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**The Impact of FDI and Remittances on
Economic Growth in South Asia: A
Panel Data Study**

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Economics**

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Abbreviations

The following table describes the various abbreviations and acronyms used throughout this study. The page on which each one is defined or first used is also given.

Abbreviation	Meaning	Page
FDI	Foreign Direct Investment	1
HCFs	Host country factors	13
IMF	International Monetary Fund	3
MNEs	Multinational Enterprises	1
ODA	Official Development Assistance	1
OECD	Organisation for Economic Co-operation and Development	11
SAARC	South Asian Association for Regional Cooperation	5
UNCTAD	United Nations Conference on Trade and Development	1

1. Introduction

This chapter provides the background, justification, aims, research questions and objectives of this study. It also briefly mentions the findings and provides a structure for the dissertation.

1.1 Background

The three main pillars of growth for developing countries are: foreign direct investment (FDI), official development assistance (ODA) and international remittances (Alfieri and Havinga, 2006). We focus on FDI and international remittances.

FDI includes tangible and intangible assets such as money and the transfer of technological capabilities. We define FDI in accordance with the United Nations Conference on Trade and Development (UNCTAD, 2007), who describe it as

“an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy in an enterprise resident in an economy other than that of the foreign direct investor”.

World FDI inflows have increased greatly, totaling US\$1.4 trillion in 2010 compared to US\$53 billion in the 1980s (World Bank, 2013). Multinational enterprises (MNEs) are investing in developing countries due to lower production and labour costs and higher profits. Figure 1 illustrates this; developing economies received over US\$ 700 billion in 2011 compared to approximately 100 billion in 1996 (ADB, 2006; Sahoo, 2006) and they accounted for more than 60% of global FDI inflows in 2013 (UNCTAD, 2013).

Starting from the late 80's, many developing nations opened up their economies to international trade. Table 1 shows the regulatory changes that occurred between 1991 and 1998; 94% of these changes were favourable to FDI (UNCTAD, 1999). However, South Asia's FDI inflows as a share of world FDI remain one of the lowest compared to

other developing regions; it averaged less than 2% between 2000-11. This is shown in Figure 1 where the graph is hardly visible for South Asia (World Bank, 2013).

