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International Influence on Stock Markets in Pakistan

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Abstract
Stock markets are one of essential tools to attract foreign investments. In the field of business finance stock market plays very important role; it provides a platform for business organization & investors. Volatility in stock market is because of both national & international factors like money supply, inflation, recession, exchange rate, foreign investment, migration of people and denominated of foreign currency. This study investigates the effect of international factors; exchange rate & foreign investment, on stock market of Pakistan. Statistical analysis showed direct relationship between stock markets and international factors. Using data from previous 25 years (i.e. 1990-2015), it is found that stock market is more vulnerable to exchange rates as compared to foreign investments.
Keywords: Exchange rate, foreign direct investment (FDI), Stock index prices
JEL classification: F10, F21, F31

Introduction

Research has countless importance in the field of business and finance, infact most of financial decisions are research based. Research will remove all the ambiguities regarding financing, investing & leveraging the business. Stock markets play a vital role in development of an economy. Strong and stable stock markets; with promising higher returns and lower risks, attract foreign investor. Performance of stock market is affected by number of national and international factors. But, international factors play leading role in effecting stock market. Exchange rate is one of international factor, and is defined, as "exchange rate between two currencies is the rate at which one currency will be exchanging for another. It is also regarded as the worth of one country's currency in terms of another currency". Another important international factor is foreign direct investment, which defined as "a component of a country's national financial accounts. Foreign direct investment is investment of foreign assets into domestic structures, equipment, and organizations. Foreign direct investment is that investment, which is made to serve the business interests of the investor in a company, which is in a different nation distinct from the investor's country of origin".

Before discussing causal relationship between international factors & stock market, there is a need to explain stock market & stock index prices. Stock market is the market in which shares are issued and traded either through exchanges or over-the-counter markets. Also known as the capital market, it is one of the most vital areas of a market economy as it provides companies with access to capital and investors with a slice of ownership in the company and the potential of gains based on the company's future performance. A stock market is an entity that provides services for stockbrokers and traders to trade stocks, bonds, and other securities. Stock market also provides facilities for issue and redemption of securities and other financial instruments, and capital events including the payment of income and dividends. Securities traded in stock market include shares issued by companies, unit trusts, derivatives, pooled investment products and bonds.

Cause and effect relationship between International factors (exchange rate & FDI) and stock index prices are calculated using descriptive, correlation & regression analysis based on previous 25 years data (1990-2015).

Literature review

Prasanna (2008), revealed the role of investment by the foreign institutions in listed companies in Bombay Stock exchange. He also examined the relationship between foreign institutional investments, firm's structure of ownership, financial and stock performance. He observed that foreign firms tend to invest in companies with majority of shares held by general public. They; generally, found that foreign firms avoid investments in companies which are usually followed by family hierarchy. For financial performance decision they suggested that share return and earning per share (EPS) are most common variable to promote investment decision. Foreign investments in capital markets are usually caused by stock market performance (Bhatia and Kishor, 2015). On another hand, it is also argued that capital market performance is enhanced with foreign institutional investments (FII) (Adam et al., 2016, Fang et al., 2016). Chakraborty (2007), investigated the causalities flow among stock market and FII. Chakraborty (2007), suggested that FIIs are more attracted by the stock returns in domestic country. The results further suggest that both, stock markets and FII have strong influence on one another. Clark and Berko (1997), also investigated the relationship between FIIs and stock market returns. They found that 1%

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percent increase in market capitalization; enhance 13% of FIIs in Mexican stock markets. While, Bansal and Pasricha (2009), found that opening stock markets to international investments have no significant effect on stock returns and market volatility. They argue that stock returns for Indian stock market (Bombay stock exchange) were relatively constant after opening to international investments. However, volatility of markets was considerably reduced .

