



## Foreign Direct Investment and Economic Growth: A Study on South Asian LDCs

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### ABSTRACT

Least developed economies strive for foreign capital as they suffer from capital constraints to accelerate growth and economic transformation, while macroeconomists debate on the impact of FDI in economic performance. South Asian LDCs continue to treat FDI inflow as a key development factor, and continue to adopt FDI-friendly policies, though only a few studies were conducted for testing the impact of FDI in the context of this region. This study extends the previous empirical studies on south Asian LDCs by developing a new framework specifying direct and spill-over effects of FDI, and providing evidence from panel data analysis for the period 1980-2014. The results show positive effect of FDI for both direct and externalities effect. It is also evidenced from this study that the impact of FDI is much stronger after 1990.

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### 1. Introduction

The role of foreign investment in economic performance has been an issue of debate and research in the literature of macroeconomics for a long time. However, the current wave of globalization, started in early 1990s with the resurgence of capital flows following the global debt crisis of 1980s, attracted increased research interest in growth studies about the contribution of foreign investment in economic growth especially for the case of developing and least developing countries. Developing economies in Asia and Latin America experienced a substantial resurgence of capital inflows – about US \$670 billion of foreign capital flowed to these countries between 1990-1994 which was about five times larger than the \$133 billion of inflows during the previous five years. Increased and attractive investment opportunities in developing and least developed countries coupled with governments' FDI-friendly economic policy and market oriented reforms are the major drivers of such flood of foreign capital to the third world countries in addition to rapid growth in international diversification and international capital markets integration. Contagion effect is also considered for increased foreign investment in countries that did not adopted FDI-friendly economic policies.

Foreign Direct Investment (FDI) is the most significant form of foreign capital flows across countries from development viewpoint, and is defined as the investment in a country outside the home economy to acquire a permanent interest in or active control over an enterprise operating outside the home country. While the portfolio and short-term capital flows declined after the debt crisis of 1980s and the start of the Asian crisis, FDI flows increased substantially and rebounded to about 38% in 1990s.

Like all other least developed economies (LDCs) of the world, Asian LDCs are the net recipient of FDI flows. FDI inflow to the seven south Asian LDCs increased from US \$18.06 million in 1980 to US\$454.9 million in 1994 and US\$2313.11 million in 2003. Most of these countries took various initiatives and adopted new policies to attract foreign private capital in late 1980s and early 1990s that brought the flood for FDI after 1990. For other

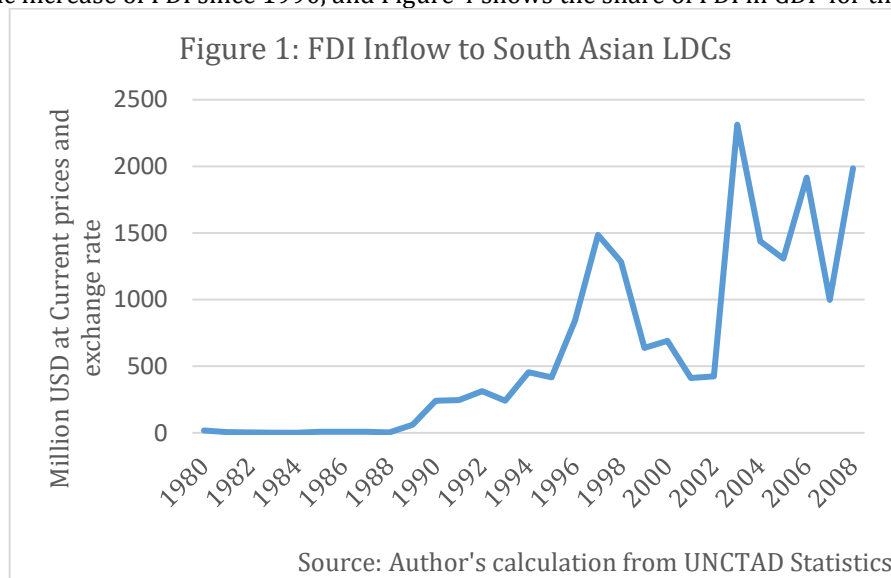
countries, contagion effect is believed to be the major driver of FDI inflows. During the same period the Asian LDCs experienced significant increase in growth rate – many of them, in fact, gained annual growth rate of at least 5% compared to their 2-3.5% growth rate in during 1980s. Policy makers and governments of these countries give credit to their initiatives and policies that helped influx of foreign private capital for the remarkable growth experience of these economies after 1990. In Bangladesh, government focuses on creating more export processing zones (EPZ), which gets most of the FDI in Bangladesh. By providing one stop service for foreign private investors, constant power supply in EPZ area, restricting forming labor unions and providing them tax holiday, Bangladesh kept inviting foreign investors. Myanmar, Maldives and Nepal are also offering similar incentives. Although there always have been growing dissatisfaction among the local investors of these countries for such privileged incentives to foreign investors, governments are desperate in bringing more FDI. International institutions and development agencies, while express their concern about restriction on forming labor union, they also prescribe and help developing FDI-friendly policies in these countries.

