World Review of Business Research
Vol. 8. No. 3. September 2018 Issue. Pp.104-125

Foreign Direct Investment, Trade Openness and Economic Growth: The Case of Bangladesh

Samiyah Haque[1] and Sakib B. Amin[2]

In a developing country like Bangladesh, FDI is considered to hold a significant value in the overall development process and industrial growth. Most firms which are financed through FDI export a significant proportion of their output, which leads to increase in net exports. Inflation affects the yield or return on capital on investment which, in turn, effects foreign investment. Hence macroeconomic stability in the form of inflation levels has direct effects on FDI and growth. However, the influence of trade and FDI on economic growth varies according to the state of development of countries. The question arises here is whether FDI and trade causes the changes in economic growth or vice-versa. This paper, therefore, analyzes the interrelationship and direction of causality between FDI, trade and growth of Bangladesh, taking macroeconomic stability into account. The study is conducted based on time series data from 1980 to 2015 for trade openness, FDI, inflation and GDP of Bangladesh, to carry out Augmented Dickey Fuller (ADF), Phillips-Perron (PP) and Granger Causality tests. Findings reveal that there is a unidirectional causality running from trade openness to GDP, trade openness to inflation and a bidirectional causal relationship between FDI and GDP in Bangladesh. However, no causal relationships between trade openness and FDI or inflation have been found. Since FDI and trade are two crucial factors that promote economic growth in Bangladesh based on the results of this study, policies that are favorable towards investment and trade sector are recommended.

Field of research: Economics

1. Introduction

Ever since globalization has emerged in the 1990s, substantial amounts of private capital in the form ofFDI has been flowing into countries all over the world, which is widely accepted to be an essential element for economic development. There is an international race for attracting FDI into the economy, especially in the developing world where the number of countries succeeding in attracting large amounts of foreign capital are on the rise. In general, FDI has been considered to have a positive effect on economic growth and beneficial for the overall economy through various ways, including generation of positive productivity effects, creation of jobs and a more competitive environment. It can be a source of valuable technological know-how while benefitting local firms via licensing, imitation, worker training, better equipment and machinery and the formation of linkages between foreign and domestic firms, thus leading to a boost in local GDP.Hence the development of financial markets and international financial integration are leading to further

[1]Samiyah Haque, BS in Economics & Finance and Corresponding Author, Department of Economics, North South University, Dhaka, Bangladesh, Email: samiyah.haque@gmail.com
[2]Dr. Sakib B. Amin, Assistant Professor, Department of Economics, North South University, Dhaka, Bangladesh, Email: sakib.amin@northsouth.edu

industrialization and developing countries are highly encouraging foreign direct investment in order to capture the economic benefits.

Over the last two decades, FDI has been playing a remarkable role in the Bangladeshi economy as there are often capital shortages that constrain the level of investments, which can be offset by growth through the inflow of funds from foreign investments.Since Bangladesh is gradually moving from an agriculture-based to an industrial economy, it has been in the center of economic investment incentive amongst many other countries throughout the world. The government has been more open towards FDI policies, trying to create a favorable investment environment in the country through various economic policies leading to trade and exchange liberalization, current account convertibility, liberalization of investment regime, privatization, and so on. This has led to a significant enhancement of the country's infrastructure, employment, capacity and skills of workers through technological knowledge and managerial capability, thus helping in integrating the domestic and international economy. Further, skilled labor in Bangladesh are available at a relatively lower wage compared to other Asian countries, along with an acceptable inflation rate, fairly stable exchange rate, favorable custom regulations and investment policies.

Over the years, the restrictions on capital and profit repatriation in Bangladesh has eventually been withdrawn and industrial investment policies has been made more favorable for foreigners. Moreover, various financial and non-financial incentives have been provided, such as tax exemptions, import duty exemptions, tax holiday schemes, no duty fee on the import of capital equipment and machinery, zero restrictions on entry and exit mode and the reduction of administrative hassles, thus enabling faster acceptance of foreign projects. FDI has gradually become the most important source of foreign capital for the emerging market economies (EMEs).

Opportunities in energy and power, infrastructure, manufacturing and knowledge-based sectors have been attracting substantial amounts of investment into Bangladesh over the years due to various factors such as low-cost labor, strategic location, regional connectivity and worldwide access, strong local market and growth, lost cost of energy, export competitiveness, competitive incentive schemes, export and economic zones and positive investment climate. All these incentives and liberal government policies towards foreign investment along with the aforementioned factors have made Bangladesh a favorable target for investment in the South Asian region. However, sudden unexpected political turmoil, as well as quite a lot of changes in the world scenario have severely affected and caused the effort of this structural progress to hold back over the years.

Firms which are financed through FDI are mostly export-oriented and tend to export a large proportion of their output compared to the local firms. They usually benefit from comparative advantage because of their knowledge of the global economy and markets, efficiency of various distribution channels and their adaptability to changing economies and dynamics of the world market. Moreover, Export Processing Zones (EPZs) also lead to FDI inflows and exports being positively correlated. FDI also tends to increase imports as certain capital goods such as equipment and machineries are not readily available in the country, hence needs to be imported. However, the extent to which FDI effects imports depends on whether the firms that are financed through FDI are import-substituting. In that case, overall imports would

gradually decline as these firms would be able to produce the goods that previously needed to be imported.

Consequently, it can be inferred that FDI plays a significant role in promoting economic development. Yet, this does not necessarily imply a causal relationship. The direction of causation between FDI and long run economic growth may run in either way. The increase in the level of standard of living and economic growth due to FDI inflows has not always been the case, according to empirical evidence. The advantages of FDI inflows into the economy in practice were based on theoretical aspects rather than evidential grounds. Further, there might be certain constraints on the benefits from FDI, such as local financial market development, educational level of the country, etc. which might prevent the economy from achieving higher growth despite of having substantial inflows of foreign direct investment. The higher economic growth due to technology brought by FDI would occur only when it can be backed up with a minimum level of human capital in the country. In some cases, growth in the economy due to FDI inflows might vary with the level of development in the financial markets and the quality and level of existing stock of human capital in the country.

In addition, inflation has also become a big concern for countries all over the world. The level of inflation in the economy effects the yield or return on capital, which is in turn, positively correlated with FDI. The return on investment adjusted to inflation, i.e. real interest rate captures the financial stability of the economy. Macroeconomic instability brings about uncertainty and counteracts FDI inflows.