Stock performance is much effected by the ownership of the beholding company (Huang and Shiu, 2009). Companies owned by foreign institutes reveal higher stock returns and attract further higher investments as compared to domestic companies. Theoretically, it is believed that FII boost domestic economic performance through stock markets. Literature also witnesses that during and after the financial turmoil, stock markets have performed better in emerging economies as compared to mature markets (Mukherjee et al., 2002). Even stock markets recovered quickly while mature markets were volatile to higher risk and lower returns. And, this was possible reason that stock markets in emerging economies attracted higher FIIs. (Mukherjee et al., 2002). Pal (2014), investigated stock market and FIIs effects on economic development of India. They found that FIIs in India had no significant effect on economic performance instead, certainty among Indian stock market was adversely effected by FIIs (Pal, 2014). Kumar (2007), on other hand, found that 18% of market capitalization in Indian stock markets is generated by FIIs. The results of Kumar (2007), further suggest that foreign investors tend to invest in firms with long-term comment of higher returns. Wang (2000), highlighted the benefits and risks associated with FIIs in Indonesian stock markets. They found that 25% of daily transactions; in capital markets of Indonesia, are associated with FIIs. But, these transactions have NO significant influence on market volatility. Choe et al. (1999), showed that foreign traders/investors have significantly NO effect on stock returns that can destabilize market. Their study consist on trade data from 1996 to 1997 for Korean stock markets. They also found that foreign investor lack interest in periods of crisis. While, for investigating the Amman stock market Al-Halalmeh and Sayah (2010), found that FDI has strong influence on stock prices. As foreign investors start investing in local stock, demand and price of that stock increase. On the other hand, Baker et al. (2009), argue that it is stock market valuation that attracts foreign investors.

Adjasi et al. (2008), investigated the relationship between exchange rate and stock market volatility for Ghana. They found positive relationship for short-run and negative relationship in long run. According to their results appreciation in local currency will reduce stock market returns for foreign investors in long run. While for short-run, stock market returns will increase as value of local currency rises against the foreign currency. Similar results were found by Asekome and Agbonkhese (2015), for stock exchanges in Nigeria. While, Kennedy and Nourzad (2016), found significant positive relationship between exchange rate and stock market volatilities for US stock markets.Dimitrova (2005), also found strong positive relationship between Euro-dollar exchange rate and stock prices in American stock markets. Bhattacharya (2012), Basabi and Jaydeep (2000), investigated causal relationship between trade balance, foreign reserves, exchange rates and stock prices in India. They found that exchange rate has no strong influence on stock prices. Theoretical evidence suggests positive nexus among exchange rates and stock market performance. Even during the periods of financial crises shocks suffered by the stock markets were due to exchange rate volatilities (Phylaktis and Ravazzolo, 2005).

The above literature suggests that stock markets are; somehow, affected by FDIs and exchange rates. However, impact of this influence varies from country to country. In Emerging economies exchange rate is negative impacts on stock prices thus demotivating FIIs in long run (Adjasi et al., 2008). While in much mature markets FDIs increase demands for domestic stocks, promising higher returns in future and increasing stock values (Fang et al., 2016). Ownership of the companies also plays an important role in attracting FDIs (Huang and Shiu, 2009). Pakistan is a developing country with more than 500 companies listed in KSE. These companies are both, publically and privately owned. In last two decades FDI in Pakistan has increased 6 folds and exchange rate against dollar has also shown sharp incline, causing depreciation in Pakistan domestic currency. Despite these facts, stock index (KSE-100) has increased sharply in last few years. Simultaneous increase in these variables suggests these variables move in similar direction and a positive relationship. But, how stock market in Pakistan is affected by exchange rate and FDI is still an open question.

Model and Hypothesis:

The literature witnesses that FDI and exchange rate tie a positive nexus with stock market indexes. A rise in any of them will shift stock index higher. Based of this empirical assumption following model was developed for this study. This model suggest that increase in levels of FDI or depreciation of domestic currency will increase stock prices in long run push stock market index higher and vice versa. This model is inspired from two studies. First, Phylaktis and Ravazzolo (2005), showing positive impact of local currency depreciation; i.e. increase in exchange rate with foreign currency, on stock markets. Second, Clark and Berko (1997), which confirm positive effect of FDI /FII on better performance of domestic stock markets. The boosted performance of stock markets further attracts investments from more institutions. So, based on this model simple hypothesis for this research could be;

H_0 = FDI and Exchange range have positive influence on stock market in Pakistan
H_1 = FDI and Exchange rate have negative impacts on KSE-100 index.

