Contribution of Foreign Direct Investment to Economic Growth in Bangladesh

Abu Taher Noor

MBA, SIAM University, Bangkok, Thailand

Abstract: Rapid industrialization is essential in Bangladesh to keep pace with its development needs. But the low rate of gross domestic savings and investment as well as low level of technology base hamper the expected industrialization process. Foreign aid and grant had been serving to bridge the gap earlier. As many developing countries are in the process of graduating from being aid-dependent economy into a trading economy, FDI has come to be viewed as a major stimulus to economic growth for these emerging economies. This paper examines the contribution of FDI to economic growth in Bangladesh over the period from 1975 to 2012. Data are compiled from World Development Indicators (WDI), International Financial Statistics (IFS), and Penn World Table (version 8.0). This paper takes the conventional neoclassical production function- type synthesis that considers FDI (foreign capital) as a factor input that depends on a set of relevant factors available in the host economy. Statistical models - OLS, 2SLS, VAR - are used for empirical analysis in this paper. The study reveals that if FDI increases l% pt, per capita growth could rise by 1.65 to 6.05 %pts in the IV model. This is a manifestation from available dataset, although not a statement as our further tweak has failed to uncover lower values. These large numbers can be understood only in the context of a major push to growth given by FDI in the textile and garment industries. The study also finds bi-directional relationship in the Granger causality sense between FDI and GDP per capita.

Keywords: Foreign Direct Investor (FDI), GDP per capita growth, Bangladesh, Time Series, OLS, 2SLS, VAR, Causality.

I. INTRODUCTION

In the standard neoclassical model of economic growth, increases in capital stock and labor force contribute to higher output .Many policymakers and academics contend that foreign direct investment)hereafter, FDI (can have important positive effects on a host country's development effort .In addition to the direct capital financing it supplies, FDI can be a source of valuable technology and knowhow while fostering linkages with local firms, which can give an economy a further growth push .Based upon these arguments, both industrialized and developing countries offer lucrative incentives to encourage inflows of foreign direct investments in their economies.

The term FDI refers to investment that is made to acquire a lasting interest in an enterprise operating abroad .In other words, FDI is an international financial flow with the intention of controlling or participating in the management of an enterprise in a foreign country .There is conceptual ambiguity in the understanding of FDI .The World Investment Directory from UNCTAD clarifies the concept well whereas formal definitions of FDI are provided in)1 (the Balance of Payments Manual) International Monetary Fund, 1997 and 1993 (and)2 (the Detailed Benchmark definitions of FDI) Organization for Economic Co-operation and Development, 1992 and 1996.(According to the Balance of Payments Manual)IMF, 1997(, FDI refers to investment made to acquire lasting interest in enterprises operating outside of the economy of the investor .Further, in cases of FDI, the investor's purpose is to gain an effective voice in the management of the enterprise .The foreign entity or group of associated entities that makes the investment is termed the "Direct Investor ."The unincorporated or incorporated enterprise -a branch or subsidiary, respectively, in which direct investment is made -is referred to as a 'direct investment enterprise .'Some degree of equity ownership is almost always considered to

be associated with an effective voice in the management of an enterprise .According to the revised edition of the manual, IMF suggests a threshold of 10 %of equity ownership to qualify an investor as a foreign direct investor.

FDI inflows have in general been recognized as beneficial to economic growth in developing countries in terms of national productivity improvement)Zhao and Zhang, 2010(, reduction in the level of unemployment)Chaudhury et al., 2006(, expansion of domestic investment, transfer of advanced technologies from abroad, greater competition in the host country, and rising export values and foreign exchange earnings)Ram and Zhang, 2002 .(The majority of studies)e.g . Balasubramanyam, 1996; Keller, 1996; and OECD, 2002 (conclude that FDI contributes to total factor productivity and income growth in host economies, over and above what domestic investment would trigger .The studies further find that policies that promote indigenous technological capability, such as education, technical training, and research and development increase the aggregate rate of technology transfer from FDI and that export promoting trade regimes are also an important prerequisite for a positive FDI impact .Many developing countries have, therefore, actively tried to attract FDI, especially since the 1980s.

