Stock Market Integration with Special Reference to India : A Review of Literature

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Abstract

The main theme of this study was to provide the available existing comprehensive literature on stock market integration with special reference to India in a summarized form so that investors can quickly access the present integration status of India with existing developing and developed countries. Data were collected from various sources since 1997 – 2015 and was analyzed in such a way that it might helpful to investors, researchers, foreign portfolio investors, academicians, etc. It was found that after 2008, integration status of the Indian stock market with developing and developed nations had increased. Policy makers will be duly benefited by such financial integrations while framing suitable policies for the economy, and while addressing issues related to crises moving from other markets to their own domestic market. Various financial institutions, foreign portfolio investments (FPIs), foreign institutional investors (FIIs), and mutual fund companies optimized their returns by investing in different countries. Such global investors could make more rational decisions by studying the strength of interdependencies and interlinkages among stock markets of different countries. In the last few years, investments made by FIIs or foreign investors were of significant quantum in India ; so, there is a need to check whether they would be benefited by investing in India.

Keywords : **Indian stock market, developing countries, developed countries, investors, foreign portfolio investors**

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The most important issue in the area of financial econometrics is perhaps to check the long-run association relationship or cointegration or integration between stock markets of different countries. Stock market integration is defined as, "A condition in which stock markets in different countries trend together and depict same expected risk adjusted returns" (Sharma & Seth, 2012, p. 85). If cointegration or long run association relationship exists between two or more countries, international investors have no benefit to diversify their investment in that country. Various financial institutions, FPIs, FIIs, mutual fund companies optimize their returns by investing in different countries. Global investors can make more rational decisions by studying the strength of interdependency and cointegration of stock markets of different countries. In the last few years, investments made by FIIs or foreign investors have been increasing tremendously in India, so there is a need to check whether they will be benefited by investment in India.

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Seth and Sharma (2015) studied the cointegration relationship among India, China, Hong Kong, Indonesia, Malaysia, Japan, Singapore, South Korea, Taiwan, Israel, Pakistan, and USA markets for a 10 year period ranging from 2000 – 2010 and found a positive correlation among these markets. Chang, Chiu, and Nieh (2007) considered data for 31 years and studied the United Kingdom and the United States, Sweden, Spain, Switzerland, Pakistan, Norway, Netherlands, Japan, Italy, India, Germany, France, Finland, Denmark, Canada, Belgium, and Australian stock markets and found that no cointegration existed in these markets during that period. The least period of 2 years from 2007 – 2009 was taken by Singh and Kaur (2015), who found that the stock markets of China and U.S. both influenced Nifty returns, but Nifty returns did not influence the Chinese and U.S. stock markets. The present study has collected various research papers from national and international reputed journals for the period from 1997 – 2015.

Rationale of the Study

In the era of complex and uncertain business environment, investors try to invest their money in that country where they can earn more returns. International investors diversify their funds all over the world, and if the countries are cointegrated, investors will not be benefited by portfolio diversification. Some authors such as Mohanasundaram and Karthikeyan (2015), Saxena and Chadha (2015), Seth and Sharma (2015), and Dasgupta (2014) checked the linkages between different stock markets and found that a positive correlation existed between these stock markets, however, negative results were obtained by Rajwani and Mukherjee (2013), Gupta and Guidi (2012), Gangadharan and Yoonus (2012), and Jeyanthi and Pandian (2008). So, the present study is planned to arrange extant studies in one place so that researchers can access the studies about the integration status of Indian stock markets with available developing and developed countries and methodology used to check the integration.

Objective of the Study

The main focus of this paper is to review the literature related to the integration of stock markets of different countries in an organized manner. This is an attempt to better understand the behavior of stock market integration. A summary of all the select previous studies with special reference to India will add value to all researchers, investors, and practitioners.

Data and Methodology

The present paper covers research studies from reputed national and international journals based on stock market integration from various countries of the world. The research paper covers studies between 1997– 2015. Some more papers were available, but we have concentrated on those papers which fulfill the objective of our study, that is, related with the Indian stock market.

