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Effect of Exchange Rate Volatility on Foreign Direct Investment in Saarc Countries

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Abstract: There are many determinants of foreign direct investment but exchange rate is one of the important determinant. The main concern of this research is to inspect the effect of exchange rate volatility on foreign direct investment in SAARC countries which includes Pakistan, India and Sri Lanka. Time series data is used in this paper from 1981 to 2013 which is taken from the World Bank website. The research intends to estimate the impact of exchange rate volatility, real exchange rate, GDP per capita, trade openness and FDI with lag on foreign direct investment. The GMM technique is used to study the relation of these variables with FDI and unit root test is used to check at which level variables are stationary. The result shows that there is a negative relationship between exchange rate volatility and foreign direct investment for these countries and the results of all the other variables are according to our expectation and prior studies.

Key words: Exchange rate volatility · FDI · Time series Analysis · GMM

INTRODUCTION

Foreign direct investment (FDI) has turn into a basic factor of the world financial system. As of its durable nature, there is a prospective for FDI to create employment, lift productivity, shift technology, augment exports and put in to the long run financial growth of the developing countries in the world Reference [1]. Additionally, FDI is measured less prone to disaster as compared to short term credits and portfolio investments, because generally when investor investing in host country have long term standpoint [2,3]. The major advantages of foreign direct investment above other kids of capital inflows are that FDI become one of the essential parts of economic development strategies. That's why; developing countries are regularly advised to encourage FDI [4]. It must be noted that during financial crisis FDI has proved to be flexible such as between 1997 and 1998 in East Asian countries it was vital throughout the global financial crisis. FDI is the main cause of growth in developing countries. FDI is not only the source of investment but also the mechanism of technological advancement with lot of benefits arising from positive spillover effects.

Foreign direct investment has known as one of the major efficient way of attracting flows from exterior sources. For developing countries, the positive effect of FDI is becoming more and more accepted as a key for economic development [5].Among the robust benefits of adopting FDI is rise in collective output, enhanced service opportunities, increased depletion of exports and swap of technical expertise between the country and investors. FDI is supposed to attract into country due to some factors such as openness of economy, market size, taxes and political stability. Due to foreign direct investment, a developing country is able to create employment and exploit the natural and human capital, to adopt novel businesses strategies, for marketing and management and ease in lowering of budget discrepancy. Another benefit of FDI is that it adds value to the human resources by providing training on the job. Foreign direct investment can use as a tool of exchange of technology and knowledge [6]. There are few risks that need to be measured in any FDI and exchange rate volatility is one of them.

Exchange rate volatility is very important risk measure and refers to the appreciation and depreciation of foreign currencies in value. There is a deep and extensive consequences of exchange rate and have vital significance in assessing the economy's competitiveness are indisputable. In local and global circumstances the exchange rates are turn out to be very sensitive to little variation and demonstrate regular changes. In reply to several variations in interest rate expectations and wealth

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the financial assets can be modified by investors in order to gain reasonable portfolio as in short time period the exchange rates found to exceed their extensive balances[7]. In developing countries actual and financial breakdown are the main reasons for instability of exchange rates with global monetary assimilation as the major dynamic force hence economic liberalization must be followed gradually in these countries [8]. Exchange rate volatility can affect any business undertaking between two countries. Some investor or traders reinforce the volatile exchange rate because it can maximize their earnings but on the other hand many traders like the scheme in which inconsistency between the actual and expected value of exchange rate is lower down.

In many countries exchange rates are changing regularly since 1973, from the fall down of Breton woods system, the investors become confused that how they explain these fluctuation because of FDI rebellious action that initiate instability. FDI can be reduced as investment may delay because of this indecisive mode of investors. Thus it is significant to conclude that although exchange rate uncertainty of Pakistan has healthy association with FDI or not. Therefore, it is Significant to conclude whether there exist a healthy association between FDI and exchange rate volatility of Pakistan.

