

# The Influence of Macroeconomic Factors on Stock Markets Performance in Top SAARC Countries and China

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## Abstract

"In global world the investment in capital market plays a vital role of an economy especially in emerging countries". The researcher found the influences of three independent economic variables i.e., foreign exchange, foreign direct investment and inflation (CPI) at SAARC countries and China and comparison of these results into two groups with high frequency monthly data of all dependent and independent variables, since last five years practice data obtain from various authentic sources. To reach these research objectives author uses the ordinary least square (OLS) to estimate the Pearson's correlation coefficient and multiple regression models. And results show that in first group, significant (positive) influences by foreign exchange & inflation while FDI has insignificant (negative) influences on stock market return in Bangladesh. And in Pakistan, foreign exchange and inflation have significant (negative) influences while FDI has insignificant (positive) influences on stock market return. In Sri Lanka significant (positive) influences by foreign exchange while FDI and inflation have significant (negative) influences on stock market return. In second group, India and China both have significant (negative) influences by foreign exchange and inflation while FDI has insignificant (positive) influences on stock market return. The high value of  $R^2$  show that variations in all independent variable have explained the all countries capital markets in all models. All-encompassing model admirable by probability of F-statistics which 95% of interval confidences. There are no serial correlation issues in all models by Durbin-Watson statistics value.

**Keywords:** Macroeconomic factors; Stock market returns; SAARC countries; China; Multiple regression; Ordinary least square (OLS)

## Introduction

SAARC (1985) the South Asian Association for Regional Cooperation an economic organization of eight countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) and China (the second largest economy in this world after USA) which are stock markets trading volume are biggest as an association compare to others in the rest of world. It are also plays an important influences role in leading the other countries stock markets in Asia like Middle East countries, Commonwealth Independent States (1991) Azerbaijan, Armenia, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, and Uzbekistan etc. and ASEAN (1967) countries i.e., Indonesia, Malaysia, Philippines, Singapore Thailand and Vietnam, and Iran and Turkey. SAARC countries i.e., Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka have more than 411 Billion foreign reserves and have a stable US\$ exchange rate to local currencies in all countries and closely trading with each other member country. And any significant impact or changes any economic activities i.e., inflation could bring big effect to its trading partners in South Asian particulars region and China.

China, Bangladesh, India, Pakistan and Sri Lanka stock markets index, have played a pivotal role in supporting the growth of Commerce, Industries, Telecommunication, Auto mobile and Science, and Technology area in SAARC countries which consists of major blue chips companies have a large human and financial capital. It is also well expanded as it comprises of diverse industries in SAARC countries and People's Republic of China. An outstanding performance of these emerging countries' stock markets could influence numerous industries in any country even to inclusive Consumer Price Index as proxy for inflation rate, foreign exchange rate and foreign direct investment and so on. The research on these stock markets presentation could provide the market contributors a pure image of the development of various industries exists in SAARC countries.

## Objectives of Research

The purposes of this research article to have following:

To discuss an idea of the South Asian Association for Regional Cooperation (SAARC) and China.

To examine the relations between the top SAARC countries and China's capital markets return and three macro-economic variables namely foreign exchange rate (US\$ to local currency), foreign direct investment (FDI) and inflation rate (measured by consumer price index).

To examine any correlation exist between top SAARC countries and China's capital markets stock return and macro-economic factors.

## Review of Empirical Literature

In last century, numerous finance theories introduced by researcher and promote these theories by others scholars after a time span, earlier announced single factor theory capital assets pricing model (CAPM) which considered return and then extension of CAPM by two factor model presented Arbitrage pricing theory (APT) which discussed same assets and many common risk factor and later three factor model announced Fama and French model which extended the CAPM by risk ( $\beta$ ), size and value of firm and later, further improvement of Fama and French model extended by momentum factor called four factor model.

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The researcher worked on stock return upon whole capital market, industry and particular listed firm's return and sometime comparison between these certain return of two firms and/or industry with assistance of common independent variables exist in any economy.

Emin et al. examined the market based ratio(s) of four independent variables namely quarterly earnings per share, quarterly price to earnings ratio and quarterly market to book ratio to impact on dependent variable namely quarterly stock returns of six insurance companies in Istanbul Stock Exchange (ISE), Turkey. The researchers worked on quarterly data from second and third quarter of 2000 to fourth quarter of 2009 used methodology panel regression analysis. Study found that the market based ratios have explanatory power on both the changes in current stock returns and one period ahead stock returns. Earnings per share ratio, price to earnings ratio and market based ratio explains 0.06 of changes in current stock returns. The earnings per share ratio, price to earnings ratio and market based ratio explains 0.63 of one period ahead stock returns [1].

Doong et al. discussed the price and volatility spillovers a single independent variables exchange rate and the dependent variable(s) stock exchange markets of G-7 countries (Canada, France, Germany, Italy Japan, UK and USA) [2]. The researchers worked on weekly data from May 01, 1979 to January 01, 1999 used procedure of EGARCH model conclude future exchange rate movements will affect by stock prices, but it has less direct impact on future changes of stock prices. In foreign exchange market of France, Italy, Japan, and the United States have significant volatility spillovers and/or asymmetric effects from these stock markets.

Madaleno et al. examined the influence of expectations over international stock returns and macroeconomic three independent variables namely industrial production index, consumer confidence index and business confidence index and the dependent variable(s) share price index of United States, United Kingdom, Japan, Portugal, Spain, Germany, France and Italy [3]. The scholars worked from first quarter of 1985 to fourth quarter of 2009 implementation Augmented Dickey-Fuller test (ADF), the Phillips Perron test (PP), Kwiatkowski Phillips Schmidt Shin test (KPSS) and Vector Autoregressive model (VAR) conclude a positively correlation between share prices and changes in sentiment, except for Italy and Germany (consumer confidence index (CCI)). The stock return has only respond contemporaneously to their own shock(s), while leading to significant and strong responses of confidence & industrial production variable(s).