Review of Studies

The main features of the previous studies are described in this section.

Mohanasundaram and Karthikeyan (2015) explored the long-run association relationship between India, USA, and South Africa stock market indices and found positive correlation between the stock market indices of India, USA, and South Africa. No cointegration was found among the stock market indices considered. Saxena and Chadha (2015) studied BSE versus NASDAQ and found that the Indian stock market was statistically significantly correlated with the American stock market. There was unidirectional Granger causality running

from NASDAQ to BSE. Cointegration was found between BSE and NASDAQ.

Seth and Sharma (2015) considered the stock markets of India, China, Indonesia, Malaysia, Japan, Singapore, South Korea, Taiwan, Israel, Pakistan, USA and found cointegration in pre, post, and during the sub-prime crises between the select Asian and U.S. region. Cointegration existing means that the U.S. and Asian markets are driven by the same factors. Singh and Kaur (2015) studied USA, India, and China markets and concluded that the stock markets of China and U.S. both influenced Nifty returns, but Nifty returns did not influence the Chinese and U.S. stock markets. Srivastava, Bhatia, and Gupta (2015) focused on USA, Japan, Singapore, Hong Kong, and Indian stock markets and found a very interesting relation that no short - run integration existed between Indian stock markets with USA, Japan, Singapore, Hong Kong, and there was presence of strong long-term integration between India and USA, Japan, Singapore, and Hong Kong markets.

Patel (2014) studied the markets of India, Pakistan, Sri Lanka, Malaysia, Korea, Japan, Singapore, Taiwan, and China and derived that the Indian portfolio managers can use Japanese markets for portfolio diversification because they were not cointegrated with each other. Dasgupta (2014) tried to find the relationships between SENSEX and four SAARC indices namely Pakistan, Bangladesh, Sri Lanka, and Nepal and suggested that the BSE SENSEX was cointegrated with SAARC countries.

Rajwani and Mukherjee (2013) studied the nature of long-run equilibrium relationship between the Indian stock market and seven other Asian stock markets, namely, Indonesia, China, Hong Kong, Japan, Taiwan, South Korea, and Malaysia and the Indian stock market was not integrated with any of the Asian markets either individually or no cointegration was found between the Indian stock market with select Asian markets either collectively or individually. Palamalai, Kalaivani, and Devakumar (2013) examined the stock market integration among major stock markets of emerging Asia-Pacific economies. Long-run feedback relationship existed between major stock markets of China, India, Japan, Indonesia, Hong Kong, Malaysia, Singapore, South Korea, Taiwan, the United States, and the United Kingdom.

Tiwari, Dar, Bhanja, and Shah (2013) investigated the cointegration of nine Asian stock markets by using multiple cross-correlation and wavelet multiple correlation. When lower frequencies data were analyzed, there was high integration ; whereas, at higher frequencies, less integration was found. Gupta and Guidi (2012) found cointegration between the Indian stock market with select Asian markets, that is, Japan, Hong Kong, and Singapore. Non existence of long-run relationship was found between India and select developed markets of Asia.

Sakthivel (2012) examined the long - run comovement between the Indian stock markets with the select developed stock markets. A strong cointegration relationship existed between India and developed stock markets. It implies that all the selected stock markets moved together and there were no benefits for diversification in these stock markets. Taneja (2012) examined the short-run linkages of Indian stock markets with Japan, France, USA, Germany, UK, Istanbul, Singapore, and Taiwan. There was a long - run relationship between the Indian stock markets with Germany, Istanbul, USA, Singapore, and Taiwan. Using Granger causality test, the study found that there existed a unidirectional relationship towards Nifty to S&P 500, NASDAQ, DOWJONES, FTSE, CAC, and DAX.

