The impact of foreign direct investment inflows on economic growth: evidence from Bangladesh

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Abstract
The research finds out that there is a causal relationship between Foreign Direct Investment Inflows (FDI) and Gross Domestic Product (GDP) Growth. The study also reveals that the issue of Foreign Direct Investment (FDI) Inflows has become a vital weapon of Gross Domestic Product (GDP) growth for Bangladesh, bringing in technological development, capital investment and knowledge also needed for economic growth. According to this view, this paper purposes to study the relationship between FDI and economic growth in Bangladesh by the co-integration and Vector Error Correction Metrics (VECM) Test. The empirical analysis has conducted by using annual secondary data for the year of 1990-2015 of Bangladesh, to investigate the relationship between FDI Inflows and Economic Growth in Bangladesh. Paper finds out the positive relationship running from FDI Inflows to GDP in the long-run and short-run. The study suggests that Bangladesh government can create foreign investment-friendly policies, transfer of knowledge and trade promotion as well. This paper also advocates that the country's capacity to improve on economic growth will subject to promote more FDI Inflows.

1. Introduction

Bangladesh is a least developed country (LDC), during the liberation ruined about one-fifth of the country's economy and over the past two decades the country gears up a small economic growth. The Bangladesh economy had accelerated by the outstanding turn-around from 1990 in the growth of multi-factor productivity. According to the statistical analysis, the country has shifted from the agricultural economy to the industrial and service economy over the past few years. The growth of internationalization is operated by economic and technological forces. In this context, it has been a matter of greater concern for the economists how FDI affects economic growth of the recipient economy. Over the two decades, FDI is the prominent drivers of economic growth and development in developed countries even in developing and less developed countries. Moreover, FDI can move faster the Gross Domestic Product (GDP) growth, and investment can increase human capital development, domestic production, and infrastructure development as well. In the early 1980s, Organization for Economic Cooperation and Development (OECD) recognized that traditional reporting frameworks could not account for the abolition of regulatory obstacles to cross-border investments. Resulting OECD implemented an advanced "Benchmark Definition of Foreign Direct Investment" which contributes a comprehensive set of rules to improve statistical measures of FDI, OECD (2008). FDI inflows provide the financial stability, the creative capacity, the labor productivity growth, the new technology transfer,

international marketing networks, and skills, and thus help to enhance the economic growth. So FDI is a vital factor in the emerging market economy in current globalization. Some global organizations, for example, the United Nations Conference on Trade and Development (UNCTAD), the OECD, World Bank and the International Monetary Fund (IMF) inspire especially developing countries to accept more liberalized policies in goods and services to FDI and International Trade respectively. Simultaneously, international trade stimulates economic growth through investment. Because Bangladesh's imports are greater than exports, means there is huge trade gap. Damijan and Rojec (2007) investigated that FDI can decrease trade gap in the Central European Countries (CECs) and can play a significant role in productivity growth in those countries. FDI also influences the consumer, tax revenues, government expenditure, exchange rate, inflation and economic development. However, (Cevis and Camurdan 2007) concluded over the panel data set of 1989-2006 of the developing countries and transition economies such as in, Asian, Eastern European and Latin American countries.

The economic growth rate, the interest rate, the inflation rate and the trade openness rate were the key drivers affecting FDI inflows in the host country. The investment is not only supposed to financial investing but also productive one (Mankiw 2012), which refers buildings, equipment, machinery, structures and such as the residential construction and allows increased production of goods and services. Bangladesh also influences export-oriented multinational companies (MNCs) to earn foreign exchanges based on several investment incentive packages, because the country always encourages economic development policies and regulations for industrial development. Through, classical and neo-classical economic framework, GDP growth depends on the supply of funds as well as the provision of skilled labor and new technology. Usually, LDCs have insufficiency of the fund for significant investment as like as Bangladesh which can be well-adjusted with an inflow of capital from foreign (public or private) investor. Bangladesh is a frontier of emerging market economies (EMEs), so there is a lot of potentialities to invest FDI in Ready Made Garments (RMG), Textile, Leather, Pharmaceuticals, Information and Communication Technology (ICT), Marine, Tourism, and Agro-based Industries, etc. Alam and Chang (2012) empirically found that Korean investment is a real contributory factor to the Bangladesh's economic growth and development. Moreover, the exports earnings allow for the imports of qualitative inputs, for example, capital goods for domestic production and exports, thus increasing the country economy's production potentialities.

