

# Foreign Direct Investment and Economic Growth: Evidence from Bangladesh

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## Abstract

This paper examines the relationship between foreign direct investments and economic growth of Bangladesh during the period 1972–2011. After reviewing the literature on the factors affecting the growth of the economy of the country, the paper empirically evaluates the most significant factors that may influence the growth of the economy of Bangladesh during the period of 1972–2011. This study evaluates the association between FDI and economic growth using multiple regression method by considering relationship between real gross domestic product, foreign direct investment, domestic investment and openness of the trade policy regime. The results indicate that domestic investments exert positive influence on economic growth whereas foreign direct investments, openness of trade are less significant.

**Keywords:** foreign direct investment, openness, inflation, infrastructure, gross domestic product

## 1. Introduction

In the context of the new theory of economic growth, FDI is considered as an engine of growth of mainstream economics and accounts for more than half of the private capital flows between countries in the world (Thilakaweera, 2011). FDI definition will be followed in accordance with the International Monetary Fund (IMF), ‘investment that is made to acquire lasting interest in an enterprise operating in an economy other than that of the investor, the investor’s purpose being to have an effective voice in the management of the enterprise’. The same definition followed by United Nations Conference on Trade and Development (UNCTAD) in its World Investment Report (2006) and Bangladesh Board of Investment (2004). Economics has the power to change the global world. Bangladesh needs economic development to survive in this world. There are varieties of components which can boost up the economy of a country. Foreign Direct Investment (FDI) is a well-known factor in the case of economic growth. After fulfilling all the basic needs, Bangladesh is unable to gather enough domestic savings to invest in lucrative projects as it is an under-developed country. In response to this, FDI is used to be one of the major components for the economic growth of Bangladesh. Shaari, Hong and Shukeri (2012), Hetes, Moldovan and Miru (2009), Z. K. Kang (2010) confirms that FDI can enhance economic growth. FDI in any country not only represent the investment of the foreign nation but it also transfers the better and current technological innovations, enhanced human resource and administrative ideas, well trained labor force and management skill. However, Ludosean (2012) and Athukorala (2004) found that FDI is not the initiative of economic growth. FDI leads to international trade and economic growth (Oladipo, 2010). My research question is FDI is not only limited to transfer or foreign money but also works for growth of an economy. My research also focuses on how FDI influenced through economic factors and how FDI revenue can change export revenue from the perspective of Bangladesh.

FDI has the potential to enhance the economic growth of developing countries. It is really hard for Bangladesh to accumulate sufficient domestic savings after meeting all the basic needs of the country. Therefore, FDI is truly important for such a least developed country like Bangladesh. Bangladesh became an independent country in the year 1971 and it has been supported by the International Development Association (IDA) as IDA provided more than US\$16 billion support for policy reforms and investment projects since 1972. According to World Bank, IDA used to be one of the major foreign aid providers of Bangladesh. Therefore, study on FDI and economic growth is timely important and it will definitely give some inputs to identify the magnitude of relationship

between FDI and economic growth in Bangladesh while evaluating the impact of policy measures adopted by the government of Bangladesh thus far to attract FDI.

## 2. Literature Review

FDI became an important issue nationally and internationally these days. J. Dunning, S. Hymer and R. Vernon are undoubtedly the world's leading scholars who worked a lot on the subject of multinational corporations and international business and they mainly focus on FDI, which is an important element of economic development in all countries, especially in the developing ones. Though it has been observed from a few empirical studies that the effects of FDI are complex considering economic development, FDI would transfer new technology, increase managerial skills, know how, expand productivity, international production network, create linkages to foreign markets and reduce unemployment. These are the positive effects on economy for which many countries get attracted to these and invest in FDI, Caves (1996).

In the perspective from a traditional macroeconomic point of view, FDI flows from the country of origin to host countries focusing on the capital flow and collection of revenue from the investments. On the other hand the microeconomic view of FDI is not limited to transfer of capital but it also looks into the motivation of investment across the country of origin, the intention of investors for investing rather than the flow of investment and stock (Lipsey, 2002). It has been also observed from the perspective of macroeconomics that FDI generates employment opportunities, increases production, builds competition among local businesses and achieves benefit through new technological knowledge and innovative ability of other firms and countries, Denisia, V. (2010). However, FDI means higher exports, replacement of bank loan, connection to foreign markets and foreign currencies in the case of developing countries.

The most important way to look at FDI is through Dunning's Eclectic Framework or OLI (Dunning, 1993a) where OLI refers to Ownership advantages, Location advantages and Internalisation advantages. Dunning explained that a country of origin should have ownership advantages over the host country and also extended the concept by emphasizing on the issue of getting more benefits by applying these OAs in suitable location where it will be produced in a more efficient manner.

After the Second World War FDI became an important phenomenon in the international economy. The core objective of FDI drives a firm to invest the projects abroad rather than export. A number of researchers explained FDI from their own point of view which is the outcome of their research and all those new outcomes added some new theories to the previous one.

The relationship between FDI and economic growth has been studied by many researchers all over the world so far. Even though the topic of FDI and economic growth is general, but the relationship between FDI and economic growth is reasonably important for less developed countries. There are many different economists who applied various approaches to identify the relationship between FDI and GDP in different nations in the global world. Authors have made conclusions consistently with each other, but conclusions of others are not the same even contradictory. FDI and economic growth has been studied quite extensively mainly based on developing economies in the recent literature of studies and outputs of the studies recorded mixed results. Some of the studies examined the impact of FDI on economic growth and found that FDI has positive and significant impact on economic growth in the host country with time lag. Shaari, Hong and Shukeri (2012) reveal that FDI and real gross domestic product (GDP) in Malaysia have positive relationship and also found that FDI has given significant impact on Malaysian economic growth while Hetes, Moldovan and Miru (2009) also showed that FDI has positive impact on economic growth in the Central and Eastern European countries.

From the perspective of Vietnam, Nguyen (2006) came up with the summary that both FDI and economic growth are supportive to each other and this is how they have two way linkages in between them. During 1996–2005, FDI has direct and positive effects on GDP in Vietnam and it has been also observed by the author that larger economic growth would have been possible in Vietnam if they had invested more resources in the development of financial markets, enhancement of training and education and minimizing the technology gap between Vietnam and foreign firms. P. Srinivasan, M. Kalaivani and P. Ibrahim, (2010) agreed to Nguyen and concluded that there is a bidirectional relationship between FDI and GDP in Vietnam. On the other hand Z. K. Kang (2010) came up with the same conclusion of bidirectional relationship and positive link between FDI and economic growth from the perspective of Cameroon during the period of 1980–2009. Moreover, he also added here that domestic investments are less important compared to external remittances particularly in Cameroon.

