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INTEGRATION OF INDIAN STOCK MARKET SENSEX WITH SELECTED ASIAN INDICES-A COMPARATIVE STUDY

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ABSTRACT

This study investigates the nature of the financial integration of India's stock market with selected Asian stock markets. In this study, month-wise average prices of BSE-Sensex, HangSeng, Nikkei225, SSE Composite index and Singapore Straits Times Index have been selected. Descriptive statistics and Correlations have been computed for the select stock market indices. Statistical Significance of the correlation has been tested by applying correlation t-test. The results of these studies support the view that there is a substantial integration between domestic and international financial markets. BSE-Sensex has witnessed greater fluctuations which has been indicated by very high Co-efficient of variation compared to other select indices. Sensex, the Indian bench market index, has shown strong association with Singapore STI and Hang Seng and weak association with Nikkei 225 and SSE Composite index.

Key words: Financial Integration, Stock market, Coefficient of Variation

INTRODUCTION

Integration of stock markets in Asian Markets could offer a way for these markets to overcome some of the obstacles constraining their development. Possible benefits associated with integration of exchanges are diversified risk in a wider market, more efficient and competitive markets, lower costs, higher returns, and increased cross border capital flows.Increased financial integration among stock markets in the world leads international investors to look for new investment opportunities in order to reduce the potential risks of each investment. When stock market indices of different countries do not follow the same trend, then international investors can find good opportunities to diversify their portfolio investments among these countries. International investors are generally interested in emerging stock markets but the interdependence among these markets and developed markets may affect the scope for diversification possibilities (Pretorious, 2002). By pooling the resources of fledgling and fragmented capital markets, regionalization could boost liquidity and the ability of these markets to mobilize local and international capital for private-sector and infrastructural development. Investors would gain access to a broader range of shares; issuers would gain access to a larger number of investors. Recognizing the critical importance of financial assets to economic agents and policy, numerous studies in the applied finance literature have concentrated on measuring the international integration of national stock markets across several developed and emerging market economies. However, studies focused on India's stock market are rather scarce. Hence, the present paper focuses on studying the comparative analysis of Indian stock market index Sensex with other Asian market indices and tries to find out whether any correlation exists between the markets or not.

REVIEW OF LITERATURE

1. William L. Huth(1994) et al have opined that economic interdependence between nations has been the focus of considerable research. In their view point, a particular avenue of international interrelationship that has received a great deal of recent attention is the integration of international stock markets. Increased trade between nations implies that domestic corporate profitability will be influenced by economic conditions in other countries.

2. Ravazzolo(2002) et al examine real and financial links simultaneously at the regional and global level for a group of Pacific-Basin countries by analyzing the covariance of excess returns on national stock markets over the period 1980-1998. They find overwhelming evidence at the regional and global level and for all sub-periods that financial integration

is accompanied by economic integration. This seems to suggest that economic integration provides a channel for financial integration, which explains, at least partly, the high degree of financial integration found in this study and in other studies for this region even in the presence of foreign exchange controls.

3. LucíaCuadroSáezet(2007) al analyses whether, and to what extent, emerging market economies (EMEs) have systemic importance for global financial markets, above and beyond their influence during crises episodes. Using a novel database of exogenous economic and political shocks for 14 systematically relevant EMEs, they find that EMEshocks not only have a statistically but also economically significant impact on global equity markets. The economic significance of EME shocks is in particularunderlined by their remarkably persistent effects over time.

4. Hazem A. Marashdeh(2010) et al examine the extent of stock market integration among the Gulf Cooperation Council (GCC) countries. The results of the empirical tests suggest that the GCC stock markets are not fully integrated and there still exist arbitrage opportunities between some of the markets in the region. On the other hand, the results show no evidence of co-integration between the GCC stock markets and developed markets, which implies that international investors can diversify their portfolio and obtain long-run gains by investing in the GCC markets

IMPORTANCE AND SCOPE OF THE STUDY

In the context of increasing globalizing and increasing opportunities to the investors to invest abroad, it is essential for the international portfolio investors from India to understand the level of interdependence among the major stock markets in the world and its impact on Indian stock market. Study of level of correlation between Indian stock market and Asian markets, helps the investors in planning for international price arbitrage and international portfolio diversification. Hence it is considered important toanalyze the levelof correlation among these major stock markets themselves. In order to reduce the portfolio risk, an investor will prefer to invest in the stock markets which are less correlated with other stock markets.This research paper concentrates on analyzing the extent of correlation of BSE Sensex with other selected Asian Indexes. Various indexes taken for the purpose of study are given in the following table