Variable Explanation and Proposed methodology:
We have used three variables. Karachi Stock Exchange 100-index (KSE-100)[1] as dependent and exchange rate (ExR) and foreign direct investment growth (FDI) as independent variables. As, per our model increase in FDI or exchange will rate shift stock index upward. Data for (KSE-100) is taken from the trading economics website where as data for ExR and FDI is extracted from World Bank. We have used exchange rate with US dollar, because most of international transaction in Pakistan are accomplished with US dollar. Also, data on FDI for this study is extracted in billions of US dollars. The data collected is time series for the time span of 26 years from 1990-2015. To overcome the problems of serial collinearity, heteroscedasticity and stationarity we transformed out data to natural logs. By applying natural logs problems of correlation and heteroscedasticity were somehow removed but data was still non-stationary at levels. After applying unit-roots and correlograms we found that data is stationary at first difference i.e. I(1) (results of tests are presented in next section). To estimate the influence of FDI and ExR on KSE we have used following equation;

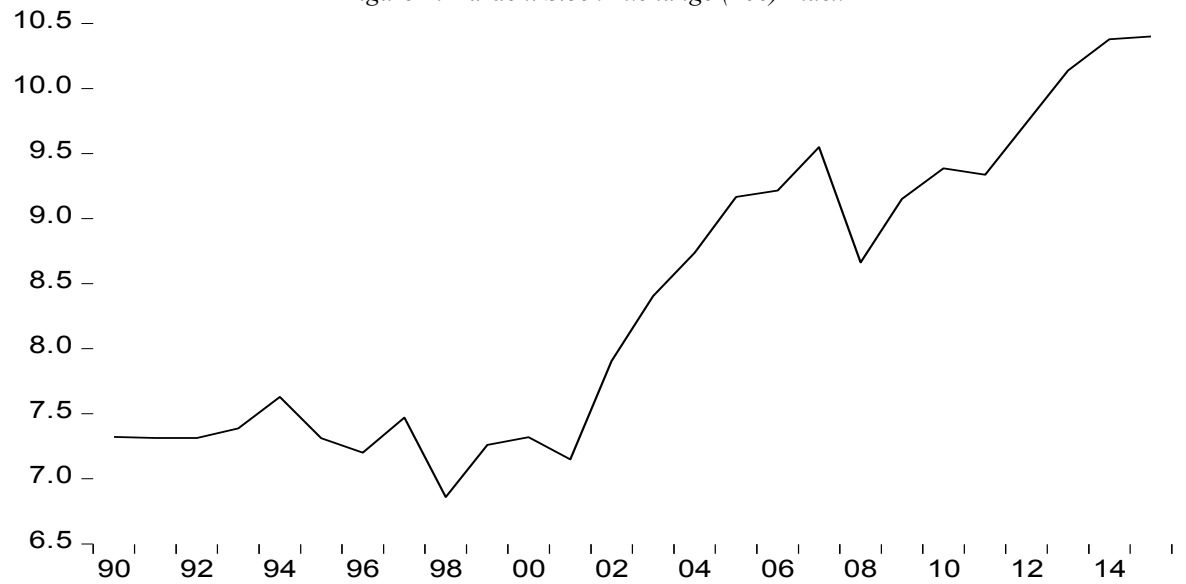
$$D(lnKSE) = \beta_0 + \beta_1\{D(lnFDI)\} + \beta_2\{D(lnExR)\} \quad (1)$$

Here, D represents first order difference. As, our data is I(1) we have used random-walk method to get first difference level of our data following Snopek (2012), and Hamilton (1994). Ln, denotes natural logarithm and β_0, β_1 and β_2 are constant and coefficients of FDI and ExR respectively.

Time Series and Descriptive analysis:
Evolution of selected variables over last 26 years is represented graphically in figure 1 to 3. Figure 1 represents LnKSE (100) whereas, figure 2 and 3 exhibit lnFDI and lnExR respectively.

[1] For this research we have used Karachi stock exchange; however there are few other stock markets is Pakistan as Lahor stock exchange and Islamabad stock exchange. Simple reason for using KSE to represent stock trade in Pakistan is KSE is the biggest stock market in Pakistan and, have enlisted all major industries of Pakistan. Recently name of KSE is also modified to Pakistan Stock exchange (PSE) represented all international trade through this platform.