Nikolaos et al. analyzed the effects of total market index and the sustainability index by five independent variables namely crude oil prices, Yen/US\$ exchange rate, 10 year bond value and non-farm payrolls variables on companies that integrate CSR activities (DJSI United States) and all United States equity securities and the dependent variable United States stock market, United State [4]. The scholars worked on monthly data from January 2000 to January 2008 implementation GARCH and Augmented Dickey Fuller test (unit root test) achieved a negatively affect by crude oil returns in the US stock returns and positively affects by 10 year bond value. Negative relationship found between the United States stock market and the exchange rate (Yen/US\$), a relationship exist between corporate social performance and employment indicators by may be attributed.

Ismail et al. discussed the impacts of macroeconomic four independent variables namely interest rate, broad money supply, domestic output and inflation rate and the dependent variable(s) Malaysia, Indonesia, Thailand, Singapore and the Philippines (ASEAN

stock market) [5]. The scholars worked from 2004 to 2009 used procedure of regressions found significant strong impact by inflation rate, broad money (M2) and interest rate on the all these stock market movement, while domestic output found surprisingly insignificant. Also found a significant impact and unchanged over time the quantum effect of time onto the stock market movement.

## Materials and Methods

### Research design

The econometric model under reading given the following equation:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

"Y" is being dependent variable, "α"=being intercept of Y; β<sub>1</sub>, β<sub>2</sub> & β<sub>3</sub> slope or change in all variable, while the 'ε'=the random error stretch

The Implementation of the econometric Model:

$$\text{LN R} = \alpha + \beta_1 \text{ER} + \beta_2 \text{LN FDI} + \beta_3 \text{INF} + \epsilon$$

R=Natural Logarithm of Stock Return, α=Constant term, β<sub>1</sub>=Foreign exchange rate, β<sub>2</sub>=Natural Logarithm of Foreign direct investment, β<sub>3</sub>=Inflation and ε=The Error term

### Research methodology

This study conducts secondary data to find the association between selected independent major economic factors and stock return of top SAARC countries (Bangladesh, India, Pakistan and Sri Lanka) and China. In this article to estimate the precise circumstances and relationship exist to which other variables quantities may be expressed by using econometric model Ordinary Least Square (OLS), E-views8 statistical software and Microsoft Excel use in this study for data analysis & performed. Descriptive statistics and the Pearson's product-moment correlation coefficient to measure of the linear correlation between two dependent and/or independent variables, as a measure of the degree of linear dependence between two variables dependent and/or independent variables X and Y giving a value between plus 1 and minus 1 inclusive. And also statistical regression technique use by Ordinary Least Square (OLS) to classify the direction and significance of relationships between dependent variables namely top SAARC countries (Bangladesh, India, Pakistan and Sri Lanka) and China's stock markets return and independent macro-economic variables namely foreign exchange rate, foreign direct investment and inflation (CPI) [6].

**Stock return:** The top SAARC countries and China's capital market's stock return calculated as the monthly change in the stock return by the following formula:

$$R(t) = \text{LN R}(t)$$

Where; R (t) the value of stock return of local stock exchange at month (t) and LN R (t) Natural Logarithm in Microsoft excel at month (t) of current month stock return. High frequency secondary data of stock return for Bangladesh; official website of Dhaka stock exchange www.dsebd.org, for India; Bombay stock exchange and for Pakistan; Karachi stock exchange and for Sri Lanka; Colombo stock exchange and for China; Shanghai stock exchange these all from yahoo finance source data covered a period from January 2011 to December 2015 [7].

**Foreign exchange:** The top SAARC countries and China's foreign exchange rate (ER) calculated as the monthly rate by the following formula:

$$ER(t) = 1/USD(t)$$

Where; ER (t) foreign exchange rate month t, and 1 divided by USD at time t are equal to local currency value at month (t). Foreign exchange data achieved for Bangladesh; the central bank of Bangladesh official website www.bb.org.bd, for India; Reserve Bank of India official website www.rbi.org.in, for Pakistan; State Bank of Pakistan official website www.sbp.org.pk, for Sri Lanka & China from the Federal Reserve official website www.federalreserve.gov collected monthly data covered a five years period from January 2011 to December 2015 [8].

**Foreign direct investment:** The top SAARC countries and China's foreign direct investment (FDI) calculated as the monthly value by the following formula:

$$FDI(t) = LN(t)$$

Where: FDI (t) the value at month t and LN (t) is Natural Logarithm in Microsoft excel at month (t) of foreign direct investment value. Foreign direct investment data achieved for Bangladesh; the central bank of Bangladesh official website www.bb.org.bd, for India; the Department of Industrial Policy & Promotion; Ministry of Commerce & Industry, Government of India official website www.dipp.nic.in, for Pakistan; State Bank of Pakistan official website www.sbp.org.pk, for Sri Lanka; Central Bank of Sri Lanka official website www.cbsl.gov.lk, for China; Ministry of Commerce, People's Republic of China official website www.english.mofcom.gov.cn, which covered a five years period from January 2011 to December 2015 [9,10]

**Inflation:** The measured of the inflation rate by the consumer price index (CPI) of the top SAARC countries and China. The twelve-monthly (YOY) change in CPI is given by the following formula:

$$INF(t) = CPI(t) - CPI(t-12)$$

Where; I (t) the annual change in CPI, that is, the inflation in month t, CPI (t) is the CPI in month t and CPI (t-12) is the CPI in the same month of the previous year time period. Data obtained for Bangladesh; the central bank of Bangladesh website www.bb.org.bd, for India; website www.inflation.eu, for Pakistan; the State Bank of Pakistan official website www.sbp.org.pk, for Sri Lanka; official website of the Department of Census and Statistics Sri Lanka, www.statistics.

gov.lk, for China; official website www.inflation.eu, covered a period of five years from January 2011 to December 2015 [11,12].

