CHAPTER II

THEORITICAL REVIEW

A. Theories

1. Co-movement

Being a specific technical term, it could not be found in common dictionary (Baur, 2004). Though some web dictionary tries to define the word, from web free encyclopedia "co-movement effect" represents the movement together of atomic nucleus and electron to the center[6]. Other similar definition is shared from different free encyclopedia and online dictionary stating that, "co-movement" as "the correlated or similar movement of two or more entities[7]" Then, the tendency of two variables moving in parallel is the most appropriate term illustrated by the example of the return from two investments. The co-movement pattern is determined by correlation coefficient or covariance[8]. Commonly, it is then important to study this topic to determine how efficient is the diversification and how does the financial system function (Baur, 2004).

2. Relationship between co-movement, contagion, co-integration, integration

Co-movement derived from commove related to commotion that is sharing movement or moving with may be normal or excess or extreme (Forbes and Rigobon,

[6] This definition is taken from the McGraw-Hill Dictionary of Scientific & Technical Terms, 6E, Copyright © 2003 by The McGraw-Hill Companies, Inc.

[7] Co-movement, retrieved from http://glosbe.com/en/en/comovement and http://en.wiktionary.org/wiki/comovement, April 03, 2013

[8] Co-movement, retrieved from http://www.lse.co.uk/financeglossary.asp? London South East extensive glossary of financial definitions

2002). If it is resulted from shock such as financial crisis, co-movement is viewed as contagion. Moreover, contagion is the dissemination of market disturbance (Dornbush, Park and Classen, 2000), the shock may spread over other markets. These markets move together during crisis. Furthermore, internationally, contagion it is the significant increase of linkage transmitted to another country while cross-market is concerned (Forbes and Rigobon, 2002). Concerning co-integration is the movement of two time series in the same direction that the two non-stationary time series produce a stationary one. Co-integration may describe the long-run economic equilibrium of the market (Mollah and Hartman, 2012). Integration, mostly in economic integration that is based on trade, there is linkage trade between countries.

3. General causes of co-movement

Factors are interrelated and have impact over each over (Benada, Yang, Khouv and Schutte).Globalization enlarges the activities in international scene, as it worldwide integration and development, it broadens the activities for instance a country can issues bonds or other contract in other countries. Then, change that makes the market much more interrelated every country operates the financial activity throughout connection that arises the speculator and investor's different strategy. Information technology that enhances the transmission of news and information about the market becomes an ultimate factor of market integration as it quickens and facilitates all transactions. Management system default, policy and economic management are similar among countries that may create spillover effect to

contagion. Moreover, lack of global system persists since there is no world central bank. International event can cause countries shock like change in crude oil price (Tsutsui and Hirayama).

4. International investment diversification: portfolio aspect

4.1 International diversification

As environment has changed, global context becomes a real object investors have to take into consideration[9]. It consists of trading or investing throughout various countries and securities[10]. Many are the researches made that demonstrate the benefit of investor while opting to the international diversification of portfolio investment[11]. As domestic assets by its loss from correlation limits investment yield, international investing is said highly beneficial both for individual and corporate as well (Obiri, 2011). Somehow, in spite of the increase of cross-border equity holdings, due to market friction, investors' tendency still remain on disproportionate domestic stocks while building their portfolio (Coeurdacier and Guibaud, 2009). Then key is given by demonstrating the advantage of diversifying the domestic equities.

