Stock market integration in emerging countries: Evidence from India and China

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Abstract

In recent years, with the increase in globalization integration among world capital markets has increased. This increased interdependence among the stock exchanges of various nations affects the portfolio diversification decisions of investors. Stock market integration decisions also affect the policy makers of various nations. This article attempts to investigate the extent of stock market integration of India and China, which both are leading emerging economies of the world. For analyzing the extent of stock market integration monthly closing prices data is analyzed. This data is obtained from yahoo finance. The results of this study indicate the high degree of correlation between BSE Sensex and Shanghai composite index. In this study granger causality was not found between the above two indices.

Keywords: BSE Sensex, SSE Composite, Correlation, Granger Causality, Portfolio Diversification

1 Introduction

The equity markets of different nations are closely interlinked with each other. The stock investors of different nations behave in such a manner that stock market movement in one nation affects the stock market movements in other nations. The dynamics of cross-country trade and payments have evolved to such an extent that the economic slowdown of a country is bound to affect other countries as clearly indicated from the recent movement in the global stock prices. The close interaction among the stock markets of different nations is due to sentiment spillover from one stock market to another stock market and due to listing of shares of various companies on many stock exchanges of the world (Bennett and Keller, 1988). Their movement in global stock prices that promotes portfolio diversification/arbitrage has contributed to the emergent cross-country co-movement of stock prices.

With the advancement of information technology, internet banking, growing liberalization, increasing globalization, the financial markets in general and stock markets in particular are coming closer to each other. The stock market movements in one stock exchange affect the sentiments of stock market investors of other stock exchanges of the world.

Today, stock markets are not segmented by national orders. The volatility of the stock market indices have been driven not just by the macro and micro factors of the domestic economy but by global movement of stock market indices. The recent effect of US financial crisis on stock markets of different economies is the clear indication of increasing linkages of world stock markets. The degree of linkages or integration among the stock markets provides important implications for the potential benefits of the international portfolio diversification and financial stability of a country (Ibrahim, 2005). With the globalization of the stock markets worldwide, dual or multiple listing of stocks across the globe has emerged as the latest trend. The Indian stock market has witnessed a major transformation and structural
change from the past 22 years as a result of ongoing economic and financial sector reforms initiated by the government of India since 1991. Along with various measures, opening of home market for the foreign investors is one of the important steps taken by the Indian government that may lead the Indian stock market to be strongly integrated with the stock markets of the rest of world.

The present study is undertaken to examine the integration of stock Indian stock markets and Chinese stock markets following the increasing liberalization, globalization and free flow of foreign investment. Integration of Indian stock market is analysed with the Chinese stock market as China is the second largest and fastest growing economy of the world. Moreover, both India and China are emerging economies in the world, attracting foreign investors from all over the world.

2 Survey of literature

The merits of international diversification in containing the systematic risk are long recognized in the literature with one of the earliest attempts by Grubel (1968). Initial studies in this direction focused upon the inter-dependence of the national equity markets. The reported low or statistically insignificant correlation of stock returns across the countries pointed to the determining role of the domestic factors as also the scope for international diversification (Lessard, 1973). The global crash of October 1987 stimulated worldwide interest in this line of study. Bennet and Keller (1988) brought out evidence of strong international equity market linkages among stock markets of different nations. The US stock market was found to have the greatest influence on all other stock markets. Such inter-linkages however put a limit on the gains out of international diversification.

While a number of hypotheses were put forward to explain the interdependence of stock returns, Heston and Rouwenhorst (1994) attributed their interdependence to four factors: global business cycle, global industry conditions, country specific macro factor and firm specific micro factors. Out of the four, the global industry conditions and global trade cycles were considered the most important with the globalization of world economy (Hobijn and Jovanovic, 2000).

In the Indian context, Ignatius (1992) compared returns on the BSE Sensex with the returns on New York stock exchange. He, however, did not find any evidence in favour of integration. In a study across 21 developed and 19 emerging countries including India, Brooks and Catao (2000) found evidence of stock market integration during period of March 1986 to August 2000, in information technology (IT) industry. In another study for 1999-2000 to 2000-01, Hansda and Ray (2002) observed a one directional causality from Nasdaq to BSE or NSE. The relation as well as direction of relationship held good for the technology segment shares of the NYSE and BSE or NSE. However, domestic prices of technology stocks and overall domestic share prices were found to be independent of each other. By using the co-integration approach, Palac-McMiken (1997) found that, with the exception of Indonesia, all the five founding members of the ASEAN stock markets were linked with each other during the period of 1987 to 1995. Hee (2000) explored the linkages and the degree of financial market integration among the ASEAN stock markets over the period 1970-1995 through the use of correlation and co-integration analysis.

Ibrahim (2000) explored the degree of financial integration and benefits of portfolio diversification among the equity markets of Asia from January 1988 to June 1997. From the co-integration analysis and
error correction model, he found the existence of long-run co-movements among the various national equity markets. He also found that the ASEAN markets were highly integrated with the US markets.