## Results and Discussion

The top SAARC countries and China are divided into two groups: In first group Bangladesh, Pakistan and Sri Lanka and second group India and China;

### First group

#### Bangladesh

**Discussion:** The value -0.2134 weak downhill (negative) relationships exist between exchange rate and FDI. An exchange rate and inflation relationship are a weak uphill (positive) linear relationship by 0.1747 values [13]. The value 0.5938 show that a moderate positive relationship exists between exchange rate and Dhaka Stock market's Return. Moderate (negative) linear relationship exists between FDI and inflation by values -0.6860. There are weak downhill (negative) linear relationships exist by -0.4597 between the FDI and Dhaka stock market's return. Weak downhill (positive) linear relationships exist between inflation and Dhaka stock market's return by values 0.4743 (Tables 1a-1c).

**Coefficient values:** In regression equation; exchange rate, foreign direct investment and inflation rate are independent variables coefficient measure the marginal contribution to independent variables of Dhaka stock exchange return the dependent variable. The value 7.5569 is y-intercept the constant term in above regression equation. The relationship between Dhaka stock exchange return and exchange rate is positive for the reason that if increase one unit in exchange rate the independent variable than 167.6414 unit change in Dhaka stock exchange return the dependent variable or if one percent increase in exchange rate independent variable leads to a 167.6414% changes in Dhaka stock exchange return the dependent variables with all others constant. FDI and Dhaka stock exchange return relationship is negative because that if increase one unit in FDI the independent variable than -0.0776 unit change in Dhaka stock exchange return the dependent variable or if value of FDI increase one percent the Dhaka stock exchange return will change -0.077% with all others constant. The relationship between Dhaka stock exchange return and inflation

|              | Exchange rate | Foreign direct investment | Inflation rate | DSE return |
|--------------|---------------|---------------------------|----------------|------------|
| Mean         | 0.012843      | 18.63478                  | 0.079727       | 8.4540     |
| Median       | 0.012858      | 18.69812                  | 0.0747         | 8.429903   |
| Maximum      | 0.014055      | 19.21733                  | 0.1159         | 8.920553   |
| Minimum      | 0.01185       | 17.99082                  | 0.0604         | 8.142906   |
| Std. Dev.    | 0.00045       | 0.309986                  | 0.016767       | 0.147393   |
| Skewness     | 0.565428      | -0.303402                 | 0.812546       | 0.805481   |
| Kurtosis     | 3.75939       | 2.241703                  | 2.430549       | 3.953217   |
| Jarque-Bera  | 4.638769      | 2.358067                  | 7.41299        | 8.759559   |
| Probability  | 0.098334      | 0.307576                  | 0.024563       | 0.012528   |
| Observations | 60            | 60                        | 60             | 60         |

Table 1a: Descriptive Statistics – Bangladesh.

|                           | Exchange rate | Foreign direct investment | Inflation rate | DSE return |
|---------------------------|---------------|---------------------------|----------------|------------|
| Exchange rate             | 1             |                           |                |            |
| Foreign direct investment | -0.21347767   | 1                         |                |            |
| Inflation rate            | 0.174749013   | -0.686011136              | 1              |            |
| DSE return                | 0.593849407   | -0.459728395              | 0.474345574    | 1          |

Table 1b: Pearson's Correlation – Bangladesh.

| Dependent variable: DSE return |             |                       |             |           |
|--------------------------------|-------------|-----------------------|-------------|-----------|
| Method: Least squares          |             |                       |             |           |
| Included observations: 60      |             |                       |             |           |
| Variable                       | Coefficient | Std. Error            | t-Statistic | Prob.     |
| C                              | 7.556957    | 1.325053              | 5.703135    | 0.0000    |
| Exchange rate                  | 167.6414    | 31.47736              | 5.325776    | 0.0000    |
| Foreign direct investment      | -0.077662   | 0.061772              | -1.257241   | 0.2139    |
| Inflation rate                 | 2.399347    | 1.13311               | 2.117489    | 0.0387    |
| R-squared                      | 0.508187    | Mean dependent var    |             | 8.454     |
| Adjusted R-squared             | 0.48184     | S.D. dependent var    |             | 0.147393  |
| S.E. of regression             | 0.106098    | Akaike info criterion |             | -1.584563 |
| Sum squared resid              | 0.630382    | Schwarz criterion     |             | -1.44494  |
| Log likelihood                 | 51.5369     | Hannan-Quinn criter.  |             | -1.529949 |
| F-statistic                    | 19.28817    | Durbin-Watson stat    |             | 1.814374  |
| Prob(F-statistic)              | 0.000000    |                       |             |           |

Table 1c: Regression equation – Bangladesh.

|              | KSE return | Exchange rate | Foreign direct investment | Inflation rate |
|--------------|------------|---------------|---------------------------|----------------|
| Mean         | 9.92268    | 0.010339      | 19.0503                   | 0.078317       |
| Median       | 9.990943   | 0.010159      | 19.00153                  | 0.0815         |
| Maximum      | 10.48407   | 0.011821      | 20.69615                  | 0.1390         |
| Minimum      | 9.312046   | 0.009226      | 18.42233                  | 0.0130         |
| Std. Dev.    | 0.407926   | 0.000749      | 0.39555                   | 0.034593       |
| Skewness     | -0.121256  | 0.609938      | 2.102246                  | -0.274622      |
| Kurtosis     | 1.446991   | 2.114014      | 8.87086                   | 2.098091       |
| Jarque-Bera  | 6.176624   | 5.682669      | 130.3619                  | 2.787775       |
| Probability  | 0.045579   | 0.058348      | 0                         | 0.248109       |
| Observations | 60         | 60            | 60                        | 60             |

Table 2a: Descriptive statistics – Pakistan.

rate is positive reason behind if increase one unit in inflation rates the independent variable than 2.3993 unit changes in Dhaka stock exchange return the dependent variable or if increase one percent inflation leads to a 2.3993% change in DSE return with all others constant [14].

