

Stock Market Relationship in South Asia: An Empirical Analysis

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Abstract--Literature indicates that there are several studies that have focused on stock market relationships and integration but very limited studies are found in this area that have focused for South Asian markets. Few that have studied stock market relationships and market integration in this region have never included Bhutan, probably due to unavailability of data on Bhutanese stock market or because it is too insignificant in terms of regional market. Particularly the relationship between Bhutanese stock market and Indian stock market is expected to be positive and significant given the very close economic ties/dependence with India. Correlation and regression analysis (data sample includes January 2006 to December 2011 for weekly returns) do not show relations between Bhutanese, Indian or any other stock returns except between Indian and Pakistani market returns. Few time varying effects were noticed when correlations were calculated for different set of split data. In general South Asian markets seem quite independent of each other. Indian stock market, which is more proficient in the region, was expected to have some influence but the results do not support this. Based on the Granger causality test, Indian market seems to provide unidirectional effect on most of the neighboring stock markets.

Key words: Bhutan; South Asia; Stock Market; Correlations

1. INTRODUCTION

Portfolio diversification models (Markowitz 1952; Sharpe 1964 and Linter 1965 among others) have shown that if the co-movement of stock markets is similar across stock markets then the gain from the portfolio diversification is not achievable. Co-movement of stock market returns can be analyzed through study of relationship (correlation and regression analysis) or co-integration. Co-integration theory is unarguably the most popular approach that has created interest among researchers in analyzing long-term relationship between stock markets. Engle and Granger (1987), Johansen (1988), Johansen and Juselius (1990) are some of the eye openers in the literature in areas of stock market co-integration analysis. Many have used these techniques in analyzing stock market integration. Kasa (1992), Chowdhury (1994) and others have applied co-integration approach in assessing long-term relationships and levels of financial market integration between Asian and global markets and within Asian markets. Among those few who investigated co-movements of stock markets in South Asia in the recent times are: Gunasinghe (2005), Hassan, Salem and Abdullah (2008), Raj and Dhal (2008), Subhani, Hasan, Mehar and Osman (2011), Sharma and Bodla (2011), Saha and Bhunia (2012) Khan and Huq (2012). They used varied techniques starting from a simple descriptive analysis to highly sophisticated

econometric models in analyzing market relationships. In any of the past studies Bhutanese stock was never included probably due to unavailability of stock index data or because the Bhutanese market is too insignificant in the region due to its smallness in size and lack of frequency in trading.

2. LITERATURE REVIEW

We have reviewed the literature in general and found that very limited studies in South Asia in this area. Some of the studies that have focused on South Asian markets that are relevant for our study given the research objectives are briefly reviewed and presented below.

Saha and Bhunia (2012) studied relationship between Indian stock and leading South Asian markets between August 2002 and August 2011. They initially looked at the simple correlation matrix among the stock markets in the region and since Indian stock was observed having relationship with others, it was thought that Indian stock as a more proficient market in the region has some influence on the others. They then used more complicated econometric process in testing market integration. They conducted unit root test for each variable and applied bivariate and multivariate co-integration (Johansen co-integration approach) and Granger causality test to see if South Asian stock market is integrated. They concluded that there is ample opportunity for the investors to broaden

the horizon of their investment in the capital market in the region to take advantage of the poor integration for risk diversification and benefit maximization.

Khan and Huq (2012) focused their studies on the risk and return behavior of different stock indices of Bangladesh. They used three stock indices of Bangladesh stock exchange covering (2002 – 2010) period to analyze risk-return pattern. They used daily, weekly and monthly data to analyze simple descriptive statistics and variances for each index and found that there was inconsistency between risk and returns indicating that an investor can achieve better returns without any additional risk. This suggests that even in the same country, the different stock indices are not integrated or closely related.