In the last decade, the country has achieved GDP growth rates near 6% because of the development of the RMG industries and microfinance. The interim approximate for Bangladesh's GDP growth in the fiscal year 2015 (ended 30 June 2014) is smaller than the 6.6% recorded in the fiscal year 2015. Figure 1 shows some key statistics about GDP Growth of Bangladesh.
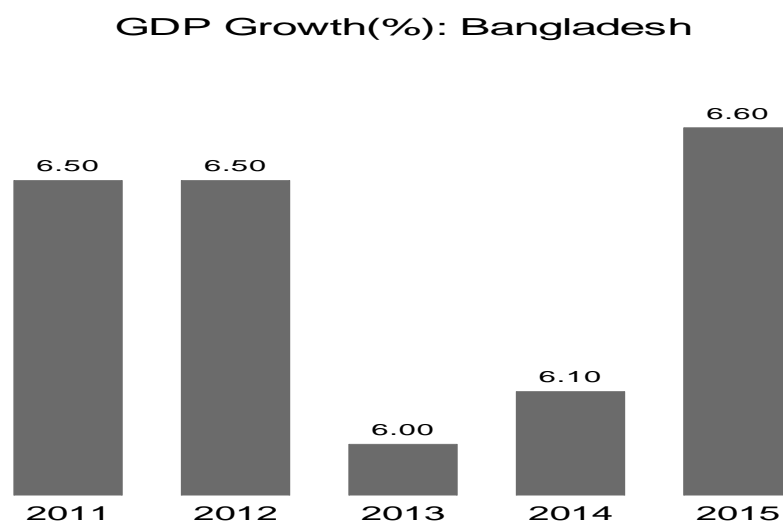
GDP Growth(%): Bangladesh

Figure 1: GDP Growth: Bangladesh

Conversely, from the middle of the 1990s, the supply of public funds has been diminishing from developed to developing countries for all over the world, while the FDI inflows rained thrust over the few decades. Ahamad et al. (2010) investigated that higher GDP growth attracts more FDI in Bangladesh. In the meantime, LDCs like Bangladesh plays a vital role with countries like South Africa, Brazil, Vietnam, Venezuela, India, Indonesia, Laos, and many other countries to attract foreign funds. The OECD (2008) also referred FDI as "an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor." The contribution of FDI is essential elements for boost up of a country's economic growth. Nevertheless, the country has very high population density like 160 million people and scarce resources. Almost one-third of Bangladesh's people live in extreme poverty. As a result, without steady growth of the economy, it will not be possible to elevate such as a massive population out of poverty. Hence, emphasis should be employed on foreign investment and trade.

In this paper, we examine the significant role of FDI in the procedure of economic growth of Bangladesh. We observe the relationship between the GDP growth rate, FDI, Export, Import, Inflation, and Exchange Rate over the time series annual data from 1990-2015 with the help of co-integration and Vector Error Correction Model (VECM) analysis. Moreover, different studies (Andraz and Rodrigues 2010; Miankhel et al. 2010; Acaravci and Ozturk 2012; M. Seyoum et al. 2015; Fadhil and Almsafir 2015 & Gupta and Singh 2016) used different methods and variables in their studies for obtaining positive results. For instance, we have used co-integration test and VECM metrics which are similar as some papers methods, but variables are different in this study for identifying the relationship between FDI inflows and GDP growth of Bangladesh. Following the Introduction in Section 1, the paper is structured as follows: Section 2 provides the literature review and objectives of the study, while Section 3 presents the data and methodological framework. Section 4, provides the empirical results, and Finally, Section 5 concludes with research limitations and direction for further research of the study.