Gangadharan and Yoonus (2012) examined the impact of global financial crises on the level of financial integration between India and USA. No cointegration was found between the Indian stock market and the USA stock market. Srikanth (2012) investigated the long - run relationship between the Indian stock market and China, Hong Kong, Indonesia, Japan, Korea Malaysia, and South Korea. All the markets were found to be cointegrated. Batareddy, Gopalaswamy, and Huang (2012) explored the strength of the long-run relationships between the select emerging and developed stock markets. Only the Indian market was cointegrated with the USA and Japan markets. None of the other markets were cointegrated with the USA and Japan markets. Mukherjee and Mishra (2010) assessed the volatility spillover and integration of India and select Asian markets. A bi-directional contemporaneous intraday return spillover was found between India and most of its Asian counterparts. Market

information flowed from Singapore, Korea, Thailand, and Hong Kong to India. The Indian stock market strongly influenced the Pakistani and Sri Lankan markets. Dhal (2009) assessed the level of integration between India and select developed markets like the USA, the UK, and Japan and two regional markets in Asia, that is, Singapore and Hong Kong.

The strength of the integration relationship of the Indian stock market with global and regional markets has increased over the period of time. Menon, Subha, and Sagaran (2009) identified the long - run linkages between China, India, Singapore, Hong Kong, and USA. No interdependency was found for the Indian stock market with American stock market and Hong Kong stock market individually ; whereas, Indian and Shanghai stock markets were found to be cointegrated.

Mukherjee and Mishra (2010) assessed the volatility spillover and integration of markets of India, Pakistan, Hong Kong, Singapore, Korea, Thailand, and Sri Lanka. Information of the Indian stock market influenced the Sri Lankan and Pakistani stock markets ; whereas, the Indian stock market was influenced by the information of Hong Kong, Korea, Singapore, and Thailand stock markets. Mukherjee and Bose (2008) assessed the existence of long run equilibrium relationship with Asian and USA stock markets after the Asian crisis in 1990. The USA market was influenced by information from Japan, Korea, Hong Kong, Singapore, and India. Jeyanthi and Pandian (2008) identified the long - run linkages between S&P CNX Nifty with select developed and select emerging countries. S&P CNX Nifty was cointegrated with other developed stock markets as well as emerging stock markets. It was found that returns of S&P CNX Nifty were higher than those of emerging and developed markets. Madhusoodanan and Kumar (2008) found long - run relationship between NSE and BSE, meaning the information was fully exchangeable between the different players of the market. Hoque (2007) assessed the long term equilibrium relationship with Bangladesh, Japan, India, and USA. Long term and short term dynamics relationships were found for Bangladesh with USA, Japan, and India. Srivastava (2007) examined the cointegration relationship between Malaysia, Korea, Hong Kong, Singapore, Indonesia, Taiwan, and India, and the two developed markets - Japan and USA. High correlation existed between returns of the Indian stock market and returns of South Korea, Malaysia, Singapore, and Indonesian markets.

Wong, Agarwal, and Du (2004) identified the short - run causal and long - run cointegration relationship between the Indian stock market and the United States, the United Kingdom, and Japan. In a short - run, there was one way causal relationship existing between USA and Japan to the Indian stock market, but the other way round, no causal relationship existed. The Indian stock market was highly cointegrated with Japan and USA markets. Arshanapalli and Kulkarni (2001) found the presence of cointegration between BSE and NYSE and BSE and NASDAQ.

Gaps in Literature

The following gaps emerge from the literature review, which could be taken up for research :

(1) As the market is highly dynamic in nature and changes its integration behavior, there is need to re-examine its linkages with other markets as time progresses.

(2) Studies carried out in the past ignored many markets which have gained importance over time. There is, therefore, a need to study the causality and cointegration relationships between these markets.

(3) It is important to explore dynamic linkages of Indian stock markets with developed and emerging countries covered and not covered in the previous studies by extending time periods covered in these previous studies.