Objective of Study: The major concern of this paper is to analyze the effect of exchange rate volatility on FDI in SAARC countries (Pakistan, India and Srilanka) over the period of 1981 to 2013 and to study the relationship between exchange rate fluctuations and FDI.

Significance: Pakistan is one of the leading component of SAARC (South Asian Association for Regional Cooperation) which is blessed with enormous God gifted resources such as agriculture, human resource and mineral assets and trying to stabilize its position in the modern world. For its future development and expansion inflation and FDI plays most important role. FDI is supposed to be the developmental instrument, which helps in achieving self-sufficiency in different sectors and in whole development of the economy in India. Therefore this study helps to provide the information about the importance of foreign direct investment in country that how it will help in the development of economy, enhance the overall productivity and increase economic growth.

Literature Review: There are many studies which suggest that exchange rate has both the direct and indirect links with trade as it play very important role in country's trade level. The indirect link of the exchange rate is difficult to separate so that in models exchange rates are shown as exogenous variable [9]. The exchange rate is based on the tradable and non tradable goods. As compared to non-tradable goods the tradable goods sector has fastest output growth that is linked with fastest productivity growth. The relative price of tradable and non-tradable indicates the country's competitiveness in foreign trade [10]. In the literature there are many evidences which supports that there are both positive and negative relation of exchange rate fluctuations with FDI. Many studies recommended that the impact of exchange rate fluctuations on foreign direct investment is based on country's openness of economy. Reference [11] suggested that volatility in exchange rate has encouraging result for FDI with the economies that have lower level of openness but has discouraging result for relatively open economies.

Reference [12] propose political economic theory which states, the main source of FDI is MCN's which are attracted by countries that have prosperous democracy where to manage people and opposition governments do not use power and violent behavior. Reference [13] concluded that under certain level of exchange rate flexibility the exchange rate volatility is not main determinant for FDI but its investment relationship is vigorous if movements of exchange rates are extremely unstable. Reference [5] studies the effect of exchange rate volatility on FDI for many countries and use generalized method of moment technique and Fixed effect model. GARCH (1, 1) technique is used to calculate the volatility which results the negative relation of exchange rate instability on FDI. Reference [9] recognized a motivating effect of exchange rate instability upon FDI and the impact takes place with a lag. Reference [14] predicts that the major factor in determining the fluctuating exchange rate to FDI is the openness of country. Particularly, uncertainty in exchange rates has negative effect on more open economy and null effect on lower degree of openness of economies. Reference [15] found negative relation between exchange rate volatility and FDI in Pakistan. It is argued that the political and institutional factors are the main apprehension for external investors when volatility proceed with larger monetary variables and thus have effect on FDI. The political and institutional are the most important factors that affect investor's belief, which is also hampered by market failure and result in price and exchange rate instability. Reference [16] predicted the relationship between real exchange rate volatility and foreign direct investment, considering

various relationships between domestic and foreign production. He found that multinational firms reduce exports to the foreign country but offsets this by growing foreign capital and production because of exchange rate risk.

Reference [17] predicts that there is a receptive relationship between FDI and some variables which includes labour cost, trade openness, economic growth, exchange rates and tax. As all these variables have both the positive and negative impact on FDI according to various researches. In econometric studies, found by Reference [18]that market size is calculated by GDP or GDP per capita that appears to b the most vigorous determinant of FDI. As Schneider and Frey (1985), Tsai (1994) and Asiedu (2002) predict that there is a positive relation between these two variables. They dispute that in host country high level of GDP per capita involves superior projections for FDI. As Reference [11] analyzes that to find out FDI, there is a diverse indication about the significance of openness of economy that is frequently calculated by ratio of exports plus imports divided by GDP. Some researcher Reference [12] predicts a positive impact of trade openness on FDI whereas Schmitz and Bieri (1972) find an insignificant and positive impact.