Michel Beine, Antonio Cosma and Robert Vermeulen (Jan 2010) have measured stock market co-movement on the basis of stock market returns of various nations. They concluded that financial liberalization significantly increases stock market integration. The introduction of the euro increases co-movement across the euro area thereby significantly reducing the benefits of portfolio diversification within the euro area.

3 Indian stock market index

To represent Indian stock market, BOMBAY STOCK EXCHANGE (BSE Ltd.) is selected. This stock exchange is selected because it is the oldest and world famous stock exchange of India. Established in 1875, BSE is one of the leading stock exchanges in Asia. Since inception Bombay stock exchange has played a pivotal role in the growth of Indian corporate sector. It has provided strong base for issuing securities for raising capital to Indian corporate units. More than 5100 companies are listed on Bombay stock exchange. It makes BSE the world’s largest stock exchange with largest number of listed companies. This stock exchange provides many other facilities related to availability of market data, risk management, funds clearing, training, etc. The national level as well as global level customers can undertake transactions related to purchase and sale of securities on Bombay stock exchange. This stock exchange is second in the whole world and first in India to get international standard organization certificate 9001:2000. The online trading system of BSE is of very high quality and for this it has been awarded Information Security Management System standard certification. The equity index of BSE named S&P BSESENSEX is the most popular stock market index in India as well as in the world.

4 Chinese stock market index

To represent Chinese stock market, SSE COMPOSITE INDEX of Shanghai Stock Exchange is selected. The Shanghai Stock Exchange is a Chinese stock exchange located in the city Shanghai of China. In China there are three stock exchanges namely Shanghai Stock Exchange, Hong Kong Stock Exchange and Shenzhen Stock Exchange. Of all these Shanghai Stock Exchange is most popular. The leading equity shares based index of Shanghai Stock Exchange is SSE Composite Index. This index is popular not only in China but also at global level. The base day of this stock index was 19th December 1990. The base value of this index is taken as 100.

5 Objectives of the study

The objective of this study is to examine stock market integration of Indian stock markets with the Chinese stock markets. The study aims:

- To examine the behaviour of the Indian stock market index and the Chinese stock market index, with respect to risk and return.
- To examine the extent to which the stock market index of India is correlated with Chinese stock market index.
To find whether causality exists between Indian stock market index and the Chinese stock market index.

To examine the co-movement of Indian stock market index with the Chinese stock market index.

6 Hypotheses of the study

- There is no significant difference between the risk and return characteristics of Indian and Chinese stock markets.
- There is no significant correlation between Indian stock market index and Chinese stock market index.
- No significant causality exists between Indian stock market index and Chinese stock market index.
- Indian stock market is not significantly integrated with the Chinese stock markets.

7 Sources of data

The present study is based on secondary data related to the monthly closing figures of Bombay Stock Exchange Sensex (Indian stock market index) and The SSE Composite Index (Chinese stock market index) over the period from July 2008 to July 2013. The data is obtained from the website of these stock exchanges and from website of Yahoo Finance.

8 Tools of analysis

Various statistical and econometric techniques like mean, standard deviation, coefficient of variation, correlation, coefficient of determination, regression, t-test, F-test, granger casualty test, etc. are used for analyzing the data. For analyzing the long term co-movement of stock prices in Indian stock market and Chinese stock market graphical analysis of monthly closing prices of BSE Sensex and SSE Composite Index has been made over the period under study.

9 Findings of the study

1. For testing the null hypothesis that there is no significant difference between the risk and return characteristics of Indian and Chinese stock markets, it was observed that standard deviation of BSE Sensex is high at 3009.05 in comparison to standard deviation of SSE Composite Index at 387.48. Similarly, higher variance is observed in BSE Sensex in comparison to SSE Composite Index. It indicates more volatility in BSE stock prices over the period under study. Skewness in both BSE Sensex (1.31) and SSE Composite Index (0.34) has been observed positive which suggests that stock prices in both the stock markets are not normally distributed. Average return in stock prices in Bombay stock markets was found 12.43 per cent over the period under study, while the average return in stock prices in SSE Composite Index (Chinese stock markets) was found 9.32 percent (Table 1). It indicates that risk and return behavior of Indian and Chinese stock markets is not same. Indian stock markets have higher returns but risk factor in Indian stock markets measured in terms of standard deviation in stock prices is also high. So we reject our first null hypothesis.
Table 1 - Analytical Study of Return and Risk in BSE Sensex and SSE Composite

