Empirical Relationship between Foreign Direct Investment and Economic Output in South Asian Countries: A Study on Bangladesh, Pakistan and India

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Abstract

This paper examines co-integration and the causal relationship between Foreign Direct Investment (FDI) and the economic output or Gross Domestic Product (GDP) in the both short and long run of Bangladesh, Pakistan and India over the period of 1972-2008. Three econometric models, viz. Augmented Dickey-Fuller (ADF) test, Engle-Granger two-step co-integration test, Vector error correction mechanism (VECM) have been used. This study also used Granger Causality (GC) to find the directional relationship between FDI and GDP. The results suggest that there is no co-integration between FDI and GDP in the both long and short run in Bangladesh and India. However, we find the co-integration between them in the both short and long run in Pakistan. Conversely, GC results suggest that there is no causality relationship between GDP and FDI for Bangladesh and one way or unidirectional relationship found for Pakistan and India, which means FDI caused economic output in Pakistan.

Keywords: Foreign Direct Investment, Gross Domestic Product, Economic Output Augmented Dickey-Fuller, Stationarity, Co-integration, Vector Error Correction Mechanism (VECM), Engle-Granger causality

1. Introduction

Foreign Direct Investment (FDI) is generally considered to be an instrument of cash and non-cash inflow into the host countries from overseas. It plays a vital role to make substantial contribution in the economic growth of the developing countries. The main role of FDI in the economic growth is that it creates more benefits for the host countries rather than just full filling the short-term capital deficiency problem, (Borensztein et al. 1998). It is not only about investment, but also about transfer of technology, training, skills and other relevant materials. According to UNCTAD (2008), foreign direct investment has potentially involved to make employment, raise productivity, transfer technology and skills, enhance export and improve the economic conditions of developing countries. Moreover, the spill over effect of multinational companies (MNEs) provides high training and labour management that leads to economic benefits for recipient countries (Borensztein et al. 1998). The training to host country's suppliers by foreigners may increase high standard production and management standards (ibid). As a result, FDI is included in the central economic policies of the developing countries. The significance of FDI is undeniable because of an inability to make internal savings for local investments. Moreover, it is one of the effective ways for developing countries to have a good relationship with the rest of the world.

1.1 Overview of Recent FDI Inflows to South Asian Countries

The inflow of Foreign Direct Investment (FDI) increased rapidly in developing countries particularly in south Asia in the mid of 1980s. The trend of FDI is different for each of the south Asian countries depends on their respective

government's economic policy. There was an inflow of $0.83 billion in FDI during 1980-84 and the growth was measured 5.34 percent annually (Mortaza, et al 2007). According to ADB (2007) FDI inflows in the south Asia was about amounted $24.3 billion represented 132.9 percent higher than the year of 2005. According to Mortaza, et al (2007), India and Pakistan is the most favourable destination for FDI followed by Srilanka and Bangladesh among the south Asian countries.

1.1.1 India

India planned and henceforth implemented a socialist economy after the birth of it in 1947. System on export and import were very strict, and efficiency was a problem in each sector (ADB, 2007). In the late 1980s, the government eased up the economic policy, taken out the boundaries on FDI and consequently they achieved high economic growth among south Asia, (ibid). In 1991, Indian government announced a new industrial policy with a view to expand opportunities to the overseas investors to invest generously in India without any condition. Local companies were permitted to compete with foreign industries and they turned a closed economy into an open economy, (ADB, 2007). In recent years, India has become the highest FDI recipient country among south Asian countries due to their great service sector (Mortaza, et al 2007). In 2006, they received about $19.4 billion FDI, which was 80 percent of total FDI inflows to the region (ADB, 2007). According to Table 1, the annual FDI inflow amount was $17.79 million in 1972 that rose to $79.16 million in 1980. After 1991, FDI inflow gradually decreased for few years and then again increased until 2008.

Insert Table 1 Here

1.1.2 Pakistan

In 1947 when Pakistan gained independence, the average economic growth rate was higher than that of the world economy during the period. During the 1960s, Pakistan was thought to be a model of economic development around the world, and achieved much admires for its economic progression. Afterwards, economic mismanagement and imprudent economic policies caused a large volume of public debt which led to slower growth in the 1990s (Wikipedia, nd). In the last two decades, Pakistan Government realised the necessity of changing to their economic policy to compete globally. In the early of 1980s, government adopted market based economic policy and kept it until 1988. After that, government became very generous to the FDI by providing fair trade policy, fiscal incentives and tariff facilities to the foreign investors to make Pakistan the most attractive investment region (Aqueel and Nishat 2005). Since the mid of 1990s, FDI inflow increased significantly in Pakistan in the sectors of agriculture, telecommunications and energy. According to Table 1, Pakistan received higher FDI than other south Asian countries between the period of 1980 and 1994 followed by India and Bangladesh.