Subhani, Hassan, Mehar and Osman (2011) analyzed co-integration for Asian stock markets that includes stock indices from four countries (India, Pakistan, Bangladesh and Nepal). They tested for each indices the presence of unit root applying Dicky and Fuller model and reported that for both (with and without differencing (first lag) there was presence of data non-stationary. Since the data was non-stationary, Johansen co-integration has been applied to see if markets were integrated. They analyzed multivariate co-integration between Pakistani stock and the rest and they did not find co-integration in the equity market in South Asian region. However, when co-integration was analyzed on one to one basis between Pakistani stock and the rest, the finding suggested that Pakistani and Bangladeshi markets are co-integrated but with Indian and Nepalese markets there was no co-integration.

Sharma and Bodla (2010) studied India, Pakistan and Sri Lanka covering daily data from 1st January 2003 to 30th June 2010 as these three countries are the most dominant ones in terms of trade and polity in the region. They firstly confirmed that all the three stock market data are stationary through unit-root test and further conducted Granger causality test for each pair. They found out that the Indian stock market Granger cause Pakistani and Sri Lankan stock market and none other indices is found to Granger cause any other indices. The study also conducted variance decomposition analysis and reported that the stock markets in South Asia (represented by three indices) are not much influenced by each other. They concluded that there exist opportunities for investors to diversify their investment among South Asian countries.

Hasan, Salem and Abdullah (2008) have studied long-term relationship between Karachi Stock exchange and equity markets of developed countries (US, UK, Germany, Canada, Italy and Australia) covering 2000 – 2006 period. They used multivariate co-integration approach advocated by Johansen and Juselius (1990). They reported that Karachi stock exchange data was not integrated with other developed countries' except with France and Japan.

Raj and Dhal (2008) looked at the integration of Indian stock market with global and regional markets. They studied correlations for different time intervals and also

looked at co-integration with full sample and with split samples for Indian Stock (BSE), Hong Kong, Singapore, Japan, UK and USA for 1993 to 2008 period. Their findings suggest that Indian stock market is globally integrated in terms of stock prices measured in US dollars but not in local currency. It was also reported that the Indian stock market provides better returns than global and regional markets. Within the Asian region, Singapore and Hong Kong market are reported to have more influence on Indian market whereas Japanese market has a weak influence.

Gunasinghe (2005) covered stock market of three countries Sri Lanka, India and Pakistan for 1997 – 2002 period. He conducted correlation analysis and co-integration test (after splitting the data) for 1992 – 1997 and full sample to see if there was any difference in integration behavior after economic liberalization initiated in early 1990s by these countries. He found out that the correlations between Indian stock and Sri Lankan stock and the Indian stock and Pakistani stock marginally improved for the full sample against the results of 1992-1997. However, his multivariate co-integration test did not indicate long-term relationship or integration between the stock markets in the region.

Mohsin and Qayyum (2005) studied inward and outward capital mobility between five South Asian countries (Pakistan, India, Bangladesh, Sri Lanka and Nepal). He analyzed market integration from saving and investment prospective following Feldstein-Horowitz (1980), Dooley (1987, Kim (1993) and Summer (1995). His findings did not support the hypothesis that there exists a perfect mobility of capital across the five countries – an indication of lack of economic integration. However, he observed that the capital mobility has improved after economic liberalization at least in Bangladesh and Nepal. He concluded that in general the financial markets in South Asia are not perfectly integrated among each other and with the rest of the world.

Lamba (2005) conducted a study to investigate short-term and long-term relationship of South Asian stock markets (India, Pakistan and Sri Lanka) with developed markets (US, UK and Japan). He looked at the correlations among different markets and elaborated the analysis using multivariate co-integration approach covering July 1997 – December 2003 data. He reported that the South Asian markets are relatively isolated from the developed stock markets but they are becoming more integrated with each other within the region at a very slow pace.

3. SIGNIFICANCE

Mukherjee (2004) states, "stock market integration or interdependence means that the investors can buy and sell shares in those markets without restriction and that identical securities can be issued and traded at the same price across the markets after foreign exchange adjustment". It is in this context, understanding trend of

various stock markets is essential for investors and academia. If markets are integrated, any uncertainty in one market can spread to another market. Therefore, to be knowledgeable about the relationship between stock markets is essential for the investors, policy makers and macroeconomic regulators. This study, as it is the first of its kind that includes Bhutanese stock market in the relationship analysis in the South Asian region, should be useful particularly for the Bhutanese investors, academia and policy makers to get an insight on how Bhutanese stock relates with others in the region and especially with India- the biggest trading partner of Bhutan.