**Standard errors:** This reports the “estimated” standard errors of the coefficient estimates and measures the statistical reliability of the coefficient estimates, the larger the standard errors of exchange rate is 31.47, that are the more statistical noise in the estimates. And foreign direct Investment standard errors are 0.0617 and inflation standard errors 1.1331 both are normally distributed.

**T-statistics:** The T-ratio checks the individual significance of the regression coefficient with the help of degree of freedom following formula:

Degree of freedom=Total number of observation – Total number of (independent) variables

Degree of freedom=60 – 3

T-calculated value of exchange rate 5.32, FDI -1.25, and Inflation 2.11, all these probability values of exchange rate and inflation rate are statistical significant which are less than 0.05 except FDI insignificant which value is 0.21.

**F-statistics:** The Frequency of distribution statistics use to whole model significance/insignificance. The probability values of F-statistics 0.00 show that model is good fit and statistical significance.

**Coefficient of determination:** The R<sup>2</sup> value show that 0.5081% variation in the all independent variable has explained by Dhaka stock exchange. Therefore, the semi strong relationship survives between independent variables and dependent variable in stock return explained

by the variation in the independent. And the adjusted R<sup>2</sup> show if add a relevant independent variable in regression equation than R<sup>2</sup> will adjust by 0.4818%.

**Serial correlation:** The Durbin-Watson statistics result show there are no auto-correlation exist among all independent variables by the value 1.8143 is nearest to 2 values.

#### Pakistan

**Discussion:** Pearson’s correlations show the value -0.8727 strong (negative) relationships exists between KSE return and exchange rate. KSE return and FDI relationships are a weak uphill (positive) linear relationship by 0.1137 values. The value -0.8350 show strong negative relationships exist between the KSE return and inflation. Lowest (negative) linear relationship exists between exchange rate and FDI by values -0.0613. There are strong (positive) linear relationships exist by -0.7468 between the exchange rate and inflation. A Weak downhill (negative) linear relationship exists between FDI and inflation by values -0.0481 (Tables 2a-2c).

**Coefficient values:** In regression; equitation exchange rate, FDI and inflation are independent variables coefficient measure the marginal contribution to independent variables of KSE return the dependent variable. The value 12.2905 is y-intercept the constant term in above regression equation. The relationship between KSE return and exchange rate is negative for the reason that if increase one unit in exchange rate the independent variable than -304.9161 unit change in Karachi stock exchange return the dependent variable or if one percent increase in exchange rate independent variable leads to a -304.9161% changes in KSE return the dependent variables with all others constant. FDI and KSE return relationship is positive because that if increase

|                           | KSE return  | Exchange rate | Foreign direct investment | Inflation rate |
|---------------------------|-------------|---------------|---------------------------|----------------|
| KSE return                | 1           |               |                           |                |
| Exchange rate             | -0.8727412  | 1             |                           |                |
| Foreign direct investment | 0.113722849 | -0.06137314   | 1                         |                |
| Inflation rate            | -0.83501357 | 0.746875341   | -0.048195326              | 1              |

Table 2b: Pearson's correlation – Pakistan.

| Dependent variable: KSE return |             |                       |             |           |
|--------------------------------|-------------|-----------------------|-------------|-----------|
| Method: Least squares          |             |                       |             |           |
| Included observations: 60      |             |                       |             |           |
| Variable                       | Coefficient | Std. Error            | t-Statistic | Prob.     |
| C                              | 12.2905     | 1.138453              | 10.79579    | 0.0000    |
| Exchange rate                  | -304.9161   | 43.65835              | -6.984142   | 0.0000    |
| Foreign direct investment      | 0.061267    | 0.055042              | 1.113091    | 0.2704    |
| Inflation rate                 | -4.881537   | 0.944696              | -5.167311   | 0.0000    |
| R-squared                      | 0.841083    | Mean dependent var    |             | 9.92268   |
| Adjusted R-squared             | 0.832569    | S.D. dependent var    |             | 0.407926  |
| S.E. of regression             | 0.166916    | Akaike info criterion |             | -0.678307 |
| Sum squared resid              | 1.560221    | Schwarz criterion     |             | -0.538684 |
| Log likelihood                 | 24.3492     | Hannan-Quinn criter.  |             | -0.623693 |
| F-statistic                    | 98.79486    | Durbin-Watson stat    |             | 1.300893  |
| Prob (F-statistic)             | 0.000000    |                       |             |           |

Table 2c: Regression equation – Pakistan.

one unit in FDI the independent variable than 0.0612 unit change in KSE return the dependent variable or if value of FDI increase one percent the KSE return will change 0.0612% with all others constant. The relationship between KSE and inflation is negative reason behind if increase one unit in inflation the independent variable than -4.8815 unit changes in KSE the dependent variable or if increase one percent inflation leads to a -4.8815% change in KSE with all others constant [15].