2. Literature Review

The Economic point of view FDI refers that MNCs have significant complementaries with local industry and welfare and stimulate development in the host economy. FDI inflows also affect the host countries economy in multifariousness. It conveys capital accumulations and technological diversification that enhances of the recipient economy (Borensztein et al. 1998; Dunning 1993; Blomstrom et al. 1996 and Irandoust 2016). Acaravci and Ozturk (2012) investigated that FDI and export have the causal relationship between economic growth in four out of ten European countries using quarterly data from 1994 to 2008.They evaluated between FDI and export on economic growth, FDI is a vital factor in boosting economic growth in those countries. Carlos and Eddie (2015) empirically analyzed by VAR model to Brazil, China, Mexico, Peru and South Korea, that there is no causal relation between FDI and GDP in Brazil, Mexico, Peru and South Korea. But only China has a little relationship between "FDI as a percentage of total gross fixed capital formation (GFCF) and economic growth," i.e., vice versa. Furthermore, some study suggested that have a positive relationship with FDI flows on economic growth both in the short run and long run. Andraz and Rodrigues (2010) found in their study that there is a positive relationship between FDI, Exports and Economic Growth in the long-run using data from 1977 to 2004 in Portugal. Besides, Miankhel et al. (2010) VECM analysis results found substantial evidence on the relationship between FDI and trade on economic growth in the East Asia region. Babatunde (2011) inspected the interaction between FDI, economic growth, trade openness and infrastructure development using a panel data of 42 sub-Saharan Africa (SSA) countries over the period 1980-2003. The empirical study specified that trade openness and infrastructural development encourage the inflow of FDI and the research revealed a positive and statistically significant relationship between the interaction of trade openness with infrastructural development and FDI, FDI and infrastructural development contribute towards enhancing economic growth in the SSA countries.

Vollmecke et al. (2016) aimed to investigate an infinite first-order Markov chain approach in European 269 regions over the data between 2003 and 2010 that they found a weak process of overall income convergence among all EU regions. Also, they investigated for poor regions in lower income

classes being caught in a "poverty trap" in Central and East European countries (CEECs) regions. In particular, given that the capital regions of the Central and East European countries (CEECs) enjoyed high per capita growth rates, the positive spillover effects from FDI contributing to catch-up and regional convergence are strongly localized. Furthermore, Su and Liu (2016) empirically investigated with Chinese cities that FDI and human capital are the vital contributors to economic growth and human capital is an initiator for the new technology diffusion embodied in FDI. Human capital speeds up the percentage of technological revolution through investments in education, workforce skills, scientific knowledge and social institutions (Nelson and Phelps 1966; Benhabib and Spiegel 1994 and Acemoglu 1998). Iamsiraroj (2016) examined between FDI inflows and per capita GDP growth among 124 cross-country data from 1971 to 2010 using the simultaneous system of equations model, the econometric results show that FDI is linked to higher rates of GDP growth and vice versa while other controlled variables can stimulate economic growth further.

In the study observed causal relationship in the long run among FDI growth, terms of trade volatility (TOTV) and GDP growth by constructing a multivariate VAR model over the period of 1993–2014 consisting of 3 Baltic economies (Estonia, Latvia, and Lithuania). During the period Estonia was well performed within the Central Eastern European countries (CEEC) group, whereas FDI inflows were 7.24 % in Estonia, 3.87 % in Latvia, and 2.91 % of GDP in Lithuania (Irandoust 2016). However, he clarified by the Granger Causality test that there is bi-directional causality in Estonia and unidirectional causality in Latvia and Lithuania running from FDI to growth. Latvia and Lithuania might stem from the fact due to lack of bi-directional causality, so both countries have not moved faster as Estonia with the timing and the execution of the economic reforms and have no capability to carry out enough reforms in the areas of enterprise and competition policy compared to Estonia. M. Seyoum et al. (2015) investigated two-way Granger causality link between FDI and economic growth: Empirical evidence from 23 African countries for the period from 1970 to 2011. The study results also portrayed unidirectional causality from FDI to GDP growth in three countries (Egypt, Gabon, and Mauritania) and they also found unidirectional causality from GDP growth to FDI in four countries (Cote d'Ivoire, Kenya, South Africa and Zambia).