4. OBJECTIVES

The objective of this paper is firstly to find out relationships between Bhutanese and Indian stock market and also with other countries in the region through correlation and regression analysis. Further, the paper intends to see if changes in returns of Indian stock market influence other markets in the region, Indian stock market being the most matured and proficient in the region. This will enable us to know the degree of influence of Indian stock on each of the other countries. Even if we find that there exists a relationship between two markets through correlations and regression analysis, we will not be in a position to confirm what causes what. It is in this context, the paper also aims at analyzing the longer-term relationships between different pairs of the stock markets through Granger causality test as this tool is widely used in the literature to confirm direction or to find out whether both variables cause effects on each other among those that have correlation or is it only one of them that cause effect on the other.

5. METHODOLOGY

This paper, firstly, uses a simple statistical tool – correlation matrix to analyze relationship between different stock market returns for a full sample period (January 2006 – December 2011) and for split data (annually) for weekly returns. Next, we looked at regression coefficients on one to one basis using univariable model using Bhutanese stock return as the dependent variable. We also ran a multivariable model with again Bhutanese stock return as dependent and the rest as independent variables since our objective was to see if Bhutanese stock returns are affected by the changes in Indian or other regional stock markets. After understanding the relationship from correlations and regression coefficients we looked at pairwise Granger causality test to analyze causality between the stock market returns.

6. FINDINGS AND DISCUSSIONS

Results and discussions thereof are presented in three parts. To start with we present the correlation matrix,

followed by regression results and finally we provide Granger causality test results.

6.1 Correlations

Correlations are measures of linear association. Two variables can be perfectly related, but if the relationship is not linear, a correlation coefficient is not an appropriate statistic for measuring their association. Broadly, the correlation is of two types. One, quite popularly used, is known as bivariate correlations. This procedure computes Pearson's correlation coefficient, Spearman's rho, and Kendall's tau-b with their significance levels. Before calculating a correlation coefficient, we need check the data for outliers (which can cause misleading results) and evidence of a linear relationship. In the event of multiple variables bivariate correlation procedure does not isolate net relationship of two variables since the effect one other variables are not controlled. In such a case the second type of correlation procedure called partial correlations is used. This procedure computes partial correlation coefficients that describe the linear relationship between two variables while controlling for the effects of one or more additional variables.

We have tried both bivariate correlation and partial correlation in our analysis. Among the bivariate correlation itself, we have analyzed Pearson's correlation, Spearman's rho, and Kendall's tau-b to check if results would be different. However, we found that the results produced by both partial and bivariate procedures and different procedures within bivariate correlation are similar. As such we arbitrarily chose to present Spearman's correlation matrix in our report.

We know that correlation ranges between -1 to +1. If the correlation is +1, then it indicates that there exist a perfect positive correlation or it means both variables move in the similar direction. On the other hand, if the correlation is negative then we know that the relationship is inverse or they move in two different directions.

Table (1) presents a correlation matrix for different stock markets for the full sample period (2006 -2011) and it shows that Bhutanese stock return (R_BHU) does not have strong correlation with Indian Stock (R_BSE) or for that matter with any other stock market in the region. With India we found the correlation is positive (0.036) but not significant statistically. Indian stock and Bhutanese stock move in the same direction but the magnitude with which these two stock returns are related in their movements is rather very weak or negligible. Bhutanese stock returns show a weak positive correlation with Pakistani stock market (R_PAK) too and shows negative correlations with the rest of the other stock markets in the region.