Figure 1: Karachi Stock Exchange (100) Index

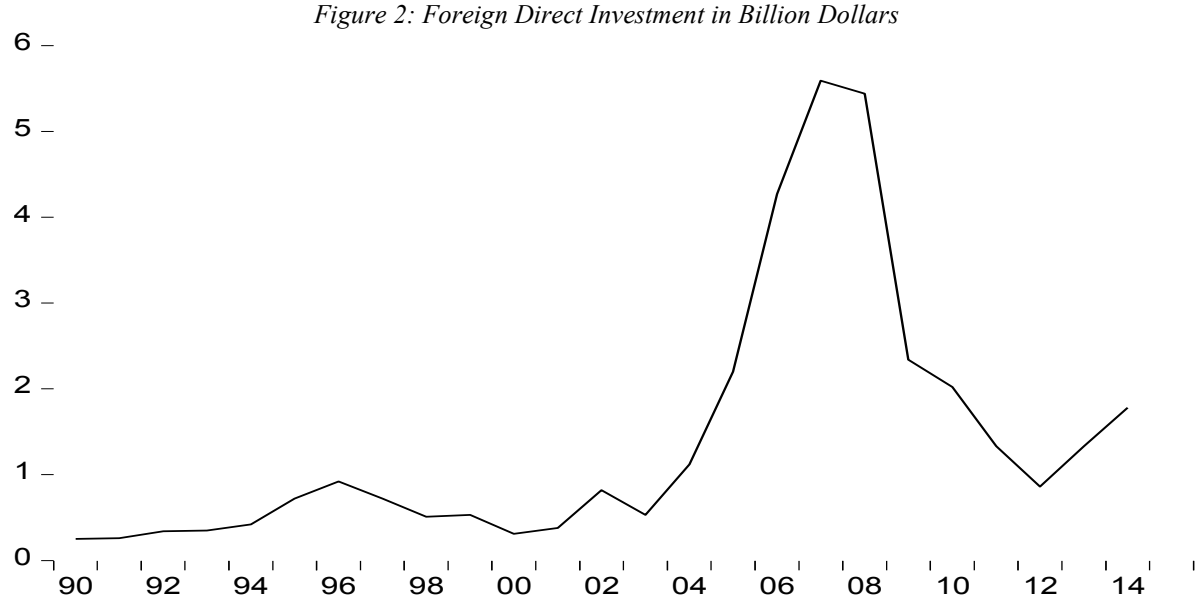


Source: Compiled by Authors

Above graph shows the trend of stock market volatilities in Pakistan over last two decades. In initial periods of our observation stock market in Pakistan have behaved quite smoothly but after year 2001, Stock market index has increased sharply followed by a small shock in year 2006-8. This downfall could possible be the reason of global financial crises. Carefull analysis of this graph show that similar shock was faced by KSE in year 1996-1998, these; again, were the years of asian financial crises. This shows that stock market is much affected by financial turmoils arround the world (this can be justified with another independent study/research). Overall in last two decades KSE has followed much of increasing trend, which is good for developing economies; if inflation is kept optimal (Anand et al., 2015, Anand et al., 2016). In last two decades KSE (100) has shown much fluctuations, ranging from index value of 952.0 (minimum) in year 1998 to maximum value of 32841 in 2015 with mean index value of 8102.2.

Figure 2 shows how foriegs institution have invested in Pakistan. Data is collected in billions of US dollars. Pakistani industries have not; so far, attrected much of foreign instititional investments. Due to several sociao political reseasons trade is Pakistan is always been much vulernable to risk of loosing investments. However, Pakistan is very rich in mineral and fertiliser resources that could have boosted internation trade. The graph shows that from year 2003 to 2007-8 FDI in Pakistan increased sharply, and after the global financial crises FDI again shrank to historical levels touching 0.86 billions US dollar; the lowest in the decade (i.e. from 2003 – 2012). In past three years FDI has increased some what promising good business opertunities in future.