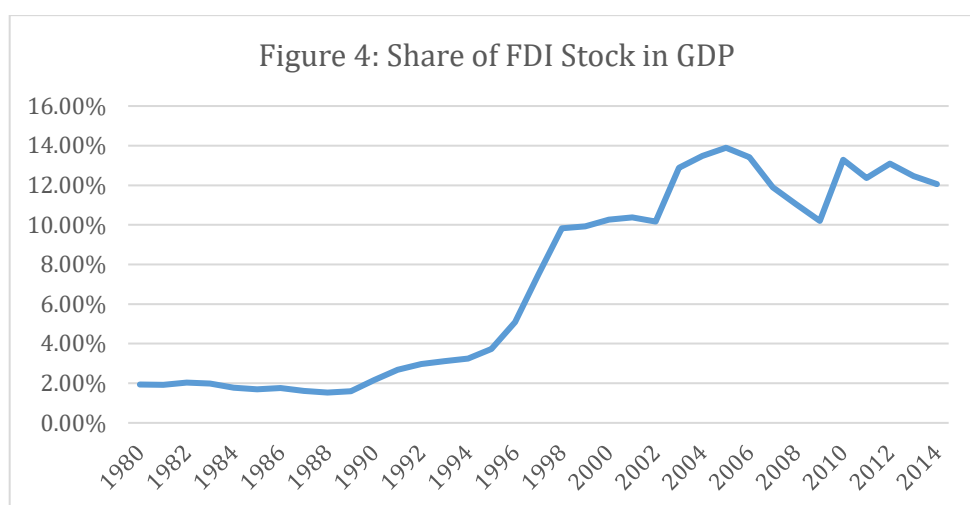
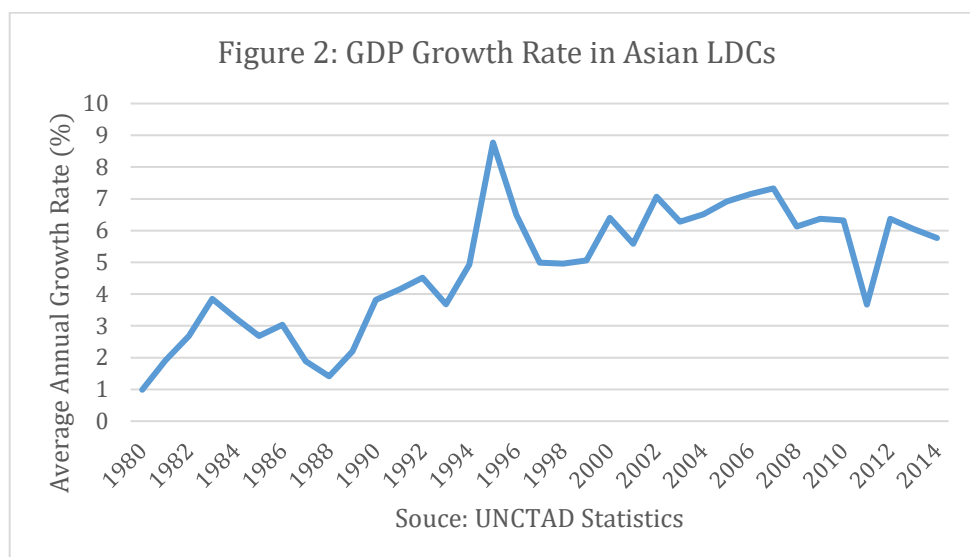
While the international organizations prescribing FDI-friendly policies, policy makers assume FDI as a key driver of growth, and governments are desperate for FDI, development economists and growth researchers could not find any conclusive nexus between FDI and growth. Most of the literature of growth studies used data before 2000, and many of these studies were conducted on large group of countries. On the one hand, considering the crowding out effect of individual and small group of countries in a large group, and conflicting empirical findings by the previous researchers, and on the other hand, Asian LDCs constant focus on FDI in their economic policies open the necessity of further researches on small group and individual countries.

Under this background, this study closely investigates the nature and extent of the contribution of FDI to the growth of a small group of countries -six south Asian LDCs. The paper first develops a theoretical model based on established economic theories and models, and then apply the model on a panel of six homogeneous economies. This study finds significant positive contribution of FDI when interaction of human capital with FDI is taken into consideration.