As indicated the Bhutanese Stock return show negative signs on its correlation with signs Bangladesh (R_BGD), Nepal (R_NPL) and Sri Lanka (R_SLK) and positive signs with Indian and Pakistani stock returns. However, we found very weak correlations rather insignificant among all

pairs of stock market returns in the region. In all the correlation matrix tables (*) indicates p- value at 5% level

or it would mean that the correlation is significant at 95% confidence level.

Table: 1 - Correlations Bhutan, India and other countries (2006 – 2011)

	R_BGD	R_NPL	R_SLK	R_PAK	R_BSE	R_BHU
R_BGD	1	0.014	-0.025	-0.047	-0.015	-0.068
R_NPL	0.014	1	0.02	-0.007	0.078	-0.087
R_SLK	-0.025	0.02	1	0.005	0.001	-0.056
R_PAK	-0.047	-0.007	0.005	1	.142*	0.024
R_BSE	-0.015	0.078	0.001	.142*	1	0.039
R_BHU	-0.068	-0.087	-0.056	0.024	0.039	1

As we know that Indian economy is much bigger than any other economy in the region, we expected that the Indian stock market would have influence on the stock markets of other nations in the region. This has not been the case in general. The correlation between Pakistan and Indian Stock returns is found to be 0.142, a weak correlation in terms of magnitude but is significant (p-value 5%). Indian stock does not have significant correlation with others as expected due to the market size and maturity compared in the region. Our findings are similar to that of Saha and Bhunia (2012). One of the analysis they conducted was the bivariate correlation for the daily data set of (August 2002 – August 2011) for leading South Asian countries to see and they found that the correlations between Indian stock market and other markets in the region are very low and also negative in some cases.

While we have presented the correlation matrix for 2006 – 2011 above, the following tables (2 – 7) present correlation between stock market returns among SAARC nations on an annual basis (based on yearly data) for 2006 to 2011. Repeating the correlation analysis for annually split data should provide us insight on whether there is any difference in the correlation among markets between full sample period and sub-sample. This helps us in checking consistency of relationship between markets.

Result shown in table 2 pertains to the data of 2006. Our finding for 2006 is similar to that of the findings for full sample. Bhutanese stock returns show weak positive correlation with India and Pakistan and negative with the other stock markets. However, none of the correlations are significant

Table: 2 - Correlations: Bhutan, India and other countries (2006)

	RBHU6	RBSE6	RPAK6	RSLK6	RNPL6	RBGD6
RBHU6	1	0.002	0.202	-0.216	-0.219	-0.158
RBSE6	0.002	1	0.247	0.221	-0.009	0.1
RPAK6	0.202	0.247	1	0.074	0.001	-0.044
RSLK6	-0.216	0.221	0.074	1	0.036	-0.074
RNPL6	-0.219	-0.009	0.001	0.036	1	0.021
RBGD6	-0.158	0.1	-0.044	-0.074	0.021	1

When we analyzed similar correlation for the data of 2007, we found that Bhutanese stock return is positively correlated with India and Nepal and negative with the rest. However, the correlation coefficients are very weak.

Indian stock also shows weak positive correlation with all markets except for Sri Lanka for 2007 data. No significant correlation is observed among any pair of the stock market.

Table: 3 - Correlations Bhutan, India and other countries (2007)

	RBHU7	RBSE7	RPAK7	RSLK7	RNPL7	RBGD7
RBHU7	1	0.088	-0.001	-0.062	0.003	-0.077
RBSE7	0.088	1	0.058	-0.04	0.165	0.169
RPAK7	-0.001	0.058	1	-0.072	-0.127	0.172
RSLK7	-0.062	-0.04	-0.072	1	0.097	0.057
RNPL7	0.003	0.165	-0.127	0.097	1	0.055
RBGD7	-0.077	0.169	0.172	0.057	0.055	1

In 2008, Bhutanese market show significant positive correlation with Sri Lankan market (.304 and significant at 5% (p-value). With other markets, correlations are very weak. Indian stock market shows negligible negative correlation (< 0.2) between Bhutan, Pakistan and Bangladesh and positive with the rest. We find significant negative correlation between Sri Lankan and Bangladeshi stock returns for 2008.

