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PROBING RELATIONS BETWEEN S&P CNX NIFTY, BSE 30 AND SHANGHAI COMPOSITE

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Abstract

The study is a continuation of research on the issue of interdependency among the stock markets and indices. If the stock markets of different countries move together, then investing in different national stock markets would not generate any long-term gain to portfolio diversification. The study examines the interdependence between Nifty, BSE 30 and Shanghai Composite.

Present research considers a key issue that may interest investors, portfolio managers, corporate executives and policy makers. The study is based on secondary data, which covers the recent period using daily closing figure from 01/06/2004 to 01/06/2009.

Interdependency among global stock markets is studied primarily through Descriptive Statistics, Correlation of Returns, Unit Root and the Granger Causality. It can be concluded that Indian indexes are not integrated with SC. the results of the present paper would be useful for individual and institutional investors for the management of their assets portfolios and policy makers especially in Chinese markets.

Introduction

In a dynamic economic environment, knowledge of the international stock market structure is significant for portfolio managers as well as investors. According to various theories in finance, the individual and institutional investors should hold a well-diversified portfolio in order to reduce risk. From the view point of an international investor who is willing to make portfolio investments in different stock markets, it is important to know if diversification can give some gain or not. International diversification is sought due to differences in the levels

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of economic growth and timing of business cycles among various countries. But, if the stock markets of different countries move together, then investing in different national stock markets would not generate any long-term gain to portfolio diversification.

In the past, International Portfolio Diversification was recommended on the assumption of low correlations/ integration among different national stock markets. But due to growing international trade, investment flows, deregulation of the financial systems and growth in international capital flows, national economies have become more closely linked. It has created a level of correlation among markets.

An inclusive study on stock market integration carries a lot of significance in the present day situation when Asian economies are among fastest growing economies in the world.

Policy-makers need to understand the emerging stock market interdependence. Such an understanding will provide a better grasp of the functioning of the Asian stock markets and allow investors and policy makers to ask various questions regarding the actual trend (i.e., constant, increasing, or decreasing) of interdependence among them.

Present research considers a key issue that may interest investors, portfolio managers, corporate executives and policy makers. They are interested in understanding the intensity of stock market integration for diversification motives. Thus, it becomes essential to examine the interdependence between Nifty , BSE 30 and Shanghai Composite.

Literature review

Ng (2002) found no evidence to indicate a long–run relationship among the South–East Asian stock markets. Correlation analyses also indicate that the South–East Asian stock markets are becoming more integrated. Nath and Verma (2003) analyzed the level of capital market integration by examining the transmission of market movements among three major stock markets in Asian region, viz., India, Singapore and Taiwan; they suggested that international investors could achieve long term gains by investing in the stock markets because of the independencies of the stock markets. Bessler and Yang (2003) concluded that The US market is highly influenced by its own historical innovations, but it is also

influenced by market innovations from the UK, Switzerland, Hong Kong, France and Germany. Darrat and Benkato (2003) analyzed stock returns and volatility relations between the Istanbul Stock Exchange (ISE) and the stock markets in the US, the UK, Japan and Germany. They realized that the two matured markets of the US and the UK shoulder significant responsibility for the stability and financial health of smaller emerging markets like the ISE.

Baharumshah et al. (2003) examines the dynamic interrelationship among four Asian markets (Malaysia, Thailand, Taiwan and South Korea) The evidence shows that the degree of integration between the Asian emerging markets and the US increased following the deregulation period, and that the relationship has intensified since the onset of the Asian crisis. Hatemi and Roca (2004) examines the equity market price interaction between Australia and the European Union . they concluded that Australia also had no causal links with Germany and France but it had with the UK, with causality running from the UK to Australia but not vice-versa.

Working in line with above researches, Narayan et al. (2004) examines the dynamic linkages between the stock markets of Bangladesh, India, Pakistan and Sri Lanka using Granger causality approach. In the short run there is unidirectional Granger causality running from stock prices in Pakistan to India, stock prices in Sri Lanka to India and from stock prices in Pakistan to Sri Lanka. Bangladesh is the most exogenous of the four markets. Click and Plummer (2005) concluded that ASEAN-5 stock markets are integrated in the economic sense, but that integration is far from complete. Maghyereh (2006) investigated the interdependence among the daily equity market returns for four major Middle Eastern and North African (MENA) emerging markets, Jordanian, Egyptian, Moroccan and Turkish markets. Evidence indicates that none of the MENA markets is completely isolated and independent. After analyzing markets of 23 different countries Mukherjee and Mishra (2007) identified increasing tendency of integration among the markets and discovered that countries of same region are found to be more integrated than others.

Present study contributes to the existing body of literature. Research studies on the issue of Stock Markets Integration, must be longitudinal rather than cross sectional. A continued research on the subject can help policy makers and practitioners. The present study takes a step ahead in the same direction. It is

also an attempt to fill the time gap of researches on Asian and US markets. It also examines TA 100 of Israel for which earlier literature is scarce.

Methodology

Sample

The study is based on secondary data, which covers the recent period using daily closing figure from 01/06/2004 to 01/06/2009.

Table 1 shows the general stock indices of the countries, which make up the sample of the study. The data is taken from Yahoo Finance and nseindia.com.

The daily returns/ prices of the sample stock markets are matched by the calendar date, the timing of the trading sessions of the stock exchanges may not completely be related. The study is based on the daily closing price, rather than the intra day prices.

Table No.1: Stock Exchanges and Stock Indices

S. No	Country /Region	Index	Symbol
1	India	BSE 30	BSE
2	India	S&P CNX Nifty	NIFTY
3	China	Shanghai Composite	SC

Hypotheses

It is evident that econometric methods are the most useful method to analyze and interpret data. For the purpose of the study, following hypotheses are put to trial.