Bangladesh, a densely populated, agro-based, developing South Asian economy has a per capita income of US$ 1048 and has achieved a GDP growth rate around 6 %in recent years .Like many developing countries, it wants to boost its economic performance for a better future .Bangladesh is distinguished among the Least Developed Countries)LDCs (because of its relative success in economic and rural development .Rapid industrialization is indeed necessary for this country to keep pace with its developmental needs .But the low rates of gross domestic savings and investment as well as a low level of technology hamper the expected industrialization process .There is a significant saving-investment gap in Bangladesh .Foreign aid and grants have served to bridge the gap in the past .But as foreign aid has decreased in recent years and developing countries are in the process of graduating from being aid-dependent economies into more of trading economies, FDI is viewed as a major potential stimulus to economic growth and industrialization .As a result, there is now widespread support for the need for FDI in Bangladesh .If its economy is to grow faster, as is being envisaged, it seems to need sustained inflows of FDI at a higher level with a view to creating jobs for its vast surplus labor, increasing foreign exchange earnings, and acquiring modem technology and management skills.

II.   OBJECTIVE

This research examines the contribution of FDI towards economic growth in Bangladesh over a period of 38 years from 1975 to 2012 in a multivariate regression framework .Data are compiled from World Development Indicators)WDI(, International Financial Statistics)IFS(, and Penn World Table)version 8.0 .(We first postulate a neoclassical growth model based on the aggregate production function .We then specify the underlying statistical models to be estimated while providing the theoretical underpinnings for the inclusion of explanatory variables .

III.   LITERATURE REVIEW

Literature on foreign direct investment can be divided broadly into two parts .One deals with the main factors that allow countries to attract FDI whereas the second and larger part discusses whether and how much FDI contributes to economic growth .FDI seems to be highly important as a catalyst to overall investment and growth in many developing countries . Several different factors have affected the volume and distribution of FDI in developing countries of the world .The main beneficiaries of the major FDI inflows have been the countries with political stability) Ghurra and Goodwin, 2000; Root and Ahmed, 1979; De Mello, 1999; Cheng and Kwan, 2000; Schneider and Frey, 1985; Wang and Swain, 1995(, favorable policies regarding taxes and subsidies)De Mello, 1999(, existence of good business environment, better administrative policies and low level of corruption)Loot, 2000; Ghurra and Goodwin, 2000 .(Moreover, macro variables such as the size of domestic market, physical infrastructure, skilled labor force, trade openness, inflation, labor cost, productivity and interest rate have also been identified as other important factors affecting FDI in developing countries)Kravis and Lipsey, 1982; Wheeler and Moody, 1992; De Mello, 1997; Lucas, 1993; Wang and Swain, 1995.(There have been many empirical studies examining the effect of FDI on economic growth of developing countries .Literature shows that such an effect of FDI inflows on economic growth differs depending on the countries examined)Ramirez, 2000, 2006; Zhang, 2001; Alguacil et al., 2002; Chakraborty and Basu, 2002, Kohpaiboon, 2003 .(FDI can contribute to growth through several channels .It can directly affect growth through capital formation .As a part of private investment, an increase in FDI will, by itself, contribute to an increase in total investment and hence growth.

IV.   FDI TREND AND FDI RELEVANT POLICIES IN BANGLADESH

To put FDI trends in Bangladesh in the global context, UNCTAD reports that FDI around the world has remained low in recent years relative to a peak of $2 trillion in 2007 .Global FDI fell by 18 percent to $1.35 trillion in 2012 and was expected to rise somewhat in 2013 to $1.45 trillion as the upper level of the predicted range .Transnational corporations)TNCs (held on to their record level of cash holdings during the global financial crisis of recent years .As macroeconomic conditions improve and investors regain confidence over the medium term, TNCs may convert some of their cash hoarding into investment .UNCTAD predicts that FDI inflows may then reach $1.6 trillion in 2014 and $1.8 trillion in 2015.

The regional distribution of FDI is analyzing trends of FDI among the developing countries, Nunnenkamp)2001 (concludes, South, East, Southeast Asia have emerged as the most important host region among the developing economies . Ranked second were the Central and Eastern Europe regions .Latin America, though slow compared to Asia, is the third most important host region .Africa and West Asia have been on the sideline in attracting FDI .However, the irony is Africa's share of the global FDI remains small and the lowest, despite known for yielding the highest rate of return. FDI inflows to South Asia declined significantly in 2012 followed by a sharp rise of 10 percent, to $36 billion in 2013 because of decreases across a number of major recipient countries including India, Pakistan and Sri Lanka .Inflows to the three countries dropped by 29, 36 and 21 percent to $26 billion, $847 million and $776 million respectively .FDI to Bangladesh also decreased by 13 percent, to about $1 billion .Nonetheless, this country remained the third largest recipient of FDI in the region, after India and the Republic of Iran .Bangladesh, India, Pakistan and Sri Lanka have become important players in global apparel exports and the first two of these countries rank fourth and fifth globally, after China, the EU and Turkey)WTO, 2010.(

The readymade garment)RMG (industry emerged in Bangladesh in the late 1970s and has become a key manufacturing industry now .Its nearly 5000 factories employ some 3 million workers and account for about three fourths of the country's total exports .In particular, Bangladesh stands out as the sourcing hotspot in the industry because it offers the advantages of both low costs and large capacity .However, working conditions and other labor issues are still a major concern, and a number of disastrous accidents that happened recently underscore the daunting challenges facing the booming garment industry in the country.