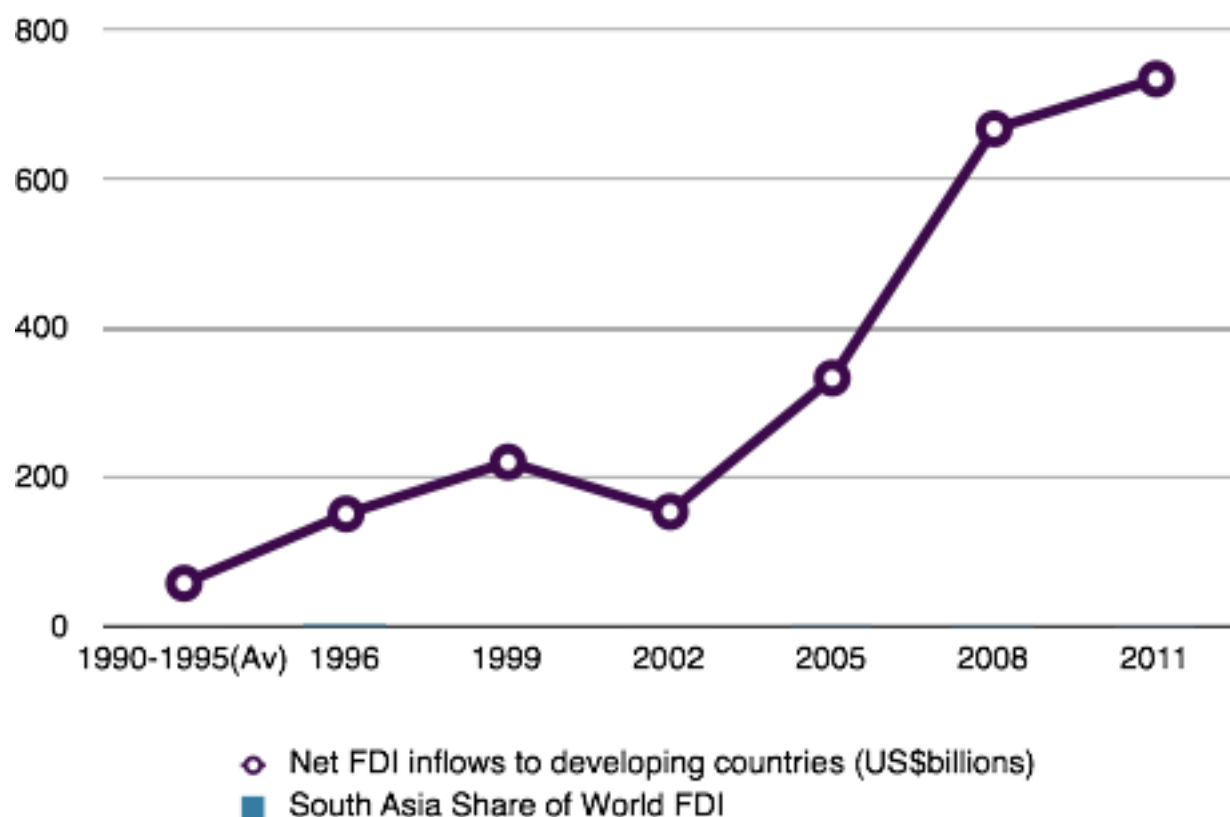
Many developing nations seek FDI due to the potential direct and indirect benefits. Direct advantages include access to modern technology and financial capital. Indirect advantages (spillovers) can be experienced through the mobility of employees from an MNE to local firms who use their expertise gained in the MNE to increase productivity in local firms (Dunning and Lundan, 2008). The host country can also use FDI to improve living conditions, infrastructure and much more.

Table 1: FDI-Related Regulatory Changes, 1991-1998

Item	1991	1992	1993	1994	1995	1996	1997	1998
Number of Regulatory regime changes of which:	82	79	102	110	112	114	151	145
More favourable to FDI	80	79	101	108	106	98	135	136
Less favourable to FDI	2	-	1	2	6	16	16	9

Source: UNCTAD (1999)

Figure 1: FDI Inflows to Developing countries and the South Asia share of World FDI, 1990-2011



Source: Created by author. Data from: ADB (2006) and Sahoo (2006)

There has been a large increase in migrants i.e. people born in low and middle-income countries that reside in high-income nations: 154 million in 1990 to 232 million in 2013 (Connor et al, 2013). Many migrants send money to their home country that is called remittances. We define remittances according to the IMF (2010) (cited in World Bank, 2011 pp.xvi) whom define it as “current private transfers from migrant workers who are considered residents of the host country to recipients in the workers’ country of origin”. Workers are considered residents if they live there for more than a year.

Remittances inflows have increased rapidly and in some developing countries they are the largest source of external funding since they are the most stable form of

finance, unlike ODA, which depends on political imperatives (Premaratne and De Mel, 2009).

South Asia is the second largest remittances recipient. India, Bangladesh, Pakistan and Sri Lanka were the top four recipients in 2010, receiving \$55.0 billion, \$11.1 billion, \$9.4 billion and \$3.6 billion, respectively (World Bank, 2011). In 2009, inflows were ten times larger than ODA and almost three times larger than FDI (Table 2), which means they are the largest source of external funding in South Asia.

There is consensus that remittances are very important for home country development and poverty alleviation. Governments have developed an active interest since inflows of ODA have declined in developing countries and they need to find alternative sources of external finance (Government Accountability Office, 2005).

Table 2: Remittances, Inward FDI and ODA in South Asia, 2011 (\$ billion)

Country	Remittances	FDI	ODA
Bangladesh	12.1	1.2	1.5
India	63.8	32.2	3.2
Pakistan	12.3	1.3	3.5
Sri Lanka	5.2	0.9	0.6
Total	93.4	35.6	8.8

Source: World Bank Indicators (2012)

1.2 Justification:

FDI and remittances are both important for developing countries' growth. However, it is not known by how much they enhance economic growth and if they are significant causal variables.