Nevertheless, the determinants of economic growth and the linkage between FDI, trade, economic growth and inflation are not the same in the developed and less developed countries (or regions).All existing studies about the relationship and direction of causality of FDI and growth have mostly focused on the overall effects of FDI and trade on growth. Despite the enormous amount of research that has been undertaken on this topic, there remain serious methodological problems. Moreover, perhaps due to the relatively smaller level of FDI in Bangladesh compared to other South Asian countries such as India, there has not been a sufficient amount of studies on the effects of FDI on economic growth in Bangladesh.

To the best of our knowledge, none of the papers have looked at how or whether inflation in the economy has any impact on the interrelationship between FDI, trade and growth. It is also worth noting that, there were no previous studies on Bangladesh which have considered all four variables. This study, therefore, analyzes the causal relationship between FDI, trade openness and economic growth, in the presence of macroeconomic stability in Bangladesh. The remaining of the paper is organized into six sections including the earlier introduction. Section 2 describes the review of previous theoretical and empirical literatures. Section 3 discusses existing studies in the context of Bangladesh. Section 4 reports the data, methodology and model specification. Empirical findings and results are reported in section 5 and lastly, section 6 presents conclusion along with some observations, recommendations and limitations of the study.

2. Literature Review

2.1 FDI and Economic Growth

Economic growth is the increase in the value of goods and services produced in an economy over time, traditionally measured as gross domestic product (GDP) or real GDP per capita to adjust nominal GDP to inflation and eliminate its' distorting effect on prices of output. According to the national income accounting method for measuring growth, the factors of economic growth or per capita output are labor productivity (including technological progress), investment, capital accumulation; in addition to non-economic factors such as institutional structures, legal and political systems, etc.

According to the neoclassical growth theory or Solow model (1956), economic growth or per capita output is a function of the three variables: capital, labor and technology. Endogenous growth theories (Paul Romer and Robert Lucas Jr.) also lay emphasis on capital accumulation and technological progress. Moreover, the Harrod-Domar model (1939), which has been widely used in macroeconomics, has explained the growth rate in terms of the level of savings and productivity of capital, implying that more investment leads to capital accumulation leading to economic growth. Thus, capital is one of the key determinants of growth. The most fundamental determinant of economic growth, according to both neo-classical and endogenous growth model, is investment.

Foreign Direct Investment (FDI) is generally defined by an investment made in an economy by a foreign investor in the form of either establishing overseas business operations or acquiring assets, which gives them ownership or controlling interest. It plays a crucial role in promoting economic activity as it is a primary source of capital and technology transfer into the economy. According to Lensink and Morrisey (2001), multinational companies are considered to be highly advanced in terms of technology, contributing to the import of more efficient technology into the economy as well as generating technological spillovers for local firms.

There is a vast literature on the relationship between FDI and economic growth. Using different conceptual and methodological viewpoints, studies have offered various sources of economic growth and there is a huge amount of empirical studies observing the link between investment and economic growth. However, the findings are not conclusive. During the past few decades, FDI has been affecting economic growth mostly positively in many ways. However, in some cases there has been negative or no impact at all. Since the neoclassical growth theories assume that growth can only be achieved through technological advancement and higher population in the long run, the impact of FDI on growth can only be experienced in the short run. It also implies that FDI will have a positive impact on growth only if there is a significant and permanent positive effect on technology. Broadly speaking, an increase in FDI is associated with improved economic growth due to productivity gains and greater efficiency as a result of increased competition between domestic and foreign companies. It also results in a transfer of skills through training and employment opportunities created by the new businesses, more advanced technology and improved methods of research and development.

A study by Petrakos and Arvantidis (2008) has found a significant positive link between FDI and growth. It has been emphasized that if an economy trades with foreign countries and earns foreign exchange, it is possible to overcome the constraints on its further expansion and escape the vicious cycle of poverty, also known as the "development trap". The big push theory of growth emphasizes that for a country to embark upon a path of self-sustaining development, there must be large amounts of investments (Rodan, 1943; Murphy, *et al*., 1989).Blomstrom (1986) shows that a higher level of FDI is eventually followed by higher growth in productivity through greater structural efficiency and foreign firms induce a competitive pressure which leads to spillover efficiency. Choe (2003) found that the causality between economic growth and FDI is bidirectional but mostly it is growth that causes FDI. Chowdhury and Mavrotas (2006) used times series data from 1969 to 2000 for three developing countries which are major recipients of FDI—Chile, Malaysia and Thailand, following the Toda and Yamamoto causality test approach. Their results demonstrated causality that runs in either direction in case of Malaysia and Thailand, but in the case of Chile it is GDP that causes FDI. Agrawal (2015) examined the relationship between FDI and growth in the BRICS countries (Brazil, Russia, India, China and South Africa) between the years 1989 and 2012; the results showed that FDI and growth are co-integrated at the panel level, thus implying a long-term relationship between the two variables.

While macroeconomic studies generally suggest a positive effect of FDI on promoting growth, especially under certain policy conditions, there are certain other theories which provide conflicting predictions. Nair-Reichert and Weinhold (2001) have put forward that the results given by macroeconomic studies are mostly flawed due to the homogeneity of assumptions across countries regarding the FDI-growth relationship. They claim that earlier macroeconomic studies did not take into account the country-specific effects and there is a very much heterogeneous relationship between investment and growth in developing countries. Hanson (2001) has found weak evidence that FDI generates positive spillovers for host countries. Carkovic and Levine (2002) later showed that after controlling for statistical problems, the outcomes are inconsistent with the view that there is positive association between FDI and growth, regardless of the other factors of growth. Similarly, Tang (2015) studied the effect of FDI on the European Union (EU) growth during 1987 to 2012 and found that higher foreign capital flows and portfolio investment have had no impact on growth.

In contrast to the endogenous growth theory (Romer, 1993), certain theories have inferred that there are several other influences on the FDI-growth linkage such as distortions in trade, inflation, financial development etc. which create an overall adverse impact on economic growth. Boyd and Smith (1992) said that FDI may hinder the rate of growth by negatively effecting resource allocation in the presence of pre-existing trade, price and other distortions. Moreover, FDI is generally concentrated on inexpensive primary exports to developed counties, which has a negative effect on growth (Singer, 1950; Griffin, 1970).