TABLE 1: Indices and Time Period Taken For Study

Country	Stock exchange	Indices	Time period
India	Bombay stock exchange	BSE Sensex	Jan 2007 to Dec2016
Japan	Tokyo Stock Exchange	Nikkei225	Jan 2007 to Dec2016
Hong kong	Hong Kong stock exchange	Hang Seng	Jan 2007 to Dec2016
Singapore	Singapore stock exchange	Straits Times Index	Jan 2007 to Dec2016
China	Shangai Stock Exchange	SSE Composite index	Jan 2007 to Dec2016

OBJECTIVES OF THE STUDY

The objective of the present study is to:

1. To study the trend of BSE Sensex in comparison with selected Asian markets.
2. To analyse the level of integration of BSE Sensex selected Asian markets.

METHODOLOGY OF THE STUDY

Period of study:

The study covers a period of 10 years from Jan 2007 to Dec2016.. Monthly average prices are taken for the purpose of research. **Data collected:**The data collected is secondary data. Month wise average prices from January 2007 to December 2016are collected for the purpose of the study.The data is collected from yahoo finance.com.Apart from this various journals and magazines and articles have been referred to get the relevant information.

ANALYSIS AND INTERPRETATION

Month wise average prices have been taken for the analysis. Descriptive statistics i.e., Minimum, Maximum, Mean, Standard Deviation, Coefficient of Variation, Skewness and Kurtosis have been computed for the select indices. Further correlation has been used to study the integration of SENSEX with other indicesand to test the statistical significance correlation t test has been used. Correlation below 0.40 has been categorized as weak correlation and correlation between 0.40 and 0.70has been categorized as moderate and correlation greater than 0.70 is categorized as strong correlation.

TREND ANALYSIS
CHART 1
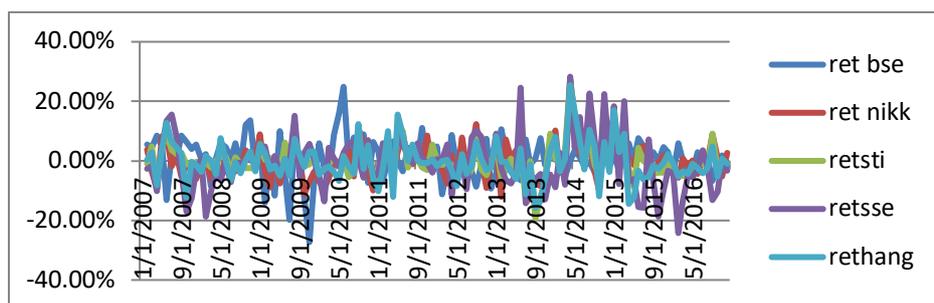
The trend chart plots the stock market index returns of each of the countries here considered. We note that there is evidence of volatility clustering, that is small (large) returns tend to be followed by small (large) returns. The phenomenon suggests that volatility changes over time.

TABLE 2. Descriptive Statistics of Selected Indices

Indices	Mean	Median	Std.Dev	Kurtosis	Skewness	Co efficient of variation	Max	Min	N
SENSEX	16146.85	17160.19	4954.22	-0.04244	0.007332	30.7%	6154.44	28693.99	120
NIKKEI225	12523.91	11820.09	3099.16	-1.41325	0.206041	24.7%	7568.42	18138.36	120
HANG SENG	20340.98	20992.53	3669.05	-0.11578	-0.21109	18.0%	12811.57	31352.58	120
Singapore STI	2859.98	2986.76	467.77	0.057979	-0.73996	16.4%	1594.87	3805.7	120
SSE COMPOSITE	2491.94	2364.73	945.157	2.339415	1.219514	37.9%	1060.74	5954.77	120

Source: (http://finance.yahoo.com/)