1.1.3 Bangladesh

Bangladesh has been turning into the most generous FDI recipient country in south Asia despite having a number of impediments, such as poor infrastructure, scarcity of power supply, political instability, redapism of bureaucrat, poor law and order situation etc. However, cheapest labour cost, tax holiday facilities etc. have been able to make the country a centre of attention of the overseas investors. Until the 1980s, Bangladesh was sceptical of the intentions of FDI and considered it as tools for promoting foreign interest. FDI inflows have risen during the period 1980-1990, and it went up about $1090 million in 2008, (UNCTAD 2008). The Board of Investments of Bangladesh has been playing a significant role to make Bangladesh the most favourable FDI region by offering convenient facilities and promotion of investments to the overseas investors. According to UNCTAD (2008), the sharpest rise in FDI inflows occurred during the period of 1995 -1997. In the fiscal year 1999-2000, Bangladesh became the most liberalized investment regime in the south Asian region (ibid, 2000).

1.2 Aims and Objectives of the Study

Over the last few years, the outstanding increase in FDI inflows in south Asian countries demands the analysis of the relationship between FDI and economic growth (Mortaza, et al 2007). That is why; policy makers have emphasised to determine the causal relationship between foreign direct investment (FDI) and economic output of the developing countries. Therefore, the purpose of this study is to examine the co-integration and causal relationship between FDI and GDP growth over the period of 1972-2008 among the selected south Asian countries.

The main objectives of this paper are to explore the following questions;

- What is the co-integration relationship between FDI and GDP in the both long and short run among three south Asian countries? And
- What is the direction of causality between FDI and GDP in those selected countries?

1.3 Hypothesis of the Study

The hypothesis of the study is described as follows:

$H_o: \delta = 0$ A Unit Root (Non-Stationary) = I (1)

$H_A: \delta \neq 0$ No Unit Root (Stationary) = I (0)

Where, H_0 defines null hypothesis and H_A defines the alternative hypothesis.

If the t-statistics value is negatively less than the critical values at 1%, 5% and 10% significance level, the null hypothesis can be rejected i.e. the series is stationary

1.4 Limitations of the Study

There are some considerable limitations identified of this study. These are as follows:

- Only two variables were used in this study so far. Therefore, the empirical relationship analysis was partial in the sense that if more number of variables were included, the study results would have been different.
- ·Only one model (Ordinary Least Square) was used to determine the co-integration relationship for both long and short run. There could have some impact on the result if other models used.
- All data was in 2000 US constant dollars in millions, however, exchange rate was not considered in this study.

2. Literature Review

The volume of FDI has been growing globally as double as the trade volume across the world (Meyer, 2003). The rapid growths of FDI inflows to the developing countries demands an analysis of the impact on economic output as the increase of FDI inflows makes huge impact on local economic growth and their productivity due to their extra facilities by getting better technologies and managerial skills. Therefore, the impact of FDI on economic output is vast.

There have been carried out a considerable number of studies on FDI and economic growth of various countries using different samples, methodologies and procedures. Most of the studies have found substantial positive causal relationship between FDI and economic growth with few exceptions where no significant impact suggested.

Rudra, et al. (2009) investigated the relationship between FDI and economic growth of five ASEAN over the period of 1970-2007 using co-integration and causality test in both individual and panel data level. Their result suggested that foreign direct investment and economic growth is co-integrated. They also estimated Granger causality with bi-directional causality between two series and explored there was a bi-directional Granger causality between GDP and economic growth for all countries except Malaysia. They stated that FDI is widely accepted as a vehicle for country's economic growth and it is most important in developing countries due to their inability to generate internal savings in response to their investment needs. The same result revealed in a study of Chakraborti and Basu, (2002) where they found from the co-integration test that FDI positively related with GDP that means they had long run relationship between two variables.

Mortaza, et al. (2007) carried out a study to scrutinize the relationship among FDI, trade liberalization and economic growth for five Asian countries over the period of 1980-2004 using panel data estimation. They explored a considerable positive relationship between FDI and economic growth. The study also examined the direction of causality among FDI, trade liberalization and economic growth using country specific data over the same period. They stated that FDI makes huge impact on local investment and trade liberalization along with FDI makes country's economic growth upward for Bangladesh and Pakistan. The same result suggested in a study of Li and Liu (2004) based on a panel data for 84 countries over the period of 1970-1999 using co-integration techniques where they found that FDI and human capital was directly responsible for promoting economic growth in developing countries.

Miankhel, et al. (2009) investigated time series data for six emerging countries of China, India, Mexico, Malaysia, Pakistan and Thailand over the period of 1970-2005 using vector error correction mechanism (VECM) to examine the relationship between export, FDI and GDP. Their result suggests that export drives the economic growth of Pakistan and FDI drives the economic growth of India. On the other hand, they find a short run relationship for Mexico and Chile but export affects FDI growth among Latin American countries in the long run. However, they explore bi-directional causality between GDP and FDI in Thailand while no causal relationship in Malaysia among East Asian countries.

Sridharan, et al. (2009), on the other hand, examined the causal relationship between FDI and economic growth of the BRICS countries over the different periods of selected countries based on the Johannes co-integration test and vector error correction model (VECM). They found co-integration relationship among the selected countries. However, the result, based on vector correction mechanism, suggested there were bi-directional causality between FDI and GDP for

Brazil, Russia and South Africa and one way Granger relationship that FDI caused with economic growth for India and China.