At the time of independence in 1971, Bangladesh inherited only a small stock of FDI, most of it by TNCs, and geared toward exploiting a domestic market protected by the then prevailing import-substitution policy .Since then, Bangladesh has been trying to attract foreign investment to underwrite its savings-investment gap as well as to redress its export-import imbalance .The country has deregulated and liberalized its foreign investment regime over the last two decades . This has been done largely under a World Bank and IMF backed Structural Adjustment Policy)SAP (package .Moreover, with a view to encouraging the flow of FDI, Export Processing Zones)EPZs (were established .The capital markets were allowed to receive foreign portfolio investments in both primary and secondary markets .The government of Bangladesh has listed the following five areas in which FDI should be encouraged under joint venture or up to 100 %ownership by the foreigners)Bhattacharya, D .2005:(

i.   Export oriented industries

ii.   Industries located in the export processing zones)EPZs(

iii.   Industries that are based on high technology, which will either be import substitute or export oriented

iv.   Basic industries dependent mainly on local raw materials and investment towards improvement of quality and marketing of goods manufactured and/or the increase of production capacities of existing industries

v.   Physical infrastructure projects of both types :Build-Operate-Own)BOO (and Build-Operate-Transfer)BOT.(

For export-oriented activities, the government has set eight export processing zones)EPZs .(Despite expansion of facilitation services and the provision of a variety of fiscal and non-fiscal incentives, FDI in EPZs has not increased relative to non-EPZs .According to Bangladesh Bank, the central bank of the country, EPZs have attracted nearly $1 billion in FDI flows in 2000-2010, accounting for roughly 14 percent of total inflows in that period .Nearly 80 percent of investments in EPZs are in textile and garments .

With respect to sectoral performance, telecommunications, banking, textiles, and gas and petroleum have been the major recipients of FDI in 2005-2011 .Bangladesh has done relatively well in attracting FDI into telecommunications which has

received $2.2 billion during the period)UNCTAD, Investment Policy Review :Bangladesh, 2013 .(There are three fully foreign-owned mobile telephony providers in the country as well as majority foreign stake in the company with the largest market share .In banking, the country has attracted some globally renowned banks .As a result, during 2005-2011, FDI in the banking industry amounted to $1 billion as compared to $946 million in the textile and garments .All these investments, however, amount to a relatively small portion of total investment in a country that generated over $22.2 billion in foreign exchange earnings through exports in 2011.

FDI inflows into Bangladesh have been well diversified by country of origin .Egypt has been the top source country investing about $830 million or 9 percent of cumulative inflows in 2005-2011, followed by the United Kingdom, the United States of America, and Singapore .FDI from Egypt is concentrated in telecommunications while FDI from the United Kingdom is diversified across many sectors with the presence of such TNCs as Unilever, Standard Chartered and British-American Tobacco .FDI from the USA is similarly diversified, but characterized by large investment in gas and petroleum.

V.   THEORETICAL FRAMEWORK AND ECONOMETRIC SPECIFICATION

5.1 Theoretical Framework and Econometric Specification:

This paper takes the conventional neoclassical production function that considers FDI)foreign capital (as a factor input along with other important growth driving factors in order to investigate the relationship between economic growth and FDI .In light of the insights gained from the literature review section, we begin with a conventional neoclassical model for the aggregate production function for Bangladesh as follows:

$$Y = A * f(K, L, H) \tag{1}$$

where Y is Income, A is total factor productivity, K is physical capital, L is Labor force, and H is human capital .Three important variables, among others, that augment the basic production function are FDI, trade openness, and financial development .Incorporating these factors in the equation for output per person, equation (1) can thus be rewritten as:

$$ypc = y)gcf, fdi, he, open, m2(\tag{2}$$

where,

ypc =GDP per capita at a constant dollar value of 2005

gcf =Gross capital formation as a percentage of GDP

fdi =Foreign direct investment, net inflow as a percentage of GDP

hc =Human capital, summing each year of education weighted by its respective return to education

xm =Total trade as a percentage of GDP

m2 =Broad money)M2 (as a percentage of GDP; a measure of overall liquidity or financial development.