Figure 2: Foreign Direct Investment in Billion Dollars

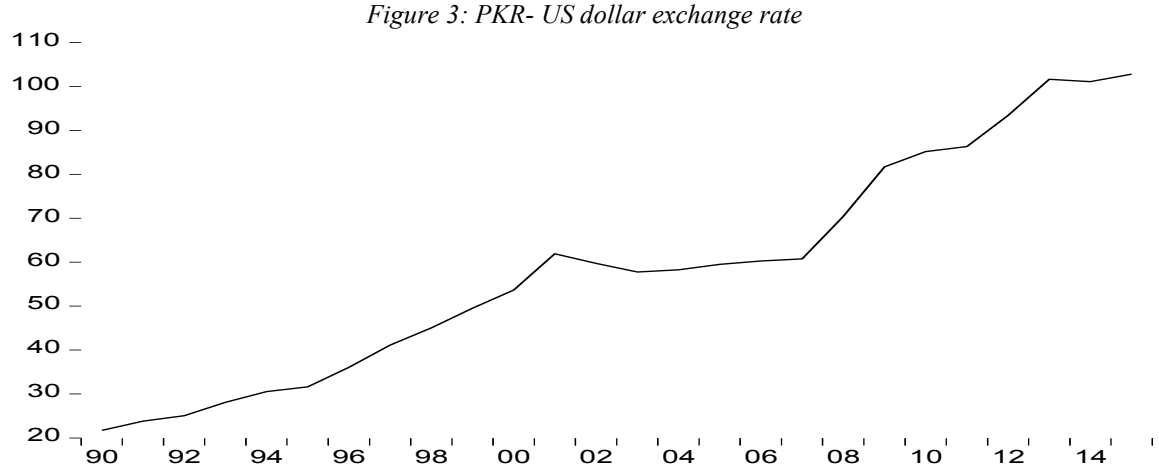


Source: Data extracted from World Bank, compiled by Author

FDI in Pakistan has been relatively less attractive, but the period from 2003-2007 and utill 2012 is considered as golden era of international trade in Pakistan so far. Higher FDIs in this era has stastical influence on economy of Pakistan as whole. For our analysis sample (26year) FDI averages 1.41 billion US dollars per year. Pakistan has enjoyed highest FDI in 2007 with amount of 5.59 US dollars followed by 5.44 billion dollars in 2008. After that FDI fell sharply touching less than 1 billion in 2013.

Pakistani Rupee (PKR) has always been vulernable to currency shocks. Since the independence of Pakistan PKR has much followed a decreasing trend. As, its clear from figure 3, exchange rate has increased over the time period exhibiting higher dollar prices againf PKR.

Figure 3: PKR- US dollar exchange rate



Source: Data extracted from World Bank, compiled by Author

Stationarity Analysis

We have used time series data for this study, and one major problem with time series data is issue of non-stationarity. i.e. most of time series data varies with time. However, it is true; in general, that data varies with time but non-stationarity property indicates that this variation in data is caused by time influence. To test the stationarity of data we have used "Augmented Dickey-Fuller" (ADF) unit root test and correlograms. Results from ADF unit root tests are presented in table 01.

As, it can be seen from table 01 that probability values for all chosen variables is greater than significance level (α=0.05). this indicates that all variables; at levels, contain unit root and using regression analysis with non-stationary elements may generate improper results. While at levels all the variables are significant (i.e. $p \leq 0.05$) meaning that these variables become stationary at first difference. This is why we have used 1st difference levels in equation on to estimate the international influence on stock market in Pakistan. Corrlograms for the variables are presented in appendices.

Table1: Stationarity Analysis

	At Levels				At First Differences			
Series: lnKSE, lnFDI, lnExR								
Method								
	Statistics	Prob**	Cross-Section	Obs	Statistics	Prob**	Cross-Section	Obs
	Null: Unit root (Assume common unit root process)							
Levin, lin and Chu t*	-1.3	0.0955	3	74	-6.44	0.0000	3	71
	Null: Unit root (Assume individual unit root proces)							
Im, Perasan & Shin W-stat	0.78	0.7842	3	74	-5.2	0.0000	3	71
ADF- Fisher Chi square	3.49	0.7451	3	74	34.98	0.0000	3	71
PP- Fisher Chi square	3.7	0.7150	3	74	34.8	0.0000	3	71
	**Probabilities for Fisher test are computed using a asymptotic Chi-square distribution. All other tests assume asymptotic normality.							

Source: Author's Own Calculations

Regression Analysis:

Main findings/results of this study are presented in table 02. The estimated equation for this analysis is

$$lnKSE = 3.1.3 + 1.32 * lnExR + 0.43 * lnFDI \quad (2)$$

The results suggest that Karachi stock market is more vulernable to exchage rate shocks than FDI. Increase in exchage rate means depriciation of local currency. Foreign investors who invest in dollars, require to be paid of in same foreign currency and when local currency depriciates against international currency, foreign investors; definitly, enjoy a higher comparative profit. Statistical analysis suggests that is model is 85% fit, indicationg that 72% varainces in dependent variable are caused by chosen idependant variables. Detailed summary of the results is presented below in table 02:

