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Long Run Dynamic Linkage of Indian Stock Market with Major Asian Stock Market

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Abstract: ***Globalization of the world market attract the interest of academics and investors to the subject of study of co movement and risk diversification opportunity across the stock markets of the world. The present study investigates the co movement of Indian Equity Market BSE30 with the markets of SSEC index - China, N225 - Japan. The results reveal that all the three stock markets have short run equilibrium whereas for long term these markets do not exhibits any relationship. This indicates that investors can be benefitted by making the investments in these markets as there is a possibility to reduce the level of risk through investments in international portfolio in these countries.***

Keywords: Co movement, diversification, International portfolio, Market equilibrium

JEL classification: G1, G12, G15

1. Introduction

Indian stock market is among the old markets in the Asia region. With the emergence from 1875 India stock market possessed several modifications in its operations and regulation. In the present scenario the market transparency is one of the most important phenomena for all financial markets. Investor tries to earn the excess return in the markets. The integrations of the market offer the global opportunity to invest. Stock markets are the long term markets to earn rather than short run. Market behaviors were governed by the investor's sentiments. Markets reflect all information floated in any corner of the world as soon as the markets are integrated with each other the speed of information adjustment is increasing and prohibiting the investors to earn any of the excess return. Investor take benefits of their information sources at the situation when the stock markets shows weak form of market efficiency some time Indian markets offers this opportunity to the investors M. Anees & kumar. S. (2014) . Long term Investors are investigates the properties of the markets which offer them to reduce their risk in the investment. Management of risk in the investment is an issue of the market efficiency as well as integration with other markets. As integration offers to invest global and information efficiency with integration level of the markets protects investors from different potential losses in their investment. BSE and NSE two major stock markets of the India have the characteristics of the market efficiency and integration. Both of the markets were least influenced by the other major Asian developed markts and offering higher opportunity to diversification in global investment Kumar. S, M. Anees (20017). In present scenario the dynamics of the stock markets have greater importance. Indian stock market well holds the dominant place among the Asian region markets and attracting the investors through FDI and FII**.** Swetadri. S. & Amalendu B. (2018).

Presently the focus of the research in finace was centered towards the assessing the dynamics nature of the developed stock markets. There is limiting study which shows the level of integration of the stock markets of the Asian regions.

The main objective of the study is to examine the long run and short run behavior of the Indian stock market (BSE30 - SENSEX) with the other Asian Stock markets of SSEC index - China, N225 - Japan during the period of 2015 - 2019 monthly observations. The present research has used the Augmented Dickey fuller test for the investigation of the stationary of the markets data and Johansen – co integration (1988) test for study of long run and short run equilibrium behavior of the markets.

2. Literature Review

Emergences of Financial integration of all stock market enhance the market efficiency and prevent the stakeholders for any kind of crises in the market. The developed markets have larger economic value and these markets are dominating all the stock market around the world. The influences of the one market on other are represented in terms of financial integration of the global stock market. Cointegration of the markets has a central concerned among the researcher and academicians dealing in economics and finance.

Benjamin Miranda Tabak (2002) argues that market of Latin America and the United shows short term relationship and it is an opportunity for investors to grasp the fruit of diversification through investing in these stock

markets. Searat Ali et al. (2011) Pakistan's Equity Market shows diversification opportunity to investors with the markets of India, China, Indonesia, Singapore, Taiwan, Malaysia, Japan, USA and UK. Alternatively Pakistan equity market do not shows opportunity of the diversification with the market of India, China, Japan and Indonesia. . Komlavi Elubueni Assiduous (2010) disclosed that investors of OECD, markets cannot control the unwanted risk arises in their portfolio due to US market. Taimur A. Khan (2011) conducts a study on long run convergence behavior of United States with 22 others developed countries and they argue that markets of China, Malaysia and Austria were showing highest diversification opportunities. Hande Erdinc, Joniada Milla (2009) investigate the relationship of joint membership on integrating behavior of the stocks markets among European member countries France, Germany, United Kingdom during 1991 - 2006. Their result of the study indicates that stock markets of these countries are co integrated with each other and relationship was continuing for long time period.