While growth literature has used all these variables as basic or proximate factors affecting income or growth, several of these variables can be considered as endogenous in the context of a growth model .In particular, as we discovered in the literature section, FDI and trade can easily be endogenous although they are also assumed to affect GDP and growth . Thus, for FDI, following the literature, we postulate a relationship as given below:

$$fdi) = infra, he, ype, remt, tnrr, gg(\tag{3}$$

where

infra =Physical infrastructure, proxied by railroads (total distance in kilometers), telephone lines (number per 100 people), and per capita electric power consumption)in kilowatt hours, or kwh(,

remt =Remittance received as a percentage of GDP,

tnrr =Total natural resource rent as a percentage of GDP,

gg =Good governance)democratic government.(

Trade is another endogenous variable that appears in our growth regression. The real exchange rate is the price of domestic goods per unit of foreign goods. A rise in this rate will tend to boost exports and reduce imports by making home goods relatively cheaper. Thus total trade should primarily depend on the income and price variables as shown in equation (4):

Open = x (ypc, reer)   (4)

where,

reer = Real effective exchange rate of the national currency (taka per US$), which is the trade-weighted exchange rate adjusted for foreign to home price ratio.

Based on the functional relationships summarized in equation (2), (3) and (4), we can develop the following simultaneous equation system:

$$dlnypc_t = \beta_o + \beta_1)gcf_t + (\beta_2)fdi_t + (\beta_3)hc_t + (\beta_4)fdi_t{*}hc_t + (\beta_5)open_t + (\beta_6)m2_t($$

$$+\beta_7)fdi_t{*}m2_t + (\varepsilon_{5t} \qquad)5($$

$$fdi_t = \beta_o + \beta_1)rail_t + (\beta_2)elect_t + (\beta_3)tele_t + (\beta_4)dlnypc_{t-i} + (\beta_5)remi_t (\beta_6)he_t + (\beta_7$$

$$)tnrr_t + (\beta_8)gg_t + (\varepsilon_{6t} \qquad)6($$

$$open_t = \beta_o + \beta_1)dlnypc_t + (\beta_2 \, lnreer_t + \varepsilon_{7t}$$

All the coefficients are expected to have a positive sign except remittances because an abundance of remittance receipts may lessen the reliance on foreign capital. In our statistical models, per capita GDP growth, FDI, and trade openness are likely to be endogenous variables and gross capital formation, human capital, broad money supply, infrastructure, remittance, and real effective exchange rate are taken to be exogenous. To control for the potential endogeneity problems, we adopt instrumental variables (IV) estimation such as the values of FDI and trade openness estimated in terms of all the exogenous variables are then used in our original growth equation (5). Though in reality perfect instruments are hard to obtain, we take statistical approaches to test for endogeneity by first running OLS estimates to choose the best instruments for FDI and trade openness.

5.2. Vector Auto Regression (VAR) and Causality:

In order to obtain consistent results derived from the Granger causality procedure three steps will be followed. The first step is to test whether there is a unit root in the variables and if yes, how many unit roots are there or, in other words, what is the order of integration of the variables. The Augmented Dickey Fuller (ADF) test can be used for this purpose. If the time series contains a unit root, the data may follow a random walk model. If a series is nonstationary (for example, in the case of a random walk), then we cannot rely on the test statistics from the regular OLS such as t-statistic, F-statistic and so forth, and must resort to such tests as the ADF test.

The second step is to run a reduced form VAR (p) model for per capita growth and FDI. A reduced form VAR expresses each variable as a linear function of its own past values, the past values of all other variables being considered, and a serially uncorrelated error term. Thus, our statistical model for the VAR analysis can be written as follows:

$$dlnypc_t = \alpha_1 + \beta_{11} \, dlnypc_{t-1} + {-}{-}{-}{-}{-}{-}{-}+\beta_{1p}dlnypc_{t-p} + \theta_{11}fdi_{t-1} + {-}{-}{-}{-}{-}{-}{-}{-}+\theta_{1p}fdi_{t-p} + e_{8t} \qquad (8)$$

$$fdi_t = \alpha_2 + \beta_{21} \, dlnypc_{t-1} + {-}{-}{-}{-}{-}{-}{-}+\beta_{2p}dlnypc_{t-p} + \theta_{21}fdi_{t-1} + {-}{-}{-}{-}{-}{-}{-}{-}+\theta_{2p}fdi_{t-p} + e_{9t} \qquad (9)$$