Market demand, quantity of firms in the market, initial cost to set up any plant, marginal cost of a firm and FDI policy of the particular host country are some major factors on which the foreign firm's investment depends on whether they should enter the host country or not (Qiu & Wang, 2011). Generally, Greenfield investment is not

attractive as the initial cost for setting up the plant is very high; however, brownfield or cross-border merger is more likely to be chosen in the case of low marginal cost of domestic firms.

Jenkins and Thomas (2002) and World Bank (2000) pointed out that many scholars have their full faith on FDI because they believe that FDI has the power to develop human capital, knowledge of new technology, create new job opportunity, facilitate foreign trade, and increase domestic investment and tax revenue. These are some major changes which could be possible in any country because of FDI inflow and these changes could bring employment growth, economic development and ultimately poverty could be reduced. However, Mayne (1997) describes that the impact of FDI on poverty depend on some other factors. These are institutions, policies, economic environment, labor market quality and investment pattern of the host country.

A study done by Samad (2009) examined the relationship between FDI and economic growth of nineteen developing countries of South-East Asia and Latin America and his result shows that Latin American countries had a long run and short run relationships between GDP and FDI while one country that was Sri Lanka in the East and South East Asia also indicated long run relationship. Besides that, there was bidirectional relationship in East and South East Asian countries. Meanwhile, Balamurali and Bogahawatte (2004) examined the relationship between FDI and economic growth in Sri Lanka. Ludosean (2012) provide evidence that the FDI does not initiate economic growth and that economic growth is an important factor in terms of attracting FDI in Romania.

However, findings of number of studies on FDI and economic growth also show that there is no significant relationship between FDI and economic growth. Study engaged by Athukorala (2004) illustrate that the regression analyses do not provide support for the view of a relationship between FDI and economic growth in Sri Lanka. Ousseini, Hu and Aboubacar (2011) found that FDI as compared with Domestic investment do not have significant impact to the economic growth in Niger and domestic investment only has positive impact on economic growth.

From the context of the neoclassical models, Solow (1956) pointed out that there is no other effective channel like FDI that can transfer the knowledge of new technology and develop growth of a country. According to the law of diminishing marginal return, the impact of FDI on growth rate of output reduces for an extra input of labor. Therefore, N. Balamurali and C. Bogahawatte (2004) described that the level of output resulted through FDI but not the growth rate.

FDI has been seen as an effective channel to transfer technology and foster growth in developing countries within the framework of the neoclassical models (Solow, 1956). The impact of FDI on growth rate of output was constrained by the existence of diminishing returns of physical capital. Therefore, N. Balamurali and C. Bogahawatte (2004) noticed that the level of output is the outcome of FDI investment and it is difficult to change the growth of output in the long run. However, modern theory of economic growth viewed FDI as an engine of growth. After doing a range of studies the World Bank (2002) declares FDI as the most important tool that can stimulate the economic development of the foreign country by improving the productivity and export revenue of the foreign country. However, the behavior and the relationship are not same between foreign multinational companies and their host countries as different country has different strategies and policies in their own country.

According to Neo-classical growth model, there is a tendency to get higher productive return and higher growth rate if proper amount of capital has been invested by the developed countries to the less developed countries as under developed economies do not have sufficient capital stock. In other words, long term investment like FDI can make available higher productive growth in the economy where capital stock is limited but for the short term period. However, this higher productive growth can influence the whole economy of that particular country for the long term period. From the perspective of the new endogenous growth theory, Romer (1986) proposed that FDI has the power to increase growth efficiency that can bring comparative advantages in the less developed economies and ultimately helps the poor economy to catch-up rich economy in the long-run.

FDI inflow plays major role on capital enhancement and other spillover effects on skill development, technological progress, efficient usage of utilities and green innovations, industrialization, trade and government investment in Bangladesh.

Todaro and Smith (2003), Hayami (2001) argues that FDI might fill the gap between investment and domestically mobilized savings as they believe that improvement of management, technology, labor skills in host countries and increased tax revenues are the results of FDI flow. Hayami (2001) also added that FDI sometimes helps a country to come out from crucial situation of underdevelopment.

Looking at two most popular developing countries China and India, Zafar, Imran and Ramzan (2013) considered FDI as an important tool to market growth. United Nations Conference on Trade and Development (2005) and

UNCTAD (2006) pointed out that FDI is an important element that can bring globalization to host economies by transferring know-how, upgrading technology and managing skills exchange.

Adhikary (2011) emphasized on strong unidirectional long-term causal flow which has been recorded from the changes of FDI, trade openness and capital formation to foster the growth of GDP. In response to this, he investigated the linkage between FDI, trade openness, capital formation, and economic growth rates empirically in the context of Bangladesh where time series data gleaned based on the time period of 1986–2008 and a strong long-run linkage found among the variables.

FDI receives more attention from all over the world from the last two decades and plays a positive role in the process of economic growth. According to Thomas et al. (2008) foreign multinational corporations became popular by developing new products and technologies faster compare to local firms, and thus competition increases among local firms to make similar products like multinationals as well as innovative products. Therefore, Zafar, Imran and Ramzan (2013) found this as the main reason of why the developing countries are trying to attract more FDI.

Zafar, Imran and Ramzan (2013) observed that increased number of new jobs, improved income level, high growth of GDP and ultimately high quality living standards are the outcome of proper utilization of FDI in respect to developing countries. Therefore, all policymakers agreed on one point that FDI imposes positive impact on productivity of host countries. Moreover, FDI can reform a national economy and promote economic development.

Blomstrom (1994) observed that effectiveness increases among local firms in Mexico and Indonesia. On the other hand, Smarzynska (2002) concluded that FDI spillovers through backward linkages resulted higher impact on local firms compare to multinational firms in Lithuania. Borensztein (1998) and Findlay (1978) concentrated on economic development, technological improvements of less-developed countries which are the results of FDI investments.

Hanson (2001) explained a few positive sides of FDI whereas Greenwood (2002) came up with negative effects of FDI that it may crowd out local firms that hampers the developments of economy. Lipsey (2002) came up with a very good conclusion that there is no consistent relationship between FDI stock and economic growth though there are positive effects that depend on the nature of the investment sector where the FDI invested.

Finally, FDI channels much needed capital for investment and provides support to capital formation; trade openness facilitates the flows of international capital and redirects factor endowments to more productive sectors; a high level of capital formation ensures needed finance for the industries growth and development; and all of them jointly promote economic growth at large. From this perspective, the linkage between FDI, trade openness, and economic growth ought to be positive. Not only this, this nexus should be co-integrated in the long-run. However, a question arises whether this nexus works equally for all developing countries, particularly in Bangladesh.

### **3. Method**

#### *3.1 Source of Data*

The research is based on regression analysis and graphical representation with the help of economic data to show economic progress. The data was collected from a range of different journals and articles and some data taken from different publications. Dynamic annual time series data from 1972 to 2011 has been used for this study from the website of World Bank. Annual Report of Central Bank of Bangladesh, monthly bulletin and Economics and Socio Statistics publications of the Central Bank of Bangladesh.