**Standard errors:** This reports the “estimated” standard errors of the coefficient estimates and measures the statistical reliability of the coefficient estimates, the larger the standard errors of exchange rate is 43.6583, that are more statistical noise in the estimates. And FDI standard errors are 0.0550 and inflation standard errors 0.9446 both are normally distributed.

**T-statistics:** The T-ratio checks the individual significance of the regression coefficient with the help of degree of freedom following formula:

Degree of freedom=Total number of observation – Total number of (independent) variables

Degree of freedom=60 – 3

T-calculated value of exchange rate -6.98, FDI 1.11, and Inflation -5.16, all these probability values of exchange rate and inflation are statistical significant which are less than 0.05 except FDI not significant which is 0.2704.

**F-statistics:** The Frequency of distribution statistics use to whole model significance/insignificance. The probability values of F-statistics 0.00 show that model is good fit and statistical significance.

**Coefficient of determination:** The R<sup>2</sup> value show that 0.8410% variation in the all independent variable has explained by KSE the dependent variable. Therefore, the strong relationship survives between independent variables and dependent variable in stock return

explained by the variation in the independent. And the adjusted R<sup>2</sup> show if add a relevant independent variable in regression equation than R<sup>2</sup> will adjust by 0.8325%.

**Serial correlation:** The Durbin-Watson statistics result show there are no auto-correlation exist among all independent variables by the value 1.3008 is near to 2 values.

### Sri Lanka

**Discussion:** The value 0.1769 weak uphill (positive) relationships exist between Colombo stock exchange return and exchange rate. Colombo stock exchange return and FDI relationship are a weak downhill (negative) linear relationship by -0.4925 values [16]. The value -0.5548 shows that moderate negative relationships exist between Colombo stock exchange return and inflation. Weak uphill (positive) linear relationship exists between exchange rate and FDI by values 0.3207. There are weak uphill (positive) linear relationships exist by -0.3894 between the exchange rate and inflation. A Moderate uphill (positive) linear relationship exists between FDI and inflation rate by values 0.5757 (Tables 3a-3c).

**Coefficient values:** In regression equation; exchange rate, FDI and inflation are independent variables coefficient measure the marginal contribution to independent variables of Colombo Stock exchange return the dependent variable. The value 10.3214 is y-intercept the constant term in above regression equation. The relationship between Colombo Stock exchange return and exchange rate is positive for the reason that if increase one unit in exchange rate the independent variable than 97.3937 unit change in Colombo stock exchange the dependent variable or if one percent increase in exchange rate independent variable leads to a 97.3937% changes in Colombo stock exchange return the dependent variables with all others constant. FDI and Colombo stock exchange return relationship is negative because that if increase one unit in FDI the independent variable than -0.1231

|              | CSE return | Exchange rate | Foreign direct investment | Inflation rate |
|--------------|------------|---------------|---------------------------|----------------|
| Mean         | 8.755361   | 0.007915      | 18.05582                  | 0.050867       |
| Median       | 8.746922   | 0.007669      | 18.07664                  | 0.0530         |
| Maximum      | 8.961617   | 0.009141      | 18.7497                   | 0.0980         |
| Minimum      | 8.483047   | 0.006961      | 17.30807                  | -0.0030        |
| Std. Dev.    | 0.120998   | 0.000622      | 0.3256                    | 0.030177       |
| Skewness     | -0.343477  | 1.009343      | -0.275662                 | -0.195125      |
| Kurtosis     | 2.096953   | 2.731231      | 2.787345                  | 2.027966       |
| Jarque-Bera  | 3.218502   | 10.36833      | 0.872953                  | 2.742862       |
| Probability  | 0.200037   | 0.005605      | 0.64631                   | 0.253744       |
| Observations | 60         | 60            | 60                        | 60             |

Table 3a: Descriptive statistics - Sri Lanka.

|                           | CSE return  | Exchange rate | Foreign direct investment | Inflation rate |
|---------------------------|-------------|---------------|---------------------------|----------------|
| CSE return                | 1           |               |                           |                |
| Exchange rate             | 0.176992437 | 1             |                           |                |
| Foreign direct investment | -0.49256263 | 0.320764223   | 1                         |                |
| Inflation rate            | -0.55488047 | 0.389415017   | 0.57573718                | 1              |

Table 3b: Pearson's correlation - Sri Lanka.

| Dependent variable: CSE return |             |            |                       |           |
|--------------------------------|-------------|------------|-----------------------|-----------|
| Method: Least squares          |             |            |                       |           |
| Included observations: 60      |             |            |                       |           |
| Variable                       | Coefficient | Std. Error | t-Statistic           | Prob.     |
| C                              | 10.32146    | 0.714903   | 14.43758              | 0.000     |
| Exchange rate                  | 97.39376    | 18.81565   | 5.17621               | 0.000     |
| Foreign direct investment      | -0.123114   | 0.040521   | -3.038246             | 0.0036    |
| Inflation rate                 | -2.242421   | 0.449608   | -4.987509             | 0.0000    |
| R-squared                      | 0.562184    |            | Mean dependent var    | 8.755361  |
| Adjusted R-squared             | 0.53873     |            | S.D. dependent var    | 0.120998  |
| S.E. of regression             | 0.082178    |            | Akaike info criterion | -2.095519 |
| Sum squared resid              | 0.37818     |            | Schwarz criterion     | -1.955896 |
| Log likelihood                 | 66.86557    |            | Hannan-Quinn criter.  | -2.040905 |
| F-statistic                    | 23.9692     |            | Durbin-Watson stat    | 1.450881  |
| Prob(F-statistic)              | 0.000000    |            |                       |           |

Table 3c: Regression equation - Sri Lanka.

unit change in Colombo stock exchange the dependent variable or if value of FDI increase one percent the Colombo stock exchange return will change -0.1231% with all others constant. Relationship between Colombo stock exchange and inflation is negative reason behind if increase one unit in inflation the independent variable than -2.2424 unit changes in Colombo stock exchange return the dependent variable or if increase one percent inflation rate leads to a -2.2424% change in Colombo stock exchange return with all others constant [17].