Many studies examined the effect of remittances and FDI on economic growth independently. The novelty of this paper is that we compare the significance of the two as determinants of economic growth in South Asia. Also, we have included a variety of variables compared to other studies. For example, Benmamoun and Lehnert (2013) included FDI, Remittances, ODA, openness, democracy, governance, inflation, population growth and initial GDP per capita. However, we have gathered what we deem to be the most important variables that impact economic growth from various studies. These are; FDI, Remittances, ODA, openness, governance, democracy, inflation, life expectancy, education attainment, initial GDP per capita, population growth, private credit and gross fixed capital formation (GFCF).

Furthermore, we compare 4 South Asian countries, including Sri Lanka (often not included). Most South Asian countries, except India, have received little attention and account for insignificant FDI inflows. However, this research is of utmost importance as South Asia is on a high growth track and is a hot spot for investors due to low costs and large capacity. South Asia is home to almost 30% of the world's population and 500 million poor people (Gordon, 2011). This poverty and political instability has global effects. It has also created global tension, for example the conflict between India and Pakistan over Kashmir has led to the inadequacy of the South Asian Association for Regional Cooperation (SAARC) to provide a platform for assistance (Gordon, 2011). If South Asia could tackle its problems, it is a very promising region in regards to the resources it can provide. We chose these specific countries because they are the largest economies in South Asia with regards to GDP (World Bank, 2012) as

shown in Table 3. Furthermore, they have all changed their policies in favour of export promotion, increased labour exports and attracted FDI in order to boost GDP as vital members of SAARC (Rahman, 2009).

Table 3: GDP in Current US\$ in South Asia, 2012

Country	GDP (Current US\$)
India	1.842 trillion
Pakistan	225.1 billion
Bangladesh	116.4 billion
Sri Lanka	59.42 billion
Afghanistan	20.50 billion
Nepal	18.96 billion
Maldives	2.222 billion
Bhutan	1.780 billion

Source: World Bank Indicators (2012).

1.3 Aims, Research Questions and Objectives:

Aim:

To find out which pillar of development, International Remittances or FDI, enhances economic growth more in South Asia.

Research Questions:

1. Has FDI positively impacted economic growth in these countries?
2. Have Remittances positively impacted economic growth in these countries?
3. Do International Remittances outperform FDI in enhancing economic growth in South Asia?
4. In which South Asian country has FDI or Remittances enhanced economic growth in by the most?

Objective:

This study proposes to answer these questions through Random-Effects (RE) Generalised Least Squares (GLS) by utilising data from the four countries between 1990 and 2012.

1.4 Findings

The main finding is that FDI contributes the most to economic growth in South Asia. FDI positively impacts GDP in South Asia whereas Remittances negatively affect it, therefore Remittances do not outperform FDI. Also, Sri Lanka is the country where Remittances has enhanced GDP the most.

1.5 Structure:

This paper has been organised as follows. Section 2 provides a literature review and Section 3 describes the data and methodology. Section 4 states the results and provides an analysis. Section 5 poses some limitations and section 6 is the conclusion and future recommendations.

2. Literature Review

2.1 Foreign Direct Investment

The FDI-Growth nexus has attracted a vast amount of research in the past few decades, but there is still no single explanation about whether there is a positive or negative relationship. The majority of the literature points to a positive association. Theoretically, FDI can help enhance economic growth through many ways including technology transfer, capital accumulation or skill acquisition. However, FDI can also negatively affect it, for example by deteriorating the balance of payments due to profit repatriation.