Asheghian (2016) observed that the major determinants of GDP per capita growth in Iran are value added growth and domestic investment growth. There is no causal relationship among FDI growth, GDP per capita growth and value added growth in either direction. Because Iran was infected in multiple events, i.e., including regime change of 1979, the two oil shocks (1973 & 1979), the Iran–Iraq war (1980–1988), American hostage crisis (1979–1980) and scared off potential foreign direct investors. Jun (2015) empirical analysis also investigated the outcomes of FDI on SAARC (Afghanistan, Bangladesh, India, Nepal, Maldives, Pakistan, Sri Lanka and Bhutan) countries annual panel data over the period 1960-2013.On the end of 2013, Bangladesh's nominal GDP was 2nd largest in the SAARC region. The Granger causality results revealed that there are bi-directional causal relationships between FDI and real GDP as a whole. SAARC countries also attracted more FDI over the period due to the continuous output of growth. Gupta and Singh (2016) aimed to test using VECM estimation technique over the period 1992-2013 individually for BRICS countries, which finds the higher economic growth in Brazil, China, and India cause of higher Inwards FDI in the long run. Conversely, the study claims that Inwards FDI and GDP are not co-integration for the Russia and South Africa in the long-run; FDI and GDP are independent of each other. Based on Nath (2009) presented a fixed effect panel data approach to investigate the effects of FDI and trade on per capita GDP growth in 13 transition economies of Central and Eastern Europe(CEE) and the Baltic region over the period from 1991 to 2005. The study suggested that there is a significant positive effect of trade on economic growth, but there is no significant positive impact of FDI on economic growth. Nevertheless, he implied that when controlling the effects of domestic investment and trade on FDI, it shows to be a significant determinant of growth for the period after 1995.

Boateng et al. (2015) used a quarterly data of macroeconomic policy over the period from 1986–2008 in Norway. FMOLS method inspected that the real GDP, the sector GDP, the trade openness and the exchange rate contribute positively and significantly to FDI inflows. However, money supply, interest rate, and unemployment employ negative influences on FDI inflows in Norway. However, the technology spillovers of FDI inflows are still not sufficiently associated with human capital to contribute to the economic growth. By Fadhil and Almsafir (2015) revealed by time series data from 1975 to 2010 that the

FDI inflows together with the human capital accumulation strongly lead to the Malaysian economic growth, conversely, the technology spillovers of Inwards FDI are still insufficiently linked with human capital to contribute to the host countries economic growth. On the other hand, Chen and Zulkifli (2012) study investigated with Outward FDI as the independent variable and labor and domestic investment as the controlled variables by VECM, the study found that there is a positive long-run relationship between outward FDI and growth as well as long-run bi-directional causation between them. They do not find Granger-causality between outward FDI and growth in the short-run.

Amoah et al. (2015) aimed to study for Ghanaian economy over the period of 1980 to 2013 using co-integration and Granger causality analysis that there is a long-run equilibrium relationship between all variables. However, Granger causality test revealed bidirectional causality between Inflation rate and Exchange rate and also between Inflation rate and GDP. And there is unidirectional causality between GDP growth rate and exchange rate; whiles FDI does not Granger cause exchange rate, Inflation rate, GDP i.e. vice versa. Another empirical study results investigated that Inflation, Exchange Rate, and Foreign Direct Investment significantly affect Economic Growth, while capital stock (GFCF) has no significant effect on economic growth. But FDI has a positive relationship with GDP growth of Pakistan. They suggested that the country needs to attract more foreign investors for increasing the growth of the economy (Ahmad et al. 2013). Likewise, Garcia-Fuentes et al. (2016) study results showed that the remittances on U.S. FDI flows could increase per capita GDP growth to the Latin American Countries (LACs) and the study also suggested that foreign remittances may positively affect the economic growth of developing countries. Thus, it can be understood from above literature review that FDI is an important tool for economic growth for any developing country. Therefore, the study also attempts to find out the important economic determinants affecting FDI inflows in Bangladesh by formulating a model with the help of preferred variables.