- i. Annual FDI data: taken from World Bank, FDI data converted from current prices to constant 2000 U. S. dollars
- ii. Economic Growth: As measured by GDP from World Bank
- iii. Export revenue: Source from World Bank

#### *3.2 Data Analysis Model*

The relationship between FDI and economic growth undertakes to set as FDI provides a substantial support to economic growth. Assuming a production function of  $Y = f(\text{FDI}, K, L)$  where Y represents aggregate real output, K is the capital stock, L is the labor force and the FDI represents the amount of foreign Direct Investment. Policy reforms and trade liberalization has a major impact on economic growth of any country. Manni and Afzal, (2012) concludes that trade liberalization policy improves the export of Bangladesh which ultimately advances the economic growth mostly from 1990. In this study openness of trade used as an independent variable where it

adds export and import and shows how economic growth changes because of liberalized trade. Because of unavailable data of capital stock, most of the studies, (Barro, 1999) took the ratio of gross fixed domestic investment to GDP as an alternative variable in the place of capital stock (K). As the interest of this study is to measure the FDI impact on the economic growth, therefore, nationally owned investment taken as another dependent variable. Here, nationally owned investment used as domestic investment (DOMINV) which is an alternative to K where DOMINV is the gross fixed domestic investment minus net FDI inflows. According to Athukorala (2003), the dependent variable (L) dropped from the regression equation based on the concept of Bangladesh is a labor surplus economy.

According to Athukorala (2003); Balamurali and Bogahawatte (2004), estimating multiple linear regression equation used in this study is:

Model: 1

$$GDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 DOMINV_t + \beta_3 OPEN_t + \varepsilon_t \quad (1)$$

Where,

GDP=Gross Domestic Products (constant in 2000 U. S dollars);

FDI=Foreign Direct Investments (constant in 2000 U. S dollars);

DOMINV=Domestic Investments (constant in 2000 U. S dollars);

OPEN=Exports+Imports (constant in 2000 U. S dollars);

$\varepsilon_t$  = Stochastic error term.

However, as the major concentration in this study is economic growth, therefore, the study extends its analysis through the two more following regression equations. Here equation (2) differs from equation (1) by taking  $\Delta GDP$  which is equal to  $(GDP(t) - GDP(t-1)) / GDP(t-1)$ .

Equation (3) adds 3 dependent variables which are lagged FDI, lagged DOMINV and lagged OPEN.

From an economic perspective, FDI, domestic investment and openness of trade may not immediately affect growth of an economy. Instead, the lagging effect on economic growth may be more reasonable since economic growth changes its behavior after a period the change of FDI inflow, effects of free trade and changes in domestic investments. Hence, it is reasonable to add consideration of lags of FDI, DOMINV and OPEN in the model.

Model: 2

$$\Delta GDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 DOMINV_t + \beta_3 OPEN_t + \varepsilon_t \quad (2)$$

Model: 3

$$\Delta GDP_t = \beta_0 + \beta_1 FDI_{t-1} + \beta_2 DOMINV_{t-1} + \beta_3 OPEN_{t-1} + \varepsilon_t \quad (3)$$

Model: 4

$$\Delta GDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 DOMINV_t + \beta_3 OPEN_t + \beta_4 FDI_{t-1} + \beta_5 DOMINV_{t-1} + \beta_6 OPEN_{t-1} + \varepsilon_t \quad (4)$$

Here,  $\beta_0$  is the intercept and  $\beta_1, \beta_2$  and  $\beta_3$  are coefficients of FDI, DOMINV and OPEN in equation 2 whereas  $\beta_1, \beta_2$  and  $\beta_3$  are coefficients of lagged FDI, lagged DOMINV and lagged OPEN in equation 3.

Here,  $\beta_0$  is the intercept and  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  and  $\beta_6$  are coefficients of FDI, DOMINV, OPEN, lagged FDI, lagged DOMINV and lagged OPEN in equation 4.

All the data of FDI, GDP, Exports, Imports, Domestic Investments, and Inflation are collected from the data bank of World Bank. Here, the data of FDI was found in current U. S. dollars and converted to constant 200 U. S. dollars after calculating the GDP deflator where base year is 2000.

To estimate the regression, the study focuses on the data of FDI, exports, imports, and gross domestic investment where gross domestic investment is constraint by the value of depreciation. Net domestic investment is actually gross domestic investment minus depreciation; therefore, by taking into our calculation the gross fixed domestic investments, the study is ignoring the depreciated value of the domestic investment each year. Another limitation found in this study is, the regression model is unable to express its result in the log-linear ( $\ln Y = \beta_0 + \beta_1 X$ ) form which expresses an increase of one unit of X is associated with a  $100 \times \beta_1\%$  increase in Y. However, expression of regression in log-linear form is only applicable when all the observations in the data set are positive and here in this study, it is constrained by the negative value of some FDI data. Therefore, the study continued its regression model based on the linear-linear ( $Y = \beta_0 + \beta_1 X$ ) form which expresses an increase of one unit of X is

associated with an increase of  $\beta_i$  units of Y.

#### 4. Findings from Graphs

Rodriguez (1996) and Rodrik (1999) observed strong and positive relation between openness and economic growth. Kraay and David Dollar (2001) provides evidence on trade liberalization, growth and poverty reduction by concluding with the findings that rapid development took place in one third of the under-developed countries of the world.