Seetanah and Khdaroo (2005) examined the impact of FDI on economic growth for a panel of 39 Sub-Saharan African countries for the period of 1980-2000 using Cobb Douglas production function. The study found that FDI is an essential part of economic performance in Sub-Saharan African countries. Moreover, the positive link is also confirmed by using GMM panel estimation. However, the involvement of FDI is less observed as compare to other types of investment.

There are other studies carried out by Lan (2006), Apergis, et al. (2007) and Aqeel, et al. (2005) based on the different periods of different countries using different techniques. Their studies suggest a significant positive impact of FDI on economic growth in Vietnam and the relationship between FDI and export is complimentary (Lan, 2006). Similarly, FDI has a significant relationship with economic growth that characterised by high level of income (Apergis, et al., 2007). On the other hand, a significant impact of FDI on GDP, exchange rate, wages and trade is found in Pakistan in both short run and long run (Aqeel, et al., 2005).

Shimul, et al. (2009), Athukorala(2003) and Sekmen (2007), however, suggested different findings in their studies rather than direct relationship between FDI and GDP. Shimul, et al. (2009) examined the long run relationship between FDI and GDP of Bangladesh based on the time series data over the period of 1973-2007, where they used two modern time series econometric approaches viz. Auto Regressive Distributed Lag (ARDL) model and Engle-Granger two step procedure. They showed in the study that FDI and GDP was not co- integrated, FDI and openness was not Granger causing GDP in both the short run and the long run. Their results suggested that FDI could only be considered to be a contributing factor to the economic development.

According to the study of Athukorala(2003) carried out on Srilanka over the period of 1959-2002 showed that FDI inflows did not influence independently on economic growth and the direction of causation was not towards from FDI to GDP growth but GDP has been caused to FDI. Political instability and disturbance, poor law and order situation and lack of infrastructural facilities were the main hindrance of less impact of FDI on economy, the study claimed. Sekmen (2007) discovered similar findings on Turkey's tourism sector over the period of 1980-2005 where the study indicated that there was no co-integration relationship among the variables. The Granger causality result suggested that there was unidirectional relationship between FDI and GDP. However, a bi-directional relationship exists between GDP and exchange rate, FDI to exchange rate.

Ilhan & Huseyin (2007) investigated the impact of FDI on economic growth of Turkey and Pakistan over the period of 1975-2004 using Engle-Granger co-integration and Granger causality techniques. They found that FDI caused increment in GDP in the case of Pakistan; however, there was strong evidence of a bi-directional causality between FDI and GDP of Turkey. The same findings confirmed in another study by using Engle-Granger method carried out by Balamurali and Bogahawtte (2004) on Srilanka based on the period of 1977-2003.

3. Methodology of the Study

The study examines co-integration relationship between FDI and GDP in both the short and long run of three southern Asian countries viz. Bangladesh, India and Pakistan. Time series data was collected of the three countries for the period of 1972-2008. The study included two main variables such as GDP (dependent variable) and FDI (independent variable) of selected countries; however, their logarithm form (LGDP and LFDI) has been used as well. Various statistical tools have been used such as standard deviation, regression, t-statistics, F-statistics, p value, R squared etc. to analyse data.

Three econometric model viz. Augmented Dickey-Fuller (ADF) test, Engle-Granger co-integration test and Granger causality mechanism have been used to establish co-integration and causal relationship between FDI and GDP.

3.1 Augmented Dickey-Fuller (ADF) test

Augmented Dickey-Fuller test is required to check the order of integration through unit root (white noise error or random walk) test. The test consists of the following two regressions:

$$y_t = \alpha + x_t\beta + \varepsilon_t \tag{1}$$

Where x and y are variables and ε_t is the error term. The test is performed under null of non-stationarity.

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha \sum_{i=1}^{m} \Delta Y_{t-1} + \varepsilon_t \tag{2}$$

Where, Y_t indicates variable of interest= (GDP and FDI), Δ is the difference operator, L=number of lags, t= time subscript, and ε_t is a white noise error term, constant variance $\{\beta_1, \beta_2, \delta, \alpha 1 \ldots \alpha 2\}$ is a set of parameters to be estimated and $\Delta Y_{t-1} = Y_{t-1} - Y_{t-2}$ etc. If the t-statistics value is negatively less than the critical values at 1%, 5% and 10% significance level, the null hypothesis can be rejected i.e. the series is stationary.