The third and final step is to carry out the Granger causality tests. The appropriate formulation of this test, applicable only to stationary series, is, with or without the intercept them:

$$dlnypc_t \quad = \quad \sum_{i=1}^{n} a_i \quad GDPG_{t-i} \quad + \quad \sum_{j=1}^{n} b_j \quad FDI_{t-j} \quad + \quad e_{10t} \quad {-}{-}{-}{-}{-}{-}{-} \qquad (10)$$

$$FDI_t \quad = \sum_{i=1}^{n} c_i \, GDPG_{t-i} + \sum_{j=1}^{n} d_j \, FDI_{t-j} + e_{11t} \, {-}{-}{-}{-}{-}{-} \qquad {-}(11)$$

Table 5.1 presents descriptive statistics on all the variables in the model. The indicators reflect typical characteristics in poor developing countries with a low per capita GDP, relatively low financial development and small FDI inflows. However, the Table also shows reasonably high standard deviations in all these indicators which actually indicate relatively rapid growth in those indicators.

Table 5.1 Descriptive Statistics of Variable

Variables	Units of Measurement	Mean	Standard Deviation	Min	Max	No .of Obs.
M2	M2/GDP percentage	33.14008	18.64253	8.353727	69.73062	38
Elect	Kwh per M2/GDP percentage capita	92.20209	77.27847	16.75773	278.4252	38
Fdi	Net inflows as a %of GDP	0.3209729	0.4358729	-0.05146	1.349295	38
Ypc	GDP per capita at constant 2005 US$	332.0658	103.9201	226.4999	597.0206	38
Gcf	%of GDP	18.98581	4.910604	6.147906	26.54181	38
Remt	%of GDP	4.516966	3.388628	0.155483	12.10513	38
Rail	Total route in KM	2810.644	191.909	1885	3125	38
He	Average years of schooling	1.648902	0.2663069	1.234397	2.151824	38
Tnrr	Nat .reso .rent, %of GDP	4.004265	1.417241	2.367191	8.772094	38
Tele	Per 100 people	0.3426877	0.2574527	0.0830275	0.9086006	38
Open	Trade, %of GDP	28.8564	11.62421	10.99563	55.29305	38
Reer	Taka per dollar, period average	41.92626	19.93951	12.18618	81.86266	38
Gg	Dummy (1 democ., 0 otherwise)	0.6052632	0.4953554	0	1	38

VI.   RESULT AND DISCUSSION

Before running OLS and 2SLS estimates, all variables were examined for stationarity both in level form and lag form at the 10 percent or lower level of significance according to Augmented Dickey-Fuller)ADF (test for unit root .Most of the variables are found stationary in either form .As the study covers the period 1975-2012 and FDI inflow into Bangladesh started in the 1990s, we should note that it is hard to place a high degree of reliance cannot be placed on the Dickey-Fuller distribution of the parameters because the small sample properties of D-F distribution is not well established .To that extent, the results for this part of the study are only indicative rather than conclusive.

6.1 .Ordinary Least Square)OLS (and Two Stage Least Square)2SLS(

Table 6.1 gives least-squares estimates of regression coefficients for the FDI equation in (6) .We observe that two out of three infrastructure variables are statistically significant at the 10 percent or lower level and two coefficient estimates do not have their anticipated signs .The goodness of fit of the model is fairly strong as indicated by the value of 0.8824 for the adjusted R^2.

Table 6.1 Dependent Variable: Foreign Direct Investment (OLS)

Variables	Coefficient Estimates	t-statistics	p-value
Intercept	-0.379	-0.45	0.658
Rail	0.0001	1.06	0.299
Elect	0.004	2.00**	0.055
Tele	1.563	4.55***	0.000
Dlnypct-i	1.609	0.61	0.546
Remt	-0.073	-1.82*	0.079
He	-0.147	-0.27	0.792
Gg	-0.145	-1.17	0.251
Adjusted R^2	0.8824		

*significance at the 10 percent level, **significance at the 5 percent level, ***significance at 1 percent level