Many research studies states that exchange rate uncertainty has negative effect on FDI. Reference [19] concluded that exchange rate inconsistency lower the foreign direct investment as it increases the business vagueness which results in producers' motivation to expand their durable investment. There are many determinants of FDI among them exchange rate is the valuable determinant. The link of FDI with exchange rate is measured as FDI will increase when the host country currency is appreciate where as with the depreciation of currency in host country the FDI will reduce. As Reference [14] states that according to this theory if a firm do investment to get high profit than appreciation in the currency of host country enhanced opportunity to raise the investment level. Reference [20] says that there is also one major factor which confines FDI is terrorism because it has great impact on the industrial and business sector of a country, no matter the terrorism is in religious form or other. Reference [18] in his study analyze that there are different kind of terrorism that effect Pakistan, as Reference [21] states that strategies, human resource and procedures of a business affected both externally and internally because of terrorism. Reference [22] in his research finds that due to political volatility the FDI reduces in Pakistan.

The relation of FDI with other variables based on prior studies [5, 23,] shows that GDP is positively related to FDI (Wang and Swain 1995; Billington 1999; Cheng 2000; Bensebaa 2005; Ying and Riming 2008; Walsh 2010; Jadhav 2012). Reference [24] find positive impact of exchange rate on FDI whereas Reference [11, 19] finds that exchange rate has negative effect on FDI. The Reference [6] (1991) research on the impact of exchange rate uncertainty on FDI and predict that there is insignificant impact of exchange rate uncertainty on the inflows of investment in US. Reference [15] examine that it is difficult or even not possible to forecast that investment increases as a result of decline in exchange rate uncertainty because it depends on the importance of investment, marginal profitability and marginal cost.

MATERIALS AND METHODS

In order to test our hypothesis we will obtain data of different variables for Pakistan, India and Sri Lanka. The time series data is used and sample covers the data over the period of 1972-2013. The period of 1972 to 1980 is sacrificed because of calculation of real exchange rate. Thus our estimation period is from 1981-2013. The analysis is based on the yearly data for all the variables which is collected from the World Bank website. We use world development indicators because it is reliable data source. We estimate the volatility in exchange rates and effect of exchange rate volatility on FDI in SAARC countries. Pakistan, India and Sri Lanka has been chosen because they are geographically located in the same region and also these countries faces the similar risks such as economic downturn and law and order issues.

Estimation Model: We will estimate following base line regression model for every country

$$FDIt = \alpha + \Phi 1RERt + \Phi 2EVOLt + \Phi 3TOPt + \Phi 4PGDCt + \Phi 5FDt\text{-}1 + {}^{o}t$$

Where FDIt is the foreign direct investment at time t and it is dependent variable so it is calculated as:

FDIt = ln (Fdi*Gdp

FDI is foreign direct investment, net inflows (%GDP) and Gdp is GDP (current US$). The independent variable real exchange rate at time t is mention by RERt. It is calculated as:

RER= ln (NEX* CU/ PI)

Where nominal exchange rate is denoted by NEX against US dollars and CU is the consumer price index (CPI) of USA and PI is the CPI of Pakistan, India and Sri Lanka. The independent variable EVOL is the volatility in exchange rate at time t. The exchange rate volatility is measured through GARCH (1,1) model by estimating the following equation:

$RERt = \alpha + \beta RERt\text{-}1 + \sigma t$

The result of this equation is obtained by GARCH variance series and it will be used as proxy for exchange rate volatility for respective country.

TOP is the trade openness at time t and this independent variable is measured by:

$$TOP = \frac{\text{Export + import}}{\text{GDP}}$$

PGDC is the per capita GDP and is used as a substitute of market size and it is calculated as

PGDC = ln (GDP)

Where FDt-1 is the foreign direct investment stock and it is independent variable. As we are dealing with time series data, we are encountering the problem of stationarity. This will be verified by conducting the unit root test. First all the variables will be made stationary then these stationary variables are used in regression analysis.

Estimation Technique: As it is evidence from our variables that we have the problem of indignity. In order to cure for indignity we will use the Generalized Method of Moments (GMM) technique of estimation to get robust results. The instruments for GMM will be the lag of dependent and independent variables under the condition that covariance between instruments and error term is equal to Z

RESULTS AND DISCUSSION

The stationarity level of all the variables is shown in Table 1. For Pakistan and India all variables are stationary at 1st difference but GDC and FDT of India are stationary at 2nd difference where as in case of Sri Lanka FDI, FDT and TO stationary at 1st diff, real exchange rate and GDC are stationary at 2nd difference but exchange rate volatility are stationary at the level.