## 2. Overview of FDI in South Asian LDCs

South Asian LDCs historically received the least amount of global flow of FDI. The region received only 3.1% of global FDI inflows in 2014, compared to 26.0% for Asia and 11.9% for Central and South America (UNCTAD 2012). When compared to GDP, the share of FDI gives consistent picture – a low GDP-FDI ratio. However, the inflow of FDI as a share of south Asian LDCs' GDP have increased substantially after 1990s, rising from around 2% in 1980 to 10% in 2000, and accelerating even further to 12% in 2014. Figure 1 shows the dramatic increase of FDI since 1990, and Figure 4 shows the share of FDI in GDP for the period 1980-2014.





At the same time these Asian LDCs have sustained high levels of GDP growth during the last two decades, especially after 1990. Figure 2 shows the growth rate of this region over the period 1980-2014. As can be seen from the figure 2, before 1990, these countries experienced low level of growth primarily due to incapable of mobilizing sufficient local savings to realize massive investment requirements to accelerate growth. Although, the saving rates of these were not lower comparing with other developing countries of the world, the demand for capital was enormous. Availability of natural resources and low cost of labor created huge demand for export in these region. This huge opportunity of investment coupled with substantial reforms in the legal and financial sectors to attract foreign investments, the multinational corporations heavily in the manufacturing sectors of these countries. Initially the foreign investments were concentrated in low value added and labor intensive industries such as textile and agricultural sectors. However, since late 1990s, other high value-added industries such as electronics, automobile industries gained increasing foreign investments as MNCs were relocating their production facilities to these countries. Substantial market oriented reforms and development of financial institutions in these countries offered a smooth inflow of such foreign capital to these countries. Historically these Asian least developed countries have a good portion of unutilized and underutilized labor force. With the flow of FDI in various industries, the unskilled labor got free or low cost training and education facilities, and economies were benefitted by huge supply of skilled and educated labor forces since late 1990s. This led to dramatically increase in the overall productivity of these countries.

### 3. Review of the Literature

Economic theories generally support positive impact of FDI on growth since FDI is another form of capital supplied to the economy, and the externalities of FDI are generally positive.

Neoclassical growth theories put forth by Solow (1956) suggest that an increase in the capital stock to an increase in the aggregate output. Therefore, the inflow of FDI directly increase the total capital available in the economy. The spill-over effects of FDI are also recognized in growth theories (Romer 1993). In addition, Antas and Helpman (2004) and Helpman, Melitz, and Yeaple (2004) show that among the firms that serve foreign

markets, the more productive ones engage in foreign direct investment. The added higher productivity in host countries can accelerate the pace of growth and economic transition.

While the above theories suggest favorable impact of FDI, however, extensive empirical studies found mixed results on the relationship between FDI and economic performance depending on characteristics of sample countries, model selection and time period of study.

The vast literature of FDI-growth link shows the outcomes vary not only in the extent of the impact, but also on the direction of impact of FDI on growth. Alfaro (2003), Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and Sayek, S. (2004), Tuan, C. and Ng, L.F.-Y. (2006), Mah (2010), Chakraborty and Nunnenkamp (2008), Azman-Saini, W.N.W., Law, S.H. and Ahmad, A.H. (2010), Javed, K., Falak, S., Awan, R. and Ashfaq, M. (2012), Ray (2012), Borensztein, E., De Gregorio, J. and Lee, J.W. (1998), Wang (2002), Haseen and Anis (2012) observed a varying degree of positive impact of FDI on growth with other key findings. On the other hand, many other empirical studies either could not find any significant impact or found weak negative impact of FDI on economic performance. Herzer, D., Klasen, S. and Felicitas, N.-L.D. (2008), Carkovic and Levine (2005), Omoniyi and Obobitan (2011), Adeniyi and Omisakin (2011) document either insignificant or negative impact of FDI on GDP growth.

Borensztein et al. (1998) found weak positive impact of FDI on growth of real GDP in a study on sixty-nine developing countries. However, when included human capital in their model, the study found numerically higher coefficient of FDI variable with higher level of significance. Therefore, the authors concluded that countries with higher level of educated or skilled labor force can experience significant impact of FDI in economic performance.

Many studies went further into the empirical evidence of impact of FDI by looking into performance of the FDI of different sectors. In a study on 47 developing and least developed countries, Alfaro et al. (2004) found concluded that while the impact of total FDI on GDP growth is insignificant, the impact of manufacturing sector's FDI is significantly positive. This study also found that service sector's FDI has insignificant negative coefficient.