3.2 Engle-Granger Co-integration Test

Engle-Granger two-step procedure is used to investigate long run and short run equilibrium relationships between the FDI and GDP. This process comprises following two equations.

$$\mathrm{LGDP} = \alpha + \delta \mathrm{LFDI}_t + \varepsilon_t \tag{3}$$

(for long run relationship test)

Here we collected residual value (ε_t) from the above equation (3), then test ε_t to identify the integrated order by usual stationarity test. If ε_t is less integrated order than the integrated order of linear combination of the variables of I (1), the variables are co-integrated i.e there exist a long run relationship.

$$\Delta \mathrm{LGDP}_t = c + \sum_{i=1}^{p} \delta_i \, \Delta \mathrm{LFDI}_{t-i} + \mu_t \mathrm{ECM}_{t-1} + \varepsilon_t \tag{4}$$

(for short run relationship test)

Where, C is a constant coefficient, $\Delta \mathrm{LFDI}_{t-i}$ is a first difference of LFDI, $\Delta \mathrm{LGDP}_{t-i}$ is a first difference of LGDP and ECM is an Error Correction Mechanism term.

The ECM_{t-1} (saved as 'Res') is the one period lagged value of the estimated error of the co-integrating regression based on Ordinary Least Square (OLS) estimation used to reconcile between short run and long run.

3.3 Granger Causality Test (Granger, 1969)

Granger causality test with three legs is carried out to determine causality relationship between two variables viz. DLGDP, DLFDI for each country. According to this approach, assume y is a variable indicates economic growth caused by another variable x (foreign direct investment), and y can be assumed to be better from past values of y and x than from past values of y alone. The hypotheses are tested by using VAR model with following equations:

$$\mathrm{LGDP} = \sum_{i=1}^{n} \alpha_i \mathrm{LFDI}_{t-1} + \sum_{j=1}^{n} \beta_j \, \mathrm{LGDP}_{t-j} + \varepsilon_{1t} \tag{5}$$

$$\mathrm{LFDI} = \sum_{i=1}^{n} \lambda_i \, \mathrm{LFDI}_{t-1} + \sum_{j=1}^{n} \beta_{2j} \, \mathrm{LGDP}_{t-j} + \varepsilon_{2t} \tag{6}$$

Where LGDP and LFDI denote the logarithm form of economic growth and foreign direct investment respectively. These are assumed that distribution of ε_{1t} and ε_{2t} are uncorrelated. Equation (5) states that current LGDP is related to past values of itself as well as that of LFDI and equation (6) explains a similar behaviour for LFDI. From the equations, (5) and (6) we may get different kinds of hypothesis based on OLS coefficient estimates about the relationship between LFDI and LGDP are as follows:

·Unidirectional Granger causality from LFDI to LGDP Thus $\sum_{i=1}^{m} \alpha_1 \neq 0$ and $\sum_{j=1}^{m} \delta_j = 0$. It may happen other way round as well.

·Bidirectional Causality Thus $\sum_{i=1}^{m} \alpha_1 \neq 0$ and $\sum_{j=1}^{m} \delta_j \neq 0$

·Independence between LGDP and LFDI, in this case there is no Granger causality in any directions. Thus $\sum_{i=1}^{m} \alpha_1 = 0$ and $\sum_{j=1}^{m} \delta_j = 0$.

When F value is greater than the chosen level of significance then we reject the null hypothesis, we may call GDP cause FDI, or FDI cause GDP, (Mun et al., 2008).

4. Empirical Results

This section describes the causal relationship between GDP and FDI of Bangladesh, Pakistan and India respectively by using Augmented Dickey-Fuller (ADF) test, Engle-Granger co-integration test and Granger causality mechanism.

4.1 Augmented Dickey-Fuller (ADF) Test

Augmented Dickey Fuller test (ADF) is used for testing stationarity and non-stationarity of each variable. Two variables have been considered for each country viz. log of GDP (LGDP) and log of FDI (LFDI) for unit root test to examine the nature of the variables as I(0) or I(1). For the ADF test in Table 1 shows the existence of unit root in all the two different series consequences using the level form and first difference form of data in order to intercept and linear trend & intercept.

4.1.1 Estimated Results of Bangladesh

ADF test indicates that, in the level form 'with intercept', ADF statistics value of series LGDP (-1.689513) is higher than the critical values at 1%(-3.626784), 5%(-2.945842) and 10%(-2.611531) significance levels, therefore null hypothesis (Ho) cannot be rejected. However, with trend & intercept gives the different result, where ADF test statistics value (-5.159441) is smaller than the critical values at 1% (-4.234972), 5%(-3.540328) and 10% (-3.202445) significance levels, which indicates that null hypothesis is rejected. This means that series of LGDP has a unit root problem in the level form 'with intercept'. Therefore, series is not stationary.

On the other hand, the ADF statistics values are smaller than the critical values at the same significance levels in the first difference of LGDP series under ADF test with intercept & trend and intercept. Therefore, null hypothesis (Ho) is rejected for the series of LGDP.

Similarly, for the series of LFDI, ADF test statistics value with intercept (-1.649670) and with trend & intercept value (-2.274439) is greater than the critical values at 1%, 5% and 10% significance levels. Therefore, null hypothesis is not rejected and the series will remain insignificant in the level form. Alternatively, in the first difference of LFDI series, ADF test statistics value with intercept (-7.920652) and with trend & intercept value (-7.725281) both are smaller than the critical values at the same significance levels. This means that null hypothesis can be rejected and the series is stationary.