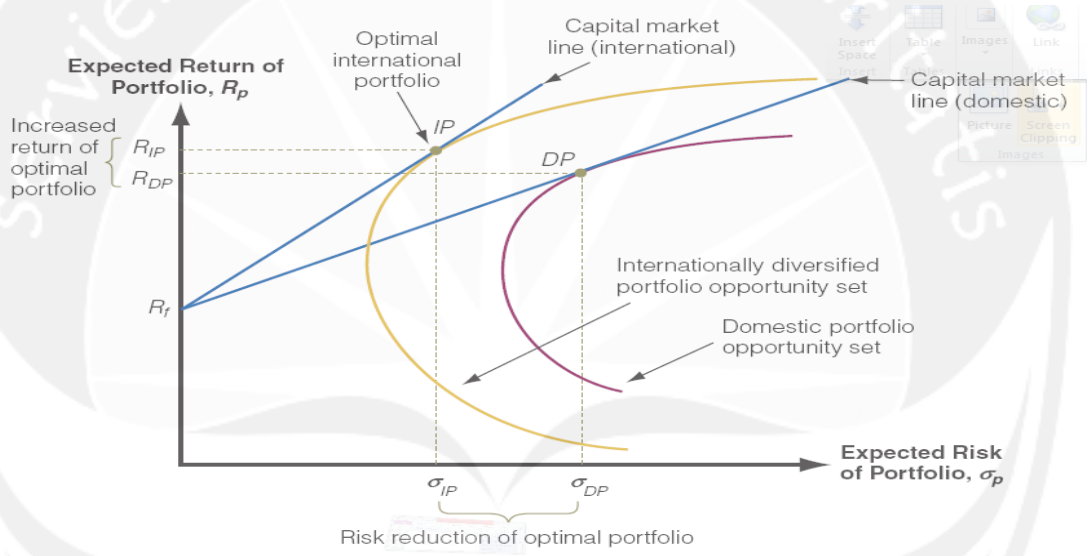
The figure below shows the benefit from shifting domestic equities investment to international prospect. The capital market lines for both options give

[9]Investment Principle and concepts, Charles. P. Jones, 11th edition, 2010 (14) it stresses as this is a "must' for investors.

[10]While defining the International diversification, retrieved from http://financial dictionary.thefreedictionary.com/International+Diversification, (April 2013)

[11] International Corporate Finance, Madura, 10 edition, p 87-88, International Stock Diversification, it tries to explain its importance by giving the standard deviation formula of two stock portfolio. Though, limitation is done in case of market integration that are highly correlated. (p88).

evidence of the yields resulting from rational option. Efficient portfolio becomes the main target if trying to interpret the return and risk for international portfolio (IP) versus domestic portfolio (DP). As with the reduction to risk, international portfolio offer a positive difference in return compared to the DP. It confirms the ideal and general assertion on investors' attitude since profit maximization requires this desired condition.



Source:wps.prenhall.com/

Figure 1: Gains from International Portfolio

The addition of internationally diversified portfolios to the total opportunity set available tothe investor shifts the total portfolio opportunity set left, providing lower expected risk portfolios for each level of expected portfolio return. (While DP: domestic portfolio is compared with the international one).

4.2 Risk and return on diversification

4.2.1Risk

The assumption of classical portfolio theory of investor risk-averse typical behavior implies a certain degrees of risk acceptance but proportional to the expected return[12]. Besides, investors always face risk towards the favorable diversification. Risks or the chance viewed also as the probability of deviation[13] that oppose investor's expectation, characterizes the field of investment whether domestic or global. Risks could be classified into two main categories; the diversifiable risk (unsystematic risk, specific risk) and the non-diversifiable risk (systematic risk, market risk). Somehow, amongst all, the typical risks for international investment prevail in exchange rate risk and country-specific risk.

4.2.1.1 Exchange rate risk

Generally, every country has the local currency which may be a soft currency. Transaction is often contracted within the hard currency like USD, thus, investor has to be exposed to uncertainty in asset return as exchange rate between currencies fluctuates.