**Standard errors:** This reports the “estimated” standard errors of the coefficient estimates and measures the statistical reliability of the coefficient estimates, the larger the standard errors of exchange rate is 18.8156, that are the more statistical noise in the estimates. And FDI standard errors are 0.0405 and inflation standard errors 0.4496 both are normally distributed.

**T-statistics:** The T-ratio checks the individual significance of the regression coefficient with the help of degree of freedom following formula:

Degree of freedom=Total number of observation – Total number of (independent) variables

Degree of freedom=60 – 3

T-calculated value of exchange rate 5.1762, FDI -3.0382, and Inflation -4.9875, all these probability values of exchange rate, FDI and inflation are statistical significant which are less than 0.05.

**F-statistics:** The Frequency of distribution statistics use to whole model significance/insignificance. The probability values of F-statistics 0.00 show that model is good fit and statistical significance.

**Coefficient of determination:** The R<sup>2</sup> value show that 0.5621% variation in the all independent variable has explained by CSE return the dependent variable. Therefore, the semi strong relationship survives between independent variables and dependent variable in stock return explained by the variation in the independent. And the adjusted R<sup>2</sup> show if add a relevant independent variable in regression equation than R<sup>2</sup> will adjust by 0.5387%.

**Serial correlation:** The Durbin-Watson statistics result show there are no auto-correlation exist among all independent variables by the value 1.4508 is nearest to 2 values.

## Second group

### India

**Discussion:** The value -0.6836 moderate uphill (negative)

relationships exists between Bombay Stock exchange return and exchange rate. Bombay stock exchange return and FDI relationship are a weak uphill (positive) linear relationship by 0.3984 values. The value -0.7038 show moderate (negative) relationships exist between Bombay stock exchange return and inflation rate. Weak downhill (negative) linear relationship exists between exchange rate and FDI by values -0.1744. There are weak uphill (positive) linear relationships exist by 0.3695 exchange rate and inflation. A weak downhill (negative) linear relationship exists between FDI and inflation by values -0.3730 (Tables 4a-4c).

**Coefficient values:** In regression equation; exchange rate, FDI and inflation are independent variables coefficient measure the marginal contribution to independent variables of Bombay stock exchange return the dependent variable [18]. The value 9.7916 is y-intercept the constant term in above regression equation. The relationship between Bombay Stock exchange return and exchange rate is negative for the reason that if increase one unit in exchange rate the independent variable than -40.8124 unit change in Bombay stock exchange return the dependent variable or if one percent increase in exchange rate independent variable leads to a -40.8124% changes in Bombay stock exchange return the dependent variables with all others constant. FDI and Bombay stock exchange return relationship is negative because

that if increase one unit in FDI the independent variable than 0.0579 unit change in Bombay stock exchange return the dependent variable or if value of FDI increase one percent the Bombay stock exchange return will change 0.0579% with all others constant. Relationship between Bombay stock exchange return and inflation is negative reason behind if increase one unit in inflation the independent variable than -4.2272 unit changes in Bombay stock exchange return the dependent variable or if increase one percent inflation leads to a -4.2272% change in Bombay stock exchange return with all others constant.

**Standard Errors:** This reports the “estimated” standard errors of the coefficient estimates and measures the statistical reliability of the coefficient estimates, the larger the standard errors of exchange rate is 6.4195, that are the more statistical noise in the estimates. And FDI standard errors are 0.0322 and inflation standard errors 0.7224 both are normally distributed.

**T-statistics:** The T-ratio checks the individual significance of the regression coefficient with the help of degree of freedom following formula:

Degree of freedom=Total number of observation – Total number of (independent) variables

|              | BSE return | Exchange rate | Foreign direct investment | Inflation rate |
|--------------|------------|---------------|---------------------------|----------------|
| Mean         | 9.95828    | 0.017814      | 21.45834                  | 0.082687       |
| Median       | 9.87687    | 0.016845      | 21.42239                  | 0.08685        |
| Maximum      | 10.28261   | 0.022647      | 22.45598                  | 0.1206         |
| Minimum      | 9.645683   | 0.014967      | 20.76441                  | 0.0412         |
| Std. Dev.    | 0.191729   | 0.002277      | 0.454235                  | 0.021475       |
| Skewness     | 0.357043   | 0.779542      | 0.372631                  | -0.114911      |
| Kurtosis     | 1.677394   | 2.461388      | 2.264007                  | 1.858257       |
| Jarque-Bera  | 5.648019   | 6.802107      | 2.742752                  | 3.390987       |
| Probability  | 0.059367   | 0.033338      | 0.253758                  | 0.183509       |
| Observations | 60         | 60            | 60                        | 60             |

Table 4a: Descriptive statistics – India.

|                           | BSE return   | Exchange rate | Foreign direct investment | Inflation rate |
|---------------------------|--------------|---------------|---------------------------|----------------|
| BSE return                | 1            |               |                           |                |
| Exchange rate             | -0.683676738 | 1             |                           |                |
| Foreign direct investment | 0.398488585  | -0.174493804  | 1                         |                |
| Inflation rate            | -0.703815903 | 0.36950881    | -0.373071733              | 1              |

Table 4b: Pearson's correlation – India.