Insert Table 2 Here

4.1.2 Estimated Results for Pakistan

As with Bangladesh, the results for Pakistan illustrate that, ADF statistics values of series LGDP in the level form with intercept and trend & intercept (values are-0.389534 and -1.919313) are greater than the critical values at 1%, 5% and 10% significance levels. Therefore, the null hypothesis (Ho) cannot be rejected. This means the series of LGDP has a unit root problem in the level form. The result also indicates that the series is not stationary at these significance levels.

Table 6 also demonstrates that, ADF test statistics values (-8.202848, -8.436374) are much smaller than the critical values of both intercept and trend & intercept at the same significance levels when LGDP is tested with first difference. This result indicates that the series of LGDP has not any unit root problem and the null hypothesis (Ho) can be rejected.

On the other hand, the ADF test statistics values in the level form with intercept and trend & intercept of the series of LFDI are much higher than the critical values at the same significance levels, which indicate that the null hypothesis cannot be rejected and the series is not stationary. However, the ADF test statistics values are smaller than the critical values at the same significance levels at the first difference stage with intercept and trend & intercept. This means the null hypothesis cannot be rejected and the series is stationary with all significance levels.

Insert Table 6 Here

4.1.3 Estimated Results for India

Similarly, the results for India indicate that, ADF statistics values of series LGDP are (-0.039747 with intercept and trend & intercept -1.337889) higher than the critical values at 1%, 5% and 10% significance levels for both the intercept and with trend & intercept in the level form. Therefore, the null hypothesis (Ho) cannot be rejected. This means that the series of LGDP has a unit root problem in the level form and the series is not stationary at this significant level. On the other hand ADF test statistics values are smaller than the critical values at the same significance levels in the first difference of the series with intercept and trend & intercept. Therefore, the null hypothesis (Ho) is rejected for the series of LGDP, which means the series is stationary.

Insert Table 10 Here

Similarly, ADF test statistics values of the series of LFDI in the level form are much higher than the critical values at the significance levels with intercept and trend & intercept. Therefore, the null hypothesis cannot be rejected and series has a unit root problem in the level form. However, the ADF test statistics values at the first difference of series LFDI for both with intercept and trend & intercept are less than the critical values at the same significance levels, which indicates that the series of LFDI is stationary.

4.2 Engle-Granger (EG) Two Steps Procedure for Co-integration

The Engle-Granger two-steps procedure is performed to ascertain both the long and short run relationship between LFDI and LGDP through co-integration test. The first stage is carried out to determine the long run relationship using OLS model and second stage to determine the short run relationship. EG states that if variables are I (1) on their level but the linear combination is I(0), then the variables are co-integrated. According to EG (1969) theory, if the variables are co-integrated then there might have Error Correction Mechanism (ECM).

4.2.1 Engle-Granger First Stage (long run) Estimation

4.2.1.1 Estimated Results for Bangladesh

The ADF test was performed with linear and intercepts to determine whether it would be an indication of the existence of a long run equilibrium relationship between the variables. From the OLS model:

Insert Table 4 Here

We found the residual (saved as Res). The ADF test statistics value is -2.457361, which is higher than the critical values at 1%, 5% and 10 % significance levels (values are -4.234972, -3.540238 and -3.202445 respectively). This result indicates that the null hypothesis is rejected which implies 'Res' series is non-stationary. As a result, FDI and GDP are not co-integrated with each other and there is no long run equilibrium relationship between them.

4.2.1.2 Estimated Results for Pakistan

Table 8 shows that the ADF test statistics value is -4.549435 in the first stage estimation that is smaller than the critical values at 1%, 5% and 10 % significance levels (values are -4.234972,-3.540238 and -3.202445 respectively). This result indicates that 'Res' series is stationary and the null hypothesis is rejected, which implies that FDI and GDP are co-integrated and there exists a long run equilibrium relationship between FDI and GDP for Pakistan.

Insert Table 8 Here

4.2.1.3 Estimated Results for India

In the Table 12, the ADF test statistics value is much higher than the critical values at 1%, 5% and 10% significance levels. This result indicates that the null hypothesis cannot be rejected and series is non-stationary, which implies that there is no long run equilibrium relationship between FDI and GDP.

Insert Table 12 Here

4.2.2 Engle-Granger Second Stage (Short run and ECM)

Having confirmed the results of long run relationship between FDI and economic output, Engle-Granger second stage test was carried out to determine the short run relationship between two variables. In the second stage of Engle-Granger approach, residual from the first stage regression is used to correct the errors to test the short run dynamic test. This theory is called Engle-Granger Error Correction Mechanism (ECM) used to test the short run relationship between two series.

4.2.2.1 Estimated Result for Bangladesh

The error correction coefficient value (ECM_{t-1}used as $\mathrm{Res}(-1)$ (-0.149244) and t-statistics value (-1.7528) are both negative but they are not significant. In this estimation, FDI is positively correlated with economic growth but error correction coefficient comes up with insignificant negative value (-0.149244). This means 14.92% disequilibrium in the short run deviations to the long run each year. On the other hand, both the adjusted co-efficient associated with the $\Delta\mathrm{DLFDI}_{t-1}$ equation and t statistics values are positive with p-values. The figures indicate that there is no relationship between FDI and GDP in short run.