The above literature indicates that various researchers have investigated in the past this issue of linkage between FDI and GDP in the perspective of different developed or developing countries. The main objective of this paper aims to investigate the impact of the Foreign Direct Investment on Economic Growth in Bangladesh. In addition, we want to check co- integrated relationship and the causality (long-run and short-run) between FDI inflows and Economic growth in Bangladesh.

3. Data and Methodology
3.1 Data

For the study the relationship between FDI Inflows and Economic Growth, the time series secondary data are used for the period of 1990 to 2015 of Bangladesh. All data compiled from World Bank Development Indicators which published by World Bank. In this paper, following procedures were implemented. Thus, the First step, we check all variables for stationary or non-stationary by unit root test using both Augmented Dickey-Fuller (ADF) test and Phillips–Perron (PP) test which can be made by differencing. As a Second step, we fixed optimum lag selection criterion to select the optimum number of lags by using the unrestricted VAR model. In terms of the Third step, after selection of optimum lags Johansen's co-integration test is employed to the variables are co-integrated or not. In the Fourth step, we apply Vector Error Correction Model (VECM) to examine in the short-run and long-run causality among variables. Finally, we run for diagnostics and stability test of the model for checking the strength of the model and verify the outcomes. All the above techniques in details are described in an empirical methodology of the paper. The variables are used in this study follows as Table 1:

3.2 Empirical Methodology

Usually, most of the empirical findings integrate either the FDI or Economic Growth hypotheses follow a traditional model, i.e., the application of Foreign Direct Investment Inflows (FDI) and GDP Growth Rate (GDP). Alongside Inflation (IF), Exports (EXP), Imports (IMP) and Exchange Rate (EX) as additional factors are manipulating the total output and growth of an economy.

The Econometric model can be indicated as follows

$$GDP = f(FDI, EXP, IMP, EX, IF)\varepsilon$$ ……………………………………..(1)

Whereas the empirical model will be implied as follows:

$$GDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 EXP_t + \beta_3 IMP_t + \beta_4 EX_t + \beta_5 IF_t + \varepsilon_t \dots\dots\dots\dots \text{(2)}$$

Where;

t = Represents the time from 1990 to 2015,

ε= Represents the Error term,

And β0, β1, β2, β3, β4 are the relevant parameters.

In this study, GDP is a dependent variable and FDI with other variables like EXP, IMP, EX & IF are the independent variables. We expect, FDI to have a positive relationship with Economic Growth and other variables to have a positive relation with Economic Growth of Bangladesh.

Variable	Definition	Measurement	Source
GDP	GDP growth (annual %)	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	World Bank national accounts data, and OECD National Accounts data files.
FDI	Foreign direct investment, net inflows (BoP, current US$)	Foreign direct investment refers to direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital. Direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy.	International Monetary Fund, Balance of Payments database, supplemented by data from the UNCTAD and official national sources.
IMP	Imports of goods and services (BoP, current US$)	Imports of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from nonresidents to residents of general merchandise, nonmonetary gold, and services. Data are in current U.S. dollars.	International Monetary Fund, Balance of Payments Statistics Yearbook and data files.
EXP	Exports of goods and services (BoP, current US$)	Exports of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from residents to nonresidents of general merchandise, net exports of goods under merchanting, nonmonetary gold, and services. Data are in current U.S. dollars.	International Monetary Fund, Balance of Payments Statistics Yearbook and data files.
IF	Inflation, consumer prices (annual %)	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.	International Monetary Fund, International Financial Statistics and data files.
EX	Official exchange rate (LCU per US$, period average)	Official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).	International Monetary Fund, International Financial Statistics.