In some cases, it is also concluded that FDI promotes economic growth only under some particular environments. Balasubramanyam, Salisu and Sapsford (1996) have emphasized on trade openness – using cross-section data and OLS, the FDI impact on growth in developing countries has been found to be relatively larger when the host country is more focused on an export promotion strategy rather than import

substitution strategy, based on the ratio of imports to GDP to determine whether a country is export-oriented or import-substituting.In addition, using both time series and panel data fixed effects estimations for a sample of 32 developed and developing countries, De Mello (1999) finds that FDI and economic growth are weakly positively correlated. Similarly, Bhatia, *et al.* (2005) provides evidence that the effect of FDI on growth is not statistically significant, for twenty OECD countries over the period 1981 – 2000. In another study by Hansen and Rand (2006), looking at heterogeneous panel data for 31 developing countries, a unidirectional Granger causality from FDI to growth has been found.

2.2 Relationship between Trade, Growth and FDI

Openness to trade is another important determinant of economic performance. Generally, the market or trade potential of a country is represented by the level of GDP in the country which attracts foreign investment, thus creating further opportunities for more trade. Openness to trade aids the transfer of technology and knowledge into the economy, which contributes to exploitation of comparative advantage through increasing exposure to competition. Also, liberalization increases specialization and division of labor, which in turn raises productivity and export capability of the country, thus improving overall economic performance. Hence it can be argued that there is a strong positive linkage between openness and economic growth, based on sound theoretical grounds. There is an enormous amount of empirical literature that has explored this linkage in practice. For instance, according to World Bank (1993), countries with more trade openness have a relatively higher economic growth compared to those which are less open. Similar views were shared by Wacziarg (1998); Lloyd and MacLaren (2000); and Jonsson and Subramanian (2001). Nevertheless, the results are not conclusive.

There has been a number of studies which highlight the methodological flaws and limitations of studies which show the positive relationship between trade and growth. Trade liberalization may harm the process of economic growth through various forms of macroeconomic stability including trade deterioration and balance of payment crisis. Therefore, the direction of causality between trade openness and economic growth is ambiguous.

FDI is likely to have a direct or indirect effect on growth through trade. Hence the causal relationship between trade, economic growth and FDI is mutual. Trade openness in the form of FDI has emerged as one of the main issues in explaining the growth phenomena in the developing countries (Dutta and Ahmed, 2001;Dawson, 2006;Estrada andYap, 2006).FDI is expected to have an impact on trade flows because it is mainly driven by two incentives—to provide resources to local markets or benefit from low cost factors of production in the host country (Hisarciklilar, *et al.*, 2006). It would be a positive impact if the country is export-oriented, and vice-versa. By applying Granger causality test to examine the direction of causalities between the FDI, trade and growth using time series data between 1970 – 2003 for several countries, they have found that for most countries there is no significant Granger causality between FDI and GDP, whereas that for GDP and trade varies in different countries. However, their results have been far from conclusive.

Some empirical evidences also provided conflicting results. Looking into data from 1980 to 2007 for Cote d'Ivoire,Serge and Yaoxing (2010)used the bounds testing co-

integration approach and the VAR Granger causality/Block Exogeneity Wald tests and revealed that there is a unidirectional long run relationship between FDI, trade openness and output; and the causality runs from FDI, trade openness to output and from output, FDI to trade openness. Both trade openness and FDI has been found to be significant factors of output growth in Cote d'Ivoire. Conversely, Acaravci and Ozturk (2012)used the ADRL and Granger causality test on the quarterly data from 1994 to 2008 to examine the long-term relationship between FDI, export and economic growth for Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. The results have showed existence of long-term co-integration in only the Czech Republic, Slovakia, Poland and Latvia. They have also concluded that the effect of FDI on growth outweighed that of export in these countries.

2.3 Effects of Macroeconomic Stability on the FDI, Trade and Growth Interrelationship

Romer (1993), Lane (1997), Terra (1998) and Bleaney (1999) have all examined the relationship between trade openness and inflation in various countries all over the world, using cross-sectional data and have assessed a strongly negative relationship between the two variables. Using panel data of 146 countries from 1973 to 1998, Alfaro (2001) found a negative and statistically significant relationship between openness and inflation in the long run, whereas in the short run there was no influence of openness on inflation.

The general idea that arises is an overall positive interrelationship between trade, FDI and growth conditioned by a stable macro economy (Manni and Afzal, 2012).According to their study, low levels of openness in Bangladesh is associated with high levels of inflation, although the impact is not statistically significant. Looking at time-series analysis of 11 developing countries in East Asia and Latin America, Zhang (2001) found that five of the countries exhibited a strongly positive relationship between growth and FDI, given a favorable trade regime and macroeconomic stability.

Increased trade openness leads to a decrease in net investment in the economy, reducing aggregate demand, thus causing the aggregate real output and price level to fall (Jin, 2006).Another study by Saleem, *et al.* (2013) based on 21 years of data from 1990 to 2011, has found that FDI is correlated with both GDP and inflation in Pakistan. Similarly, GDP growth has found to be positively related with FDI and negatively related with inflation—a bidirectional relationship between GDP and FDI whereas unidirectional causality from GDP and FDI to inflation in Ghana (Andinuur, June 2013).However, Omankhanlen (2011) examined the effect of exchange rate and inflation on the FDI-growth nexus and found that inflation has no effect on FDI.
The co-integration and causal relationship between FDI and GDP in three South Asian countries—Bangladesh, Pakistan and India—was investigated by Hossain, A. and Hossain, M. K. (2012). Based on Granger causality tests, a unidirectional relationship from FDI to economic growth was found in Pakistan, whereas in case of India and Bangladesh, there was no causality relationship between GDP and FDI. Conversely, a unidirectional short-term relationship from GDP to FDI was found in Bangladesh by Samad (2009) based on a Granger causality test and an Error Correction Model (ECM).

For the period 1972 to 2011, Tabassum and Ahmed (2014) found that FDI and trade openness are insignificant in promoting economic growth in Bangladesh. Recent research by Sethi and Sucharita (2015) examines the effect of FDI on economic growth in Bangladesh using time-series analysis based on data from 1974 to 2009, conducting a bivariate regression, Granger causality test and OLS test. A strong positive correlation between FDI and GDP growth per capita has been found from a simple regression analysis; however, multiple regression using time series data produced ambiguous results, i.e. the estimated coefficient for FDI was found to be positive but statistically insignificant. Hussain and Haque (2016) also reveals that there is a long-term relationship between FDI, trade and growth rate of per capita GDP for Bangladesh, based on annual time series data from 1973 to 2014. Using a co-integration analysis and a Vector Error Correction Model (VECM), trade and foreign investment has been found to have a significant impact on the growth in per capita GDP. On the contrary, some studies have also shown that there is absolutely no long-term connection between FDI and GDP of Bangladesh (Shimul, Abdullah & Siddiqua, 2009).