Table 2: Summary of Results

Variable	Coeficient	t-statistics	Probability
lnExR	1.32	3.82	0.0009
lnFDI	0.438	2.52	0.0192
C	3.10	2.43	0.035
R^2= 72% **$\overline{R^2}$= 70%**		F-Statistics 29.00* Durbin Waston Statistics 1.97	
*** significant at p ≤0 .01**			

Source: Author's own Calculations

Above table indicates positive influence of Exchange rate and FDI on stock market index in Pakistan. Increase in either one or both will shift stock prices high and vise versa. How ever stock prices are more vulernable to exchange rates as compaired to FDI. One percent rise in exchange rate with US dollar will boost KSE-100 index up by 1.32%. According to results this relationship is significant at $p \leq 0.01$. Where as, FDI also has postive nexus with KSE-100 where one percent rise in FDI will cause an increase of 0.43% in stock market index in Pakistan. Further values of R-squared and adjusted R-squared show the fitness of model. According to these results our model is 70% fit. F-statistics and Durbin Waston Statistics show the colinearity among chosen variables. The results from analysis exhibit very smaal evidence of serial colinearity amoung variables.

Conclusions

This study aimed to investigates the international influence on stock markets in Pakistan. Karachi stock exchange is the largest stock market in Pakistan and enlists most of major industries in Pakistan. KSE is attrackts more than 80% FII in stock markets in all over Pakistan and represents international trade in Pakistan. Recently, name of KSE has been changed to Pakistan stock exchange (PSE). In this study, we used time series data for last 26 years. We first checked stationarity properties of data and transformed the data to natural log to reduce the problems of serial corelation and heteroskedasticity then we estimated least square regression at first diference to see the effect of exchange rate and FDI on KSE-100. We found that KSE-100 is positively related to exchange rate and FDIs. However, magnitide of exchage rate is bit higher that FDIs.

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Appendices: (A) Correlograms for Variables

At Levels

lnKSE(100)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |****** |	. |****** |	1	0.868	0.868	21.962	0.000
. |***** |	. | . |	2	0.745	-0.037	38.801	0.000
. |**** |	. *| . |	3	0.619	-0.082	50.922	0.000
. |**** |	. *| . |	4	0.486	-0.106	58.734	0.000
. |*** |	. |* . |	5	0.403	0.118	64.374	0.000
. |**. |	. *| . |	6	0.306	-0.116	67.776	0.000
. |**. |	. | . |	7	0.230	0.008	69.797	0.000
. |* . |	. | . |	8	0.179	0.035	71.100	0.000
. | . |	***| . |	9	0.040	-0.397	71.167	0.000
. | . |	. | . |	10	-0.063	0.019	71.347	0.000
. *| . |	.**| . |	11	-0.204	-0.262	73.358	0.000
.**| . |	. | . |	12	-0.323	-0.010	78.777	0.000

lnExR

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |****** |	. |****** |	1	0.875	0.875	22.304	0.000
. |***** |	. *| . |	2	0.746	-0.085	39.183	0.000
. |**** |	. *| . |	3	0.609	-0.107	50.920	0.000
. |*** |	. | . |	4	0.483	-0.034	58.654	0.000
. |*** |	. | . |	5	0.364	-0.057	63.257	0.000
. |**. |	. *| . |	6	0.241	-0.112	65.366	0.000
. |* . |	. | . |	7	0.138	-0.008	66.092	0.000
. | . |	. | . |	8	0.063	0.035	66.253	0.000
. | . |	. | . |	9	0.009	-0.000	66.257	0.000
. | . |	. | . |	10	-0.037	-0.039	66.319	0.000
. *| . |	. | . |	11	-0.076	-0.028	66.596	0.000
. *| . |	. | . |	12	-0.097	0.014	67.086	0.000

lnFDI

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |****** |	. |****** |	1	0.836	0.836	19.665	0.000
. |***** |	.**| . |	2	0.632	-0.224	31.386	0.000
. |*** |	. *| . |	3	0.439	-0.071	37.308	0.000
. |**. |	.**| . |	4	0.214	-0.260	38.777	0.000
. | . |	. |* . |	5	0.058	0.103	38.892	0.000
. | . |	. |* . |	6	0.014	0.189	38.899	0.000
. | . |	. *| . |	7	-0.016	-0.073	38.909	0.000
. | . |	. | . |	8	-0.011	0.013	38.914	0.000
. | . |	. *| . |	9	-0.002	-0.113	38.914	0.000
. | . |	. | . |	10	-0.023	-0.031	38.938	0.000
. *| . |	. *| . |	11	-0.077	-0.107	39.225	0.000
. *| . |	. *| . |	12	-0.148	-0.088	40.369	0.000