Omar Masooda (2010) the markets of Baltic bench, Riga and Tallinn shows bidirectional relationship and this reveals that opportunity for the investment is better in these countries. As these markets shows the confidence and trust of their investors. E. M. Ekanayake (1999) investigates the casual relationship in export and economic growth in India Indonesia, Korea, Pakistan, Philippines, Srilanka, Thailand and Malaysia. His work supports the conventional economic theory of export contributes positively on the economic growth of the country. He found bidirectional relationship between growth and export. Tantatape B. & Komain. J. (2007) examined the relationship among the selected macroeconomic variables, industrial production index, money supply, exchange rate, oil prices, and stock index in Thailand. The result of their study indicates that all the economic variables were integrated with each other and have long run relationship. Money supply has only positive impact on index whereas all other variable were negatively influences the index. For the post financial crisis periods there is lack of integration for long run and only money supply was positively influencing the index.

Kamal Amin El - Wassal (2005) argues that relationship between stock market growth and economic activity, privatization, stock return in emerging economies India, Korea, Malaysia, Philippines, Zimbabwe is bidirectional that means both side of the economic development indicators indicates the financial growth of the country. Loesse. J. &Yaya. K (2010) study the longitudinal relationship between the saving and investment among the countries of UEMOA membership. They argues that for long time period it is domestic saving who contributes in development of investment for the half of the group member country and for other half they founds that these variables were not related. Mohammed Issa. S. et al. (2014) examines the relationship between energy consumption and real economic growth in 17 Arab countries during 1980 - 2011. Results of their study shows that there is no causality between economic growth and energy consumption in the country indicate that no one variables are related with each other as well as not influencing each others. Srikanth, P. (2012) During 2000 - 2010 stock market indices of India (SENSEX), is integrated with the markets of Hong Kong (HSI), Indonesia (JKSE), Malaysia (KLSE), South Korea (KOSPI), Japan (Nikkei 225) and China (SSEC). Samadder, &Amalendu Bhunia (2018) Argues that Indian stock market were integrated with other developed market of Australia, Canada, France, Germany, UK, USA. These markets show that there is opportunity for diversification in their investment for the short term whereas for the long terms this opportunity is not fruitful. Ranjan Dasgupta (2014) investigates the long and short run relationship between BRIC countries and developed stock market. Indian and Brazil stock market shows bidirectional relationship. Chinese market granger causes the Brazils markets which affects the Russian market. This relationship attracts investors to invest in the BRIC countries markets.

Vanitha & Shruti (2011) Investigates the integration of Indian stock market with the stock market of Japan, UK, US and China over the period 1st January 1998 to 31st October 2008. Their results reveal that Indian stock market is not integrated with these markets except US. It is an opportunity to the investors to speculate in these markets. Samveg A. Patel. Vilakshan, (2013) During 2000 - 2012 Indian stock market do not show long run equilibrium relation with the markets of US UK Germany, Australia, France, Canada, Japan. Further these markets also do not showing the causality relationship. These results indicated that these markets were highly speculative for the investment. Patel, Samveg (2013) investigates the interdependence of Indian Stock Market with other Asian equity markets like Pakistan, Sri Lanka, Malaysia, Korea, Japan, Singapore, Taiwan and China during 1997 - 2012. All Asian stock indices are long run equilibrium relationship. Anjana Raju, G. Velip, S. P. (2019) Concluded that needs of the integration of the global markets were originated from the great financial crises of 1999 and 2008. In the previous researcher has focused their study for the developed and emerging markets, whereas the frontier and standalone market were untouched.

Above discussion on the long run behavior of the markets has shows that this behavior of the markets will be influenced as well as changes with respect to the time. Therefore our effort is to capture the long run behavior as well as the diversification opportunity of the Indian stock market with other two most strong markets of Japan and China.