Literature on Stock Market Integration

This section deals with the outcome of the review of literature. Table 1 provides the list of econometric techniques used in previous studies. From Table 1, it is clear that Johansen cointegration test was used in majority of the research papers to check the integration relationship followed by unit root test to check the stationarity condition of variables. Vector error correction model was used to verify the integration relationship, Granger causality test to check the causality relationship, GARCH (1,1) for volatility ; correlation, VAR, and error correction mechanism were also used extensively in previous studies. Other tests include cointegrating regression Durbin – Watson (CRDW) test, Engle – Granger cointegration test, impulse response analysis, fractional cointegration, Gregory and Hansen cointegration technique, Lagrange multiplier (LM) test, multiple cross correlation analysis, run test, recursive cointegration test, TGARCH (1,1), and variance decomposition analysis.

Table 1. Econometric Techniques Used in Previous Studies for Data Analysis

Unit root test	19
Johansen cointegration test	20
Correlation	7
Granger causality test	14
Error correction mechanism	2
Vector error correction model	8
GARCH (1,1)	3
Vector autoregressive	2
Jarque – Bera test	04
Variance decomposition analysis	4
Others	19

Note. Others include cointegrating regression Durbin – Watson (CRDW) test, Engle – Granger cointegration test, Impulse response analysis, Fractional cointegration, Gregory and Hansen cointegration technique, Lagrange multiplier (LM) test, run test, Wavelet multiple cointegration test, multiple cross correlation analysis, TGARCH (1,1), PP Test, recursive cointegration test.

Studies in which Cointegration is Present

Numerous studies have been conducted to check the cointegration relationship or long - run association relationship among different groups of countries. Studies which found the cointegration or long - run equilibrium relationship are Srivastava et al. (2015), Saxena and Chadha (2015), Patel (2014), Dasgupta (2014), Sakthivel (2012), Srikanth (2012), Taneja (2012), Tiwari et al. (2013), Chittedi (2010), Batareddy et al. (2012), Dhal (2009), Menon et al. (2009), Madhusoodanan and Kumar (2008), Hoque (2007), Wong et al. (2004), Arshanapalli and Kulkarni (2001). Table 2 shows the studies in which cointegration is present. A maximum of 12 countries were covered by Seth and Sharma (2015) and maximum of 22 years of data were considered by Srivastava et al. (2015).

Table 2. Cointegration Existing Among the Markets

S. No.	Author (s) Name	Year	Cointegration Existing Among the Markets	Duration
1	Srivastava et al.	2015	India, USA, Japan, Singapore, Hong Kong	1992–2014
2	Seth & Sharma	2015	India, China, Hong Kong, Indonesia, Malaysia, Japan, Singapore, South Korea, Taiwan, Israel, Pakistan, USA	2000–2010
3	Saxena & Chadha	2015	India and USA	2004 –2013
4	Patel	2014	India, Pakistan, Sri Lanka, Malaysia, Korea, Japan, Singapore, Taiwan, and China	1997–2012
5	Dasgupta	2014	Pakistan, Sri Lanka, India, and Nepal	2007–2012
6	Sakthivel	2012	United States, United Kingdom, Germany, France, Japan, Malaysia, Korea, Singapore, India, Taiwan, and Thailand	1998–2010
7	Srikanth	2012	India (Sensex), Hong Kong, Indonesia, Malaysia, South Korea, Japan, China	2000–2010
8	Taneja	2012	USA, France, Japan, Taiwan, Singapore	1999–2010
9	Tiwari et al.	2013	India, China, Japan, Malaysia, Hong Kong, Singapore, South Korea, Indonesia, and Taiwan	2005–2012
10	Chittedi	2010	India, USA, UK, Japan, France, Australia	1997–2007
11	Batareddy et al.	2012	India, China, South Korea, and Taiwan with USA ; and India, China, South Korea, and Taiwan with Japan	1998–2008
12	Dhal	2009	India, USA, UK, Japan, Singapore, and Hong Kong	1993–2008
13	Menon et al.	2009	India and China	1997–2007
14	Madhusoodanan & Kumar	2008	BSE, NSE	1997–2005
15	Hoque	2007	India, Bangladesh, USA, Japan	1990–2000
16	Wong et al.	2004	US, UK, Japan, India	1991–2003
17	Arshanapalli & Kulkarni	2001	India, USA	1991–1999