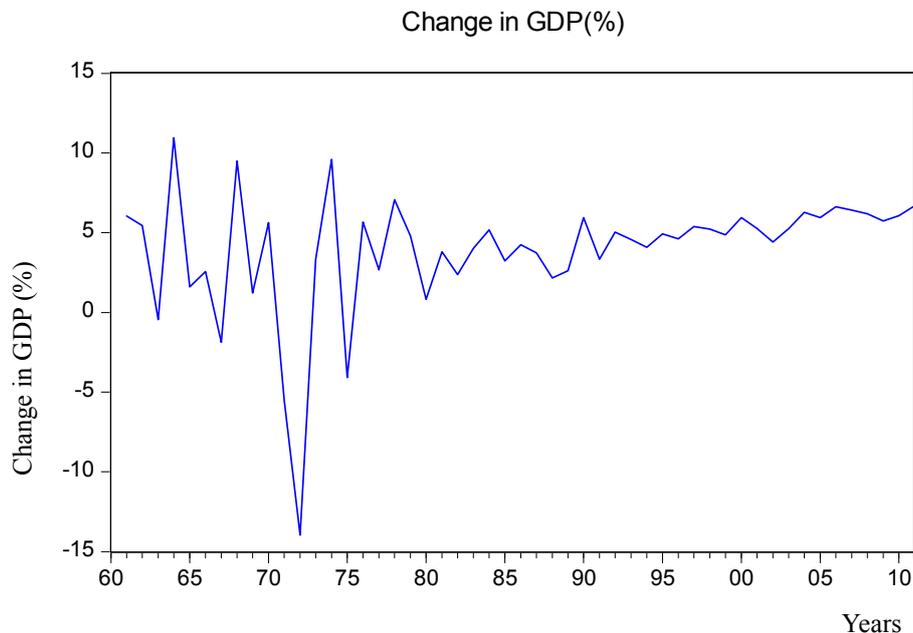


Figure 1. Percentage change in GDP year by year

Looking at the graph of percentage change in GDP (Figure 1), it is obvious that the line (percentage change in GDP) is a little bit consistent from the year 1980 compare to the period of 1960–1980. The growth rate fluctuates at a higher rate compare to the period of 1980–2011. During the time period of 1990s decade, GDP of Bangladesh almost become double as tariff and non-tariff barriers were reduced (Kraay & David Dollar, 2001). Islam (1992) observed high economic growth in Bangladesh due to the effect of domestic resources compare to foreign resources concentrating on the period of 1972–1988.

To assist private investment, Bangladesh government introduced ‘Board of Investment’ in 1989 by focusing domestic and foreign sources. The government also reduced the restriction on capital and profit which comes from foreign countries and opened up almost all industrial sectors for foreign investors so that their investment with local partners can increase. According to Billah (2012) a huge amount of foreign exchange flows out from the country every year as Bangladesh has some shortcomings in its policy.

In Bangladesh, during the time periods of relative economic and political stability, Foreign Direct Investment inflows have responded positively in the periods of 2000–2011.

Looking at the FDI history, volume of FDI is low in Bangladesh even though the country has been identified by global institutions as a highly attractive investment destination and wide-ranging incentives received from foreign investors.

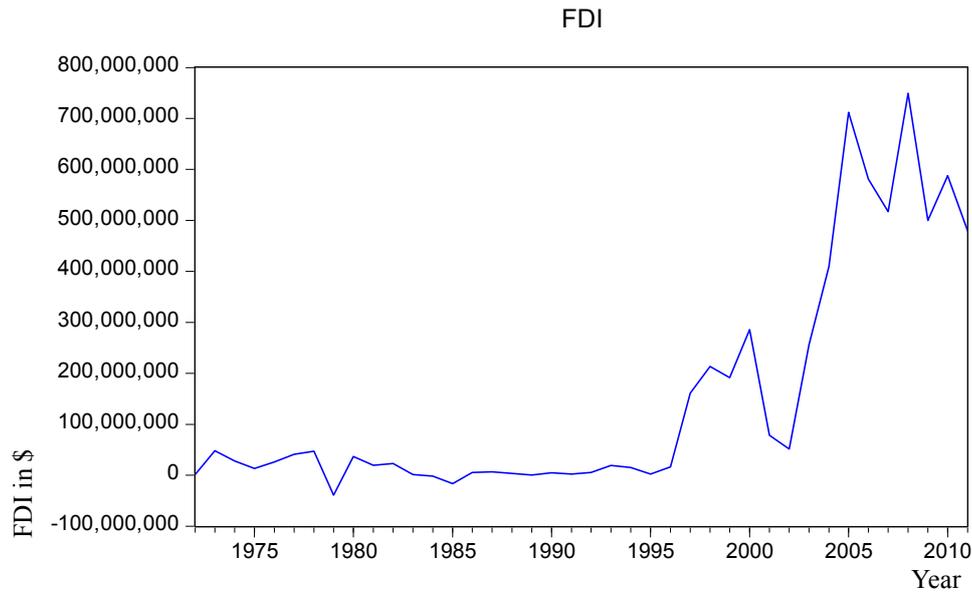


Figure 2. Foreign direct investment year by year

Bangladesh received FDI 0.09 million U. S dollars just after the 1 year of its independence. After that inflow of FDI fluctuated a lot till 1979. FDI played a minor role in the economy of Bangladesh until 1980. Looking at the above graph, it seems that inflow of FDI was very inconsistent until 1980. Nevertheless, in the year 1980 inflow of FDI increased a bit and it was quite consistent till 1995. Moreover it seems from the graph Figure 2 that the inflow of FDI was in increasing mode from the year 1996 to year 2000 but then it dropped a bit, however, the scenario changes with the dramatic increment of FDI in the year 2003. Though substantial improvement seen in the year 2005, however, inflow of FDI dropped a bit again in the period of 2006–2007, but then again extensive improvement was seen in the year 2008 compare to the period of 2009–2011 where the year 2009 effected by the world recession. Eventually, it is a fact that inflow of FDI is gradually increasing in Bangladesh after the year 1980.

Openness of trade can bring progressive economic growth resulted from positive effect of exports, imports, FDI and remittance. Open trade regime is a great support for the market to operate in a better way as most of the empirical evidence proved positive effects of liberalization on economic growth (Dollar, 1992; Frankel & Romer, 1999; Dollar & Kaaray, 2001; Bhagwati & Srinivasan, 2001; Wacziarg, 1998).

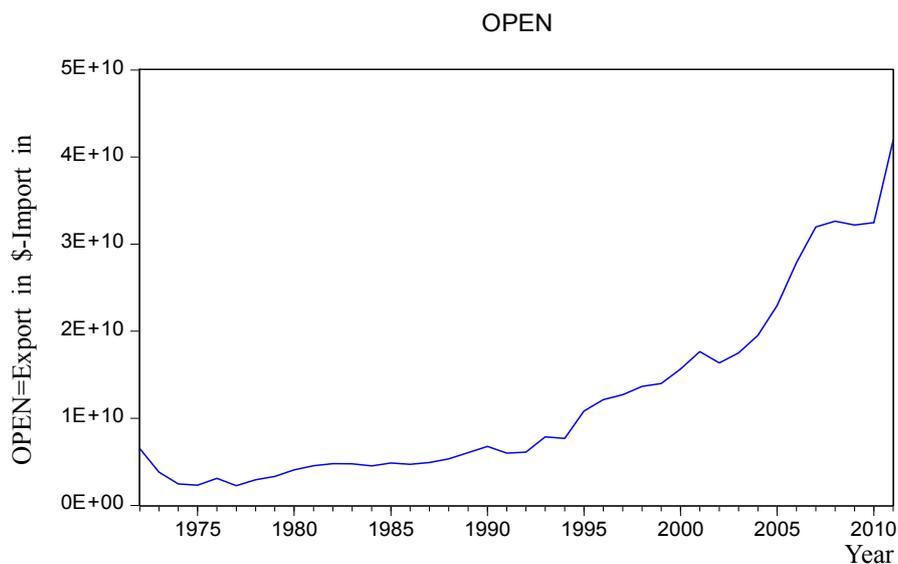


Figure 3. Openness of trade year by year

In the case of Bangladesh, trade liberalization policy in 1990 opened up the opportunity that truly enhances the economic growth of the country. One fifth of the economy destroyed during the Liberation War of 1971 and economic growth slowed down for the next two decades (Manni & Afzal, 2012). Then the economy accelerated sharply after the initialization of trade liberalization policy in 1990 and restoration of democracy (Islam, 2001). Because of successful expansion of export-oriented garment industry and the implementation of Green Revolution, Bangladesh economy developed in the last two decades (Manni & Afzal, 2012). Use of pesticides and high yield different types of grains made this green revolution successful enough that they enabled Bangladesh to survive in the weakening global economy with the help of high productive rice.