One concern here is that FDI might be affected by a threshold level of growth .The graphical presentation of FDI inflows shows that most of the FDI occurred when the growth rate is above 4 percent .Therefore, we generate a threshold dummy that takes the value 1 if growth is above 4 percent and 0 otherwise .Similarly, we assign judicious, albeit the author's subjective, weights to components of infrastructure to create a composite infrastructure variable .These weights are 20% for rail, 40% for telephone, and 40% for electricity, based on the author's evaluation of the relative importance of each form of infrastructure in Bangladesh .Taking all these considerations together, we develop a modified regression equation as follows:

$$fdi_t = \beta_o + \beta_1\ infra + \beta_2\ )dlnypc_{t-i} + (\beta_3\ )remi_t + (\beta_4\ )dumyg4_t + (\beta_5\ )hc_t($$

$$+\beta_6\ )tnrr_t + (\beta_7\ )gg_t + (\varepsilon_{12t} \qquad\qquad)12($$

Table 6.2 presents the OLS estimates of the modified regression equation (12) .We observe that three coefficients are statistically significant at 1 percent level and one coefficient is significant at 10 percent level .All coefficients do have expected signs except for the threshold growth of 4 percent plus (dumyg4) and good governance (gg) .The goodness of fit of the modified regression is slightly increased as indicated by the value of 0.8912 of the adjusted R2 .However, good infrastructure is virtually a precondition for attracting FDI; the infrastructure variable turns out to be fairly insignificant.

Table 6.2 - Dependent Variable: Foreign Direct Investment (Modified OLS)

Variables	Coefficient Estimates	t-statistics	p-value
Intercept	-2.652	-3.52***	0.0001
Infra	0.0008	1.28	0.211
Dlnypct-i	0.023	2.75***	0.010
Remt	-0.056	-1.79*	0.085
Dumyg4	-0.097	-0.85	0.403
He	1.368	2.92***	0.007
Tnrr	0.105	451***	0.000
Gg	-0.169	-1.47	0.152
Adjusted R^2	0.8912		

* significance at the 10 percent level, ** significance at the 5 percent level, *** significance at the 1 percent level

Next, Table 6.3 shows the OLS estimates of trade openness (*open*) regression in equation (7) .The objective of the regression for trade openness which is an explanatory factor in the growth regression is to instrument this variable in terms of other nonendogenous variables .The variable log real effective exchange rate (*InReer*) is found trend stationary at the 10 percent level according to the Augmented Dickey-Fuller test for unit root .We notice from Table 6.3 that all the coefficients are statistically significant at 1 percent or lower level and all the coefficients give us expected signs .The value of the adjusted R2 (0.898) is also fairly high.

Table 6.3 - Dependent Variable: Trade Openness (OLS)

Variables	Coefficient Estimates	t-statistics	p-value
Intercept	12.109	6.57***	0.000
Dlnypc	0.733	4.87***	0.000
Lnreer	0.231	3.35***	0.002
Adjusted R^2	0.8975		
***significance at 1 percent level			

Table 6.4 gives the coefficient estimates of the base growth regression in equation)5 (before accounting for any endogeneity in the right-hand-side variables)FDI and openness .(The most surprising thing about the results in Table 6.4 is that the gross capital formation is related inversely with growth .Is it possible to have gross investment variable to reduce growth? We know Bangladesh has only invested 19 percent of GDP annually over 37 years .This is not a very large percentage when we compare it with the investment in emerging economies that have attained medium to high

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growth .This raises a question about other possible reasons for a negative marginal return on investment .On FDI, there is no significant relationship of FDI with output growth .However, both human capital and openness exhibit a significantly positive relationship with growth .The adjusted R^2 at 0.89 is high.

Table 6.4 - Dependent Variable: GDP per capita growth at a constant US$ of 2005 (OLS)

Variables	Coefficient Estimates	t-statistics	p-value
Intercept	-22.937	-1.22	0.232
Gcf	-0.959	-2.16**	0.039
Fdi	10.612	0.180	0.857
He	24.032	1.29*	0.206
Open	0.298	I 99**	0.056
M2	0.033	0.130	0.898
Fdihc	-7.030	-0.160	0.874
fdim2	0.153	0.290	0.777
Adjusted R^2	0.8946		

 **significance at 5 %level, *significance at 20 percent level

Results from Table 6.4 lead to the conclusion that OLS does not provide a significant and consistent output for desired explanatory variables .To account for endogeneity in the two noted variables, we use the instrumental variable approach, obtain the predicted values for FDI and openness from regression (6) and (7) and use them in the estimation of equation (5) above .Results of this 2SLS regression are reported in Table 6.5 .We observe that three out of six explanatory variables are statistically significant at the 10 percent or lower level but two coefficient estimates do not have their anticipated signs .Calculations based on estimated coefficients indicate that as the share of foreign direct investment in GDP increases by 1 percentage point, we can expect an increase of 1.64 percentage points in per capita GDP growth, other things being equal .We note that the intercept term, which captures the effect of technological progress, is statistically significant at the 5 percent level.