Earlier studies on economic growth were based on the aggregate production function, which analysed the impact of FDI on the growth of national income and production factors such as capital or labour (Nowbutsing, 2009). The studies published by Solow (1956, 1957) formed the basis for most of the analysis within this Neo-classical model. This model explains that steady economic growth can be achieved through the correct amounts of labour, capital and technology (when output per worker and capital per worker are constant) (Boianovsky and Hoover, 2009). Solow (1956) argued that capital formation increased labour productivity in a dynamic process of investment growth. The model acknowledged that when the economy is in a steady state, permanent economic growth could only occur if there is technological progress but it did not explain why or how (Djurovic, 2012). It states that the growth rate of per capita income cannot be maintained through continuous savings and investment because as per capita labour rises, the marginal productivity of capital runs into diminishing returns (Boianovsky and Hoover, 2009). This means that if you provide people with more and more capital goods without inventing new uses for the capital, then eventually the extra capital become redundant (Aghion and Howitt, 1997), i.e. FDI cannot impact output in the long run.

Following this, the endogenous growth model was developed which focused on technological progress, unlike Solow's model, which assumed technological growth to be exogenous (Solow, 1956). The theory concluded that FDI affects the rate of growth of output in the long run. The simplest model, the 'AK Model'; $Y=AK$ (A is marginal productivity of capital and K is some composite capital and labour input), shows that there is a constant marginal product of capital, which makes long run growth possible. The theories of Lucas (1998) and Rebelo (1991) emphasised the importance of technology and stated that investment should be made in the area of technological innovations since it had higher returns than usual (Djurovic, 2012). Romer (1990) and Barro and Sala-i-Martin (1995) expanded the meaning of capital to include human capital and accumulation of knowledge. The Romer model (1990) stated that FDI enhances economic growth through the accumulation of both human and knowledge capital. However, this relationship does not apply to every country, because the impact depends on the host country's environment. For example, it is common that if a country has open trade regimes and high levels of exports, then they would benefit more from FDI than their counterpart (OECD, 2002).

In contrast to the theories that state that FDI positively impacts economic growth, the dependency theory reveals a negative association between the two, because the host country's dependence on foreign investment negatively impacts their economic growth and income distribution (Adhikary, 2011). Amin (1974) argues that when foreigners control an economy, the economy develops in a disarranged way, not in an organic way, due to a number of reasons. For example, FDI can have an adverse impact on employment, income distribution and autonomy of a country (Musila and Sique, 2006). It can also lead to the exit of many local firms due to an imbalance in the competition because foreign firms are superior in terms of capital, technologies, networks, managerial, and marketing skills (Marksun and Venables, 1997).

Furthermore, it can diminish the financial stability of a country through shrinking foreign exchange reserves if the profits and capital of FDI are repatriated. The dependency theory argues that FDI does not assist economic development but undermines it.

Based on these mixed theoretical views, researchers carried out empirical studies to examine the relationship. UNCTAD (2003) conducted investment policy reviews, which provide evidence of the benefits of FDI such as generating employment and an increase in wages. The general conclusion is that FDI does have a positive impact on economic growth but this depends on the specific country. A large number of studies suggest that there is a positive link between FDI and economic growth due to the capital formation and technology transfers as stated in the endogenous growth theory (Zenasni and Benhabib, 2013; Borensztein et al, 1998; Aurangzeb and Ul Haq, 2012). This is because FDI gives the host economy a stock of knowledge capital that aids the increase in productivity of factors such as labour and capital.

Researchers have found a positive and statistically significant relationship between FDI and economic growth in 32 developing nations including India, Pakistan and Morocco (Lan, 2000; Mottaleb, 2007; Hansen and Rand, 2006). Studies have also concluded that both FDI and exports enhance economic growth in the long run and in the short run there is a bi-directional causal relationship between FDI and economic growth (Ahmad et al, 2012; Andraz and Rodrigues, 2010). This positive association is also found in the USA, where FDI contributes not only to the economic growth but total factor productivity as well which further increases economic growth (Asheghian, 2004; Roy and Van der Berg, 2006).