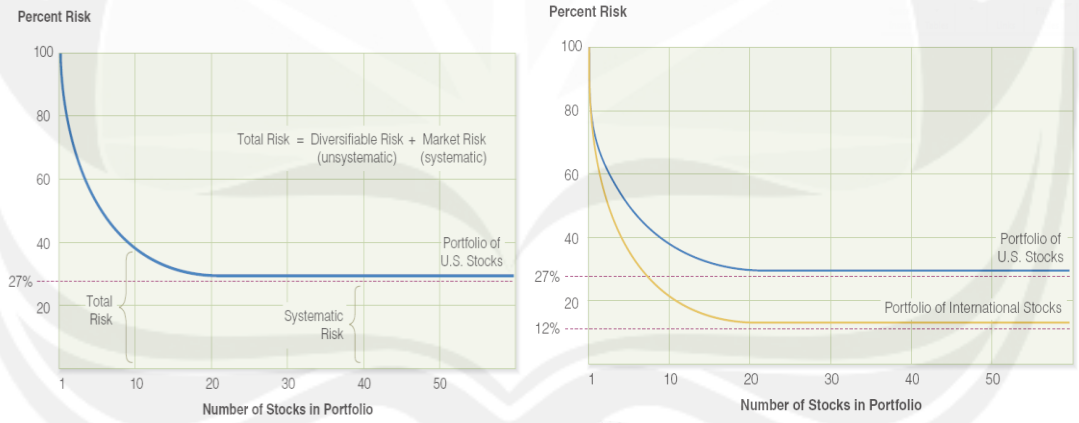
4.2.1.2 Country-specific risk

Country risk represents the business climate change within the country in concern. Its effect is important than the specificity or differences (size of stock

[12] Topics in International finance, Part 6, chapter 17, International Portfolio Theory and Diversification page W-6. Risk and return coexists investor has to face.
[13] Usually, risk is measured by the value of standard deviation.

market, banking sector, openness) that exist across countries (Driessen and Laeven, 2004). Among the other risks country risk may occur in the form of the following.

Political risk such as government instability, socioeconomic conditions, internal conflict, corruption, military in politics, religious tensions, law and order, democratic accountability and bureaucracy quality. Then, country financial risk, including foreign debt, exchange rate stability is an important factor. Lastly, economic risk could affect the diversification like the GDP per capita, real annual GDP growth, annual inflation rate and budget balance. Sarkis Joseph Khoury (2003) added reserves/import, interest/export, export growth, domestic saving.



Source:wps.prenhall.com/

Figure 2: Portfolio risk and diversification

Risks are inevitable but are manageable by reducing its effect through diversification. Here US stock is taken as example versus the international stocks, the result shows that with the same stock go globally reduces risk.

4.2.2 Return

Function by time period, return results from the change of value of the investment. Common methods used for determining return are HPR (with or without dividend), CAPM. Return on international diversification is higher.

B. Global stock market and economy, BRIIC and PIIGS

1. Economy of BRIIC and PIIGS

Apart from the above mentioned findings concerning the BRIIC group, this term is also supported by OECD[14] by adding South Africa becoming BRIICS, though our concern remains the former group. Some economic important variables (growth GDP (real value), balance, export/import and population growth) are used to reflect both group economy towards the whole world.

Table 1 and 2 shows the forecast up to 2014, concerning growth, BRIIC potential countries remain China 8.9% followed by India 7% and Indonesia 6.5%. These countries are said the most rapidly growing countries in Asia. From centuries ago, Indonesia and India already have a tight bilateral relationship in economic cooperation. In October 2005, Indonesia and India signed new strategic partnership including II CECA. For PIIGS, Ireland is hoped to reach the level of 2.2% whereas Greece still in decrease with negative value of -1.3%. Governments balance somehow

[14] An organization established in 1961, headquartered in Paris, France, having mission to promote policies aiming to promote economic and social well-being of people around the world. It works with government and publishes 250 new titles a year.

in overall tends to be negative due to the fact that allocation to public investment remains higher for population care and economic concern.

Table 1: Growth rate (GDP real value %)[15]

Country/Year	2007	2008	2009	2010	2011	2012	2013	2014
BRIIC								
Brazil	6,1	5,2	-0,3	7,6	2,7	1,5	4,0	4,1
Russian Federation	8,5	5,2	-7,8	4,3	4,3	3,4	3,8	4,1
India	10,0	6,0	5,2	10,5	7,8	4,5	5,9	7,0
Indonesia	6,3	6,0	4,6	6,2	6,5	6,2	6,3	6,5
China	14,2	9,6	9,2	10,4	9,3	7,5	8,5	8,9
PIIGS								
Portugal	2,4	-0,0	-2,9	1,4	-1,7	-3,1	-1,8	0,9
Italy	1,5	-1,2	-5,5	1,8	0,6	-2,2	-1,0	0,6
Ireland	5,4	-2,1	-5,5	-0,8	1,4	0,5	1,3	2,2
Greece	3,5	-0,2	-3,1	-4,9	-7,1	-6,3	-4,5	-1,3
Spain	3,5	0,9	-3,7	-0,3	0,4	-1,3	-1,4	0,5