None of the existing literature focused on all four variables—inflation, foreign investment, economic growth and trade considering the economy of Bangladesh. This paper hypothesizes that more trade openness leads to greater FDI inflows, thus higher economic growth, given a stable macroeconomic condition.

3. Methodology

This paper is based on secondary data collected from World Bank, World Development Indicators online database. Time series data for trade (TRD), FDI, inflation (INF) and GDP of Bangladesh has been collected for the years 1980 to 2015. Here, the GDP is in terms of current US dollars, trade openness is represented by the amount of trade as a percent of GDP, inflation as measured by the consumer price index and FDI (net inflows) based on balance of payments data.

Unit Root Test

Unit root tests are applied to check for the stationarity of the macroeconomic variables, which involves testing of the order of integration of the individual time series under consideration. The tests are initially performed at levels and then in first difference form, considering three different models with varying deterministic components:

a) model with an intercept which assumes that there are no linear trends in the data such that the first differenced series has zero mean
b) model with a linear trend which includes a trend stationary variable to take account of unknown exogenous growth, and
c) a model which neither includes a trend nor a constant

Unit root tests tend to have non-standard, non-normal asymptotic distributions which are highly affected as the deterministic terms such as constant, time trend, etc. are included. Time trend (t) is considered as an extraneous regressor and its inclusion reduces the power of the test. However, failing to include a time trend could also reduce the power of the test if the true data generating process were trend

stationary, which would be worse than the reduction in power of the test caused by the inclusion of a time trend when it is extraneous (Lopez et al., 2005). The optimum time lag length for the unit root test is automatically chosen by the software used—EViews 8, based on the Schwartz Information Criterion (SIC).

In order to detect the existence of possible unit roots (if any) in the data set, two types of tests are used—Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979, 1981) and Phillips-Perron (PP) test (Phillips & Perron, 1988).

The ADF test relies on rejecting a null hypothesis of unit root (non-stationary series) in favor of the alternative hypothesis of stationarity. For each of the series, the tests are conducted with and without a deterministic trend (*t*).

General form of ADF test is estimated by the following regression:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum \alpha \Delta y_t + e_t \quad (4.1)$$

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum \alpha \Delta y_t + \mu_1 + e_t \quad (4.2)$$

where, *y* is the time series, *t* is the linear time trend, Δ is the first difference operator, $\alpha_0$is a constant, *n* is the optimum number of lags in the dependent variable and *e* is the random error term.
General equation for Phillips-Perron test:

$$\Delta y_t = \alpha_0 + \alpha y_{t-1} + e_t \quad (4.3)$$

This test is referred to as a non-parametric test.

Co-integration Test

Once the variables are found to be stationary, co-integration test is run to find possible linear combinations of the variables which could be considered as stationary. The superior test for co-integration is Johansen's test, which is known to provide a unified framework for estimation and testing for co-integration relations in the context of VAR error correction models (Sjo, 2008).For this purpose, an Unrestricted Vector of Autocorrelation of the following form has been estimated:

$$\Delta x_t = \alpha + \theta_1 \Delta x_{t-1} + \theta_2 \Delta x_{t-2} + \theta_3 \Delta x_{t-3} + \cdots + \theta_{k-1} \Delta x_{t-k+1} + \theta_k \Delta x_{t-k} + u_t \quad (4.4)$$

where Δ is the difference operator;x_t is a *(nx1)*vector of non-stationary variables (in levels); and u_t is the *(nx1)* vector of random errors. The matrix θ_k contains the information on long term relationship between the variables. For instance, if $\theta_k = 0$, the variables are not co-integrated. On the other hand, if the rank (usually denoted by *r*) is equal to 1, there exists one co-integrating vector. If $1 < r < n$, there are multiple co-integrating vectors. There are two tests for co-integration, namely the trace test and maximum Eigen value test (Johansen, 1990). The trace statistic test evaluates the null hypothesis, that there are at most *r* co-integrating vectors;

whereas the maximum Eigen value test evaluates the null hypothesis that there are exactly *r* co-integrating vectors in x_t.

Granger Causality Test

Lastly, the co-integrated variables are used to conduct the Granger causality test in order to examine the pair-wise causalities between trade openness, FDI, inflation and GDP. If none of the variables are co-integrated, it would be impossible to deduce a long term relationship between the non-stationary time series. The presence of non-stationarity can lead to ambiguous or misleading conclusions in the Granger causality test (Engel & Granger, 1987).

When $x$and $y$are considered as the variables of interest, the Granger causality test (Granger, 1969) determines whether past values of $y$add to the explanation of current values of$x$, as provided by information in the past values of $x$itself. *y* is said to "Granger-cause" *x* if and only if *x*can be predicted using past values of *y*. If previous changes in y do not cause current changes in x, then y does not "Granger cause"x. Similarly, whether x Granger causes y can also be examined by simply interchanging the variables and carrying out the same process again.If *x* causes *y* but *y* does not cause *x,* then the causality is said to be unidirectional from *x* to *y*. There are four possible outcomes:

i. y Granger causes x (unidirectional causality from *y* to *x*)
ii. x Granger causes y(unidirectional causality from *x* to *y*)
iii. Both x and y Granger cause each other, or
iv. Neither of the variables Granger cause each other (statistically independent)

In this paper, the causality tests among GDP, FDI, TRD and INF are conducted, for which the following two sets of equations are estimated:

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \cdots + \alpha_l x_{t-l} + \beta_1 y_{t-1} + \cdots + \beta_l y_{t-l} + u_t \quad (4.5)$$

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \cdots + \alpha_l y_{t-l} + \beta_1 x_{t-1} + \cdots + \beta_l x_{t-l} + v_t \quad (4.6)$$

The above equations are considered for all possible pairs of (x, y) series in the group. The reported F-statistics are the Wald statistics for the joint hypothesis

$$\beta_1 = \beta_2 = \cdots = \beta_l = 0 \quad (4.7)$$

As mentioned earlier, GDP in current US dollars is an indicator of economic growth, which has been considered as the dependent variable and the rest as independent variables.

$$Y = f(X_i) + \varepsilon \quad (4.8)$$

where, Y = GDP
X_i = TRD, INF, FDI

$$GDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 INF_t + \beta_3 TRD_t + \varepsilon \quad (4.9)$$

where, FDI_t= foreign direct investment
INF_t= inflation
TRD_t= trade openness
ε= error term
t = time

The next section discusses the empirical results.