For the data set of 2009 and 2010, we find no significant correlation between any pair of the stock market. Bhutanese stock market although showed positive correlations with most markets but they are not even remotely significant.

Finally, we have compared the correlations for 2011 and found that Bhutanese market has no significant correlation with any other market. Indian and Pakistani stock market show positive correlation at 10% (p-value).

Table: 4 - Correlations: Bhutan, India and other countries (2008)

	RBHU8	RBSE8	RPAK8	RSLK8	RBGD8
RBHU8	1	-0.08	0.015	.304*	0.012
RBSE8	-0.08	1	-0.131	0.062	-0.134
RPAK8	0.015	-0.131	1	-0.006	-.344*
RSLK8	.304*	0.062	-0.006	1	-0.028
RBGD8	0.012	-0.134	-.344*	-0.028	1

Table: 5 - Correlations Bhutan, India and other countries (2009)

	RBHU9	RBSE9	RPAK9	RSLK9	RNPL9	RBGD9
RBHU9	1	0.114	0.057	0.03	-0.012	-0.212
RBSE9	0.114	1	0.262	-0.112	0.204	-0.113
RPAK9	0.057	0.262	1	-0.106	0.225	0.027
RSLK9	0.03	-0.112	-0.106	1	0	-0.158
RNPL9	-0.012	0.204	0.225	0	1	-0.2
RBGD9	-0.212	-0.113	0.027	-0.158	-0.2	1

Table: 6 - Correlations Bhutan, India and other countries (2010)

	RBHU10	RBSE10	RPAK10	RSLK10	RNPL10	RBGD10
RBHU10	1	0.017	0.162	0.161	-0.026	0.083
RBSE10	0.017	1	0.273	0.073	0.115	-0.225
RPAK10	0.162	0.273	1	-0.023	-0.132	-0.196
RSLK10	0.161	0.073	-0.023	1	-0.039	0.027
RNPL10	-0.026	0.115	-0.132	-0.039	1	0.196
RBGD10	0.083	-0.225	-0.196	0.027	0.196	1

Table: 7 - Correlations Bhutan, India and other countries (2011)

	RBHU11	RBSE11	RPAK11	RSLK11	RNPL11	RBGD11
RBHU11	1	-0.113	-0.08	-0.069	-0.007	0.028
RBSE11	-0.113	1	.403**	-0.264	0.095	-0.116
RPAK11	-0.08	.403**	1	-0.206	0.071	-0.225
RSLK11	-0.069	-0.264	-0.206	1	0.037	-0.008
RNPL11	-0.007	0.095	0.071	0.037	1	0.052
RBGD11	0.028	-0.116	-0.225	-0.008	0.052	1

Upon our analysis from the correlation matrix for the whole sample period and for the split data annually, generally we do not see that there exists significant correlation between most pairs of stock market in the region except in very few cases. We found significant

correlation only with Pakistani and Indian stock market for the full sample period and 2011. Bhutanese stock market showed no correlation either with Indian stock or with any other market except with Sri Lankan stocks just for one

year (2008). Pakistan and Bangladesh stock showed significant negative correlation in 2008.

On the whole, it may be concluded that the South Asian stock markets are uncorrelated to each other. These finding are similar to that of the recent findings Saha and Bhunia (2012) who reported correlation matrix between Indian stock and other leading South Asian markets. Uncorrelated stock markets in the region provide more opportunities for choosing an investment portfolio that minimizes risk. However, to avail such opportunity we should promote ease in capital movements, which is not happening. Cross-country investments, trade and capital movement among the SAARC countries is not so liberal. Issues related to poor economic integration among SAARC nations is presented in Dubey (2007). He argued that despite South Asian Preferential Trade Agreement (SAPTA), trade between the nations is very negligible due to political differences among the countries.

When we find that the regional stock markets are uncorrelated with the stock market of the biggest economy in the region, it throws some light on the fact that the markets are not integrated. But it is difficult to conclude just through the correlations analysis. It needs further research with more advanced statistical techniques and we will explore in the following sections and in the next paper.