As shown in table 1, SSE composite index has witnessed greater fluctuations which have been indicated by very high co-efficient of variation of 37.9% , followed by BSE Sensex with a variation of 30.7%.Nikkei 225 and Hang seng have shown a moderate fluctuation whereas Singapore STI Index shows a low fluctuation. Skewness of the distribution of BSE Sensex, Nikkei 225 and SSE composite index pricesare positive except Hang seng index and Singapore index. The skewness is negative, which tells us that the returns are negatively biased. Kurtosis values of all the indices are less than 3 which indicates that they are platykurtic. The returns distribution of all these indices is less clustered around the mean. Hence the platykurtic returns will have fewer large fluctuations than the returns displaying normal or leptokurtic distributions. Hence investments in these markets are less risky.This indicates that the markets are highly integrated as they canassimilate the information across the globe and make their markets strong by not giving any scope to the player to yieldabnormal returns. Nikkie225, Sensex and SSE Composite index are positively skewed whereas, both the related indices Hang seng and Singapore STI Are negatively skewed. It gives an indicationthat Sensex is highly correlated with Shanghai and Hang Seng and the change in their returns and movements will also change the movement of Sensex.

TABLE 3: Correlation among Selected Asian Indices

Indices	BSE Sensex	Nikkei 225	HangSeng	Singapore STI	SSE Composite
BSE SENSEX	1	0.111	0.823	0.782	0.383
NIKKEI 225	0.111	1	0.234	0.394	0.161
HANGSENG	0.823	0.234	1	0.907	0.718
SINGAPORE STI	0.782	0.394	0.907	1	0.597
SSE COMPOSITE	0.383	0.161	0.718	0.597	1

Source: (http://finance.yahoo.com/)

It is clear from the above results that BSE Sensex is highly correlated with Hang Seng(82%) followed by Singapore STI (78%) when compared to Nikkei 225(11%) and SSE Composite(38%). Sensex shows a positive correlation with the selected Asian indices indicating its positive relationship with those markets. Similarly Hang seng shows a very high correlation of 90% with Singapore STI and SSE Composite Index of 71% when compared to other markets.

TESTING THE SIGNIFICANCE OF CORRELATION
Null hypothesis: Ho=There is no significant relationship between BSE Sensex and other indices.
Alternate hypothesis: H1=There is a significant relationship between BSE Sensex and other indices.

TABLE 4: Significance Level of Correlation

INDICES	Correlation coefficient	Level of correlation	t-Value	p value	Hypotheses accepted /rejected
SENSEX AND NIKKEI225	0.111	weak	6.791	0.001	Accept H1
SENSEX AND HANG SENG	0.823	strong	-7.452	0.001	Accept H0
SENSEX AND SINGAPORE STI	0.782	strong	29.248	0.001	Accept H1
SENSEXANDSSE COMPOSITE	0.383	weak	29.657	0.001	Accept H1

The study of relationship between BSE-Sensex and other select indices (table 4) indicates that, alternate hypothesis is accepted in all the cases except with Hang seng. Hence, there is a significant relationship between Sensex and Nikkei 225, Singapore STI and SSE Composite index. In all the cases, correlation is significant at 1% level of significance, indicating strong integration of Indian stock market with major world stock markets. Though, the correlation of Indian stock market is weak with Nikkei 225 of Japan and SSE Composite of Shangai market, the relationship was statistically significant as it is revealed in t-test. As shown in table 3 highestcorrelation was recorded between Sensex and Hang Seng and the lowest correlation was recorded betweenSensex and Nikkei 225.

CONCLUSION

The results of this study support the view that, there is a substantial integration between Indian and Selected Asianmarkets. BSE-Sensex has witnessed a greater fluctuation which has been indicated by a very high Co-efficient of variation compared to other select indices. Sensex, the Indianbench mark index, has shown strong association with Hang Seng and Singapore Straits Times Index. The study reveals that, there is a Weak integration of BSE- Sensex with, Nikkei225 and SSE Composite Index. It depicts that the stock markets do impact each other; more so in the recent times after the year 2000 as the barrier of boundaries started dissolving with respect to investments as the pattern of holdings of portfolio investment is jumping between the counterparts by Foreign Institutional Investors (FIIs). Also, during the year 2008-09 when the global recession started, all the markets started showing negative returns indicating the integration of markets and their connectivity. In addition, the global markets automation has also helped the global financial markets to integrate quickly and effectively.Thus it is clearly evident that the select global market indicesare integrated with each other, and more specifically Sensex ismore integrated with other Asian exchanges. This can be verywell noticed in the period of economic recession in recent timeswhich has affected the entire globe except India and Chinabecause of the stringent policies adopted by the regulatoryauthority.

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