4. Empirical Results

The annual level of GDP, FDI and trade (% of GDP) showed overall long-term growth whereas inflation has been fluctuating over the years (Figure 1).

Figure 1: Time Series Plot of Variables in Levels

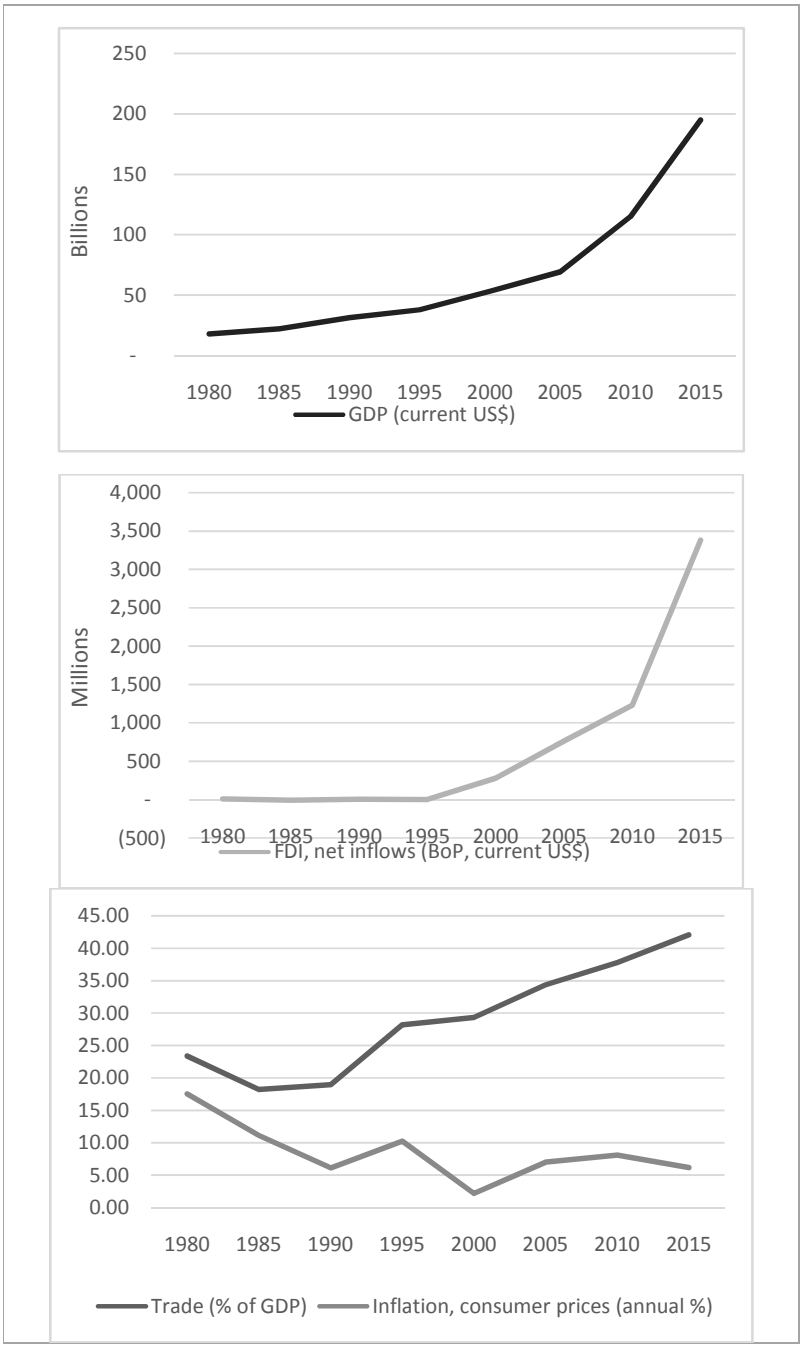
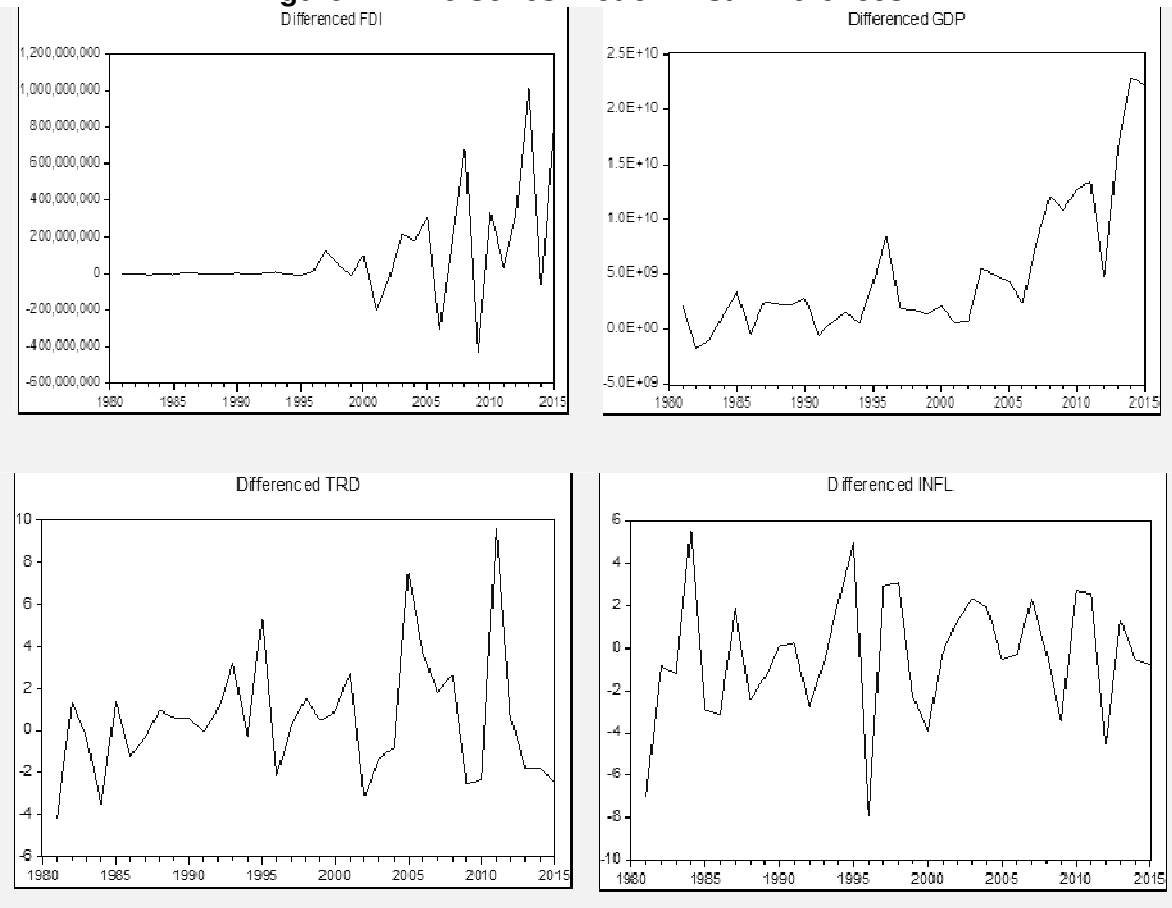