Studies in which Cointegration is not Present

Every coin has two faces ; so, some studies were found in which no cointegration exists. Table 3 gives the detailed description of studies in which no cointergration was found. Studies conducted by Mohanasundaram and Karthikeyan (2015), Rajwani and Mukherjee (2013), Gupta and Guidi (2012), Gangadharan and Yoonus (2012), Menon et al. (2009), Jeyanthi and Pandian (2008) among others studied the 18 nations – Australia, Belgium, Canada, Denmark, Finland, France, Germany, India, Italy, Japan, Netherlands, Norway, Pakistan, Spain, Sweden, Switzerland, the United Kingdom, and the United States for the period from 1957 – 1978 and did not find any cointegrating relationship with the Indian stock market.

Table 3. Cointegration Does Not Exist Among the Markets

S. No.	Author (s) Name	Year	Cointegration does not exist among the markets	Duration
1	Mohanasundaram & Karthikeyan	2015	U.S., India, South Africa	2004–2014
2	Rajwani & Mukherjee	2013	India with Japan, India with China, India with South Korea	1991–2011
3	Gupta & Guidi	2012	India, Hong Kong, Japan, and Singapore	1999–2009
4	Gangadharan & Yoonus	2012	India and USA	2005–2010
5	Menon et al.	2009	India and USA	1997–2007
6	Jeyanthi & Pandian	2008	India with South Korea, India with China, India with U.S., India with UK, India with Germany, India with Japan (pair wise)	2000–2007

Conclusion

This study examines the research papers from reputed journals during the period from 1997 – 2015. The main objective of this paper is to review the literature related to the integration of stock markets of different countries. Johansen cointegration test was used the most by researchers to check the level of integration and ADF test was used the most to check the stationarity aspect of the data. Maximum authors focused on the USA, the UK, Japan, France, and Singapore stock markets, and still, there are so many countries upon which the researchers have not focused to check the integration status of different stock markets.

Implications

(1) Integration can help policymakers in framing suitable policies to isolate the economy from shocks caused by crises moving from other markets to the domestic market.

(2) Cointegrated stock markets are expected to contribute to financial stability since they cannot deviate significantly from the path of long-run equilibrium.

(3) Investors cannot reap consistent benefits from arbitrage activities over the long- run in cointegrated markets.

Limitations of the Study and the Way Forward

All stock markets are dependent on some local and global macroeconomic factors, situations, and events. For example, financial environments and the 2008 sub-prime crises in the U.S., Europe, other parts of Asia, etc. ; capital inflows and outflows by the FIIs and others should also be considered in these kind of studies to provide reliable and concrete results. Thus, inclusion of more world-related variables keeping in mind the domestic and international factors with a longer time-frame may improve the results of future studies.

A plethora of empirical studies exist in the area of financial integration of stock markets. However, few studies are found that analyzed the co-movement of macroeconomic fundamentals and bi-lateral trade among countries and examined their impact on financial integration. Investment in foreign markets leads to the import and export of capital. It is, therefore, of great importance to policy makers. This area has largely remained outside the domain of extant research. The theme of this study centres on the assessment of the cointegration of the Indian stock market with developed and emerging economies rather than conducting an examination of whether the developed

and emerging economies are cointegrated among themselves. Only the stock market indices of major developed and emerging economies are considered for the long - run relationship. There may be macro variables affecting the stock markets like inflation, interest rate, exchange rate, GDP, money supply etc. These areas can be explored by researchers in future studies.

Authors' Contribution

Dr. Pravin Kumar Agrawal collected the various research papers from online library of MNNIT Allahabad, IIM Lucknow, and IIFT Delhi during his Ph.D. work. He carried out this research under the supervision of his Thesis Supervisor, Prof. Tanuj Nandan. Dr. Ashutosh Pratap Singh compiled the data in tabular form.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter, or materials discussed in this manuscript.

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