Source:www.oecd-ilibrary.org/(adapted)

[15]Last updated: 5 December 2012

Table 2: General government financial balance, surplus (+), deficit (-) (%)

Country/Year	2007	2008	2009	2010	2011	2012	2013	2014
BRIIC								
Brazil	-2,8	-2,0	-3,3	-2,5	-2,6	-2,2	-1,7	-2,0
Russian Federation	5,6	7,3	-4,3	-3,5	1,6	0,5	0,1	0,0
India	-4,0	-7,1	-9,7	-7,4	-7,9	-8,4	-8,3	-7,6
Indonesia	-1,3	-0,1	-1,6	-0,7	-1,1	-2,0	-1,8	-1,6
China	2,0	0,9	-1,1	-0,7	0,1	-2,0	-2,2	-1,7
PIIGS								
Portugal	-3,2	-3,7	-10,2	-9,8	-4,4	-5,2	-4,9	-2,9
Greece	-6,8	-9,9	-15,6	-10,8	-9,5	-6,9	-5,6	-4,6
Italy	-1,6	-2,7	-5,4	-4,3	-3,8	-3,0	-2,9	-3,4
Ireland	0,1	-7,4	-13,9	-30,9	-13,3	-8,1	-7,5	-5,3
Spain	1,9	-4,5	-11,2	-9,7	-9,4	-8,1	-6,3	-5,9

Source: www.oecd-ilibrary.org/ (adapted)