Figure 2: Time Series Plot of First Differences



In the next step, the Augmented Dickey-Fuller test for the four variables are conducted for different model specifications and lag lengths, as shown in Table 1.The test is based on the null hypothesis that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process. If the calculated test statistics are less than the critical value of the test statistics, then the null hypothesis will be rejected.

Table 1: Augmented Dickey Fuller (ADF) Unit Root Test for All Variables

Panel 1A. Levels			
	ADF Statistics (constant)	**ADF Statistics (Constant & Trend)**	**Decision**
GDP	10.34307	5.476068	Stationary
Foreign Direct Investment (FDI)	4.068677	5.649674	Stationary
Trade openness (TRD)	1.384580	-3.161564	Non-stationary
Inflation (INFL)	-4.542626	-4.374537	Stationary
Panel 1B. First differences			
	ADF Statistics (constant)	**ADF Statistics (Constant & Trend)**	**Decision**
GDP	-0.719864	-2.477275	Non-stationary
Foreign Direct Investment (FDI)	5.005932	2.123322	Stationary when constant; non-stationary considering constant and trend
Trade openness (TRD)	-2.330090	-4.770827	Non-stationary when constant; stationary considering constant and trend
Inflation (INFL)	-7.270811	-7.293527	Stationary

Note: All regression is estimated with and without trend. Selection of the lag is based on Schwartz Information Criterion (SIC). EViews 8.0 software automatically selects the most significant lag length based on this criterion.

Table 2: Phillips-Perron (PP) Unit Root Test for All Variables

Panel 2A. Levels			
	PP Statistics (constant)	**PP Statistics (Constant & Trend)**	**Decision**
GDP	10.92869	9.617753	Stationary
Foreign Direct Investment (FDI)	4.476370	2.496115	Stationary when constant; non-stationary considering constant and intercept
Trade openness (TRD)	-0.333891	-3.301346	Non-stationary
Inflation (INFL)	-4.562360	-4.370264	Stationary
Panel 2B. First differences			
	PP Statistics (constant)	**PP Statistics (Constant & Trend)**	**Decision**
GDP	-0.078767	-2.477275	Non-stationary
Foreign Direct Investment (FDI)	-6.292164	-7.884071	Stationary
Trade openness (TRD)	-6.241109	-6.420626	Stationary
Inflation (INFL)	-10.90885	-13.20183	Stationary
Note: All regression is estimated with and without trend. Selection of the lag is based on Schwartz Information Criterion (SIC). EViews 8.0 software automatically selects the most significant lag length based on this criterion.			

ADF test results suggest that all the data except trade openness are stationary in both levels and first differences. Trade openness (TRD) is only stationary in first differences, considering constant and trend. On the other hand, PP test shows that all variables are stationary except GDP in the first difference form.

Table 3 below shows the results of the Johansen Co-integration Test. The null hypothesis for the row with rank 0 is that there is no co-integration. The hypothesis is tested with rank 1 (there is one co-integration) and reject the null hypothesis in favor of the hypothesis that there is at least one co-integrating vector in the system. For rank 2 and 3, i.e. there are 2 and 3 co-integrations respectively, we accept the null hypothesis because the trace statistics are smaller than the critical values. Similar results are obtained when the tests are redone with maximum statistics in the lower panel of the table.

Table 3: Johansen Tests of Co-integration

Trace Test				
Null	**Alternative**	**Trace Statistic**	**95% Critical Value**	**Conclusion**
r = 0	r = 1	35.47473	29.79707	2 co-integrating equations at the 0.05 level
r <=1	r = 2	8.509558	15.49471	
r <=2	r = 3	0.004998	3.841466	
Maximum Eigenvalue Test				
Null	**Alternative**	**Max-Eigen Statistic**	**95% Critical Value**	**Conclusion**
r = 0	r = 1	26.96518	21.13162	2 co-integrating equations at the 0.05 level
r <=1	r = 2	8.504559	14.26460	
r <=2	r = 3	0.004998	3.841466	

Finally, the Granger Causality Test has been conducted to describe the nature of causality (if any) between the variables. The results of the test for lag 2 are reported in the following Table 4 below:

Table 4: Pair-wise Granger Causality Tests (lags: 2)

Null Hypothesis	F-Statistic	p-value	Granger Causality
GDP does not Granger cause FDI FDI does not Granger cause GDP	2.63183 2.64495	0.0891 0.0881	Bidirectional causality FDI ↔ GDP
INFL does not Granger cause FDI FDI does not Granger cause INFL	0.00367 0.05623	0.9963 0.9454	No causality between INFL and FDI
TRD does not Granger Cause FDI FDI does not Granger Cause TRD	1.73750 0.48710	0.1938 0.6193	No causality between TRD and FDI
INFL does not Granger Cause GDP GDP does not Granger Cause INFL	0.77610 0.16984	0.4695 0.8446	No causality between INFL and GDP
TRD does not Granger Cause GDP GDP does not Granger Cause TRD	3.58594 0.38436	0.0406 0.6843	Unidirectional causality TRD → GDP
TRD does not Granger Cause INFL INFL does not Granger Cause TRD	2.82654 0.76116	0.0756 0.4762	Unidirectional causality TRD → INFL

Granger causality test results show that there is a unidirectional causality running from trade openness to GDP, trade openness to inflation and a bidirectional causality between FDI and GDP.