Table 1: Unit Root Test

Pakistan	Intercept			Trend and Intercept			Intercept			Trend and Intercept			Intercept			Trend and Intercept		
India	---			---			---			---			---			---		
Sri Lanka	Level	1st Diff	2nd diff	Level	1st Diff	2nd diff	level	1st diff	2nd diff	level	1st diff	2nd diff	level	1st diff	2nd Diff	level	1st diff	2nd diff
ADF Statics	-1.17	-4.59	-7.44	-3.86	-4.6	-7.35	-0.82	-4.23	-7.49	-3.77	-4.25	-4.76	-0.96	-6.37	-6	-5.08	-6.31	-5.85
1%	-3.65	-3.66	-3.67	-4.3	-4.28	-4.29	-3.65	-3.71	-3.67	-4.27	-4.35	-4.39	-3.65	-3.67	-3.71	-4.28	-4.29	-4.35
FDI																		
5%	-2.95	-2.96	-2.96	-3.57	-3.56	-3.56	-2.95	-2.98	-2.96	-3.55	-3.59	-3.61	-2.95	-2.96	-2.98	-3.56	-3.56	-3.59
10%	-2.61	-2.61	-2.62	-3.22	-3.21	-3.22	-2.61	-2.62	-2.62	-3.21	-3.23	-3.24	-2.61	-2.62	-2.62	-3.21	-3.21	-3.23
ADF statics	-2.24	-4.38	-8.2	-1.84	-4.88	-8.13	-2.07	-4.43	-5.96	-0.73	-5.09	-5.87	-2.43	-3.24	-11.6	-5.56	-3.24	-11.5
1%	-3.66	-3.66	-3.67	-4.27	-4.28	-4.21	-3.65	-3.66	-3.67	-4.27	-4.28	-4.3	-3.68	-3.68	-3.68	-4.28	-4.32	-4.32
RER																		
5%	-2.96	-2.96	-2.96	-3.55	-3.56	-3.56	-2.95	-2.96	-2.96	-3.55	-3.56	-3.57	-2.97	-2.97	-2.97	-3.56	-3.58	-3.58
10%	-2.61	-2.61	-2.62	-3.21	-3.21	-3.22	-2.61	-2.61	-2.62	-3.21	-3.21	-3.22	-2.62	-2.62	-2.62	-3.21	-3.22	-3.22
ADF Statics	-3.93	-8.89	-9.4	-4.42	-8.93	-8.94	-2.27	-7.28	-7.64	-3.16	-7.21	-7.45	-5.6	-7.03	-4.64	-5.95	-4.33	-4.39
1%	-3.66	-3.67	-3.67	-4.28	-4.29	-4.3	-3.68	-3.66	-3.67	-4.32	-4.28	-4.3	-6.6	-3.67	-3.67	-4.27	-4.41	-8.07
				3.56														
EVOL																		
5%	-2.96	-2.96	-2.96	-3.21	-3.56	-3.57	-2.97	-2.96	-2.96	-3.58	-3.56	-3.57	-2.61	-2.96	-3	-3.55	-3.62	-3.25
10%	-2.61	-2.62	-2.62		-3.21	-3.22	-2.62	-2.61	-2.62	-3.22	-3.21	-3.22		-2.62	-2.64	-3.21	-3.24	
ADF Statics	-1.46	-4.55	-7.63	-3.62	-4.51	-7.55	-0.49	-4.29	-4.29	-3.68	-4.2	-4.4	-0.94	-6.27	-5.85	-4.32	-6.31	-5.85
1%	-3.65	-3.66	-3.67	-4.3	-4.28	-4.29	-3.71	-3.71	-3.73	-4.27	-4.35	-4.39	-6.6	-3.67	-3.71	-7.84	-4.29	-4.35
FD																		
5%	-2.95	-2.96	-2.96	-3.57	-3.56	-3.56	-2.98	-2.98	-2.99	-3.55	-3.59	-3.61	-2.61	-2.96	-2.98	-3.21	-3.56	-3.59
10%	-2.61	-2.61	-2.62	-3.22	-3.21	-3.21	-2.62	-2.62	-2.63	-3.21	-3.23	-3.24		-2.62	-2.62		-3.21	-3.23
ADF Statics	1.37	-4.29	-6.6	-1.43	-5.66	-6.48	-1.19	-4.93	-10.3	-1.16	-5.32	-10.2	2.01	-4.7	-7.73	-0.42	-5.29	-7.63
1%	-3.65	-3.66	-3.67	-4.27	-4.28	-4.3	-3.65	-3.66	-3.67	-4.27	-4.28	-4.29	-6.6	-3.66	-3.67	-4.27	-4.28	-4.3
PGDC																		
5%	-2.95	-2.96	-2.96	-3.55	-3.56	-3.57	-2.95	-2.96	-2.96	-3.55	-3.56	-3.56	-2.61	-2.96	-2.96	-3.55	-3.56	-3.57
10%	-2.61	-2.61	-2.62	-3.21	-3.21	-3.22	-2.61	-2.61	-2.62	-3.21	-3.21	-3.21		-2.61	-2.62	-3.21	-3.21	3.22
ADF Statics	-2.74	-8.47	-8.44	-2.98	-8.42	-8.28	0.64	-6.53	-3.78	-2.21	-4.4	3.74	-1.07	-4.87	-5.86	-1.12	-4.36	0.17
1%	-3.65	-3.66	-3.67	-4.27	-4.28	-4.3	-3.65	-3.66	-3.71	-4.27	-4.33	-4.35	-6.6	-3.66	-3.68	-4.27	-4.29	-4.41
TOP																		
5%	-2.95	-2.96	-2.96	-3.55	-3.56	-3.57	-2.95	-2.96	-2.98	-3.55	-3.58	-3.59	-2.61	-2.96	-2.97	-3.55	-3.56	-3.62
10%	-2.61	-2.61	-2.62	-3.21	-3.21	-3.22	-2.61	-2.61	-2.62	-3.21	-3.22	-3.23		-2.61	-2.62	-3.21	-3.21	-3.24