Table 6.5 -Dependent Variable :GDP per capita growth)2SLS1(

Variables	Coefficient Estimates	t-statistics	p-value
Intercept	-25.665	-2.05**	0.050
Fdi	18.556	1.86*	0.073
Open	0.119	0.31	0.756
Laggcf	-0.159	-0.27	0.788
Laghc	20.276	1.19	0.246
Fdihc	-18.698	-2.29**	0.029
Fdim2	0.427	1.94*	0.062
Adjusted R2	0.8368		

Instrumented: fdi, xm

Instruments :laggcf laghc fdihc2 fdim22 dlnypclagl remt he tnrr lnreer

 **significance at 5 percent level, *significance at 10 percent level

Since FDI is the pivotal explanatory variable to explain growth in this paper, we check the robustness of our exercise by introducing some modifications in our 2SLS regression to examine the net effect of FDI in our model .The reasons behind these modifications are :first, M2 is an ambiguous variable to represent the financial depth in an economy where informal financial market is relatively large .M2 also reflects some business cycle trends rather than just the long-term growth phenomenon .Further, it cannot capture other aspects of financial development in an economy such as strength of the stock market.

Still another reason for slightly changing the model is that human capital takes time to contribute to economic growth . Also, by leaving out other aspects of human capital accumulation such as on-the-job training and changes in health situation, the measured human capital variable fails to accurately represent the true human capital .Finally, trade openness is also not an exogenous variable since output growth can influence both exports and imports in Bangladesh .The results after suitable modifications to the model appear in Tables 6.6 and 6.7.

Table 6.6 –Dependent Variable :GDP per capita growth at a constant US$ of 2005)modified 2SLS2(

Variables	Coefficient Estimates	t-statistics	p-value
Intercept	-12.401	-2 53***	0.017
Fdi	13.303	1.47	0.151
Open	0.459	1.96**	0.059
Laggcf	0.417	1.40	0.170
Fdihc	-16.683	-2.27**	0.031
fdim2	0.401	2.03**	0.051
Adjusted R2	0.8679		

Variables instrumented :fdi xm

Instruments :laggcf fdihc2 fdim22 dlnypclagl remt he tnrr lnreer

**significance at 5 percent level, ***significance at 1 percent level

Table 6.7- Dependent Variable: GDP per capita growth at a constant US$ of 2005)modified 2SLS3(

Variables	Coefficient Estimates	t-statistics	p-value
Intercept	-7.238	-1.51	0.142
Fdi	18.420	1.77*	0.087
Laggcf	0.701	2.34**	0.026
Fdihc	-17.938	-2.09**	0.045
fdim2	0.513	2.34**	0.026
Adjusted R^2	0.8222		

Instrumented :fdi

Instruments :laggcf fdihc2 fdim22 dlnypclagl remt he tnrr

 *significance at 10 percent level, **significance at 5 percent level

Table 6.6 shows that when both FDI and trade openness are instrumented, we observe that three out of five coefficients are statistically significant at the 5 percent level .The adjusted R^2 stays fairly high at 0.87 .But when only foreign direct investment is instrumented (Table 6.7), we observe that three out of four coefficients turn out statistically significant at 5 percent level and one coefficient is statistically significant at 10 percent level .The 2SLS regression in Table 6.7 reveals that if the share of FDI in GDP increases by 1 percentage point, we would expect an increase of 6.05 percentage points in per capita GDP growth rate if and only if FDI is instrumented, other things being equal .This result is surprising because of the large size of the effect of FDI although one can argue that it was FDI-led initial impetus given to the textile and garment industry that led to a boom in manufacturing investment and a major push to exports .In the empirical literature we do not find such a high effect of FDI on GDP growth in any country which raises a question about model misspecification of some kind .However, there is no basis on which to claim that the effect captured by the regression will continue for any time in future, particularly as domestic investment becomes larger and more mature .Our significant attempts to further tweak the model in light of empirical exercises conducted by other authors and discussed in the literature review section have failed to uncover values for the growth effect of FDI lower than the range of estimates between 1.65 and 6.05 implied from the numbers reported in Tables 6.5 and 6.7.