Some studies such as Haseen and Anis (2012) found the impact of FDI depends economic characteristics of host countries including market openness, financial development and legal system. Lee and Chang (2009) found strong positive impact in the long run and weak positive impact in the short run in their study on 37 countries using data from 1970 to 2002.

Using a bivariate model, Herzer et al. (2008) studied the contribution of FDI to GDP growth of 28 developing countries for the period of 1970 to 2003. Their study concludes no statistically significant role of FDI when human capital and trade openness are considered as separate variables in the growth model.

In a study on a large list of developing countries, Carkovic and Levine (2005) found no explanatory power of FDI for GDP growth. Changing the estimation method in their study yielded similar results, leading the authors to conclude that inflow of FDI has no significant impact on growth.

Omoniyi and Omobitan (2011) used two stage simulation of least square method (2SLS) to study the economic impact of FDI and foreign debt in Nigeria for the period 1996 to 2006. They observed negative impact of both FDI and foreign debts on the economic performance of Nigeria.

Adeniyi and Omisakin (2012) studied the relationship of FDI, financial development and GDP growth by using a tri-variate Vector Error Correction (VEC) model for small developing economies. The estimated coefficients of the VEC indicate that FDI does not granger cause GDP growth while financial development does.

While empirical studies on large sample of countries showed mixed results, most of the studies on individual Asian countries found positive impact of FDI on economic performance and transformation. Wang (2002) studied 12 Asian countries that revealed significant positive impact of FDI with greater impact of manufacturing sector's FDI. In an intensive study on China by using firm level data of 55,348 firms from all the major regions of China, the largest recipient of FDI, by Tuan et al. (2009) documented positive impact of FDI on overall Chinese economy with greater impact in coastal and financially developed areas. Another study by Yao and Wei (2007) on 29 provinces of China found similar but stronger impact of FDI on Chinese economy. Such studies on India and Pakistan show similar positive results.

Only a few studies have been conducted in the context of south Asian LDCs, and none of these studies used robust methodology in testing the impact. Sohag, and Tabassum (2010) studied the impact of FDI on various aspect of south Asian countries' economy such as export, balance of payment, and GDP by using two stage least square method. They found varying degree of positive relationship with FDI and selected macroeconomic variables. Other studies were conducted on individual members of south Asian LDCs.

Studies on Bangladesh show strong positive impact of FDI (Mottaleb 2007, Muhammad Azam 2010). Realizing such impact of FDI, Bangladesh government implemented various major reforms over the last two decades including changing legal framework for securing foreign investments, creating new EPZs (Export processing zones), one-stop service for foreign investments, new law (Foreign Investment Act, 2009). Similar steps were taken in Maldives based the role of FDI in the economy of Maldives. However, few studies on SAARC countries as a group found no significant impact of FDI. Similar result found in case of Sri Lanka.

From the above discussion it is clear that the rich literature on FDI-growth relation documented wide varying results ranging from nature to degree of relationship between FDI and GDP growth. A critical review of

the literature shows that the differences in outcomes are mostly due to differences in sample size, study periods, model selection and substantial variation in the initial development levels of human capital, financial development, and infrastructure development etc. of countries in the same group. It is also evident that the impact of FDI varies within the least developed countries. Therefore, study on small group of economies with similar level of initial development can avoid the crowding out effect of large group of economies, and provide better picture of the impact of FDI on growth for that group. Under this assumption, this study aims to examine the role of FDI for a small group of homogeneous economies of south Asia that was not been studied rigorously as a group before.

#### 4. Theoretical Framework and Model Specifications

Based on the economic theories, the role of FDI in growth can be explained from two dimensions – FDI as a part of capital formation, and the spillover effects of FDI. Under capital formation viewpoint, FDI can be seen as an addition to the existing domestic capital formation since FDI is a source of long-lasting physical capital to the host economy. In line with the neoclassical growth model such as Solow (1956), the inflow of FDI directly increase the total capital available in the economy. However, due to the diminishing return, the positive contribution of this additional capital will stay only up to certain time period.

The spill-over effects of FDI has widely been recognized by many growth theories (Romer 1993). FDI is considered as key diffuser of technology, knowledge and human capital that ultimately contributes to the economic performance of the host country. FDI theories suggest that the technology spill-over can be found in the form of imitation, training, linkage or competition (Kokko 1994, Kugler 2011). The theory Antras and Helpman (2004) on firms' global sourcing strategy suggest that firms with higher productivity engages in foreign direct investment (FDI) and intrafirm trade instead of outsourcing the intermediate products. These theories clearly highlight the positive impact of FDI on the total factor productivity of the host countries.