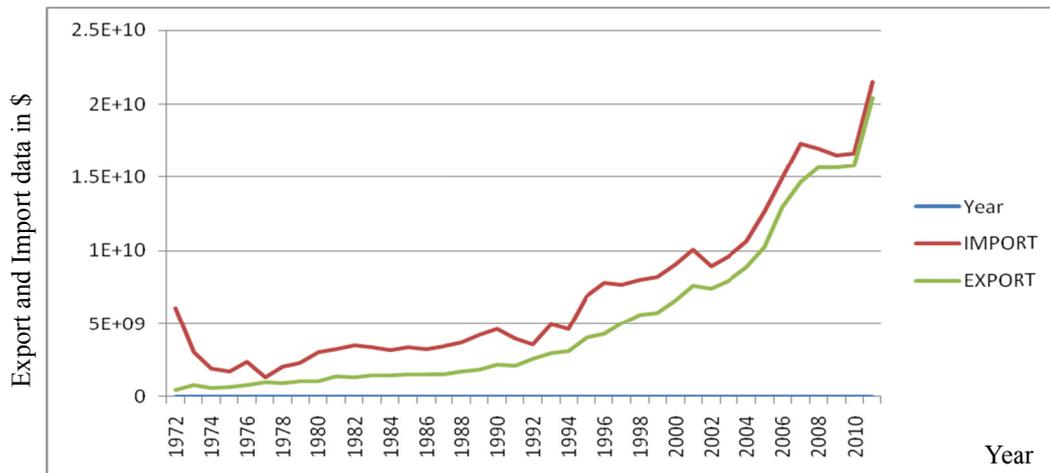


Figure 4. Comparison of export and import data year by year

In the case of gross capital formation, it is apparent from the below graph (Figure 5) that domestic investment (DOMINV) is gradually increasing two years after the Liberation War since 1974. From the year 1998 growth was increasing at a faster rate compare to previous time period and till now it is in increasing mode.

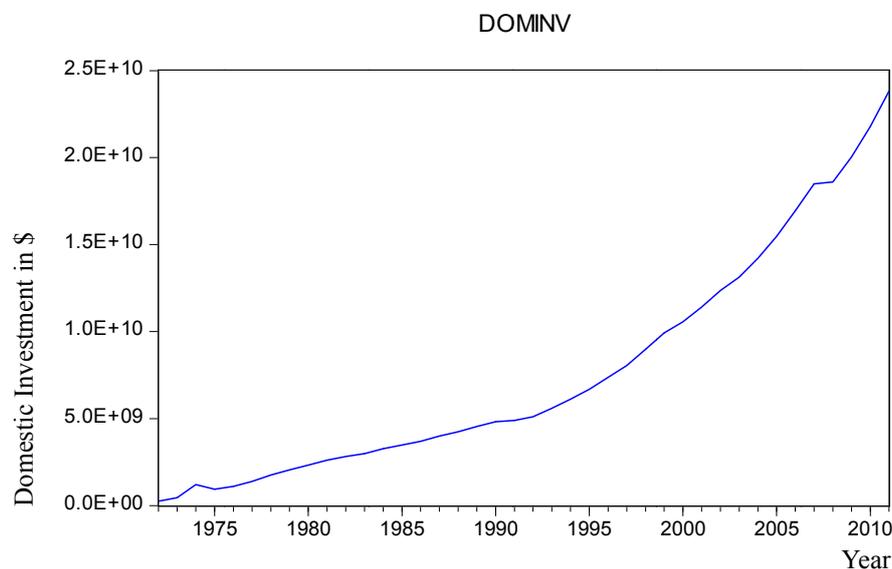


Figure 5. Domestic investment year by year

## 5. Findings from Model Estimation

Multiple regression analysis is employed to examine the casual nexus between FDI and economic growth for the period of 1972–2011. ‘Multiple linear regression’ explores the relationship between one dependent variable and

two or more independent variables to see the impact of independent variables on dependent variable. From the perspective of Bangladesh, in this paper, we concentrate to trace the relationship between FDI, trade openness, capital formation, and economic growth over a period of 1972–2011. In doing so, we consider changes in real GDP as an indicator of economic growth. FDI is standardized by GDP to remove the problem associated with absolute measurement.

Time series data from the period of 1972–2011 have been collected from World Development Indicators published by World Bank. E-VIEWS 7.0 software was used to run multiple regression analyses. All the models estimated multiple linear-linear regression employing the relationship among GDP, FDI, DOMINV and OPEN. Here GDP is Gross Domestic Products, FDI is Foreign Direct Investments, DOMINV is gross capital formation/gross domestic investments and OPEN is the combination of exports and imports. All the values are in constant prices based on 2000 U. S. dollar.

The summary of regression analysis is presented below (Table 1):

Table 1. Summary of regression

Variable	Model 1	Model 2	Model 3	Model 4
Constant	1.39E+10***	2.91E+08**	3.33E+08**	2.58E+08**
	-2.79E+08	-1.07E+08	-1.24E+08	-1.17E+08
FDI	-2.014574	0.589943		1.037598
	-1.588682	-0.591341		-0.666737
DOMINV	3.135851***	0.106093*		0.601233**
	-0.13313	-0.058968		-0.221553
OPEN	0.033	0.054043		0.065444
	-0.087108	-0.037885		-0.046952
FDI(-1)			1.03094	-0.414041
			-0.719319	-0.812329
DOMINV(-1)			0.185492***	-0.541145**
			-0.05695	-0.24126
OPEN(-1)			0.004125	-0.007262
			-0.041397	-0.041623
R-squared	0.997787	0.937243	0.926573	0.947008
F-statistics	0	0	0	0

Note. Standard errors are reported in parenthesis, and \*\*\*, \*\* and \* denote the significance at 0.01, 0.05 and 0.10 levels respectively.

The above table is the summary of all the four models of regression estimation. The coefficient of each independent variable expresses how much dependent variable changes for a change of one independent variable by holding other independent variables constant.