Table 3: BRIIC export and import

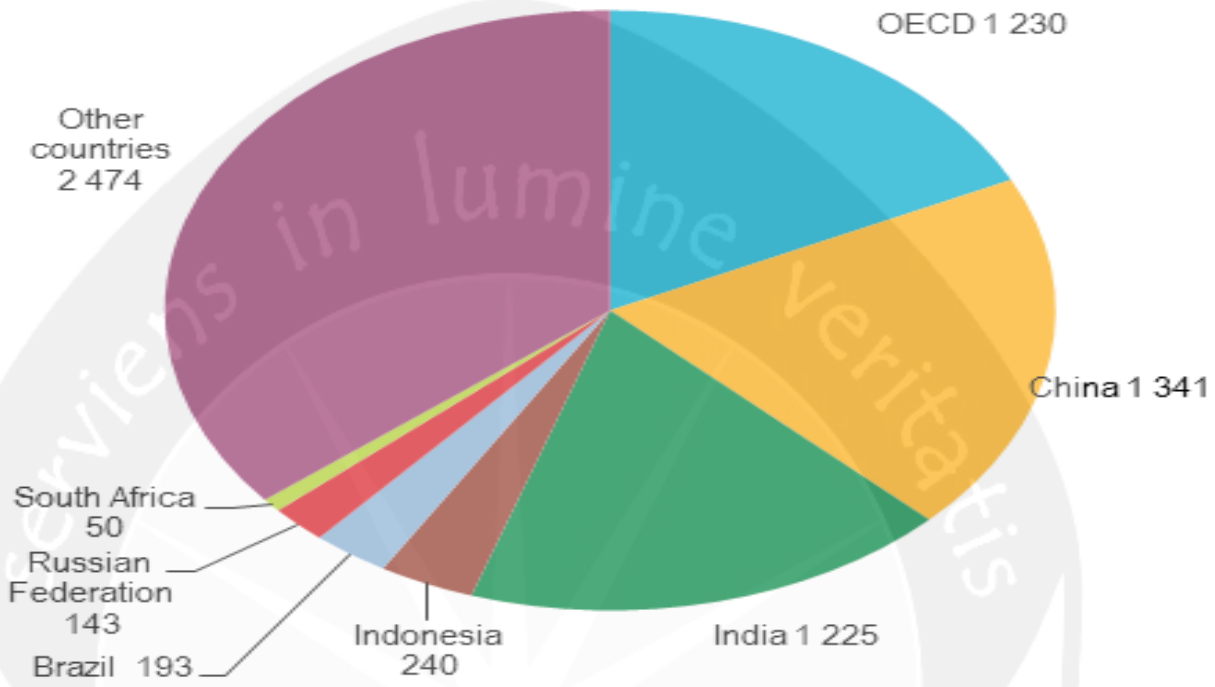
CT	Ex	Rk	Partners	Ip	Rk	Partners
BRIIC						
Brazil	242	25	**China 17%**, US 10.8%	238.8	22	US 15.1%, **China 14.5%**
Russia	530.7	9	Netherlands 12.2%, **China 6.4%,** *Italy 5.6%*	335.4	16	**China 15.5%**, *Italy 4.3%* (2011)
India	309.1	18	UAE 12.7%, US 10.8%, **China 6.2%**	500.3	9	**China 11.9%**, UAE 7.7%, Switzerland 6.8%
Indonesia	188.7	28	Japan 16.6%, **China 11.3%**, Singapore 9.1%, US 8.1%	179	28	**China 14.8%**, Singapore 14.6%, Japan 11%
China	2.05	2	US 17.2%, Hong Kong 15.8%, Japan 7.4%	1.817	3	Japan 9.8%, South Korea 9.3%, US 7.3%
PIIGS						
Portugal	57.8	57	*Spain 25.1%*, Germany 13.6%, France 12.1%	67.03	46	*Spain 31.8%*, Germany 12.4%, France 6.9%, *Italy 5.4%*
Italy	483.3	10	Germany 13.3%, France 11.8%, US 5.9%, *Spain 5.4%*	469.7	13	Germany 16.5%, France 8.8%, **China 7.7%**, *Spain 4.7%* (2011)
Ireland	113.6	36	US 22.3%, UK 16.1%, Belgium 15.5%, Germany 7%	63.1	49	UK 39.8%, US 13%, Germany 7.8%
Greece	26.67	69	*Italy 9.5%*, Turkey 7.9%, Germany 7.9%	57.92	51	Germany 10.6%, **Russia 9.4%**, *Italy 9.2%*, **China 5.7%**
Spain	303.8	19	France 17.8%, Germany 10.6%, *Portugal 8.3%*, *Italy 8.3%*	322.7	18	Germany 13%, France 11.8%, *Italy 6.7%*, **China 5.8%**

Source: www.cia.gov/(adapted)

Table 4: Population growth

	1997	98	99	2000	1	2	3	4	5	6	7	8	9	10
BRIIC														
Brazil	1,5	1,5	1,5	1,5	1,4	1,4	1,3	1,2	1,2	1,1	1,0	0,9	0,9	0,9
Russian	-0,2	-0,3	-0,3	-0,4	-0,4	-0,4	-0,4	-0,4	-0,3	-0,2	-0,2	-0,1	-0,1	-0,1
India	1,8	1,8	1,8	1,7	1,7	1,6	1,6	1,6	1,5	1,5	1,5	1,4	1,4	1,4
Indonesia	1,4	1,4	1,3	1,3	1,3	1,3	1,3	1,3	1,2	1,2	1,1	1,1	1,1	1,0
China	1,0	0,9	0,8	0,8	0,7	0,6	0,6	0,6	0,5	0,5	0,5	0,5	0,5	0,5
PIIGS														
Portugal	0,3	0,4	0,4	0,5	0,7	0,7	0,7	0,6	0,5	0,3	0,2	0,1	0,1	..
Italy	0,1	0,0	0,0	0,1	0,1	0,3	0,8	1,0	0,7	0,6	0,7	0,8	0,6	..
Ireland	1,1	1,1	1,0	1,3	1,5	1,8	1,6	1,6	2,2	2,6	2,3	1,9	0,8	0,3
Greece	0,6	0,5	0,4	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,4	..
Spain	0,3	0,4	0,5	0,8	1,1	1,5	1,7	1,6	1,7	1,5	1,8	1,6	0,7	0,3
World	1,4	1,4	1,3	1,3	1,3	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2