To study the direct and indirect contribution of FDI, this study incorporates the FDI in the output function. Growth models generally use supply side frameworks of output function to analyze the contribution of growth variables. Among the growth models, one notable framework is Levin and Raut (1997) model. Levin and Raut used the model to study the impact of export in GDP growth, and showed that the model provides similar results as that of the widely appreciated theoretical model of Feder (1982).

Following the framework of Levin and Raut, we evaluate the impact of foreign direct investment on growth by incorporating FDI variables in the growth equation. This approach assumes that FDI contributes to total factor productivity, and has a positive impact on labor productivity. Formal specification of the aggregate production function is mentioned below.

$$Y = AK^{\beta_1} L^{\beta_2}$$

$$\text{Where, } A = B[1 + \eta(F/Y)] F^\theta$$

Where Y, K, F, L and A are, respectively, real GDP, stock of domestic capital, stock of foreign capital, labor and total factor productivity level of the economy. This specification of aggregate production function allows incorporating FDI variables as contributing factors of the total factor productivity (A). The total factor productivity is, thus, determined endogenously by the stock of FDI ( $F^\theta$ ) and the share of FDI in real GDP, as well as exogenous influences represented by the residual productivity factor (B). The stock of FDI variable, ( $F^\theta$ ), captures the externalities effects of FDI on technology diffusions and economic transition, and the share of FDI in GDP, ( $F/Y$ ), reflects the superior productivity of foreign investments.

$$\text{So, the production function becomes: } Y = B \left[ 1 + \eta \left( \frac{F}{Y} \right) \right] F^\theta K^{\beta_1} L^{\beta_2} \quad (1)$$

By taking logarithm on both sides of the equation (1), we find

$$\ln(Y) = \ln(B) + \ln \left[ 1 + \eta \left( \frac{F}{Y} \right) \right] + \theta \ln(F) + \beta_1 \ln(K) + \beta_2 \ln(L)$$

By expressing natural logarithm of upper-case variable in lower-cases, using the approximation that  $\ln(1+z) \approx z$ , when z is small, we find the following

$$y = b + \eta \left( \frac{F}{Y} \right) + \theta f + \beta_1 k + \beta_2 l$$

By taking first differences on both sides, and with some manipulation we find the following equation:

$$\Delta y = \eta \Delta \left( \frac{F}{Y} \right) + \theta \left( \frac{\Delta F}{F} \right) + \beta_1 \left( \frac{\Delta K}{K} \right) + \beta_2 \Delta l \quad (2)$$

Equation 2 can be estimated by the following econometric model. It can be noted that the first differences of natural logarithm values indicate percentage change of the original variable. Thus,  $\Delta y$  indicates the growth rate of GDP.

$$\Delta y = \beta_0 + \beta_1 \Delta \left( \frac{F}{Y} \right) + \beta_2 \left( \frac{\Delta F}{F} \right) + \beta_3 \left( \frac{\Delta K}{K} \right) + \beta_4 \Delta l + \varepsilon \quad (3)$$

##### 4.1 Level of Development and GDP Growth

An important implication of neoclassical growth model is the prediction of conditional convergence, which implies that the further an economy is away from its steady-state, the faster the economy tends to grow, and the closer an economy is from its steady-state, the slower the economy tends to grow (Solow 1957). In other

words, poorer countries as represented by lower initial per capita GDP are predicted to grow faster than the rich countries. The major reason behind such convergence of income level is that since capital is relatively scarce in poor countries, the return on capital is higher that leads the economy grow faster. Many empirical growth studies found such relationship using Pen World data (e.g. Barro 1991).

However, recent studies (e.g. Levine and Renelt 1997) found statistically insignificant relationship between initial per capital GDP and average growth rate using recent data on OECD and non-OECD countries separately.

To the extent the initial development can represent a country's ability to attract and utilize foreign capital flows, this study expects negative relationship in line with other recent growth studies such as Barro & Sala-i-Martin (1995). Thus, the econometric model (3) becomes:

$$\Delta y = \beta_0 + \beta_1 \Delta \left( \frac{F}{Y} \right) + \beta_2 \left( \frac{I_F}{Y} \right) + \beta_3 \left( \frac{I_D}{Y} \right) + \beta_4 \Delta l + \beta_5 y_0 + \varepsilon \quad (4)$$

#### 4.2 Data and data sources

Economic theory recommends human capital as an important source of economy's growth. However, empirical studies on the relationship between human capital and growth found mixed results. A rich literature on growth model considered human capital, as measured by enrollment rate in school, as a critical factor for growth, though many other studies found no explanatory power of literacy rate other than the initial level of literacy (Romer 1990). While the direct contribution of human capital is a debated issue, the indirect role of human capital is recognized in all empirical studies. In case of international capital mobility and diffusion of technology, the interaction with human capital is highly significant (Nelson and Phelps 1966).