## 6. Summary of Models

Model 1 is ignoring the growth of GDP in their regression estimation and model 2 is ignoring lagged variables. As the effect of a previous value of the lagged variable is important in understanding the outcome of current period, hence, this study estimated model 4 to see the lagging effect of the same variable on the GDP growth. It is likely that model 4 is better in comparison of other models. In an economic point of view, it is reasonable to consider the previous DOMINV, FDI and OPEN behavior of an economy because they may influence the growth of GDP, besides the influence from the current values of the same variables.

The study extended its investigation by adding current and lagged values of FDI, DOMINV and OPEN to Model 4, therefore tried to reveal whether lagged variable effects more or not compare to current prices of the same variable. According to the results from the estimations, the DOMINV is insignificant as the P-value is more than 10 % significance level. However, coefficient looks better in FDI, DOMINV and OPEN rather than lagged FDI, lagged DOMINV and lagged OPEN.

F-statistics is the measurement which determines whether a range of independent variables are jointly influence dependent variables or not. In this study, the good news is, in all the models, the Prob. (F-statistic) is 0.0000, which is smaller than 0.01, means all the independent variables of each model are jointly influencing the dependent variable of GDP in model 1 and growth in GDP in other models.

According to statistics, the null hypothesis refers to a general or default position that there is no relationship between two measured phenomena. Therefore, rejecting or disproving the null hypothesis means that there is a significant relationship between the two phenomena. In this study, P-values of DOMINV are less than 0.10 in all the models whereas the value is less than 0.05 in model 3 and 4, meaning that the null hypothesis is rejected and relationship is significant. However, P-values of OPEN and FDI are more than 0.10 in all the models, therefore the null hypothesis is not rejected and thus relationship is insignificant among GDP growth, FDI and openness of trade. So relation between GDP growth and domestic investment is significant whereas relation among FDI, OPEN and GDP growth is not significant.

## 7. Concluding Remarks

If we look back to the literature review of this study, it is quite clear that there is a range of arguments about the statement of FDI can bring up economic growth or not. Positive association between FDI and GDP growth where FDI can enhance economic growth has been investigated after doing a range of studies by Shaari, Hong and Shukeri (2012), Hetes, Moldovan and Miru (2009), Z. K. Kang (2010). After investigating the relationship between FDI and economic growth, Nguyen (2006) found positive result in Vietnam and Balamurali and Bogahawatte (2004) found the association positive in Sri Lanka. After doing research on China and India, I. Zafar, M. Imran and M. Ramzan (2013) considered FDI as an important factor for growth. Borensztein (1998) and Findlay (1978) explored technological improvements and economic enhancement of less-developed countries which are the results of FDI investments. Hanson (2001) explained a few positive sides of FDI. According to Ahamad and Tanin (2010), gradually increased FDI in recent years has had positive influence on the economic progress of Bangladesh.

This study investigates the linkage between FDI, domestic investment, openness of trade and economic growth from the perspective of Bangladesh followed by the time series data from 1972–2011 time periods. In this study, the significance of lagged response variables followed by F-statistics reveals that the independent variables are jointly significant as the P-values are less than 0.01 in all those models. It has been also explored by the study that domestic investment is more significant compare to other two independent variables and domestic investment has positive effect to foster the economic growth of Bangladesh. This study results also support the study of Adhikary (2011) where he examined the relationship among growth of real GDP, volume of FDI, level of capital formation, and therefore revealed significant positive effects from the perspective of Bangladesh.

In this study, P-value represents the domestic investment (DOMINV) is significant as the P-value is low in all those models. On the other hand, FDI and Openness of trade (OPEN) showed insignificance with high P-value. The reason could be the robust import compare to export in Bangladesh, henceforth openness of trade policy might not be an effective one. FDI is promoting the growth of GDP but this is again not true for Bangladesh as the P-value showing the level of insignificance level with high P-value. So, it is clear that FDI possess less relation to boost up GDP to grow. Changes in FDI inflows can change economic growth is not ascertained in this study. However, the other way round could be that, the growth of GDP could be the reason for increasing value of FDI rather than FDI promotes GDP. However, Ahamad and Tanin (2010) investigated the relationship between FDI and GDP empirically in the context of Bangladesh by analyzing time series data of 1970–2006 and therefore revealed economic growth attracted FDI inflow instead FDI generates economic growth. The same sort of point agreed by Ghali & Al-Mutawa (1999), Levine and Renelt (1992), and Barro (1991), Adhikary and Mengistu (2008) that domestic investment can raise economic growth and FDI as well. In response to this, Raihan (2011) explored that Bangladesh GDP growth in recent years resulted mostly because of improvement of domestic investments. In this study, the low P-value of all the models are also represents significance between domestic investment (DOMINV) and GDP growth.

Theoretically it is true that trade openness and economic growth should possess a positive association but the study of Levine and Renelt (1992), and Krugman (1994) traced insignificant or negative relationship between them. The same sort of result found by Adhikary (2011) and there he revealed reasons behind the negative association between the trade openness and economic growth rates in Bangladesh. He pointed out exchange rate depreciation, large volume of imported materials and negative trade balance position are major reasons behind this negative relationship. In this study, robust import has been found in Figure 4 compare to export in Bangladesh since 1972. In this study, the P values of openness to trade are more than 0.10 in all those models; therefore, the openness to trade and economic growth are insignificant. Therefore, export revenue can change because of change in FDI inflows has not been ascertained.

Finally, international finance and neoclassical growth theory says, there is a positive relationship between the rate of economic growth and the rate of capital formation and also revealed by the study of Kormendi & Meguire

(1985), Barro (1991), Levine & Renalt (1992). In response to this, Bangladesh is one of them that they are utilizing domestic investment more effectively for economic development and attract FDI as well.

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#### Appendix A. World Bank Data in Dollar Value from Year 1979–2011