Source:www.oecd.org/statistics/(adapted)



Source: www.oecd.org/statistics/

Figure 3: World population including BRIIC

The growth rate tremendously increases for the BRIIC countries; India leads the concern followed by Indonesia. Viewed from the figure, almost half of the world population dwells within these survived countries. European countries still fail to make its citizen younger.

Population has considerable impact on economic development, the younger the labor force, the faster the production is. It attracts investors as the cost often tends to be lower. Besides, large number of population helps the country development in term of consumption, market share increases proportional to consumer number.

2. Stock market

Table of market capitalization clarify the market capitalization among the BRIIC and PIIGS countries for ten years starting from 2002 to 2011. It is resulted from stock prices times by the number of share outstanding. Figures are expressed in billion of USD. Opportunities from such economy become more and more interesting whereas those from well-established economy remain lower. It is viewed from the figures that market capitalization from PIIGS has tendency of decrease as opposed to the BRIIC market. Compared with the world measurement, 11.81 percent of the global market belongs to the newly emergent against only 4.2 percent. China has noticeable difference with Shanghai and Shenzen bourses already surpassed USD 4.2 trillion by the end of Q1 in 2011. Portugal the least, does not develop yet its capital market with only USD 78.59 billion dollars.

Table 5: BRIIC and PIIGS Market capitalization (in Billion USD)

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
BRIIC											**11,81**
Brazil	123,81	234,56	330,35	474,65	711,10	1 370,38	589,38	1 167,33	1 545,57	1 228,97	777,61
Russian	124,20	230,79	267,96	548,58	1 057,19	1 503,01	397,18	861,42	1 004,52	796,38	679,12
India	131,01	279,09	387,85	553,07	818,88	1 819,10	645,48	1 179,24	1 615,86	1 015,37	844,50
Indonesia	29,99	54,66	73,25	81,43	138,89	211,69	98,76	178,19	360,39	390,11	161,74
China	463,08	681,20	639,76	780,76	2 426,33	6 226,31	2 793,61	5 007,65	4 762,84	3 389,10	2 717,06
PIIGS											**4,52**
Portugal	42,85	58,28	70,24	66,98	104,20	132,26	68,71	98,65	82,00	61,69	78,59
Italy	480,63	614,84	789,56	798,17	1 026,64	1 072,69	520,86	317,32	318,14	431,47	637,03
Ireland	60,38	85,07	114,09	114,13	163,36	144,03	49,40	29,88	33,72	35,36	82,94
Greece	68,74	106,84	125,24	145,01	208,28	264,94	90,40	54,72	72,64	33,65	117,05
Spain	465,00	726,24	940,67	960,02	1 323,09	1 800,10	946,11	1 297,23	1 171,61	1 030,95	1 066,10
World	23 509,27	32 036,19	38 151,37	43 319,35	53 375,29	64 575,37	34 900,89	47 379,87	54 511,41	46 783,97	43 854,30

Source:**api.worldbank.org/(adapted)**

C. Literature review

Researchers often consider to differentiate the world countries co-movement in general without focusing on the two different groups. Sometimes they mixed the elements with the other country economic classifications. Concerning the survived countries, Gupta (2011) tries to focus on the first cluster but it excludes Indonesia. The findings between BRIC series conclude that the series are not normally distributed; they are at stationary level and correlated positively. Among the countries; Russia, India and China have impact over Brazil economy the same as India over Russia viewed by Granger causality with unidirectional causality only. Whereas China granger-causes Russia and India and reversely. In sum, co-movement exists within the elements of the cluster.