H_{01} = Return of all indexes under study are highly correlated.

H_{02} = All indexes effect (granger cause) each other.

H_{03}= Nifty and BSE are more volatile than SC.

H_{04}=All indexes contain unit root.

Methodology

Following methods are used to test correlation, stationarity and causalities between the stock markets. The computations in the present study are aided by the use of Eviews 5.1. In this study, following tests were undertaken:

- Pearson correlation is used to find correlation between the stock markets returns.
- Testing for stationarity (unit root test) is done by using, the Augmented Dickey- Fuller method.
- For Causality Test, Granger test is used, which identify whether or not one series has significant explanatory power for another series

Return of the indexes is used to find out correlation among the stock markets, Daily return has been calculated as follows by taking the natural logarithm of the daily closing price relatives

$$r = \ln (P_t/P_{t-1})$$

It may further be noted that the price of the indexes are used to do test for stationarity and Granger Causality Test.

Analysis of empirical results

Descriptive Statistics

Table 2 provides summary statistics about index return, namely means, minimums, maximums, medians, standard deviations (SD), skewness, kurtosis and the Jarque-Bera.

It is noted that NIFTY's SD is 0.03875 in the considered time period. In the same period highest SD is witnessed in BSE followed by SC. Fall in SD signifies falling volatility. The results show that the returns are not normally distributed, which may open the door to the issue of stationarity of the time series of returns under study.

Table 2: Characteristics of Distributions of the Stock Indices

	BSE	NIFTY	SC
Mean	-0.000874	-0.000845	-0.000418
Median	-0.001617	-0.001567	-0.000162
Maximum	0.727019	0.365888	0.795718
Minimum	-0.651788	-0.345243	-0.914406
Std. Dev.	0.067612	0.038759	0.062282
Skewness	0.280952	0.058527	-1.692989
Kurtosis	33.54466	23.60942	108.2987
Jarque-Bera	50592.22	23025.64	601673.8
Probability	0.00	0.00	0.00
Observations	1301	1301	1301

Correlation

Table 3 shows the return correlations among the various indices under study.

Table 3: Correlations of Returns of the Stock Indices

	BSE	NIFTY	SC
BSE	1.00		
NIFTY	0.68	1.00	
SC	0.10	0.08	1.00

It is seen that correlation of NIFTY with BSE is higher than the correlation between NIFTY and SC. The correlations need to be further verified for the direction of influence by the Granger causality test.

Unit Root Test

A unit root test is used to test a time series for stationarity. The most appropriate and widely used test is the Augmented Dickey-Fuller (ADF), which uses the existence of a unit root as the null hypothesis.

Augmented Dickey-Fuller (ADF Test)

Results of the Unit Root Test are contained in Table 4

Table 4: Augmented Dickey-Fuller (ADF Test)

	Level			First Difference		
Symbol	**Lag Length**	**ADF Statistic**	**P-value**	**Lag Length**	**ADF Statistic**	**P-value**
BSE	3	-1.0061	.7530	2	-29.2137	0.00
NIFTY	3	-0.7699	.8266	2	-25.9050	0.00
SC	3	-1.0465	.7383	2	-30.7276	0.00

Exogenous: Constant
Lag Length: Automatic based on SIC, MAXLAG=25
*MacKinnon (1996) one-sided p-values.
Deterministic terms: Intercept

The critical values from MacKinnon (1996) for rejection of H0: intercept	1% level	-3.433291
	5% level	**-2.862726**
	10% level	-2.567447

Inferring from table 4, one can conclude that the null hypothesis about the existence of a unit root cannot be rejected for all the variables using intercept terms in the test equation at the level form. However, for the first differences of all the variables the null hypothesis of a unit root is strongly rejected. So it can be said that all the variables contain a unit root, that is, non-stationary in their level forms, but stationary in their first differenced forms.

Pair-wise Granger Causality Tests

This test involves examining whether lagged values of one series have significant explanatory power for another series. They have null hypotheses of no granger causality. The results of this test are summarized in Table 5 and it indicates whether there exists significant Granger Causality and if it exists, then in which direction such causality exists among various stock markets.

The table elucidates that null hypothesis is rejected in case of NIFTY and BSE that means both way causality exists in these two markets. Similarly, null hypothesis is also rejected in case of SC and BSE, which again implies that these two markets hold explanatory power for among themselves. While in case of NIFTY and SC the null hypothesis is accepted, which entails that two way granger cause do not exists in these two markets.

Table 5: Pair-wise Granger Causality Tests

Null Hypothesis:	Observations	F-Statistic	Probability
NIFTY does not Granger Cause BSE	1296	24.5739	0.0000*
BSE does not Granger Cause NIFTY		9.7552	0.0000*
SC does not Granger Cause BSE	1296	5.77416	0.0000*
BSE does not Granger Cause SC		3.26408	0.0062*
SC does not Granger Cause NIFTY	1296	0.63097	0.6762
NIFTY does not Granger Cause SC		0.65167	0.6603

(*) Rejection of the null hypothesis at 5% and therefore there is Granger causality

Conclusion

The study is a continuation of research on the issue of interdependency among the stock markets and indices. Interdependency among global stock markets is studied primarily through Descriptive Statistics, Correlation of Returns, Unit Root and the Granger Causality.

Results of hypotheses testing is presented

H_{01} = Rejected, H_{02}= Rejected, H_{03}= Rejected, H_{04}= Accepted

In terms of Granger Causality SC and BSE are integrated but NIFTY and SC are not. Returns of Indian indexes are also correlated, but not with SC. It can be concluded that Indian indexes are not integrated with SC.

It is hoped that the results of the present paper would be useful for individual and institutional investors for the management of their assets portfolios and policy makers especially in Chinese markets.

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