The impact of FDI on economic growth varies from country to country and depends on a number of different factors. Borensztein et al (1998) found a positive relationship but this only occurred when the host country had a highly educated

workforce. Additionally, many researchers have found that if a country changes their investment policies from import substitution to more open, export led policies it can enhance the benefits that come from FDI (Bhagwati, 1978; Agrawal, 2000; Balasubramanyam et al, 1996; Tiwari and Mutascu, 2011; Ray, 2012). Import substitution is an economic policy where a country focuses on being self-sufficient by increasing domestic production and depending less on foreign trade. Foreign produced goods such as energy, food and water are substituted with locally produced ones. It became popular in the 1950s and 60s to promote the economic independence of developing nations (Bruton, 1997). In the late 1970s, export led policy replaced import substitution as a way to improve the development of countries. It aims to speed up the industrialisation process by exporting goods and it favours free trade. Export-led development is thought to benefit countries through technology diffusion and knowledge spillovers, which speed up the growth of productivity (Palley, 2011). They suggested that those economies without sufficient resources to become self-sustained for example enough food or natural resources, should adapt an export-led strategy in order to achieve high growth.

Other host country factors (HCFs) that can moderate the relationship between FDI and economic growth include; human capital, infrastructure, level of financial development, institutional quality and the level of economic development of the host country (Kotrajaras, 2010; Blomstrom et al, 1992; Durham, 2004; Solomon, 2011). However, some literature claims that HCFs do not significantly affect the relationship between FDI and economic growth. Carkovic and Levine (2005) investigated the moderating effects of the level of human capital, financial development, level of GDP per capita and trade openness on the correlation between FDI and economic growth in 72 developed and developing countries. They incorporated interaction terms between

FDI and each of the HCFs in separate specifications and concluded that both FDI and the interaction terms were statistically insignificant.

Contrastingly, some studies have also found a negative correlation between FDI and economic growth. Research was conducted in various countries including Pakistan, India and China (Rizvi and Nishat, 2009; Falki, 2009; Carkovic and Levine, 2002). They concluded that FDI does not impact economic growth, it does not create employment in a direct manner in any country and enhancement policies must be implemented to stimulate employment growth. Bornschieer et al (1978) conducted Ordinary Least Squares Regression (OLS) on 76 developing countries and also found a negative relationship between FDI and GDP, which became stronger as income levels increased.

When analysing the size of the effect of FDI on economic growth, we should be cautious. Most investigations have used data that measured the international flow of resources for foreign direct investment (stated in the balance of payments). However, this is only part of the resources invested by a multinational firm because some “investment could be financed using debt or equity issues raised in the domestic market” (Borenzstein et al, 1998, p.134) and so the coefficients of FDI may be relatively overestimated. Also, studies measure FDI by using the sum of flows of FDI, but this does not represent the current value and so this may be an underestimate. Another practice that could affect the amount of FDI is “Round tripping”, where domestic investors pretend to be foreign investors to take advantage of tax benefits and so the actual FDI stock could be less than stated in statistics (Re-define, 2013).

2.2 International Remittances

There have been numerous studies about the impact of Remittances on economic growth and as expected, there have been contrasting views. Previous studies have been doubtful about the economic impact of international remittances, as they believed that remittances were spent on personal consumption (Russell, 1986; Barajas et al, 2009). However, most of the literature that supports this argument is supported by anecdotes rather than empirical evidence (Adams, 2007). Most recent studies have found that international remittances are spent on savings and investments as well as personal consumption (Dustmann and Kirchamp, 2002; Adams, 2002).

Many researchers have concluded that International Remittances have a positive impact on the economic growth, mainly in developing countries (Ukeje and Obiechina, 2013; Driffield and Jones, 2013; Ahmad et al, 2013; Azam et al, 2012). Jawaid and Raza (2012) found a significant and positive long-run relationship in India, Bangladesh, Sri Lanka and Nepal but it was negative for Pakistan. This relationship was bi-directional for Nepal and Sri Lanka but unidirectional for the rest of the countries. Remittances can help reduce poverty through increasing households' incomes. This increase in income can help improve human capital and living standards through developments in education, health and business (World Bank, 2006). Page and Adams (2003) studied 74 low and middle-income developing countries and found that remittances lead to a reduction in poverty and income inequalities; on average a 10% increase in remittances leads to a decrease in poverty of 1.6%. A few studies have also concluded that remittances have contributed more to economic growth than ODA and FDI (Benmamoun and Lehnert, 2013; Rahman, 2009)