Table 1: Explanatory variables, definition, measurement and source the World Bank

4. Empirical Results

Table 2 shows that Augmented Dickey-Fuller and Phillips-Perron Unit Root Test are employed to investigate the stationary property of the particular data series. The study indicates that all variables are not stationeries at level in both unit root test, only IF was stationary at level on Augmented Dickey-Fuller Unit Root Test and only EXP was stationary at level on Phillips-Perron Unit Root Test. But, when both series are converted to the first difference, both series are become to be stationary and also integrated at the Lag [Order] of one, I (1). These (ADF and PP Unit Root Test) results will overlay for running lag selection criterion.

Variables	ADF				PP			
	AT LEVEL		AT 1ST DIFFERENCE		AT LEVEL		AT 1ST DIFFERENCE	
	t-stat	Prob*	t-stat	Prob*	t-stat	Prob*	t-stat	Prob*
GDP	-2.504757	0.1263	-7.580954	0.0000	-2.504751	0.1263	-12.01526	0.0000
EX	-0.702365	0.8285	-3.865299	0.0081	-0.730078	0.8212	-4.226437	0.0033
EXP	2.743399	0.6223	-1.055957	0.0000	3.412640	0.0048	-4.154886	0.0038
IF	-3.597618	0.0133	-6.614501	0.0000	0.614250	0.9871	-10.46529	0.0000
FDI	4.582717	0.4546	1.709435	0.0000	7.598149	1.0000	-5.400928	0.0002
IMP	1.698616	0.5571	-1.413173	0.0000	2.360973	0.9999	-4.595500	0.0014

Table 2: Augmented Dickey-Fuller and Phillips-Perron Unit Root Test

Table 3 shows that there is a limited number of observations in the model. The model directed us to consider with a maximum of 2 lags and the outcomes of lag length for GDP model which is the lag 2. Results of this study depend on LR, FPE, AIC, SC and HQ criteria as advised by Engle and Granger (1987).

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1749.343	NA	1.36e+56	146.2785	146.5731	146.3567
1	-1652.951	136.5551	9.84e+53	141.2459	143.3075	141.7928
2	-1585.014	62.27502*	1.35e+53*	138.5845*	142.4132*	139.6003*

Notes: * indicates lag order selected by the criterion, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information, and HQ: Hannan-Quinn information criterion.

Table 3: Lag selection criterion

According to this paper, the study uses a small sample of annual data, selecting more lags would reduce the degree of lack of restrictions. Johansen and Juselius (1990) theory advised that for small samples the best lags should be limited to 1 or 2 for the well-organized results. The optimum lags selected in this model is 2 which already have written in Table 3. The existence optimum lag will be using in the Johansen Co-integration test and Vector Error Correction Model (VECM) test as well.

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.966767	179.6110	95.75366	0.0000
At most 1 *	0.883310	97.90968	69.81889	0.0001
At most 2	0.698088	46.35197	47.85613	0.0688
At most 3	0.335178	17.60908	29.79707	0.5950
At most 4	0.228045	7.811412	15.49471	0.4858
At most 5	0.064474	1.599524	3.841466	0.2060

Notes: Trace test indicates 2 cointegrating eqn(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, and **MacKinnon-Haug-Michelis (1999) p-values.

Table 4: Co-integration Rank Test (Trace)

The results for both the Trace statistic in Table 4 and the Maximum Eigen statistic observed in Table 5 indicated a maximum rank of one for the scenario selected at the 5% significance level; the Johansen co-integration test has allowed one co-integrating vector or rank; hence one rank is applied to establish the VECM. Therefore, we conclude that there is one long-run co-integrating relationship among Variables in this model. According to the definition of co-integration, Engle and Granger (1987) refers that if a set of variables are co-integrated, then there exist valid error correction representations of data. Also, this theory is widely recognized as Granger's Representation Theorem. The VECM is estimated here, and its results are presented in the Table 6 and the Table 7

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.966767	81.70137	40.07757	0.0000
At most 1 *	0.883310	51.55770	33.87687	0.0002
At most 2 *	0.698088	28.74289	27.58434	0.0354
At most 3	0.335178	9.797670	21.13162	0.7634
At most 4	0.228045	6.211888	14.26460	0.5862
At most 5	0.064474	1.599524	3.841466	0.2060

Notes: Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, and **MacKinnon-Haug-Michelis (1999) p-values.