Table 2: Pakistan estimated results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RER	2.520041	0.448618	5.617346	0.0000
EVOL	-252.0398	109.4645	-2.302480	0.0307
FD	0.455877	0.096873	4.705897	0.0001
PGDC	0.999374	0.184769	5.408766	0.0000
TOP	16.41492	2.902531	5.655380	0.0000
C	-8.722579	2.159468	-4.039226	0.0005
Durbin-Watson stat		1.907346	J-statistic	4.737555

Table 3:India Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RER	1.468612	0.224159	6.551649	0.0000
EVOL	-42.96570	7.815461	-5.497526	0.0000
FD	0.499997	0.035644	14.02772	0.0000
PGDC	0.726189	0.293772	2.471943	0.0217
TOP	3.250946	0.768456	4.230491	0.0003
C	1.992788	1.659639	1.200736	0.2426
Durbin-Watson stat		2.012045	J-statistic	7.226478

Table 4: Sri Lanka Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RER	-1.095699	0.311958	-3.512326	0.0020
EVOL	-7.682595	3.604137	-2.131605	0.0445
FD	0.264088	0.106260	2.485305	0.0210
PGDC	1.109070	0.221432	5.008627	0.0001
TOP	2.285893	0.463402	4.932855	0.0001
C	13.74201	1.900616	7.230295	0.0000
Durbin-Watson stat		1.971788	J-statistic	6.453260