| Dependent variable: BSE return |             |            |                       |           |
|--------------------------------|-------------|------------|-----------------------|-----------|
| Method: Least squares          |             |            |                       |           |
| Included observations: 60      |             |            |                       |           |
| Variable                       | Coefficient | Std. Error | t-Statistic           | Prob.     |
| C                              | 9.791646    | 0.724788   | 13.50966              | 0.0000    |
| Exchange rate                  | -40.81247   | 6.419536   | -6.357541             | 0.0000    |
| Foreign direct investment      | 0.057935    | 0.032234   | 1.797292              | 0.0777    |
| Inflation rate                 | -4.227238   | 0.722486   | -5.85096              | 0.0000    |
| R-squared                      | 0.719366    |            | Mean dependent var    | 9.95828   |
| Adjusted R-squared             | 0.704332    |            | S.D. dependent var    | 0.191729  |
| S.E. of regression             | 0.104253    |            | Akaike info criterion | -1.619645 |
| Sum squared resid              | 0.608651    |            | Schwarz criterion     | -1.480022 |
| Log likelihood                 | 52.58936    |            | Hannan-Quinn criter.  | -1.565031 |
| F-statistic                    | 47.84935    |            | Durbin-Watson stat    | 1.49596   |
| Prob (F-statistic)             | 0.000000    |            |                       |           |

Table 4c: Regression equation – India.

Degree of freedom=60 – 3

T-calculated value of US\$ -6.3575, FDI 1.7972, and Inflation -5.8509, all these probability values of exchange rate and inflation rate are statistical significant which are less than 0.05 except FDI insignificant which value is 0.0777.

**F-statistics:** The Frequency of distribution statistics use to whole model significance/insignificance. The probability values of F-statistics 0.00 show that model is good fit and statistical significance.

**Coefficient of determination:** The R<sup>2</sup> value show that 0.7193% variation in the all independent variable has explained by Bombay stock exchange the dependent variable. Therefore, the strong relationship survives between independent variables and dependent variable in stock return explained by the variation in the independent. And the adjusted R<sup>2</sup> show if add a relevant independent variable in regression equation than R<sup>2</sup> will adjust by 0.7043%.

**Serial correlation:** The Durbin-Watson statistics result show there are no auto-correlation exist among all independent variables by the value 1.4959 is close to 2 values.

**China:**

**Discussion:** The value 0.1765 weak uphill (positive) relationships

exist between exchange rate and FDI. An exchange rate and inflation relationship are a moderate (negative) linear relationship by -0.5793 values. The value -0.2952 show weak downhill (negative) relationships exist between exchange rate and Chinghai stock market's return. Weak downhill (negative) linear relationship exists between FDI and inflation by values -0.1323 [19]. There are no (negative) linear relationships exist by -0.0081 between the FDI and Chinghai stock market's return. Weak downhill (positive) linear relationships exist between inflation and Chinghai stock market's return by values -0.1403 (Tables 5a-5c).

**Coefficient values:** Regression equitation; exchange rate, FDI and inflation are independent variables coefficient measure the marginal contribution to independent variables of Chinghai stock exchange return the dependent variable. The value 13.9009 is y-intercept the constant term in above regression equation. The relationship between Chinghai stock exchange return and exchange rate is negative for the reason that if increase one unit in exchange rate the independent variable than -38.2241 unit change in Chinghai stock exchange return the dependent variable or if one percent increase in exchange rate independent variable leads to a -38.2241% changes in Chinghai stock exchange return the dependent variables with all others constant. FDI and Chinghai stock exchange return relationship is positive because that if increase one unit in FDI the independent variable than 0.0091 unit

|              | Exchange rate | Foreign direct investment | Inflation rate | SSE return |
|--------------|---------------|---------------------------|----------------|------------|
| Mean         | 0.159582      | 24.67411                  | 0.028645       | 7.835439   |
| Median       | 0.160201      | 24.9359                   | 0.02365        | 7.767071   |
| Maximum      | 0.165188      | 25.56169                  | 0.0668         | 8.436361   |
| Minimum      | 0.151476      | 22.77739                  | 0.0074         | 7.590453   |
| Std. Dev.    | 0.003284      | 0.74544                   | 0.015462       | 0.219615   |
| Skewness     | -0.509814     | -1.024958                 | 1.105746       | 1.044612   |
| Kurtosis     | 2.62975       | 3.084451                  | 3.123505       | 3.210506   |
| Jarque-Bera  | 2.941819      | 10.52321                  | 12.26488       | 11.02293   |
| Probability  | 0.229716      | 0.005187                  | 0.002171       | 0.00404    |
| Observations | 60            | 60                        | 60             | 60         |

Table 5a: Descriptive Statistics – China.

|                           | Exchange rate | Foreign direct investment | Inflation rate | SSE return |
|---------------------------|---------------|---------------------------|----------------|------------|
| Exchange rate             | 1             |                           |                |            |
| Foreign direct investment | 0.176572383   | 1                         |                |            |
| Inflation rate            | -0.579364145  | -0.132392054              | 1              |            |
| SSE return                | -0.2952944    | -0.008145576              | -0.14038504    | 1          |

Table 5b: Pearson's Correlation – China.