The findings above suggest no causal relationship between inflation-FDI, trade-FDI and inflation-GDP. This does not support our hypothesis that FDI has an effect on GDP through trade. However, our hypothesis has been proven to be partially true as a bidirectional Granger causality has been found between FDI and GDP. The results of this paper seem to confirm the argument put forward by Carkovic and Levine (2002) that there is a positive correlation between FDI and growth, irrespective of other factors. However, it differs from the findings of Shimul, Abdullah and Siddiqua (2009) in that there is no long-term interrelation between FDI and growth in Bangladesh.

5. Conclusions

In this age of globalization, the two most important factors of long-term economic growth are international trade and foreign direct investment. Living standards, as measured by per capita income or GDP depends heavily on these factors. Also, more open trade policies are associated with the presence of foreign firms and economy-wide productivity gains and technological advancement, particularly in developing countries. Hence an investment-friendly macroeconomic environment and favorable policies towards the trade sector is vital for the economic development of Bangladesh.

There is a large number of applied papers that have looked at the FDI, trade and growth nexus. However, very few of them have focused on the Bangladeshi economy and did not take into account the importance of macroeconomic stability. In this study, the significant role of FDI, trade and macroeconomic stability in the process of economic growth in Bangladesh is investigated, highlighting the research gap and also expanding the time span. The main objective of this paper is to analyze the interrelationship between FDI, trade openness, inflation and economic growth in Bangladesh, using time series data from 1980 to 2015.

Based on results from Augmented Dickey-Fuller and Phillips-Perron unit root tests, Johansen's test of co-integration and Granger Causality Test, a long run co-integrating relationship has been found between FDI and economic growth of Bangladesh. The study also revealed unidirectional causality relationships running from trade openness to economic growth and from trade openness to inflation. This implies that trade openness has an impact on both inflation and the economic growth of the country. Trade openness can have both short and long run effects on inflation through changes in productivity and interest rate (Menghan, 2008). Increased trade openness leads to a rise in money circulation in the economy, thus causing overall price levels to increase.

In addition, according to Johansen tests for co-integration, there are two co-integrating relationships among the macroeconomic variables. Surprisingly, empirical findings suggest no causal relationship between inflation-FDI, trade-FDI and inflation-GDP. This does not support the view that FDI has an effect on economic growth through trade and that there is an inter-relationship between these variables. This answers the question that was put forward in the introduction of this study – whether foreign investments have an impact on growth on Bangladesh through trade, given a stable macroeconomic condition. Based on the findings, it can be concluded that FDI and growth are in fact positively associated, however, trade openness has been found to have no impact on this relationship. Also, contrary to existing literature, inflation seems to have no impact on any of the variables except trade. Therefore, the importance of effects of inflation on trade openness of a country, as discussed both theoretically and for economic policy considerations, may be overstated. However, research has also pointed out that the informal economy in Bangladesh holds a significant proportion of the overall GDP, which is large enough to distort any macroeconomic outcomes (Schneider, 2004).Hence, incorporation of the informal economy and other factors affecting growth is recommended for further studies on this issue.

Since a long-term relationship exists between FDI, trade and growth in the economy, it is important for the government to take measures in order to attract more FDI and promote trade through tariff-free access to the international market. There are several promising attributes of Bangladesh that has the potential to attract substantial amounts of investment by foreign investors from both developed and developing countries. Given the industrious low cost of energy and workforce, strategic location, export competitiveness and the growing market demand, Bangladesh can exploit these opportunities to the fullest.

Nearly one-third of Bangladesh's 160 million are living in poverty, due to high population density and lack of resources. This is a major issue and needs to be dealt with for enhancement of the country's development. Without a steady economic growth rate, such high levels of poverty cannot be reduced. Therefore, emphasis should be placed on investment and trade. Policies should be framed such that FDI inflows into the economy increase, thus generating more opportunities in the form of higher employment, income and overall output.

Moreover, financial facilities enable international integration, hence the overall financial system in the country also need to be enhanced in order to ensure ease of access to funds for foreign investors. Another crucial factor that affects the FDI inflows in Bangladesh is political instability. Political turmoil in the country, including corruption, terrorism, distorts law and order and creates an adverse impact on the overall macroeconomic performance of the country, along with discouraging potential foreign investors.

Nevertheless, one of the limitations of this study is that there are many other factors other than FDI, trade and inflation that may affect the economic growth of a country, which have not been considered. Also, the causational findings of this study may not generalize to other countries. For further research, the critical relationship between economic growth and its other factors such as political factors, innovation and R&D, socio-cultural factors, etc. in Bangladesh can be studied. Lastly, a similar study can be conducted using panel data with a larger time period and including a few other South Asian countries, which would provide a more robust representation of the actual scenario.

References

Acaravci, A. & Ozturk, I., 2012,'Foreign direct investment, export and economic growth: empirical evidence from new EU countries', *Romanian Journal of Economic Forecasting*, Vol.*2*, Pp.52-67.

Andinuur, J., 2013, *Inflation, Foreign Direct Investment and Economic Growth in Ghana,* Doctoral dissertation, University of Ghana.

Balasubramanyam, V.N., Salisu, M. & Sapsford, D., 1996,'Foreign direct investment and growth in EP and IS countries', *The economic journal*, Vol. 104 No. 434, Pp.92-105.

Blomström, M., 1986,'Foreign investment and productive efficiency: the case of Mexico', *The Journal of Industrial Economics*, Vol. 35, No. 1,Pp.97-110.

Boyd, J.H. & Smith, B.D., 1992,'Intermediation and the equilibrium allocation of investment capital: Implications for economic development', *Journal of Monetary Economics*, Vol. *30, No.* 3, Pp.409-432.

Choe, J.I., 2003,'Do foreign direct investment and gross domestic investment promote economic growth?', *Review of Development Economics*, Vol. *7, No.* 1, Pp.44-57.

Chowdhury, A. & Mavrotas, G., 2005, '*FDI and growth: a causal relationship',* No. 2005/25, Research Paper, UNU-WIDER, United Nations University (UNU).

De Mello, L.R., 1999,'Foreign direct investment-led growth: evidence from time series and panel data', *Oxford economic papers*, Vol. *51, No.* 1, Pp.133-151.

Hansen, H. & Rand, J., 2006,'On the causal links between FDI and growth in developing countries', *The World Economy*, Vol. *29, No.* 1, Pp.21-41.