Table 5: Co-integration Rank Test (Maximum Eigenvalue)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.872272	0.757635	-2.471206	0.0330

Table 6: VECM long-run relationship

According to Table 6, the optimum lags selection is 2. For instance, the Johansen's co- integrating test, 1 co-integrating vector indicates that there is long-run causality running from FDI, EX, EXP, IF, and IMP toward GDP because probability value is 3.3% which is significant, and the coefficient is approximately 187 % which is negative. Thus, Co-integrating equation one CE (1) is significant. The estimated coefficient of the error correction vector is 1.87, means CE (1) is the speed of adjustment correcting back disequilibrium at the rate of 187 percent annually i.e.; the speed of adjustment of dis-equilibrium is extremely fast. The negative sign of coefficient and the significant of probability value signify the existence of co-integration among variables. Estimation technique shows that approximately 187% of the previous year's disequilibrium in the economy is corrected in the long-run. There exists causal relationship running from FDI, EX, EXP, IF, and IMP toward GDP.

Variables	Test Statistic	Value	df	Probability
GDP	Chi-square	1.221940	2	0.5428
EXP	Chi-square	3.951187	2	0.1387
EX	Chi-square	1.383938	2	0.5006
IF	Chi-square	3.305318	2	0.1915
FDI	Chi-square	6.981773	2	0.0305
IMP	Chi-square	1.383123	2	0.5986

Table 7: VECM short-run relationship using Wald Test

Table 7 indicates that there is short-run causality running from FDI inflows to GDP by using Wald Test. Because the probability value of FDI is 3.05%. While the rest of the variables such as EXP, EX, IF and IMP with probabilities of 13.87%, 60.06%, 19.15% and 59.86% respectively determined that there is no short-run causality running from EXP, EX, IF and IMP toward GDP.

	Obs*R-square	F-statistic	Prob*
Serial correlation: Breusch-Godfrey Serial Correlation LM Test	0.558811	0.099604	0.7562
Heteroscedasticity Test: Breusch-Pagan-Godfrey	19.09701	2.283361	0.2094

Table 8: Diagnostic test.

Table 8 also shows the diagnostic test of the residuals of serial correlation using Breusch-Godfrey Serial Correlation LM and Heteroskedasticity Test using Breusch-Pagan-Godfrey. The estimated results show that the probability value of 75.62% residuals are not serially correlated, and the probability value of 20.94% concluded that the residuals are homoscedasticity as well thus our model is free from serial correlation and Heteroskedasticity.
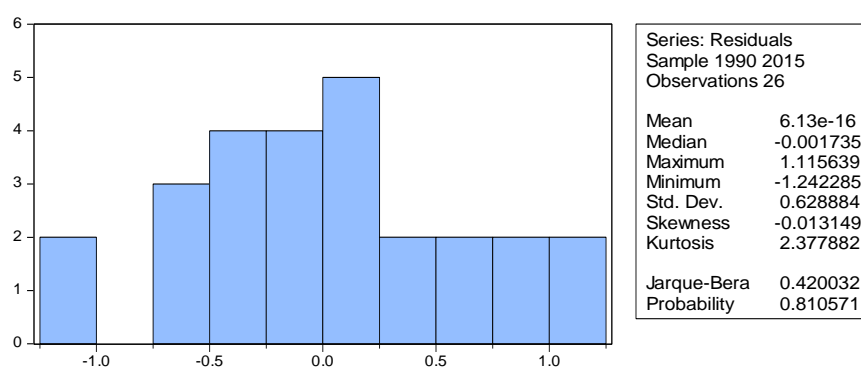