| Dependent variable: SSE return |             |                       |             |           |
|--------------------------------|-------------|-----------------------|-------------|-----------|
| Method: Least squares          |             |                       |             |           |
| Included observations: 60      |             |                       |             |           |
| Variable                       | Coefficient | Std. Error            | t-Statistic | Prob.     |
| C                              | 13.90094    | 1.705537              | 8.150477    | 0.0000    |
| Exchange rate                  | -38.2241    | 9.669341              | -3.953124   | 0.0002    |
| Foreign direct investment      | 0.009101    | 0.035028              | 0.259827    | 0.7959    |
| Inflation rate                 | -6.639113   | 2.039259              | -3.25565    | 0.0019    |
| R-squared                      | 0.234151    | Mean dependent var    |             | 7.835439  |
| Adjusted R-squared             | 0.193123    | S.D. dependent var    |             | 0.219615  |
| S.E. of regression             | 0.197272    | Akaike info criterion |             | -0.344125 |
| Sum squared resid              | 2.179313    | Schwarz criterion     |             | -0.204502 |
| Log likelihood                 | 14.32374    | Hannan-Quinn criter.  |             | -0.28951  |
| F-statistic                    | 5.707148    | Durbin-Watson stat    |             | 1.20318   |
| Prob (F-statistic)             | 0.001759    |                       |             |           |

Table 5c: Regression Equation – China.



change in Chinghai stock exchange return the dependent variable or if value of FDI increase one percent the Chinghai stock exchange return will change 0.0091% with all others constant. Relationship between Chinghai stock exchange return and inflation is negative reason behind if increase one unit in inflation the independent variable than -6.6391 unit changes in Chinghai stock exchange return the dependent variable or if increase one percent inflation leads to a -6.6391% change in Chinghai stock exchange return with all others constant [20].

**Standard Errors:** This reports the “estimated” standard errors of the coefficient estimates and measures the statistical reliability of the coefficient estimates, the larger the standard errors of exchange rate which is 9.6693 that are the more statistical noise in the estimates. And FDI standard errors are 0.0350 and inflation standard errors 2.0392 both are normally distributed.

**T-statistics:** The T-ratio checks the individual significance of the regression coefficient with the help of degree of freedom following formula:

Degree of freedom = Total number of observation – Total number of (independent) variables

Degree of freedom = 60 – 3

T-calculated value of exchange rate -3.953, FDI 0.2598, and Inflation rate -3.255, all these probability values of exchange rate and inflation are statistical significant which are less than 0.05 except FDI insignificant which value is 0.7959.

**F-statistics:** The Frequency of distribution statistics use to whole model significance/insignificance. The probability values of F-statistics 0.0017 show that model is good fit and statistical significance.

**Coefficient of determination:** The  $R^2$  value show that 0.2341% variation in the all independent variable has explained by Chinghai stock exchange the dependent variable. Therefore, the semi strong relationship survives between independent variables and dependent variable in stock return explained by the variation in the independent. And the adjusted  $R^2$  show if add a relevant independent variable in regression equation than  $R^2$  will adjust by 0.1931%.

**Serials correlation:** The Durbin-Watson statistics result show there are no auto-correlation exist among all independent variables by the value 1.2031 is nearest to 2 values [21].

## Conclusion

In first group; exchange rates have (positive) significant influence on Dhaka stock exchange, Bangladesh and Colombo stock exchange, Sri Lanka while in Pakistan has (negative) significant influence on KSE return. Reason behind since 2011 exchange rates are in stable in Bangladesh as compare to other regional countries, in Sri Lanka the government decrease their currency value for encourage to investors and in Pakistan an artificial decline US\$ by new elected government. FDI has (negative) insignificant influence on Dhaka stock exchange return, Bangladesh. And in Pakistan (positive) insignificant influence on KSE return by FDI while in Sri Lanka (negative) significant influence on Colombo stock exchange return by FDI. Causes, better environment provided to foreign investors by a strong political elected government, in Pakistan political usability in same time and in Sri Lanka decline the foreign investment by Government's week policies. Inflation has (positive) significant influence on Dhaka stock exchange return, Bangladesh. And in Pakistan and Sri Lanka have (negative) significant influence on KSE return and Colombo stock exchange'

return by inflation. Because international commodities (i.e., crude oil and gold) prices were decline and its good impact on emerging importing countries like Bangladesh, Pakistan and Sri Lanka but the Governments of Pakistan and Sri Lanka didn't transfer these benefits to general public due to reduce/control their financial budget deficit. Overall in group one a same economic conditions (foreign reserves and financial control system etc.) exist with same nature of capitalism emerging economies have a higher value  $R^2$  explained by stock markets of Bangladesh, Pakistan and Sri Lanka and a better predict model of one term from another with fitness of statistical probability. Dhaka, Karachi and Colombo stock exchange take also influences by Chinghai stock exchange, China.

In second group; exchange rates have (negative) significant influence on Bombay stock exchange return, India, and Chinghai stock exchange return, China with almost same value. Reasons for, US\$ stable in India by strict policy of Government, in China an almost constant rate exist because Chinese exports goods are high to compare their imports goods and exchange didn't positively influence on both countries capital markets. FDI has (positive) insignificant influence on Bombay stock exchange return, India, and Chinghai stock exchange return, China with nominal differences. Causes for insignificant, a better facilitate to foreign investors and a stable background economic policies by their federal and stats Government with a strong political government system. Inflation has (negative) significant influence on Bombay stock exchange return, India, and Chinghai stock exchange return, China with nominal differences. Because, international trade commodities prices were reduce due to US\$ rates decline in international level and its negative impact on exporting countries like India and China. Overall in second group, a similar nature of large economies (domestic production via largest consumer markets) and similar economic conditions (gold reserves, foreign reserves & natural resources) exist with a value  $R^2$  explained by stock markets of India and China a better predict model of one term from another with fitness of its statistical probability. For India; China is IST largest trading partner in world, and for China; India is 10<sup>th</sup> largest trading partner in rest of world. The New York Stock Exchange (NYSE), United States of America has influences on rest of world especially in Bombay stock exchange return, India and Chinghai stock exchange return, China.

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