Insert Table 5 Here

4.2.2.2 Estimated Result for Pakistan

The error correction co-efficient value (ECM_{t-1} named as Res') had the expected negative and significant sign. According to Table 9, there is 25.39% disequilibrium in the short run and it needs to deviate with long run each year. The adjusted co-efficient value of $\Delta\mathrm{DLFDI}_{t-1}$ (-0.036654) and the values of t-statistics (-1.542518) which means it is significant with p -values. The finding of this estimate shows that foreign direct investment has a significant relationship between economic output and FDI in the short run as well as long run.

Insert Table 9 Here

4.2.2.3 Estimated Result for India

The error correction co-efficient value is negative (-0.037855) and 3.78% has to disequilibrium each year in the short run with long run. The t-statistics value of FDI indicates that there is no short run relationship between two variables. The major finding is that there is no relationship in both short run and long run for India.

Insert Table 13 Here

4.3 Granger Causality Test

Granger causality test with three legs results suggest that GDP does not Granger cause with FDI for Bangladesh because the null hypothesis is not rejected when the p-value (0.9542) is greater than the critical value at 5% level of significance. Alternatively, FDI also does not Granger causes with GDP of Bangladesh due to failing to reject the null hypothesis when the p value (0.5148) is higher at the same significance level. Therefore, there is no Granger causality relationship between FDI and economic growth of Bangladesh. Political instability, inappropriate indicators of trade liberalizations, government tariffs etc. could be reasons of it.

Insert Table 14 Here

In the case of India, the results indicate that GDP Granger causes with FDI because F statistics is too higher to reject the null hypothesis at 5% significance level. On the other hand, FDI does not Granger cause with GDP because the null hypothesis cannot be rejected.

Finally, the results suggest that GDP does not Granger cause with FDI of Pakistan because F statistics value is too higher at the 5% significant level. Therefore, the null hypothesis cannot be rejected. On the other hand, there is unidirectional or one-way Granger causal relationship between FDI and GDP. The result also indicates that FDI Granger causes with economic output because we can reject the null hypothesis at this significance level.

5. Analysis of Results

In this study, modern time series econometric approach has been used to identify the long and short run equilibrium relationship between FDI and GDP. The Granger causality (GC) relationship has also been investigated between them for three countries. The study identified the poor statistical indication of both long and short run relationship between FDI and GDP of Bangladesh and India but positive and significant relationship for both long run and short of Pakistan. GC results also suggest that there is no Granger causality relationship between FDI and GDP of Bangladesh, however India and Pakistan has one way or unidirectional relationship between GDP and FDI

These results are similar to the paper carried out by Shimul, Abdullah and Siddiqua, (2009) for Bangladesh. They also found "no cointegration" between FDI and economic growth using time series data with ARDL and Engle-Granger two-step mechanism. Another paper studied by Sekmen (2007), found no cointegration with three variables FDI, GDP and EX for Turkey using Granger causality and error correction (ECM) techniques. Feridum (2004) examined the relationship between FDI and economic growth for Cyprus. His result indicated that there was no relationship between two variables but found unidirectional causality GDP with FDI that is similar to our results for Pakistan and India. The same result found by Athukorala (2003) for Srilanka. He found in his study that there was no long run relationship between FDI and economic growth, however GDP caused by FDI. Another similar paper (Aqeel & Nishat (2005)) examined the cointegration for Pakistan found quite similar result with our study result estimated for Pakistan. They also found both short and long run relationship for Pakistan.

However, this study contradicts with the findings of many literatures. Lan (2006) claimed that FDI was an important contribution to improve the economic growth such as for Vietnam. He found the positive relationship between FDI and GDP for Vietnam. That is contradicting with our study. Another research paper studied by Chakraborti & Basu (2002), examined co-integration relationship for both short and long run. They found the positive relationship for both short and long run for India, which is opposite to our study. The reason might be different sources of data collected and different period.

6. Conclusion

There are so many arguments for and against of the relationship between foreign direct investment and the economic development of a country. Some researchers discovered stronger relationship between FDI and economic development and some others could not. This study found that FDI behaved differently with GDP for each country. The Eagle Granger first stage test results suggest that there is no relationship between FDI and economic output for Bangladesh and India in the long run. However, the study found the co-integration relationship between FDI and GDP in the long run for the Pakistan.

To confirm the Eagle Granger first stage test for, the second stage test has been carried out which suggests that there is a short run dynamic relation between FDI and economic output in Bangladesh and India. However, there is no short run dynamic relationship between FDI and economic output in Pakistan. On the other hand, Granger Causality test suggests that there is a unidirectional relationship between FDI and GDP and FDI is the vital contributor as well as a significant driver for the economic growth of Pakistan and India. Conversely, there is no causality relationship between GDP and FDI for Bangladesh.