In the case of Pakistan the Table 2 results shows that exchange rate volatility which is the main variable of my study has negative and s ignificant impact on FDI. The same results are supported by Reference [5, 23 - 27]. As volatility can increase the exchange rate risk which can discourage the foreign direct investment. So exchange rates need to be stable to attract more FDI. Real exchange rate effect on FDI is positive and significant as it is important variable in determining the FDI. Reference [16, 24] also finds the same relationship between these two variables. This positive impact shows that the country currency appreciate this can increase the return on investment for foreign investor so that real exchange rate can attract FDI in the Pakistan. Trade openness is positively related to FDI and is significant. Other studies also proved the same result such as Reference [27] Culem (1988), Edwards (1990) Cevis and Camurdan (2007) finds the strong positive relation between trade and FDI. As openness to trade refers to the extent a country do trade with other country which includes both imports and exports to GDP. In developing countries the trade openness shows the degree to which country's borders has no restrictions on import and export, as it is favorable for encouraging foreign direct investment. So trade liberalization can attract more FDI. The FDI with lag has a positive relationship with FDI and is very significant. Reference [1] also confirmed the positive and significant effect on FDI. The lag is used to find out the long term impact of FDI. GDP per capita has positive relationship with the FDI and was significant. This relationship is in uniformity with Reference [14] Schneider and Frey (1985), Tsai (1994) and Asiedu (2002). GDP per capita is used as a substitute of market size and according to Reference [26] larger market size encourage the FDI in economy. This means it is strong determinant to enhance the FDI in country.

For India, the exchange rate volatility is negatively related and is significant as expected and it has important role in analyzing the FDI. The real exchange rate is significant and has positive impact on FDI which shows that it attracted the FDI in country. Reference [7,16] also predicts the significant positive relation between real exchange rate and FDI. This shows that the real exchange rate encourages the FDI in India. The GDP per capita and FDI with lag both are positively related to FDI and are significant as the same relation is confirmed by prior studies where as the openness of economy has positive and significant effect. Reference [14, 20] Ahmad and Malik (2009) and Demirhanand and Masca (2008) also proved the positive significant results [28].

In case of Sri Lanka the effect of volatility in exchange rate on FDI inflows is negative and insignificant as the same result was predicted by other researches. Exchange rate has negative impact on FDI and was significant. Reference [19, 20] has also found the negative and significant relationship. Which shows that foreign investor have lower return because of depreciation of currency in the country. So that real exchange rate can reduce the foreign direct investment in Sri Lanka as it is negatively impacting the FDI inflows. Per capita GDP and openness in trade both have positive impact on FDI and are highly significant. These results are consistent with [14, 24]. These two variables plays vital role in attracting the FDI in Sri Lanka. As increase in openness of economy can attracts more FDI this leads to economic growth, productivity and increasing output level. The FDI with lag are positively related with FDI and is significant [28].

CONCLUSION

This research project aims to evaluate the effect of exchange rate volatility on FDI in Pakistan, India and Sri Lanka for the period of 1981 to 2013. I examine that result for most of the variables are according to the prior researches. For these three countries the exchange rate volatility has negative significant impact on FDI. Therefore to attract more FDI in these countries the governments need to make policies such as monetary policy to maintain the stable exchange rates. In case of Pakistan and India the real exchange rate is positively impacted the FDI and it encourages FDI in these countries where as in case of Sri Lanka there is negative relation between these two variables so that real exchange rate in Sri Lanka discourages FDI. This is mainly analyzed that GDP per capita and Openness of economy are the main factors in these countries which can encourage more FDI. As these variables has strong positive relation with FDI. Trade liberalization and reduction in trade barriers have turn out to be the important economic policies in developing countries like Sri Lanka, Pakistan so on and play a vital role in attracting FDI. While GDP per capita is used as a proxy for market size which is important determinant of FDI shows that the FDI will start increasing where the countries have larger market size that utilized their resources efficiently and where firms can earn high profit on their investment.

In Pakistan, India and Sri Lanka, to motivate domestic economy, generate employments for growing population and searching for new technology foreign direct investment plays a crucial role. As there are opportunities for foreign investors in Pakistan but different risks such as terrorism and political instability are barriers in the progress of FDI.

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