Thus, following the rich literature of human capital and growth, and the interaction of human capital with FDI, we incorporate the human capital in our growth model, and the complementariness in the productivity factor as an endogenous variable. Thus, the total factor productivity can be shown as:

$$A = B \left[ 1 + \eta_0 \left( \frac{F}{Y} \right) + \eta_1 H \left( \frac{F}{Y} \right) \right] F^\theta$$

The growth model (4) becomes the following:

$$\Delta y = \beta_0 + \beta_1 \Delta \left( \frac{F}{Y} \right) + \beta_2 H \Delta \left( \frac{F}{Y} \right) + \beta_3 \left( \frac{I_F}{Y} \right) + \beta_4 \left( \frac{I_D}{Y} \right) + \beta_5 \Delta l + \beta_6 y_0 + \beta_7 H + \varepsilon \quad (5)$$

### 5. Data and Estimation Specifications

This study deals with the south Asian least developed countries (LDCs), as defined by the United Nations Conference on Trade and Development (UNCTAD), over the period of more than three periods ranging from 1980 to 2014. This list includes Afghanistan, Bangladesh, Bhutan, Maldives, Myanmar and Nepal. Among these six countries Maldives graduated from the category of LDC in 2011. However, Maldives has been included in this study since it was a LDC during most the period this study deals with. All the data was collected from UNCTAD and World Bank databases that are available on their websites.

Econometric model (5) used as the basis for the panel data analysis of the impact of FDI on growth for the six countries of this study. To capture any possible geographical, structural and political effect, few modifications are made in estimating the regression models.

First, economic growth and distribution of FDI vary significantly among the south Asian LDCs. Countries with access to sea port such as Bangladesh, Myanmar and Maldives experienced higher growth rate and FDI compared to the economic performance of landlocked countries such as Bhutan, Nepal and Afghanistan. To capture any possible effect of such geographical variation, we include a dummy variable in the estimation model - countries with sea port gets the value 1 and without sea port gets 0.

Second, as discussed in the introductory part of this paper, the growth rates and inflows of FDI changed significantly after 1990 compared to previous 10 years. Changes in economic policies of the governments to attract more foreign investment are considered to be among the major drivers of the changes in economic performance. Therefore, to capture any possible effect of such changes in economic policies, we estimated the regression model for three separate periods: 1980-1989, 1990-2000 and 2001-2014.

Third, to further explore the effect of FDI, model 4 and 5 in all the above cases were estimated with and without FDI variables.

The growth rate ( $y$ ) is calculated as the first difference of natural logarithm of real GDP. The growth rate of working age population (age 15-64) is used as the growth rate of labor ( $l$ ). The ratio of domestic investment and output is calculated by dividing the nominal gross fixed capital formation (GFCF) by nominal GDP. Similarly, the ratio of FDI inflow and output is calculated by dividing the nominal FDI inflow by nominal GDP, and the ratio of FDI stock and output is calculated by taking the ratio of nominal FDI stock and nominal GDP. Following the standard literature on growth study, human capital is measured by the rate of secondary school enrollment.

Table 1: Summary Statistics of the panel sample for the period 1980-2014

Variable		Mean	Std. Dev.	Min	Max
GDP	$\Delta y$	0.05931	0.08080	-0.14965	0.34997
Growth Rate		5	7		4

Labor Growth Rate	$\Delta l$	5	0.02529	3	0.01671	-0.03468	7	0.07554	
Secondary School Enrollment Rate	$H$	9	0.34695	9	0.17813	0.06745	5	0.83413	
Domestic Investment - GDP Ratio	$\left(\frac{I_D}{Y}\right)$	3	0.23524		0.08644	0.09487		8	0.35022
FDI Inflow-GDP Ratio	$\left(\frac{I_F}{Y}\right)$	7	0.01498	7	0.03042	-0.02321	9	0.18691	
Growth of share of FDI stock in GDP	$\Delta\left(\frac{F}{Y}\right)$		0.05782	4	0.03539	-0.12847	4	0.27086	
School Enrollment Rate x Growth of FDI share in GDP	$H\Delta\left(\frac{F}{Y}\right)$		0.03103		0.01781	-0.05776		0.12307	
Initial GDP per Capita (Log)	$y_0$	4	5.55193	4	0.73091	4.24750	6	6.52018	

### 5.1 Panel Unit Root Test

Time series data needs to be stationary for unbiased and efficient estimation. This study applies Levin-Lin-Chu test and Hadri LM test for the panel unit root test. All series found stationary which is consistent with characteristics of the series. Since the series are natural logarithm of original data, and then taken first differences of logged values, it is reasonably expected that the series are stationary.