6.2 Regression Analysis

Among the different models in the regression, the ordinary linear regression method is quite popular in estimating relationship between variables. The coefficients of the linear equation, involving one or more independent variables predict the value of the dependent variable. For example, if we try to estimate the relationship of Bhutanese stock market (the dependent variable) with independent variable, say Indian stock returns, equation 1 below can be used. Similarly if we need to study the relationship between Bhutanese a market and any other

market in the region, we can use the same equation replacing the Indian stock data in the model by whichever market we want to study the relationship with. If we are interested to estimate the relationships of Bhutanese stock market with all the markets at once then a multiple regression in the form of equation 2 can be employed.

$$Y^B = a + bY^I + u \quad (1)$$

$$Y^B = a + bY^I + cY^N + dY^B + bY^S + eY^P + u \quad (2)$$

Where Y^B is the Bhutanese stock return (dependent variable), Y^I is Indian stock returns, Y^N represents Nepalese stock return, Y^B is return for Bangladesh stock market, Y^S stands for Sri Lankan stock return, Y^P represents Pakistani stock market return and u represents error term. Letters "a" in both the equations represent constant term and "b" in equation 1 and "b" to "e" in equation 2 are coefficients attached to respective variables. This is exactly the same approach applied by Wong, Agarwal and Du (2005) while they estimated the relationship between Indian stock market and selected stock markets of developed countries (USA, UK and Japan) as a first step in their investigation for market integration. In this section we run the univariable regression of equation (1) to assess the relationship of Bhutanese stock market with Indian market and each of the other markets (by replacing independent variable in equation 1) and also run the multiple regression of equation (2) to look at the effect of each market on Bhutanese market. Further, we also estimated the relationship of each market with the rest by changing the dependent variable in equation (2) to see the regional effect of stock market to each country. Results for different combination of regression models are presented and explained in the series of tables below.

Table 8 presents the relationship based on equation 1 between Bhutanese stock (RBHU), dependent variable and Indian stock (RBSE), independent variable. Result shows no significant relationship between the two stock markets.

Table: 8 - Regression Bhutanese stock returns against Indian stock

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	
1	(Constant)	.002	.001		1.237
	RBSE	.030	.038	.044	.780
					.217
					.436

a. Dependent Variable: RBHU

Result of equation (2) with Bhutanese stock as dependent and other stocks and independent variables (RBSE, India, RNPL – Nepal, RBGD – Bangladesh, RSLK – Sri Lanka, RPAK – Pakistan) is presented in table 9. It is evident from the results that the Bhutanese stock has no

relationship with any other stock market in the region. Bhutanese stock return shows positive correlation coefficients with India and Pakistan and negative with the rest but none of the relationship is significant.

Table: 9 - Regression: Bhutanese stock returns against other stock markets in the region

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.002	.002		1.543	.124
	RBSE	.031	.039	.046	.804	.422
	RNPL	-.020	.017	-.065	-1.140	.255
	RBGD	-.065	.049	-.076	-1.341	.181
	RSLK	-.041	.040	-.058	-1.020	.309
	RPAK	.012	.043	.016	.283	.778

a dependent Variable: RBHU (R sq = 0.12)

Results for equation (1), that is univariable model, with Bhutanese stock return as dependent and the other markets (with replacement of independent variable for each table)

is presented in the tables 10 to 13. We did not find any relationship between Bhutanese stock and any of the markets in the region.

Table: 10 - Regression between stock price of Bhutan and Bangladesh

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.002	.001		1.460	.145
	RBGD	-.066	.049	-.076	-1.348	.179

a dependent Variable: RBHU

Table: 11 - Regression between stock price of Bhutan and Nepal

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.002	.001		1.322	.187
	RNPL	-.018	.017	-.061	-1.068	.287

a Dependent Variable: RBHU

Table: 12 - Regression between stock returns of Bhutan and Sri Lanka

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.002	.001		1.392	.165
	RSLK	-.040	.040	-.057	-1.000	.318

a dependent Variable: RBHU

Table: 13 - Regression between stock price of Bhutan and Pakistan

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.002	.001		1.270	.205
	RPAK	.019	.042	.025	.448	.655

a dependent Variable: RBHU

Since we failed to establish any relationship between Bhutanese stock market and any of the markets in the region, interest arouse to assess if other markets are different from Bhutan in terms of their relationship with other regional markets, particularly with India as it is more matured and professionalized in terms of stock market. It is in this context, a multivariable model (equation 2) has been run changing the dependent variable each time.

