-integration relation with the other markets at Asia due to its trace statistics > critical value at 5% significance level. Table 3 also resulted that European equity

markets trace statistics > critical value at 5%. It is revealed that there is an existence of 8 trace statistics cointegration vector. All the equity markets of Europe have cause and effect with each other due to cointegration relationship of equity markets of Europe. PSX-100 has also integration with markets at Europe and America, which is a positive signal to diversify the risk of investor while decisions of investments.

Table 4: Johanson Multivariate Cointegration of Asia Pacific, European and American Equity Markets (Maximum Eigen Value)

Equity Markets.	Hypothesis No. of CE(s)	Eigen Value	Max. Eigen Value	5% Critical Value	Critical Remarks
PSX-100 WITH ASIAN EQUITY MARKETS.					
PSX-100	None	0.2248	786.1318	NA	In this there exist 4 Co-Integration Vector at Critical level of 5%.
Hang Seng	At most 4 *	0.1887	645.3889	58.4335	
KLSE	At most 6 *	0.1751	594.0677	46.2314	
NIKKIE-225	At most 8 *	0.1533	513.6672	33.8769	
PSX-100 WITH EUROP EQUITY MARKETS.					
PSX-100	None	0.2248	786.1318	NA	In this there exist 4 Co-Integration Vector at Critical level of 5%.
CAC-40	At most 3 *	0.1996	687.3794	64.5047	
FTSE-100	At most 4 *	0.1887	645.3889	58.4335	
NASDAQ	At most 5 *	0.1834	625.6118	52.3626	
PSX-100 WITH AMERICA EQUITY MARKETS.					
PSX-100	None *	0.2023	697.7993	21.1316	In this there exist 2 Co-Integration Vector at Critical level of 5%.
IPC	At most 1 *	0.1772	601.9275	14.2646	
S&P 500	At most 2 *	0.1369	454.5332	3.8415	

Table 4 indicates the existence of 10 co-integration maximum eigen value statistics > at 5%critical level, suggesting that the investors can have implication to enhance the activities of trade with diversified decision. The Bivariate test of cointegration of PSX-100 with markets at Europe revealed that PSX-100 was cointegrated with equity markets at Europe and European equity markets were also cointegrated with each other, which reveals that there exists a long term integration relation of PSX-100 with other international equity markets.

Table 5: Bivariate Cointegration for PSX-100 with Asia, Europe and America:

Equity Markets.	Hypothesis	Eigen Value	Trace Statistics.	At 5% Critical Value	Critical Remarks.
PSX-100 WITH ASIAN EQUITY MARKETS.					
PSX-100 -Hang Seng	None *	0.1849	1102.4990	15.4947	Co-integration Exist.
	At most 1 *	0.1417	471.5576	3.8415	

PSX-100 –KLSE	None *	0.1695	1036.0840	15.4947	Co-integration Exist.
	At most 1 *	0.1392	462.6470	3.8415	
PSX-100 -NIKKEI-225	None *	0.1897	1116.7170	15.4947	Co-integration Exist.
	At most 1 *	0.1404	467.1962	3.8415	
PSX-100 WITH EUROPEAN EQUITY MARKETS					
PSX-100 -FTSE-100	None *	0.1960	1134.6640	15.4947	Co-integration Exist.
	At most 1 *	0.1388	461.3684	3.8415	
PSX-100 –NASDAQ	None *	0.1869	1101.7220	15.4947	Co-integration Exist.
	At most 1 *	0.1393	463.0010	3.8415	
PSX-100 WITH AMERICAN EQUITY MARKETS					
PSX-100 –IPC	None *	0.1840	1092.0760	15.4947	Co-integration Exist.
	At most 1 *	0.1396	464.2516	3.8415	
PSX-100 -S&P 500	None *	0.1920	1128.7380	15.4947	Co-integration Exist.
	At most 1 *	0.1414	470.6083	3.8415	

There also found to be a short run relationship of NIKKEI-225 with KLSE at lag length 1 and with Hang Seng at lag length 2. In short the overall results reveal that there exist short run relationships of PSX-100 with equity markets of Asia. Further analysis indicates the results of Vector Error Correction Model of PSX-100 with European equity markets in table 5. There found short run relationship FTSE at lag length 1 and with KSE-100, CAC-40 at lag length 2. There also found short run relationship of CAC-40 with NASDAQ at lag 1. FTSE has also short run relationship with CAC-40 and NASDAQ at lag 1 and with CAC-40 at lag length 2. NASDAQ with CAC-40 at lag 1 and with KSE-100 and CAC-40 at lag 2. So Overall result indicates that European markets have short run relationship with each other but KSE-100 has only with ATX. Table 5 reveals the result of Vector Error Correction Model of KSE-100 with American Equity Markets. Results indicate that there exist short run relationship of KSE-100 with IPC and S&p500 both the markets of America at lag 1 and with S&P500 at lag 2.