For Modi, Patel and Patel (2010), while studying the co-movement between Brazil, Russia and India with other markets including Hong Kong, Mexico, US and UK; Russian RTS index represents the highest volatile market among them. For pairing studies, Brazil-Hong Kong, US (DJIA-NASDAQ) and UK-Brazil are the most correlated volatile markets. The finding ended by dividing the markets into two other different groups in which US investors have opportunity if investing in Indian and Russian markets.

Mobarek, using 19 stocks with BIIC and Italy states that integration exists among such groups of countries stock markets. Intensified co-movement persists over

the times in those that are newly blooming ones. Other markets are influenced only by those of Brazil, Russia and US though they do not affect the latters.

If considering the PIIGS countries, Tatomir and Alexe, (2012) make comparison between them versus CEE members using quantitative economic analysis (ECI and SCI) and more focus on economic interrelationship among them. Only Italy has no progress in economic development. Moreover, in 2010, PIIGS recognized the highest economic convergence. Throughout the period Italy and Ireland did.

Furthermore, Baskaran and Hessani, (2011) put stress on the debt crisis that have occurred especially in the EMU area. PIIGS countries are tighter in their fiscal policy before the introduction of the Euro. After adopting the Euro system, the group looses it and with higher degree of borrowing expecting the bailout policy while crisis will take place.

Finally, Evans and McMillan, (2006) encompass both groups within 33 stocks aiming to determine the evidence of their co-movement and correlation as well. Between 5 subdivisions G7, North Europe, South Europe, Asia and others, a unique vector of integration exists implying the long-run stationary relationship among them. A non-strong co-movement occurs between the international indices. US have an uptrend correlation with the rest of the world but lower one for the other group. Thus, co-movement exists but lower that implies the range of opportunity while diversifying portfolio internationally or even regionally.

1. BRIIC countries co-movement

Table 6: Findings on BRIIC countries co-movement

Market , Study, Methodology Used	Result Found
Gupta, (2011) **Brazil, Russia,India, China (2008-11)** Normally test: Jarque-Bera test (normal probability distribution) Stationarity test=unit root test analysis: Augmented Dicky Fuller Test (series stationary or not) ADF: for high order correlation Causality=Granger causality test: Engle and Granger (is time series$x_t$causes times series y_t?, to predict y_t)	All stock series are non-normal distribution. The series are at stationary level forms. Positive correlation exists among the series. Direction of influence between the two variables: India, Russia and China Granger causes Brazil economy not the converse RIC granger causes Brazil (not converse) India Granger causes Russia (not converse) China Granger causes RI Russia and India (converse as Chinese economy largely interdependent of Indian and Russian economy)
Modi, Patel and Patel, (2010) **Brazil, Russia,India**, Mexico, Hong Kong, US (DJA, NASDAQ), UK (1997-08) Daily Indexes: Brazil (BVSP) Russia (RTS) India (SENSEX) Mexico (MXX) Hong Kong (HANGSENG) US (DJA, NASDAQ), UK (FTSE-100) Graphical exposition, correlation analysis, 200 days rolling coefficient, Interdependency analysis	Volatility highest: RTS lowest: DJA Average daily return: H: MMX and L: FTSE 100 Correlation: There is H and L between some pairs; H: DJA and L: NASDAQ. So they are attracted to Indian Investor Rolling correlation: existence of considerable volatility correlation between the eight stock indices. BSE positive over them. most Volatile: BSE- HANGSENG, DJA-NASDAQ, FTSE100-RTS least Volatile: BSE-NASDAQ, DJIA-FTSE100 US investor has good portfolio diversification in India and Russia. Conclusion: two fragments: US and some leading markets (BSE, RTS).
Mobarek, (n.d.) **Italy**, Australia, Canada, France, Germany, Hong Kong, Japan, Sweden, United Kingdom and United States, **Brazil, India, Indonesia, China**, Argentina, Chile, Korea, Malaysia and South Africa (1995-09) Geweke measures of feedback (contemporaneous and unidirectional feedback), (Stock market integration) Geweke measure of feedback (contemporaneous, pooled cross-country time-series regression, pairing) (determinants)	There is stock market integration between these studied stock markets. For markets that economically emerged, there is intensified co-movement across market over time. Some markets are more likely or lead other markets than vice versa. The leader-follower market has trend that may change over time due to country's economy and global market conditions. US, Brazil, Russia affect other markets but not be affected.