Results are quite surprising in the sense that no stock market is related with any other market in the SAARC region except for India and Pakistan. Regression result placed for each market as dependent variable and the rest as independent between tables (14 to 18) confirm that none of the markets are related except for the two (India and Pakistan), the two biggest nations in the SAARC region.

Table: 14 - Regression between stock price of India and the rest

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.002	.002		.851	.396
	RNPL	.040	.025	.089	1.582	.115
	RBGD	-.007	.072	-.005	-.093	.926
	RSLK	-.002	.059	-.002	-.028	.977
	RPAK	.156	.062	.142	2.514	.012
	RBHU	.067	.084	.046	.804	.422

a Dependent Variable: RBSE (R sq = 0.174)

Table: 15 - Regression between stock price of Nepal and the rest

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.003	.005		.616	.539
	RBGD	-.023	.162	-.008	-.143	.886
	RSLK	-.006	.133	-.003	-.047	.963
	RPAK	-.018	.142	-.007	-.127	.899
	RBHU	-.215	.188	-.065	-1.140	.255
	RBSE	.203	.128	.091	1.582	.115

a Dependent Variable: RNPL (Rsq = 0.11)

Table: 16 - Regression between stock price of Bangladesh and the rest

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.004	.002		2.577	.010
	RSLK	-.017	.047	-.020	-.352	.725
	RPAK	-.035	.050	-.041	-.708	.479
	RBHU	-.089	.067	-.077	-1.341	.181
	RBSE	-.004	.046	-.005	-.093	.926
	RNPL	-.003	.020	-.008	-.143	.886

a Dependent Variable: RBGD (Rsq = 0.10)

Table: 17 - Regression between stock price of Pakistan and the rest

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.001	.002		.445	.657
	RSLK	.008	.054	.009	.157	.875
	RBHU	.022	.076	.016	.283	.778
	RBSE	.129	.051	.143	2.514	.012
	RNPL	-.003	.023	-.007	-.127	.899
	RBGD	-.046	.065	-.040	-.708	.479

a Dependent Variable: RPAK (Rsq = .15)

Table: 18 - Regression between stock price of Sri Lanka and the rest

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.004	.002		2.110	.036
	RBHU	-.083	.081	-.059	-1.020	.309
	RBSE	-.002	.056	-.002	-.028	.977
	RNPL	-.001	.025	-.003	-.047	.963
	RBGD	-.025	.070	-.020	-.352	.725
	RPAK	.010	.061	.009	.157	.875

a Dependent Variable: RSLK (R sq = .06)

In the series of tables above (14 to18) we have presented the multiple regression result using of each market against the rest in the region. General findings from regression tables suggest that no stock market in the region is significantly related with any other market. Significant relationship is found only between Indian and Pakistani stock market. Finding from correlation matrix confirms the finding of regression analysis. However, when data was split annually we saw some correlation between some pairs of stock market. We know that even if there exists any relationship between any pair of stock market, cause and effect (what causes what) can be analyzed only if Granger causality test is conducted. From our earlier study that was published in September 2012, the result of Granger causality test for different pairs of the stock markets is presented.