Year	DOMINV	FDI	GDP	IMPORT	EXPORT	OPEN
1979	2046231839	-38859395.84	20294806754	2267716594	1037295645	3305012239
1980	2320926639	36676815.34	20461050013	3026002454	1047202680	4073205134
1981	2609552934	19651037.96	21238978734	3208162443	1340683066	4548845509
1982	2819181408	23086490.86	21743716016	3509873193	1280945615	4790818808
1983	2985097287	1221658.622	22616962795	3364303923	1399252857	4763556780
1984	3273139215	-1541833.088	23788673522	3146692591	1386034953	4532727544
1985	3485015996	-16273895.34	24555449226	3374574071	1495514690	4870088761
1986	3694569926	5356430.34	25598704785	3234240563	1478326745	4712567308
1987	3995066807	6524097.503	26554115959	3418650120	1506420628	4925070748
1988	4241517774	3374660.029	27127473044	3674799677	1667300728	5342100404
1989	4542020815	422963.8377	27836138078	4227751457	1815710226	6043461683
1990	4824804488	5092877.054	29489968538	4621469613	2138660208	6760129822
1991	4896244602	2056158.136	30474743435	3927442997	2072542499	5999985496
1992	5110693568	5163216.118	32010406325	3582194700	2525301675	6107496375
1993	5584174677	18927631.94	33474682526	4922612778	2939272261	7861885039
1994	6112170987	14975028.92	34842024065	4621787860	3047389541	7669177401
1995	6682572372	2454839.232	36558011931	6858566577	3983672757	10842239334
1996	7377111409	16315812.91	38247711533	7826280186	4305370052	12131650238
1997	8051685326	161247614.5	40308326777	7690477625	5017011694	12707489320
1998	8990299102	213293277.7	42415457211	8034301014	5632134618	13666435632
1999	9922375568	191524270	44480763467	8219415385	5759035832	13978451217
2000	10564430982	285598832.9	47124925462	9060862652	6588073942	15648936593
2001	11397599007	78527040.08	49610300682	10077154142	7570238893	17647393035
2002	12361324304	51522636.25	51800799317	8946556919	7396047477	16342604396
2003	13133334078	255920609.2	54523446362	9608931077	7904142749	17513073826
2004	14206655091	409668170.5	57942340648	10627488042	8895065145	19522553187
2005	15468724556	712038879.1	61393084272	12652947367	10282804881	22935752248
2006	16940963912	580903877.6	65463038830	14954265870	12937922031	27892187901
2007	18488362852	517170693	69670899876	17345649538	14617389768	31963039306
2008	18599525664	749004562.6	73983829245	16988963294	15646120973	32635084267
2009	20045569656	499724842.2	78231358239	16546969380	15649927542	32196896922
2010	21789716017	587799302.1	82979485251	16660041688	15797262794	32457304482
2011	23828878525	479530024.7	88545829824	21517619998	20432193009	41949813007

**Appendix B****Consequences of Model 1 to 4**

## Model 1.

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Dependent Variable: GDP  
Method: Least Squares  
Date: 03/30/14 Time: 11:46  
Sample: 1980 2011  
Included observations: 32

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.39E+10	4.57E+08	30.41365	0.0000
FDI	-1.993274	1.873383	-1.063997	0.2964
DOMINV	3.208577	0.215706	14.87477	0.0000
OPEN	-0.011244	0.127432	-0.088236	0.9303
R-squared	0.997092	Mean dependent var		4.33E+10
Adjusted R-squared	0.996780	S.D. dependent var		1.99E+10
S.E. of regression	1.13E+09	Akaike info criterion		44.63974
Sum squared resid	3.56E+19	Schwarz criterion		44.82296
Log likelihood	-710.2359	Hannan-Quinn criter.		44.70048
F-statistic	3199.678	Durbin-Watson stat		0.849657
Prob(F-statistic)	0.000000			

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## Model 2.

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Dependent Variable: D(GDP)  
Method: Least Squares  
Date: 03/30/14 Time: 11:47  
Sample (adjusted): 1981 2011  
Included observations: 31 after adjustments

---

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.71E+08	1.01E+08	2.677865	0.0125
FDI	0.536239	0.394283	1.360038	0.1851
DOMINV	0.105520	0.046184	2.284780	0.0304
OPEN	0.056101	0.026927	2.083481	0.0468
R-squared	0.974782	Mean dependent var		2.20E+09
Adjusted R-squared	0.971980	S.D. dependent var		1.40E+09
S.E. of regression	2.35E+08	Akaike info criterion		41.50802
Sum squared resid	1.49E+18	Schwarz criterion		41.69305
Log likelihood	-639.3744	Hannan-Quinn criter.		41.56834
F-statistic	347.8824	Durbin-Watson stat		2.229010
Prob(F-statistic)	0.000000			

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## Breusch-Godfrey Serial Correlation LM Test:

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F-statistic	0.708602	Prob. F(2,25)	0.5020
Obs*R-squared	1.663057	Prob. Chi-Square(2)	0.4354

---

## Test Equation:

Dependent Variable: RESID  
Method: Least Squares  
Date: 04/01/14 Time: 09:10  
Sample: 1981 2011  
Included observations: 31

Presample missing value lagged residuals set to zero.

---

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10677306	1.03E+08	0.104012	0.9180

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FDI	0.020414	0.399079	0.051152	0.9596
DOMINV	-0.002928	0.046866	-0.062469	0.9507
OPEN	0.000769	0.027312	0.028154	0.9778
RESID(-1)	-0.155816	0.199413	-0.781376	0.4419
RESID(-2)	-0.199065	0.199641	-0.997115	0.3283
R-squared	0.053647	Mean dependent var		-2.17E-07
Adjusted R-squared	-0.135624	S.D. dependent var		2.23E+08
S.E. of regression	2.38E+08	Akaike info criterion		41.58192
Sum squared resid	1.41E+18	Schwarz criterion		41.85946
Log likelihood	-638.5197	Hannan-Quinn criter.		41.67239
F-statistic	0.283441	Durbin-Watson stat		1.967668
Prob(F-statistic)	0.917752			

---

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.867111	Prob. F(3,27)	0.4702
Obs*R-squared	2.724247	Prob. Chi-Square(3)	0.4361
Scaled explained SS	1.791721	Prob. Chi-Square(3)	0.6167

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 04/01/14 Time: 09:10

Sample: 1981 2011

Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.00E+16	2.79E+16	2.152119	0.0405
FDI	-33064625	1.09E+08	-0.304038	0.7634
DOMINV	7658159.	12738533	0.601181	0.5527
OPEN	-5416374.	7426937.	-0.729288	0.4721
R-squared	0.087879	Mean dependent var		4.81E+16
Adjusted R-squared	-0.013468	S.D. dependent var		6.44E+16
S.E. of regression	6.48E+16	Akaike info criterion		80.37856
Sum squared resid	1.13E+35	Schwarz criterion		80.56359
Log likelihood	-1241.868	Hannan-Quinn criter.		80.43887
F-statistic	0.867111	Durbin-Watson stat		1.995219
Prob(F-statistic)	0.470168			

## Model 3.

Dependent Variable: D(GDP)

Method: Least Squares

Date: 03/30/14 Time: 11:48

Sample (adjusted): 1981 2011

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.85E+08	1.09E+08	1.691838	0.1022
FDI(-1)	0.782475	0.485951	1.610194	0.1190
DOMINV(-1)	0.285673	0.052062	5.487154	0.0000
OPEN(-1)	-0.049193	0.034132	-1.441262	0.1610
R-squared	0.970328	Mean dependent var		2.20E+09
Adjusted R-squared	0.967031	S.D. dependent var		1.40E+09
S.E. of regression	2.55E+08	Akaike info criterion		41.67065
Sum squared resid	1.75E+18	Schwarz criterion		41.85568
Log likelihood	-641.8951	Hannan-Quinn criter.		41.73097
F-statistic	294.3170	Durbin-Watson stat		1.989132
Prob(F-statistic)	0.000000			

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Breusch-Godfrey Serial Correlation LM Test:

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F-statistic	0.257638	Prob. F(2,25)	0.7749
Obs*R-squared	0.626040	Prob. Chi-Square(2)	0.7312

Test Equation:  
 Dependent Variable: RESID  
 Method: Least Squares  
 Date: 04/01/14 Time: 09:12  
 Sample: 1981 2011  
 Included observations: 31

---

Presample missing value lagged residuals set to zero.