## 6. Results and Analysis

The regression results are summarized in Table 2 and Table 3. Table 2 shows results for the panel data for overall study period, and two sub periods. Table 3 shows the regression estimates for individual country for the overall period.

For all the periods in panel data, the regression results clearly show the significance of FDI variables, particularly in the sub period 1990-2014. Adding FDI variables increased adjusted R2 by 11% for overall study period, and by 17% in 1990-2014. In individual country case, except Bhutan, the FDI variables are also found significant.

The superior productivity of FDI represented by the coefficient of the variable  $\Delta(F/Y)$ , is significantly positive at 10% level in all periods of panel data, indicating the positive impact of FDI on the growth performance of these economies. In fact, for the period after 1990 – 2014, the superior productivity of FDI is highly significant in both data sets. This finding is consistent with the findings of *Sohag, M. and Tabassum, P. (2010)* for south Asian LDCs.

The externality effect of foreign direct investment as measured by the coefficient of the variable  $(I_F/Y)$  is also positive in all periods. Except the sub period 1980-1989, this variable is significant in both overall period and in the sub period 1990-2014. This results reflects the reality of technological diffusion from the presence of multinational companies in these countries. It is generally agreed that the improvement of intra-industry productivity in these countries are due to the introduction of new technologies in production, communication and transaction systems – all these are externalities of foreign long term investments. More importantly, market oriented reforms in these economies, especially in the financial sector, is one of the most significant effect of these foreign investments.

**Table 2: Summary of regression coefficient estimations for panel data of six countries**

Dependent variable GDP Growth ( $\Delta y$ ). Values within parenthesis are t-statistics.

	Full Period (1980 – 2014)		1980-1989		1990-2014	
	Without FDI Variables	With FDI Variables	Without FDI Variables	With FDI Variables	Without FDI Variables	With FDI Variables
Number of Observation	210	210	60	60	150	150
$\beta_0$	-0.319	-0.272	-0.427	-0.338	-0.418	-0.387

	(-2.41)	(-2.97)	(-2.68)	(-2.97)	(-3.31)	(-3.16)
$\Delta \left( \frac{F}{Y} \right)$		0.31 (1.93)		0.11 (1.82)		0.24 (3.94)
$H\Delta \left( \frac{F}{Y} \right)$		0.11 (1.91)		0.05 (1.13)		0.17 (2.63)
$\left( \frac{I_F}{Y} \right)$		0.29 (2.88)		0.19 (1.62)		0.32 (2.97)
$\left( \frac{I_D}{Y} \right)$	0.137 (2.41)	.168 (2.79)	0.122 (2.98)	0.131 (2.52)	0.144 (1.78)	0.137 (1.89)
$\Delta l$	0.861 (3.17)	0.596 (2.91)	0.71 (2.17)	0.79 (2.56)	0.68 (2.26)	0.62 (1.98)
$y_0$	-0.081 (1.72)	-0.052 (1.61)	-0.083 (-1.42)	-0.078 (-1.28)	-0.079 (1.48)	-0.071 (-1.57)
$H$	0.003 (1.33)	0.004 (1.01)	0.011 (1.23)	0.008 (1.17)	0.009 (1.35)	0.01 (1.38)
$D$	0.006 (1.16)	0.005 (1.27)	0.006 (1.17)	0.003 (1.30)	0.005 (1.27)	0.003 (1.11)
Adjusted R <sup>2</sup>	0.67	0.78	0.59	0.73	0.59	0.76
F-Statistic	29.76	38.43	17.88	12.35	15.76	16.14

**Table 3: Summary of regression coefficient estimates for individual countries for the period 1980-2014**

Dependent variable GDP Growth ( $\Delta y$ ). Variables  $y_0$  and  $D$  omitted as their coefficient are 0. Values within parenthesis are t-statistics.