6.3 Granger Causality Test

Table 19 presents the results of Granger causality test for different pairs of South Asian stock market. The first pair is between Bhutanese stock and Indian stock. The

hypothesis that Indian stock does not cause effect on Bhutanese stock is rejected, as p-value is less than 5%. However, the reverse is not true (changes in Bhutanese stock does not cause changes in Indian stock). This is understandable given the huge differences in market size. Indian stock market also Granger causes Pakistani stock market. Although from the regression analysis and correlation matrix we found relationship between these two markets but the Granger causality test confirms that it is the Indian market that Granger causes Pakistani market and the reverse is not true. Further the Indian stock market also is found have unidirectional influence on Bangladeshi and Sri Lankan stock markets. The unidirectional causality produced by the Indian stock on others remained significant mostly at 5% levels. On the whole the market relationships or integration among South Asian stock market is found to be very weak, however, India as the much bigger stock market seems to influence the rest in the region.

Table: 19 - Granger Causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
RBSE does not Granger Cause RBHU	311	4.19297	0.0414
RBHU does not Granger Cause RBSE		0.09865	0.7537
RNPL does not Granger Cause RBHU	311	0.03591	0.8498
RBHU does not Granger Cause RNPL		0.07555	0.7836
RBGD does not Granger Cause RBHU	311	1.10935	0.2930
RBHU does not Granger Cause RBGD		0.26303	0.6084
RSLK does not Granger Cause RBHU	311	0.00304	0.9561
RBHU does not Granger Cause RSLK		0.62584	0.4295
RPAK does not Granger Cause RBHU	311	2.43928	0.1194
RBHU does not Granger Cause RPAK		1.95597	0.1630
RNPL does not Granger Cause RBSE	311	0.12180	0.7273
RBSE does not Granger Cause RNPL		0.03397	0.8539
RBGD does not Granger Cause RBSE	311	0.01193	0.9131
RBSE does not Granger Cause RBGD		3.14270	0.0773
RSLK does not Granger Cause RBSE	311	12.1283	0.0006
RBSE does not Granger Cause RSLK		3.00956	0.0838
RPAK does not Granger Cause RBSE	311	1.52196	0.2183

RBSE does not Granger Cause RPAK		3.70473	0.0552
RBGD does not Granger Cause RNPL	311	1.32187	0.2511
RNPL does not Granger Cause RBGD		0.31919	0.5725
RSLK does not Granger Cause RNPL	311	0.01283	0.9099
RNPL does not Granger Cause RSLK		0.34651	0.5565
RPAK does not Granger Cause RNPL	311	1.39140	0.2391
RNPL does not Granger Cause RPAK		0.98863	0.3209
RSLK does not Granger Cause RBGD	311	1.99901	0.1584
RBGD does not Granger Cause RSLK		1.02593	0.3119
RPAK does not Granger Cause RBGD	311	0.37180	0.5425
RBGD does not Granger Cause RPAK		1.86444	0.1731
RPAK does not Granger Cause RSLK	311	2.68082	0.1026
RSLK does not Granger Cause RPAK		0.00730	0.9320

Source: International Journal of Management and Information Technology, Sept. 2012

7. CONCLUSION

Given the close economic ties and dependence of Bhutan on India, the positive relationship between two countries' stock market was expected. It is not the case seeing through the regression result; may be due to the fact that the Bhutanese stock index that represent only six companies has not captured the economic of Bhutan. Bhutanese stock also does not show any relationship with other markets in the region. As the Indian stock market is probably the most developed one and the fact that Indian economy is invariably the most dominant one in the region, our expectation was that at least Indian stock market would have relationship with most other markets. However, this has not been proven at least from the regression results except with Pakistan stock market. Findings reflect the case of poor economic integration among the SAARC nations as indicated by earlier studies. It could also be true that the ordinary regression, as it has several limitations, did not capture the relationship even if it existed. However, with Granger causality test we found, Indian stock market influencing all others in the region except Nepalese stock. The causality between the stock markets in unidirectional. It is the Indian stock that Granger causes the stock returns in Bhutan, Pakistan, Bangladesh and Sri Lanka and the vice-versa is not true. Poor correlation among different pairs of stock markets, insignificant relationship and just the unidirectional Granger causality basically indicate poor market integration in the region. This provides investors some opportunity to take advantage of market inefficiency in

maximizing return without having to take proportionately higher risk in their effort to sustainably grow their income from the investment in capital markets.

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