6.2 .VAR and Causality:

Table 6.8- Results of reduced form VAR

Estimated Coefficients	Constant	D1nypc(1)	D1nypc(2)	Fdi(1)	Fdi(2)
α_1	1.70 (1.68)				
α_2	-0.042 (0.431)				
$B_{11\text{----}}\beta_{1p}$		0.354 (0.032)	0.344 (0.039)		
$B_{21\text{----}}\beta_{2p}$		0.011 (0.191)	0.012 (0.162)		
$\Theta_{11\text{----}}\theta_{1p}$				7.755 (0.022)	-0.883 (0.809)
$\Theta_{21\text{----}}\theta_{2p}$				0.680 (0.000)	-0.165 (0.391)

Notes: p-values are in parenthesis

The results from table 6.8 show that lagged FDI and lagged GDP per capita help to predict current GDP per capita growth at 5 percent level of significance .However, the lagged GDP per capita does not predict the current FDI .The direction can be further examined by the results of the Granger causality test shown in Table 6.9 which shows that GDP per capita does Granger cause FDI at the 5 percent significance level, whereas we find a bi-directional causality between FDI and growth at the 10 percent level.

Table 6.9- Granger Causality Wald tests

Null Hypothesis	Chi2 statistic	p-value
GDP per capita growth does not Granger cause FDI	5.95**	0.051
FDI does not Granger cause GDP per capita growth	5.45*	0.066
*significance at 10 percent level, **significance at 5 percent level		

VII.   CONCLUSION AND RECOMMENDATION

This thesis has investigated three aspects of the role of foreign direct investment in economic development of Bangladesh : a (identifying the major determinants of FDI; b (to what extent FDI contributes to per capita GDP growth; and c (determining the direction of causality, whether FDI causes growth, growth causes FDI, or both.

Our OLS estimates suggest that human capital, remittance, total natural resources rent, and lagged per capita GDP are the significant determinants of FDI in Bangladesh .After instrumenting the endogenous FDI and openness, the results of the 2SLS exercises suggest that if the share of FDI in GDP increases by 1 percentage point, we would expect an increase in per capita growth between 1.65 and 6.05 percentage points .These effects encompass a number of possibilities but they all point to a relatively large effect of FDI on growth .The policy implication toward boosting the amount of foreign direct investment is therefore clear .While this study offers a macro growth perspective alone, attempts to raise FDI must deal with policies on specific industries .Some of these industries might hold promise in terms of dynamic comparative advantage though the identification of such industries is never easy.

We also find from vector auto regression and Granger causality models that growth Granger causes FDI strongly but there is bi-directional causality between FDI and growth at slightly weaker 10 percent level of significance .

By now, Bangladesh has done away with most if not all entry and exit barriers in foreign investment .The country has signed international and bilateral arrangements with important trade partners, including India, US and EU that have helped to reduce regulatory barriers to international trade and investment)WDR, 2005 .(It is true that cost of doing business in Bangladesh is often very high because of rent-seeking behavior of the members of the state bureaucracy and government .According to Doing Business Report 2012, Bangladesh ranked 122nd among 183 economies and 5th among SAARC nations on ease of doing business .The acrimonious nature of domestic politics that Bangladesh has been forced to cope with continuously for decades creates some uncertainty about stability of politics for investors.

To attract FDI, Bangladesh has to transform the poor state of its infrastructure .Our regression results for the effect of infrastructure on FDI were not highly significant indicating that marginal improvements may not lead to a more rapid growth .Yet, a major upgrade of infrastructure facilities could have a large potential in encouraging domestic investment as well as FDI .Furthermore, a consistent incentive package could be implemented by including trade policies such as rationalization of the tariff structure and elimination of non-tariff barriers; financial policies such as by streamlining interest rates at competitive levels and increasing access to finance; and institutional measures such as through enhancement of competitiveness and strengthening rules of corporate governance .It is generally true that FDI follows domestic investment which makes it imperative to create conditions for larger domestic investment .Bangladesh also needs to look at investment opportunities within the South Asian region .Incremental regional investment complemented by the initiative to build a regional free trade area may work as a catalyst for attracting extra-regional FDI.

Finally, it can be argued that simply providing a better incentive package and more liberalization measures may not necessarily attract FDI .Literature does not show that FDI automatically boosts economic growth or that strong causal effect of FDI in the past, as was found for Bangladesh in this study, will inevitably continue in the future .A constant review of factors would be necessary since conditions that are appropriate for more FDI and for a greater impact of FDI on growth change from time to time.

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