	Overall Period (1980 - 2014)					
	Afghanistan	Bangladesh	Bhutan	Maldives	Myanmar	Nepal
Number of Observation	35	35	35	35	35	35
$\beta_0$	-0.528 (-2.32)	-0.215 (-2.96)	-0.327 (-2.68)	-0.197 (-3.21)	-0.241 (-2.57)	-0.387 (-3.16)
$\Delta \left( \frac{F}{Y} \right)$	0.31 (4.17)	0.23 (2.67)	0.14 (1.98)	0.26 (3.41)	0.21 (2.33)	0.18 (2.19)
$H\Delta \left( \frac{F}{Y} \right)$	0.23 (2.96)	0.15 (1.98)	0.09 (1.82)	0.17 (2.33)	0.14 (1.87)	.012 (1.88)
$\left( \frac{I_F}{Y} \right)$	0.39 (3.35)	0.29 (2.35)	0.18 (1.92)	0.34 (2.88)	0.26 (2.12)	0.20 (2.11)
$\left( \frac{I_D}{Y} \right)$	0.11 (2.21)	0.16 (2.79)	0.27 (3.36)	0.19 (2.15)	0.21 (3.11)	0.24 (3.18)
$\Delta l$	0.46 (2.89)	0.69 (2.11)	0.89 (4.16)	0.57 (1.97)	0.61 (3.82)	0.63 (2.58)
$H$	0.002 (1.64)	0.004 (1.58)	0.08 (1.89)	0.01 (1.58)	0.009 (1.83)	0.01 (1.38)
Adjusted R <sup>2</sup>	0.79	0.73	0.68	0.77	0.62	0.65
F-Statistic	35.66	28.43	20.67	27.13	19.6	23.25

The interaction of FDI and human capital as represented by the coefficient of the variable  $H\Delta(F/Y)$ , is positive and significant, especially during the period 1990-2014. This is consistent with the wide literature of the impact of human capital on growth. As discussed earlier that human capital itself may not explain significantly, but the interactive effect of human capital is unanimously accepted in the literature. This is obvious from theoretical viewpoint as well.

The direct and indirect effects of FDI on economic growth increased substantially after 1990 compared to the any previous period. This is evidenced in all three variables of our regression model in panel data set. This growing effect of FDI reflect the relative importance of foreign capital in these least developed countries.



Another key finding of this study is that the superior productivity of FDI as represented by the coefficient of the variable, changes in share of FDI stock in GDP,  $\Delta(F/Y)$ , is greater than the coefficient of the share of domestic investment – GDP ratio in the sub period 1990 – 2014 and in overall period. This seems to be surprising but, is consistent with the economic theories such as Antras and Helpman (2004), Caves (1996) and Zhang and Markusen (1999). Antras and Helpman proved that only the higher productivity multinational companies engage in FDI. Caves (1996) and Zhang and Markusen (1999) showed that by adding advanced technology and efficient management to the existing advantageous resources of the host country, FDI enjoys greater productivity compared to the domestic investments.

The coefficient of the dummy variable, D, representing the geographical advantage of access to sea port, is not significant in any of the cases of this study. This support the widely recognized assumption that the geographical location of the south Asian countries has no impact of its economic performance in general, and export performance in particular. In addition, these countries have smooth connectivity including the undergoing project of building trans-Asian highway among the south Asian countries.

The results of individual country analysis show that while FDI has significant influence in explaining the growth of south Asian LDCs, it does not have much influence in economic performance of Bhutan. This finding highlights that the impact of FDI can vary among economies in the same region and category depending on the characteristics of the economy.

## 7. Conclusion

Foreign investment has become a significant source of capital for the least developed economies. The literature on the relationship of FDI and growth it can be deduced that there is no one-size-fits-all nature of relationship between FDI and economic performance. Moreover, foreign investments bring significant externalities to the host economies – the impact of these externalities also vary depending on the various economic criteria of host economies. Given such diverse nature of link between FDI and growth, and their interaction, it is justified to investigate this relation on individual and small group of economies that can avoid the crowding out effect of large grouping. In addition, model selection can have substantial influence on results. As mentioned in the literature review, many studies did not incorporate the interaction of FDI with other economic variables, and impact FDI on labor productivity in their selecting the model. Taking all these issues into consideration, this study uses a comprehensive model to capture all possible major effect of FDI on GDP growth of a small group of homogenous economies in south Asia.

This study is the first on the south Asian LDCs as a group to investigate comprehensively the role of FDI, though a number of studies have been conducted on some individual countries of this group. The results of this study show that FDI has significant positive impact on the economic performance and transformation of south Asian LDCs. This result is consistent in the context of Asian countries as most of the studies on Asian countries show varying degree of positive role of FDI.

The findings of this study supports the governments' recognition of FDI as a key to development and rapid transformation, and therefore, agree on the necessity of FDI-friendly policies in these economies. The results of this study will help the international agencies, who play a key role in development activities of these countries, in developing appropriate policies for these economies. International agencies often prescribe similar policy for the members of a group of countries. In this context, this study will be an important document for development partners of these LDCs.

While this study aims to be as comprehensive as possible in capturing all possible effects of FDI on growth, some socially important factors could not be modeled due to lack of reliable secondary data. Among these the link of FDI with the widespread nature of corruption in these countries, deteriorating human rights condition as reflected in restrictive labor rights and environmental pollution are the major possible areas to accommodate in growth studies of this region. Further studies are needed to capture possible impact of these negative externalities.

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