Hisarciklilar, M., Kayam, S., Kayalica, M. & Ozkale, N.L., 2006, Foreign direct Investment and growth in Mediterranean Countries. *Sustainable Development and Adjustment in the Mediterranean Countries Following the EU Enlargement, FrancoAngeli, Milan*, Pp.395-420.

Hossain, A. & Hossain, M.K., 2012, Empirical relationship between foreign direct investment and economic output in South Asian countries: A study on Bangladesh, Pakistan and India', *International Business Research*, Vol. *5, No.* 1, P.9.

Hussain, M.E. & Haque, M., 2016,'Foreign Direct Investment, Trade, and Economic Growth: An Empirical Analysis of Bangladesh', *Economies*, Vol. *4, No.* 2, P.7.

Jin, J.C., 2006, 'Openness, growth, and inflation: Evidence from South Korea before the economic crisis', *Journal of Asian Economics*, Vol. *17, No.* 4, Pp.738-757.

Lensink, R. & Morrissey, O., 2000,'Aid instability as a measure of uncertainty and the positive impact of aid on growth', *The Journal of Development Studies*, Vol. *36, No.* 3, Pp.31-49.

Lensink, R. & Morrissey, O., 2001, *Foreign direct investment: Flows, volatility and growth in developing countries*, University of Groningen.

Manni, U.H. & Afzal, M.N.I., 2012, Effect of trade liberalization on economic growth of developing countries: A case of Bangladesh economy', *Journal of Business, Economics*, Vol. *1*, p.2.

Munir, S. & Kiani, A.K., 2011,'Relationship between Trade Openness and Inflation: Empirical Evidences from Pakistan (1976—2010)', *The Pakistan Development Review*, Pp.853-876.

Nair-Reichert, U. & Weinhold, D., 2001,'Causality Tests for Cross-Country Panels: a New Look at FDI and Economic Growth in Developing Countries', *Oxford bulletin of economics and statistics*, Vol. *63, No.* 2, Pp.153-171.

Omankhanlen, A.E., 2011, The effect of exchange rate and inflation on foreign direct investment and its relationship with economic growth in Nigeria. *EA1*, *1*.

Petrakos, G. & Arvanitidis, P., 2008, Determinants of economic growth, *Economic alternatives*, Vol. *1*, Pp.49-69.

Saleem, F., Zahid, A., Shoaib, B., Mohamood, M. & Nayab, S., 2013,'Impact of inflation and economic growth on foreign direct investment: evidence from Pakistan', *Interdisciplinary Journal of Contemporary Research in Business*, Vol. *4, No.* 9, Pp.236-244.

Samad, A., 2011,'Does FDI Causes Economic Growth?: Evidence from South-East Asia and Latin America', *International Journal of Economics*, Vol. *5, No.* 2, Pp.143-153.

Shimul, S.N., Abduallah, S.M. & Siddiqua, S., 2009, An examination of FDI and growth nexus in Bangladesh: Engle Granger and bound testing cointegration approach.

Tang, D., 2015, Has the Foreign Direct Investment Boosted Economic Growth in the European Union Countries. *J. Int. Glob. Econ. Stud, Vol. 8,*Pp.21-50.

Taylor, A.M., 1998, 'On the costs of inward-looking development: price distortions, growth, and divergence in Latin America', *The Journal of Economic History*, Vol. *58, No.* 01, Pp.1-28.

Uddin, G.S., Sjö, B. & Shahbaz, M., 2013,'The causal nexus between financial development and economic growth in Kenya', *Economic Modelling*, Vol. *35*, Pp.701-707.

Yaoxing, Y., 2010,'The relationship between foreign direct investment, trade openness and growth in Cote d'Ivoire', *International Journal of Business and Management*, Vol. *5, No.* 7, P.99.

Zhang, K.H., 2001,'Does foreign direct investment promote economic growth? Evidence from East Asia and Latin America', *Contemporary economic policy*, Vol. *19, No.* 2, Pp.175-185.

Appendix

Table 5

Year	Trade (% of GDP)	FDI, net inflows (BoP, current US$)	Inflation, consumer prices (annual %)	GDP (current US$)
1980	23.38	8,510,000	17.56	18,138,049,096
1981	19.25	5,360,000	10.53	20,249,694,002
1982	20.61	6,960,000	9.69	18,525,399,202
1983	20.32	403,979	8.52	17,609,048,822
1984	16.81	(553,269)	14.05	18,920,840,000
1985	18.22	(6,660,000)	11.15	22,278,423,077
1986	17.02	2,436,499	8.00	21,774,033,333
1987	16.69	3,205,087	9.87	24,298,032,258
1988	17.68	1,838,242	7.41	26,579,005,760
1989	18.33	247,908	6.05	28,781,714,764
1990	18.97	3,238,781	6.13	31,598,341,234
1991	18.89	1,390,444	6.36	30,957,483,291
1992	19.93	3,721,853	3.63	31,708,873,955
1993	23.12	14,049,887	3.01	33,166,520,085
1994	22.87	11,147,788	5.31	33,768,662,171
1995	28.21	1,896,372	10.30	37,939,748,051
1996	26.08	13,529,832	2.38	46,438,482,370
1997	26.33	139,376,153	5.31	48,244,308,275
1998	27.88	190,059,373	8.40	49,984,559,471
1999	28.39	179,662,970	6.11	51,270,569,884
2000	29.32	280,384,630	2.21	53,369,787,319
2001	32.10	78,527,040	2.01	53,991,289,844
2002	28.97	52,304,931	3.33	54,724,081,491
2003	27.66	268,285,232	5.67	60,158,929,188
2004	26.86	448,905,401	7.59	65,108,544,250
2005	34.40	760,504,266	7.05	69,442,943,089
2006	38.11	456,523,168	6.77	71,819,083,684
2007	39.94	651,029,738	9.11	79,611,888,213
2008	42.62	1,328,422,987	8.90	91,631,278,239
2009	40.09	901,286,583	5.42	102,477,791,472
2010	37.80	1,232,258,247	8.13	115,279,077,465
2011	47.42	1,264,725,163	10.70	128,637,938,711
2012	48.11	1,584,403,460	6.22	133,355,749,482
2013	46.30	2,602,962,095	7.53	149,990,451,022
2014	44.51	2,539,190,940	6.99	172,885,454,931

Source: World Development Indicators Online Database