Table 5: Vector Error Correction Model of PSX with Europe Markets

PSX-100 WITH ASIAN EQUITY MARKETS				
Error Correction:	D(KSE-100)	D(HangS)	D(KLSE)	D(Nikkei-225)
CointEq1	[-0.64850]	[-0.48123]	[16.4409]	[6.68782]
D(KLSE(-1))	[-0.47565]	[-2.08600]	[-23.5071]	[2.56396]
D(KLSE(-2))	[0.07650]	[-2.05764]	[-13.8331]	[2.68436]
D(Nikkei-225(-1))	[-1.69278]	[-0.54234]	[3.53395]	[-35.8691]
D(Nikkei-225(-2))	[-0.47484]	[2.52178]	[1.60140]	[-19.0991]
PSX-100 WITH EUROPEAN EQUITY MARKETS				
CointEq1	[-0.31564]	[45.0468]	[4.08932]	[-3.93049]
D(CAC-40(-1))	[-1.09005]	[0.34200]	[0.50949]	[-2.26376]
D(CAC-40(-2))	[-1.29488]	[-0.66151]	[0.25311]	[-1.65821]
D(FTSE(-1))	[0.08779]	[9.32668]	[-37.5583]	[-2.12225]

D(FTSE(-2))	[0.00052]	[6.31295]	[-17.2656]	[-1.09319]
D(NASDAQ(-1))	[0.60557]	[-10.2347]	[0.23941]	[-37.9762]
D(NASDAQ(-2))	[2.29471]	[-2.81678]	[0.07260]	[-21.3533]
PSX-100 WITH AMERICAN EQUITY MARKETS				
CointEq1		[-3.73681]	[-8.72476]	[32.1107]
D(Kse-100(-1))		[-35.1226]	[2.77093]	[-4.37744]
D(Kse-100(-2))		[-18.3914]	[0.98587]	[-2.83576]
D(IPC(-1))		[1.38912]	[-29.5730]	[-11.7518]
D(IPC(-2))		[0.19080]	[-18.2801]	[-4.67307]
D(S&P500(-1))		[-3.35566]	[-6.28635]	[-0.05460]
D(S&P500(-2))		[-1.11269]	[-3.07494]	[-2.07177]
C		0.000	0.000	0.000
		0.000	0.000	0.000
		[-0.06024]	[0.02340]	[-0.00317]

IPC has short run lead lag relationship with S&P500 at lag 1 and 2. S&P500 also found to be as a short run relationship with KSE-100, IPC at lag 1 and with IPC at lag 2. So in short all three regions of equity markets has the lead lag short run relationship which is a positive signal for the investor to enhance the trading activities and for diversification decisions.

CONCLUSION

In this study of cointegration in economic globalization perspective of Asia, Europe and America stock markets, PSX-100 is risky as concern to other equity markets. As for as this rational in finance is concerned, more risk more return and vice versa, is reflected in the results of this study. The equity markets in Asia are more risky as compared to Europe and America because of positive return. Overall analysis revealed that there exists a long run and short run relationship of equity markets with each other in Asia, Europe and America. This will create a positive signal for the investor to happen the trade activities for diversification decisions. The international trade is used for financial integration at global level. The dynamics of economic globalization will proceeds the growth and linkage dependency among international due to long term complex implication. The globalization as a cross border financial integration concerned to international trade flow and foreign direct investments (FDI). The trade flows and FDI with proportion of GDP contributes to capital invested at international level. The favorable situation of taxes, labour cost, tariffs, control over capital due to financial integration lead to down in exchange rate. The decline in currency may improve the trade and growth patterns. However, international financial markets transmission patterns are seems to be a relevant process. Therefore, PSX-100 as Asia pacific equity market is providing space to the investors to perform better.

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