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17829801	1.17E+08	0.152971	0.8796
FDI(-1)	0.020461	0.503456	0.040641	0.9679
DOMINV(-1)	-0.015192	0.058912	-0.257879	0.7986
OPEN(-1)	0.008337	0.037476	0.222452	0.8258
RESID(-1)	-0.046158	0.215680	-0.214012	0.8323
RESID(-2)	-0.152444	0.215418	-0.707667	0.4857
R-squared	0.020195	Mean dependent var		-2.98E-07
Adjusted R-squared	-0.175766	S.D. dependent var		2.42E+08
S.E. of regression	2.62E+08	Akaike info criterion		41.77928
Sum squared resid	1.72E+18	Schwarz criterion		42.05683
Log likelihood	-641.5789	Hannan-Quinn criter.		41.86976
F-statistic	0.103055	Durbin-Watson stat		1.902347
Prob(F-statistic)	0.990589			

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Heteroskedasticity Test: Breusch-Pagan-Godfrey

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F-statistic	0.935423	Prob. F(3,27)	0.4372
Obs*R-squared	2.918659	Prob. Chi-Square(3)	0.4043
Scaled explained SS	1.714562	Prob. Chi-Square(3)	0.6337

Test Equation:  
 Dependent Variable: RESID^2  
 Method: Least Squares  
 Date: 04/01/14 Time: 09:13  
 Sample: 1981 2011  
 Included observations: 31

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.48E+16	3.08E+16	1.779330	0.0864
FDI(-1)	-1.63E+08	1.37E+08	-1.188955	0.2448
DOMINV(-1)	1913830.	14670352	0.130456	0.8972
OPEN(-1)	1008075.	9617822.	0.104813	0.9173
R-squared	0.094150	Mean dependent var		5.66E+16
Adjusted R-squared	-0.006500	S.D. dependent var		7.16E+16
S.E. of regression	7.18E+16	Akaike info criterion		80.58396
Sum squared resid	1.39E+35	Schwarz criterion		80.76899
Log likelihood	-1245.051	Hannan-Quinn criter.		80.64428
F-statistic	0.935423	Durbin-Watson stat		1.608898
Prob(F-statistic)	0.437161			

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#### Model 4.

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Dependent Variable: D(GDP)  
 Method: Least Squares  
 Date: 03/30/14 Time: 11:51  
 Sample (adjusted): 1981 2011  
 Included observations: 31 after adjustments

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
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C	2.52E+08	1.07E+08	2.344000	0.0277
FDI	0.641468	0.490812	1.306953	0.2036
DOMINV	0.109905	0.179310	0.612933	0.5457
OPEN	0.082076	0.031864	2.575798	0.0166
FDI(-1)	-0.128196	0.581547	-0.220440	0.8274
DOMINV(-1)	0.036349	0.219997	0.165225	0.8702
OPEN(-1)	-0.054027	0.036177	-1.493385	0.1484
R-squared	0.977871	Mean dependent var		2.20E+09
Adjusted R-squared	0.972338	S.D. dependent var		1.40E+09
S.E. of regression	2.33E+08	Akaike info criterion		41.57090
Sum squared resid	1.31E+18	Schwarz criterion		41.89470
Log likelihood	-637.3489	Hannan-Quinn criter.		41.67645
F-statistic	176.7566	Durbin-Watson stat		2.328203
Prob(F-statistic)	0.000000			

## Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.613885	Prob. F(2,22)	0.5503
Obs*R-squared	1.638592	Prob. Chi-Square(2)	0.4407

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 04/01/14 Time: 09:14

Sample: 1981 2011

Included observations: 31

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4193959.	1.09E+08	-0.038397	0.9697
FDI	-0.040505	0.501647	-0.080744	0.9364
DOMINV	0.013316	0.183228	0.072675	0.9427
OPEN	0.000585	0.032504	0.018009	0.9858
FDI(-1)	-0.006700	0.592646	-0.011306	0.9911
DOMINV(-1)	-0.015236	0.225088	-0.067688	0.9466
OPEN(-1)	0.000885	0.036798	0.024047	0.9810
RESID(-1)	-0.194590	0.212673	-0.914974	0.3701
RESID(-2)	-0.163587	0.213493	-0.766242	0.4517
R-squared	0.052858	Mean dependent var		-3.91E-08
Adjusted R-squared	-0.291558	S.D. dependent var		2.09E+08
S.E. of regression	2.37E+08	Akaike info criterion		41.64562
Sum squared resid	1.24E+18	Schwarz criterion		42.06194
Log likelihood	-636.5072	Hannan-Quinn criter.		41.78133
F-statistic	0.153471	Durbin-Watson stat		2.003529

## Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.849317	Prob. F(6,24)	0.5451
Obs*R-squared	5.429386	Prob. Chi-Square(6)	0.4900
Scaled explained SS	3.622071	Prob. Chi-Square(6)	0.7277

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 04/01/14 Time: 09:14

Sample: 1981 2011

Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.61E+16	2.99E+16	2.212732	0.0367
FDI	-10901426	1.37E+08	-0.079783	0.9371

DOMINV	-29089498	49918920	-0.582735	0.5655
OPEN	-5460089.	8870789.	-0.615513	0.5440
FDI(-1)	58898875	1.62E+08	0.363799	0.7192
DOMINV(-1)	49368465	61245815	0.806071	0.4281
OPEN(-1)	-8417130.	10071534	-0.835735	0.4115
R-squared	0.175141	Mean dependent var		4.22E+16
Adjusted R-squared	-0.031073	S.D. dependent var		6.40E+16
S.E. of regression	6.50E+16	Akaike info criterion		80.45999
Sum squared resid	1.01E+35	Schwarz criterion		80.78380
Log likelihood	-1240.130	Hannan-Quinn criter.		80.56555
F-statistic	0.849317	Durbin-Watson stat		1.872591
Prob(F-statistic)	0.545088			

## Appendix C

### Abbreviations

FDI: Foreign Direct Investments;

GDP: Gross Domestic Products;

DOMINV: Domestic Investments;

United Nations Conference on Trade and Development (UNCTAD);

IDA: International Development Associations;

OLI: Ownership Location Internalization;

OA: Ownership Advantages;

PCM: Product Cycle Model.

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