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Table 1. FDI inflows of Selected Asian Countries (US $ in million)

Year	Bangladesh	Pakistan	India	Year	Bangladesh	Pakistan	India
1972	0.09	17	17.79	1991	1.39	271.91	75
1973	2.34	4	37.91	1992	3.72	306.56	252
1974	2.2	4	56.97	1993	14.05	399.3	532
1975	1.5433	25	85.09	1994	11.14	789.34	974
1976	5.42	8.22	51.11	1995	92.3	492.09	2151
1977	6.98	15.22	-36.07	1996	231.6	439.305	2525
1978	7.7	32.27	18.09	1997	575.25	711	3619
1979	-8.01	58.25	48.57	1998	576.46	506	2633
1980	8.51	63.63	79.16	1999	309.12	532	2168
1981	5.36	108.09	91.92	2000	578.7	309	3585
1982	6.96	63.83	72.08	2001	354.5	383	5472
1983	3.4	29.46	5.64	2002	328.3	823	5627
1984	-0.55	55.51	19.24	2003	350.2	534	4323
1985	-6.66	47.44	106.09	2004	460.4	1118	5771
1986	2.44	92.237	117.73	2005	845.3	2201	7606
1987	3.21	110.06	212.32	2006	792.5	4237	20336
1988	1.84	133.71	91.25	2007	666.4	5590	25127
1989	2.25	184.34	252.1	2008	1086.3	5438	41554
1990	3.23	278.33	236.69				

Sources: Constructed from UNCTAD, Major FDI indicators (WIR 2009)

Table 2. ADF test for FDI and GDP for Bangladesh

Variables	Level/ 1st difference	Augmented Dickey Fuller Statistic(ADF) test							
		t-statistics	With Intercept			t- statistics	With trend and Intercept		
			1%	5%	10%		1%	5%	10%
LGDP	Level	-1.689513	-3.62678	-2.945842	-2.611531	-5.159441	-4.234972	-3.540328	-3.202445
	1st Difference	-5.653672	-3.6329	-2.948404	-2.612874	-5.574371	-4.243644	-3.544284	-3.204699
LFDI	Level	-1.649670	-3.626784	-2.945842	-2.611531	-2.274439	-4.234972	-3.540328	-3.202445
	1st Difference	-7.920652	-3.632900	-2.948404	-2.612874	-7.725281	-4.243644	-3.544284	-3.204699

Table 3. Long run relationship between FDI and GDP in Bangladesh

Dependent Variable: LGDP, Method: Least Squares, Sample: 1972-2008, Included observations: 37				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant (C)	9.571946	0.092382	103.613	0
LFDI	0.206747	0.023251	8.892094	0
R-squared	0.693169	Mean dependent var		10.20852
Adjusted R-squared	0.684402	S.D. dependent var		0.632234
S.E. of regression	0.355177	Akaike info criterion		0.820135
Sum squared resid	4.415266	Schwarz criterion		0.907212
Log likelihood	-13.1725	Hannan-Quinn criter.		0.850834
F-statistic	79.06934	Durbin-Watson stat		0.490013
Prob(F-statistic)	0			

Table 4. Unit root for saved Residual through ADF

Series	ADF t statistics	Test Critical Values with Trend & Intercept		
		1%	5%	10%
Res (saved as residual)	-2.457361	-4.234972	-3.540328	-3.202445
Here the long run OLS models is LGDP = 9.57194586662 + 0.20674725651*LFDI				

Table 5. Short Run Relationship between FDI and GDP for Bangladesh

Dependent Variable: DLGDP, Method: Least Squares, Sample: (adjusted) 1972-2008, Included observations: 37 after adjustments				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant (C)	0.059992	0.028948	2.072371	0.0464
DLFDI (-1)	0.021546	0.035312	0.610147	0.5461
RES (-1)	-0.149244	0.085146	-1.7528	0.0892
R-squared	0.133459	Mean dependent var		0.065188
Adjusted R-squared	0.0793	S.D. dependent var		0.169534
S.E. of regression	0.162673	Akaike info criterion		-0.71233
Sum squared resid	0.846799	Schwarz criterion		-0.57902

**indicates statistical significance at 0.05 level

Table 6. ADF test for FDI and GDP for Pakistan

Variables	Level/ 1st difference	Augmented Dickey Fuller Statistic(ADF) test							
		t-statistics	With Intercept			t- statistics	With trend and Intercept		
			1%	5%	10%		1%	5%	10%
LGDP	Level	-0.389534	-3.6268	-2.945842	-2.611531	-1.919313	-4.234972	-3.540328	-3.202445
	1st Difference	-8.202848	-3.6329	-2.948404	-2.612874	-8.436374	-4.243644	-3.544284	-3.204699
LFDI	Level	-0.495709	-3.626784	-2.945842	2.611531	-3.522867	-4.234972	-3.540328	-3.202445
	1st Difference	-8.116388	-3.632900	-2.948404	-2.612874	-7.934223	-4.243644	-3.544284	-3.204699