3. Research Methodology

For the present study the daily stock prices of BSE 30, N225, SSEC, during the period of 2015 to 2019 has been taken from the website of yahoo finance, which provides all the data related to the major stock market in all region of the world. The integration of stock markets were tested with the help of co integration rank test based on maximum Eigen value, co integration test of trace statistics. In order to test the stationary of the price series

Dickey and Fuller (1979) and Phillips and Perron (1988) test has been applied coined another method for testing the presence of unit root termed as nonparametric method of controlling for serial correlation when testing for a unit root.

$$\Delta Yt = (\Phi - 1) + Yt - 1 + Ut \text{ - - - - - - - - - (i)}$$

The null and alternate hypothesis is written as

H0: $(\Phi - 1) = 0$, H1: $(\Phi - 1) < 0$ (Damodar and Gujrati)

Johansen, S. (1988) argues that if two time series in co integrated then we will estimates linear relationships. On the other hand if they are not co integrated then we cannot estimate linear relationship among them anyhow. For analyzing the relationship all of the series must have stationary at equal orders.

$$BSE = \alpha + \beta 1\ N225 + \beta 2\ SSEC + u \text{ - - - - - - (ii)}$$

$$N225 = \alpha + \beta 3\ BSE + \beta 4\ SSEC + v \text{ - - - - - -(iii)}$$

$$SSEC = \alpha + \beta 5\ BSE + \beta 6\ N225 + w \text{ - - - - - (iv)}$$

Where α is a Constant, βs are the coefficients of the markets, u, v, w are error term.

4. Analysis and Discussion

Unit Root at Level:

To test the presence of unit root in the series Augmented Dickey - Fuller and Phillips - perron test has been applied on the Logarithm form of all the series. The outputs are as;

Table No.1

Augmented Dickey - Fuller test statistic			Phillips - Perron test statistic	
Index	t - value	p - value	t - value	p - value
BSE	- 0.454	0.985	- 0.484	0.984
N225	- 2.46	0.345	- 2.442	0.357
SSEC	- 0.732	0.969	- 0.732	0.969

From the table it is clear that p values resulted from applying both the test for all the series is more than the acceptable value at 5%level of significance, which indicate that we are fails to accept the null hypothesis of presence of unit roots at level. Therefore it can said to be that all the index series are non stationary at level which indicates that the prices of the stock are fallowing random walk behavior. Further this series has been tested at its first level of differences the results are shows in table.

Table N0.2: Unit root test at first order differences

Augmented Dickey - Fuller test statistic			Phillips - Perron test statistic	
Index	t - value	p - value	t - value	p - value
BSE	- 33.115	0.000	- 33.068	0.000
N225	- 36.677	0.000	- 36.660	0.000
SSEC	- 34.639	0.000	- 34.641	0.000

The above table reveals that, the p value resulted from both test are smaller than 0.05 and therefore the null hypothesis is rejected for all indexes, that means all index become stationary at its first level of differences. Therefore it seems that short run equilibrium exists among all the stock markets.

Co - Integration test: investigating the co integrating vectors at least 2 orders

Table No.3

Hypothesized Number of C. E (S)	Eigen Value	Trace Statistics	Critical value 0.05	P - Value
None	0.009	14.110	29.797	0.834
At most 1	0.003	3.490	15.494	0.940
At most 2	1.770	2.150	3.841	0.999

Unrestricted Co integration Rank Test (Maximum Eigen value)

Table No.4

Hypothesized Number of C. E (S)	Maximum Eigen Value	Trace statistics	Critical value 0.05	P - Value
None	0.009	10.61	21.13	0.685
At most 1	0.003	3.49	14.26	0.908
At most 2	1.77	2.15	3.84	0.999

Co integration rank test (trace) shows that, there is no co integrating equations founds to be significant at any level. The Maximum Eigen value test confirms the results of rank test, as it also shows that there are no co integration vector exists at any level. Therefore, it is concluded that, all markets do not have long run equilibrium. Results show that it is not possible to predict any of the stock markets with the help of other stock market. This indicates that, it is not possible to assume any kind of linear relationship among these Markets.

5. Conclusion

Financial integration of global stock markets enhances the market efficiency of the stock markets. Market prohibits the bad practices in stock market and reduces the chances of hazards to the investors in their investments. The price indexes of all these Asian markets are fallowing the random behavior which indicates there are no opportunities for the investor to get the undue advantage just only analysis the past data. Co integration analysis insist that these stock market are integrated at short run that mean in short run investors have an opportunity to manage the risk in their investments through investing in these markets, but for the long run there were no linkage has been observed therefore the investor for long run prospective do not grapes the diversification opportunity in their investment.

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