Source: Gupta, (2011), Modi, Patel and Patel (2010) and Mobarek, (n.d.)

2. PIIGS countries interrelationship

Table 7: Findings on PIIGS countries interrelationship

Market , Study, Methodology Used	Result Found
Tatomir, &Alexe, (2012) **PIIGS**: Portugal, Italy, Ireland, Greece and Spain vs CEE: Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, and Slovakia (2000.08.10) Quantitative analysis ECI: Economic Convergence Index, variables used: GDP (ppp), labor and price; method used: GEA (Group of Applied Economics) SCI: Structural Convergence Index, variables used: GVA; agriculture, industry, construction, trade, financial service and other services; method used: ISD by Krugman	Only Italy has no progress but all have made improvement in catching up in the last decade, the most are Ireland and Slovakia In 2010, for PIIGS, had the highest level of economic convergence, for CEE: Slovenia had Italy and Ireland have the higher degree of convergence in the Euro Area throughout the period
Baskaran, &Hessani, (2011) **PIIGS**: Portugal, Italy, Ireland, Greece and Spain EU: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Sweden, Luxemburg, Netherlands, Norway, Poland, Hungary, Iceland, UK (1975-09) difference-in-difference methodology Using Maastricht Treaty contract (deficit within the time period measurement)	significant effect is viewed with PIIGS rather than with other EMU countries on public borrowing PIIGS more consolidated until the introduction of Euro While Introducing Euro PIIGS countries loose their fiscal policy, their borrowing was increased noticeably, they believed on bailout commitment to sort out debt crisis

Source: Tatomir, &Alexe, (2012) and Baskaran, &Hessani (2011)

3. Both groups BRIIC and PIIGS countries co-movement

Table 8: Findings on both BRIIC and PIIGS countries co-movement

Market , Study, Methodology Used	Result Found
Evans, & McMillan, (2006) 33 stocks including PIIGS (Portugal as Italy as G7, **PIIGS**: Portugal (South Europe), Italy (member of G7), Ireland (North Europe), Greece (South Europe) and Spain (South Europe) **BRIIC:** Brazil (Others), India (Others), Indonesia (Asia) and China (Asia) Co-integration analysis :not able to capture the fluid nature of financial integration only looks commonality over a fixed time frame, only gives economic significance in long-term horizon (1994-05) Multivariate extension of GARCH model: require to ensure tractable estimation that makes result different from different GARCH specification Realized correlation: free from measurement error and provides a model free nonparametric framework	between the five groups there is a single co-integrating vector that means just one long-run stationary relationship for Asia 2 co-integrating vectors number of common stochastic trends: G7 there are six North Europe there are eight South Europe there are three Asia there are eight Others there are two There is then evidence of co-movement among the international indices but not strong. Correlation between US and the rest of the world is uptrend. Correlation between the other group exist but not too much the degree of co-movement is not high so there is still room for manager to portfolio diversification regionally or globally

Source: Evans, & McMillan, (2006)

D. Hypothesis of the research

As the objective of the study reflects the existence of stock market integration and co-movement between the two main categories, the hypotheses enhance the approaches. Based on the background and research on the degree of integration among the international and domestic market returns, it should not be significantly positive (highly co-integrated) if to optimize profit (Harrison and Moore, 2010), hypotheses are formulated as the following:

H_1: Stock markets between BRIIC and PIIGS countries are co-integrated

H_2: Strong co-movement exists between the BRIIC and PIIGS countries through long- run relationship

Theses hypotheses are interrelated and the process uses step by step approach, in other words, H_1 determines the following step while testing the second hypothesis H_2. The methodology verifies the result as each hypothesis is tested through the stages in co-movement process. H_1 becomes the result of the co-integration test, whereas H_2 drawn from the interpretation of ECT and VECM.