Table 7. Long run relationship between FDI and GDP for Pakistan

Dependent Variable: LGDP, Method: Least Squares, Sample: 1972-2008, Included observations: 37				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant (C)	8.432502	0.103411	81.54321	0
LFDI	0.416006	0.018899	22.01216	0
R-squared	0.932632	Mean dependent var		10.577
Adjusted R-squared	0.930707	S.D. dependent var		0.8015
S.E. of regression	0.21099	Akaike info criterion		-0.2215
Sum squared resid	1.558094	Schwarz criterion		-0.1344
Log likelihood	6.097186	Hannan-Quinn criter.		-0.1908
F-statistic	484.5354	Durbin-Watson stat		1.2481
Prob(F-statistic)	0			

Table 8. ADF test for saved residual for Pakistan

Series	ADF t statistics	Test Critical Values with Trend & Intercept		
		1%	5%	10%
Res (saved as residual)	-4.549435	-4.234972	-3.540328	-3.202445
Here the long run OLS models is LGDP = 8.43250223038 + 0.416006138326*LFDI				

Table 9. Short run Relationship between FDI and GDP for Pakistan

Dependent Variable: DLGDP, Method: Least Squares, Sample: (adjusted) 1974-2008, Included observations: 37 after adjustments				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant (C)	0.103077	0.013574	7.593698	0
DLFDI (-1)	-0.03665	0.023762	-1.542518	0.1328
RES (-1)	-0.25391	0.074774	-3.395705	**0.0018****
R-squared	0.265002	Mean dependent var		0.0937
Adjusted R-squared	0.219065	S.D. dependent var		0.0858
S.E. of regression	0.075822	Akaike info criterion		-2.2391
Sum squared resid	0.183965	Schwarz criterion		-2.1057

**indicates statistical significance at 0.05 level

Table 10. ADF test for FDI and GDP for India

Variables	Level/ 1st difference	Augmented Dickey Fuller Statistic(ADF) test							
		t-statistics	With Intercept			t- statistics	With trend and Intercept		
			1%	5%	10%		1%	5%	10%
LGDP	Level	-0.039747	-3.6268	-2.945842	-2.611531	-1.337889	-4.234972	-3.540328	-3.202445
	1st Difference	-4.4916	-3.6329	-2.948404	-2.612874	-4.471532	-4.243644	-3.544284	-3.204699
LFDI	Level	-2.676343	-4.234972	-3.540328	-3.202445	-2.676343	-4.234972	-3.540328	-3.202445
	1st Difference	-6.105933	3.632900	-2.948404	-2.612874	-6.125380	-4.243644	-3.544284	-3.204699

Table 11. Long run relationship between FDI and GDP for India

Dependent Variable: LGDP, Method: Least Squares, Sample: 1972-2008, Included observations: 37				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant (C)	10.92635	0.146081	74.79638	0
LFDI	0.271986	0.022701	11.9813	0
R-squared	0.803978	Mean dependent var		12.55682
Adjusted R-squared	0.798378	S.D. dependent var		0.719475
S.E. of regression	0.323061	Akaike info criterion		0.63059
Sum squared resid	3.652905	Schwarz criterion		0.717667
Log likelihood	-9.665916	Hannan-Quinn criter.		0.661289
F-statistic	143.5516	Durbin-Watson stat		0.467808
Prob(F-statistic)	0			

Table 12. ADF test for saved residual for India

Series	ADF t statistics	Test Critical Values with Trend & Intercept		
		1%	5%	10%
Res (saved as residual)	-2.437332	-4.234972	-3.540328	-3.202445
Here the long run OLS models is LGDP = 10.9263512536 + 0.271986398889*LFDI				

Table 13. Short run Relationship between FDI and GDP for India

Dependent Variable: DLGDP, Method: Least Squares, Sample: (adjusted) 1974-2008, Included observations: 37 after adjustments				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant (C)	0.06946	0.013517	5.138563	0
DLFDI (-1)	0.033215	0.017992	1.846066	0.0742
RES (-1)	-0.03786	0.045096	-0.839425	0.4075
R-squared	0.158963	Mean dependent var		0.0937
Adjusted R-squared	0.106398	S.D. dependent var		0.0858
S.E. of regression	0.076548	Akaike info criterion		-2.2391
Sum squared resid	0.187507	Schwarz criterion		-2.1057
Log likelihood	41.84964	Hannan-Quinn criter.		-2.174
F-statistic	3.024139	Durbin-Watson stat		1.3566
Prob(F-statistic)	0.062667			

**indicates statistical significance at 0.05 level

Table 14. Result of Granger causality test (tested with 3 lags)

Countries	Null Hypothesis	Observations	F-Statistic	Probability
Bangladesh	DLGDP does not Granger Cause DLFDI	33	0.10887	0.9542
	DLFDI does not Granger Cause DLGDP		0.78196	0.5148
India	DLGDP does not Granger Cause DLFDI	33	3.14882	0.0419**
	DLFDI does not Granger Cause DLGDP		2.58384	0.0748
Pakistan	DLGDP does not Granger Cause DLFDI	33	0.27979	0.8395
	DLFDI does not Granger Cause DLGDP		4.64545	0.0099**

**indicates statistical value at 5% significance level