Figure 2: Normality test

Figure 2 shows the test of normality of the residuals using Jarque-Bera Normality test. The residual normality test of probability approximately 81.06% reveals that residuals are multivariate normal. The empirical results imply that the null hypothesis of residuals are normally distributed which accepted at 5 percent level of significance.
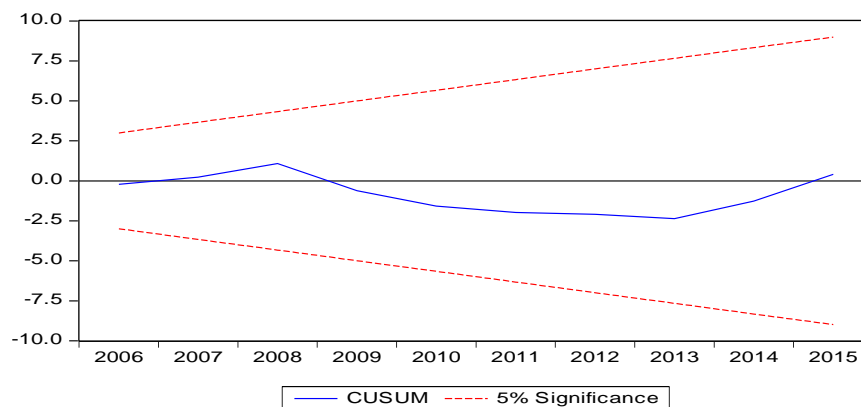
Figure 3: Stability test

Figure 3 shows the stability of the model using CUSUM test at 5% significance level. From this figure reveals that the model of the data are stable because blue line is within the red lines which imply that the model is structurally stable.

5. Discussions and Conclusions

The purpose of this research was empirically examining the impact of FDI inflows on Economic Growth in Bangladesh by compelling FDI, EXP, IMP, IF and EX as independent variables. We investigated that there is a relationship among Foreign Direct Investments, Export, Import, Inflation, Exchange rate and per capita GDP Growth rate for Bangladesh with the help of annual time series secondary data for 1990 to 2015. The VECM model analysis found that there is a long-term relationship among these variables. In the short run analysis, there is no causal relationship between these variables except FDI has a short-run relationship between Economic Growth. To check the validity of the VECM model, we employed diagnostic and stability tests and found that the residuals of the regressions are normally distributed, and there is no auto-correlation. And our model is also structurally stable. Our study results are similar to Ahmad et al. (2013) for Pakistan and Andraz and Rodrigues (2010) for Portugal in the case of FDI Inflows and Economic Growth. However, Nath (2009) study did not find a positive relationship between FDI and GDP for Central and Eastern Europe (CEE) and the Baltic region. Also, we have used different variables for obtaining good results for Bangladesh case while these studies did not use as like as our variables. Since VECM model exists a long-term and short-run relationship between FDI inflows and GDP Growth, we suggest that Bangladesh government can create foreign investment-friendly policies, transfer of knowledge and trade promotion. These also it needs to take a destructive policy of promoting the trade sector by safeguarding duty-free access to developed countries.

5.1 Limitations and Future Research

The empirical results of the test demonstrate that FDI has a positive effect on economic growth rate of Bangladesh. The study results must be interpreted comprehensively and thoroughly. This is related to some limitations which can be used as a basis for suggesting further research. We have used limited time from 1990 to 2015 (twenty-six years) for this study however in future researchers can be used the longer period for better results. In our study, the impact of foreign direct investment is linked with the GDP growth, export, import, exchange rate and inflation but in future impact of foreign direct investment can be measured by national expenditure, employment, foreign direct investment outflow, national income, etc. Policymakers should understand the importance of foreign direct investment and its impact on Economic growth whatever making the policies. They should encourage and assist foreign investors in enhancing the Foreign Direct Investment (Inflows), which will also make an advantage to increase the country's foreign reserves. Policy makers should also create a business-friendly environment to the foreign investors, and proper direction should provide to the foreign investors. Many studies have demonstrated that improvement of regulation and order, the formation of an investment-friendly environment, technology transfer and infrastructure development play a vital role in attracting foreign investment. According to this type of critical relationship, we leave it to future study on Bangladesh's economic growth and internationalization for further research.

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