<table>
<thead>
<tr>
<th>Country</th>
<th>India</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock Index</td>
<td>BSESENSE</td>
<td>SSECOMPOSITE</td>
</tr>
<tr>
<td>Average Return</td>
<td>12.43 per cent</td>
<td>9.32 per cent</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>3009.05</td>
<td>387.48</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.31</td>
<td>0.34</td>
</tr>
<tr>
<td>t-value</td>
<td>14.532</td>
<td></td>
</tr>
<tr>
<td>Table Value (5% level of significance)</td>
<td>12.706</td>
<td></td>
</tr>
</tbody>
</table>

2. For testing the null hypothesis that there is no significant correlation between Indian stock market index and Chinese stock market index, Karl Pearson coefficient of correlation was computed between the monthly closing prices of BSE Sensex and SSE Composite Index. High correlation coefficient was found in these stock prices. Its value was recorded at 0.61. Using t-test, the significance of this coefficient of correlation value was measured and the computed value was found more than the tabulated value using 5 per cent level of significance, so the relationship of both stock prices was found to be significant. Further, coefficient of determination was found at 37.21 percent, which indicates that 37.21 per cent variation in one stock market can be explained by the other stock market prices (Table 2). So we reject our second null hypothesis and conclude that both Indian stock markets and Chinese stock markets are integrated with each other.

Table 2 - Analytical Study of relationship in BSE Sensex and SSE Composite

<table>
<thead>
<tr>
<th>Coefficient of Correlation</th>
<th>0.61</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient of Determination</td>
<td>0.3721 (37.21%)</td>
</tr>
<tr>
<td>t-value</td>
<td>2.933</td>
</tr>
<tr>
<td>Table Value (5% level of significance)</td>
<td>2.576</td>
</tr>
</tbody>
</table>

3. For testing the null hypothesis that there is no significant causality is found between Indian stock market index and Chinese stock market index, Granger Causality test was applied. For this purpose, pair-wise Granger Causality was computed to test this hypothesis and to further verify the correlation for the direction of influence. This test was applied to find out that which stock market from BSE and SSE Composite acts as a cause to affect the prices of other. Two sub hypotheses were tested, i.e. is BSE Sensex granger cause SSE Composite Index or is SSE Composite Index granger cause BSE Sensex. It was observed that both BSE Sensex and SSE Composite Index do not granger cause each other (Table 3). This test suggests independence of both sets of data (BSE Sensex and SSE Composite index) as both regression coefficients are not found statistically significant using F statistics. For both pair of observation the computed value
was observed as less than the tabulated value of F test using 5 per cent level of significance. It further implies that we accept our third null hypothesis and conclude that both Indian stock markets and Chinese stock markets do not have any causality and the both stock markets are independent of each other. The results of granger causality are shown in table 3.

**Table 3 - Granger Causality between BSE Sensex and SSE Composite**

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>F- statistics</th>
<th>Probability Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSE does not granger cause SSE composite</td>
<td>0.416</td>
<td>0.795</td>
</tr>
<tr>
<td>SSE does not granger cause BSE index</td>
<td>0.451</td>
<td>0.778</td>
</tr>
</tbody>
</table>

4. For testing the null hypothesis that Indian stock market is not significantly integrated with the Chinese stock markets long term co-movement is analyzed using closing monthly prices of BSE Sensex and SSE Composite Index over the period under study. For the purpose of analyzing the co-movement of BSE Sensex and SSE Composite stock prices indices three figures have been constructed.

Figure 1 analyses the movement of BSE sensex closing monthly prices over the period under study. Figure 2 shows the movement of SSE Composite Index values and figure 3 exhibits the co-movement of BSE Sensex and SSE Composite stock prices indices. Analysis of these figures clearly reflects the following conclusions:

- Both BSE Sensex and SSE Composite Index were at their bottom around January 2009, it was the effect of global financial crisis.
- In January 2010 and in January 2011 curves of both the indices have reached at their highest levels which reflects that recovery in stock prices in India as well as in China has resulted due the recovery of world economy. Further the timings of this recovery in both the nations were almost same.
- In recent years Indian stock markets have performed better than the Chinese stock markets. In January 2012 and July 2013 Indian stock market is above its average while Chinese stock market is still below its long term average.

Form the figure 1, 2 and 3 it can be concluded that both BSE Sensex and SSE Composite Index have very limited co-movements. So we reject our fourth null hypothesis.
Figure 1: Movement of BSE sensex monthly closing prices
(Source: Based on data from Yahoo Finance and BSE Sensex)

Figure 2: Movement of SSE composite index monthly closing prices
(Source: Based on data from Yahoo Finance and SSE Composite index)
Conclusion

In this study it was found that to some extent Indian stock market is integrated with the Chinese stock market under the period of study, i.e. from July 2008 to July 2013. The correlation in the prices of BSE Sensex and SSE Composite Index was found high. This calls for an active role of policy-makers. The world economy is passing through the euro zone crisis, so preventive efforts have to be taken by the policy makers of India and China to check possible spillover of global crisis in their domestic economies. More return in Indian stock markets will act as a major factor for global investors to divert their portfolio investment into Indian capital markets.

References