At 1st Difference

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. *| . |	. *| . |	1	-0.201	-0.201	1.1369	0.286
. | . |	. | . |	2	0.066	0.026	1.2639	0.532
. |**. |	. |**. |	3	0.249	0.279	3.1683	0.366
.**| . |	. *| . |	4	-0.281	-0.203	5.7084	0.222
. *| . |	.**| . |	5	-0.084	-0.243	5.9465	0.311
.**| . |	***| . |	6	-0.219	-0.364	7.6521	0.265
. | . |	. |* . |	7	0.051	0.127	7.7512	0.355
. | . |	. |**. |	8	0.025	0.229	7.7758	0.456
. *| . |	. *| . |	9	-0.163	-0.116	8.9028	0.446
. |**. |	. | . |	10	0.333	0.017	13.890	0.178
. *| . |	. *| . |	11	-0.121	-0.169	14.591	0.202
. | . |	. | . |	12	-0.031	-0.040	14.640	0.262

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |**. |	. |**. |	1	0.313	0.313	2.7535	0.097
. *| . |	.**| . |	2	-0.093	-0.212	3.0073	0.222
. |* . |	. |* . |	3	0.079	0.210	3.2002	0.362
. |* . |	. | . |	4	0.142	0.019	3.8462	0.427
. *| . |	.**| . |	5	-0.200	-0.272	5.1977	0.392
****| . |	****| . |	6	-0.589	-0.504	17.537	0.008
. *| . |	. |**. |	7	-0.092	0.298	17.851	0.013
. |* . |	. |* . |	8	0.197	0.087	19.389	0.013
. | . |	. | . |	9	-0.052	0.008	19.506	0.021
. *| . |	. | . |	10	-0.079	0.038	19.786	0.031
. |* . |	. *| . |	11	0.089	-0.205	20.166	0.043
. |**. |	. *| . |	12	0.244	-0.090	23.251	0.026

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |* . |	. |* . |	1	0.210	0.210	1.1919	0.275
. | . |	. | . |	2	0.069	0.027	1.3283	0.515
. | . |	. | . |	3	0.065	0.048	1.4547	0.693
***| . |	***| . |	4	-0.368	-0.411	5.6716	0.225
***| . |	.**| . |	5	-0.407	-0.315	11.114	0.049
. *| . |	. | . |	6	-0.164	-0.030	12.046	0.061
.**| . |	. *| . |	7	-0.279	-0.197	14.905	0.037
. *| . |	. *| . |	8	-0.130	-0.192	15.568	0.049
. |* . |	. | . |	9	0.206	0.014	17.338	0.044
. | . |	. *| . |	10	0.065	-0.149	17.523	0.064
. |**. |	. | . |	11	0.226	0.033	19.979	0.046
. |**. |	. | . |	12	0.261	-0.049	23.512	0.024

(B) Descriptive (Raw Data)

Table 3: Descriptive Statitics for Raw data

	KSE (100)	EXCHANGERATE	FDI (Billion Dollars)
Mean	7112.483	56.97040	1.413600
Median	2709.130	58.26000	0.820000
Maximum	32148.65	101.6300	5.590000
Minimum	952.4200	21.71000	0.250000
Std. Dev.	8087.412	24.33753	1.532655
Skewness	1.684072	0.301700	1.779931
Kurtosis	5.343587	2.100275	5.091865
Jarque-Bera	17.53833	1.222496	17.75886
Probability	0.000155	0.542673	0.000139
Sum	177812.1	1424.260	35.34000
Sum Sq. Dev.	1.57E+09	14215.57	56.37678
Observations	25	25	25

Source: Author's own calculations

Table 4: Covariancce and Correlation Analysis

Covariance Correlation t-Statistic Probability	LNKSE	LNEX	LNFDID
LNKSE	1.154441		
	1.000000		

LNEX	0.393357	0.207742	
	0.803229	1.000000	
	6.466915	-----	
	0.0000	-----	
LNFDID	0.718853	0.268731	0.826206
	0.736055	0.648652	1.000000
	5.214770	4.087352	-----
	0.0000	0.0005	-----

Source: Compiled by Authors