International Remittances can also affect balance of payments, interest rates and foreign exchange rates. World Bank (2006) found that in 22% of the countries investigated, remittances lead to the appreciation of exchange rates that reduced exports

and diminished economic growth. On the other hand, United Nations (2006) provided evidence that “foreign exchange inflows associated with remittances also improve the creditworthiness of receiving countries, lower their borrowing costs and provide reliable financing in times of instability”.

Countries have to satisfy conditions to maximise the benefits from Remittances. Some have found that the positive relationship between Remittances and economic growth is stronger in low-income countries and where the financial system is less developed. This is because it provides an alternative method by which to finance investment and overcome liquidity constraints (Benmamoun and Lehnert, 2013; Fayissa and Nsiah, 2008; Giuliano and Arranz, 2009).

However, Cooray (2012) found that Remittances positively impact economic growth when education levels and financial sector development are high. Catrinescu et al (2009) found that Remittances will contribute when the country has high quality political and economic institutions and policies in place. This should aid the implementation of sound policies to encourage investments and savings. In countries where economies are stagnating, Remittances cannot impact economic growth positively (Barguelli et al, 2013).

From this selective review, we observed that there are several studies based on developing countries, which conclude that FDI and International Remittances have a positive effect on economic growth. However, these issues are still not resolved and deserve further investigation. The research of South Asian economies is of utmost importance as they are hot spots for investors and home to nearly 30% of the world’s population (Gordon, 2011), so whatever decisions are made will have worldwide impacts.

Summary tables of the empirical literature can be found in Appendix A: Table A1 and Table A2.

3. Model Equation, Data and Methodology

3.1 Model

To answer our research questions, we used panel data on Bangladesh, India, Pakistan and Sri Lanka between 1990 and 2012. Panel data combines cross-sectional and time series dimensions, which simplifies computation and statistical inferences. It can also produce more accurate predictions for individual outcomes through pooling data (Hsiao, 2007). We used a model created by Benmamoun and Lehnert (2013) who derived it from Barro (1996) and Kosack and Tobin (2006).

The Base Model:

$$\text{GDP}_{it} = \beta_0 + \beta_1 \text{FDI}_{i,t} + \beta_2 \text{REMIT}_{i,t} + \beta_3 \text{Openness}_{i,t} + \beta_4 \text{Democracy}_{i,t} + \beta_5 \text{Governance}_{i,t} + \beta_6 \text{Inflation}_{i,t} + \beta_7 \text{Pop_Gwth}_{i,t} + \beta_8 \text{Life}_{i,t} + \beta_9 \text{Education}_{i,t} + \beta_{10} \text{GFCF}_{i,t} + \beta_{11} \text{PC}_{i,t} + \beta_{12} \text{ODA}_{i,t} + \eta_i + \varepsilon_{it}$$

it refers to country index and time index respectively.

η_i is the unobserved invariant country-specific effect.

ε_{it} is the error term

We modified the original model to include the dependent variable as real GDP and added extra variables; life expectancy, education attainment, GFCF and Private Credit as we believe these are factors that also significantly impact the GDP.

3.2 Data

The table below shows the studies in which we found the variables used in this study:

Table 4: Variables and their corresponding studies

Variable	Study
Real GDP	Balasubramanyam et al (1996), Kotrajaras (2010), Hansen and Rand (2006), Ahmad et al (2012), Jawaid and Raza (2012), Andraz and Rodrigues (2009), Sahoo (2006)
FDI (absolute)	Azam, Hassan, Khairuzzaman (2013).
Remittances (absolute)	Azam, Hassan, Khairuzzaman (2013). Rahman (2009).
Openness	Benmamoun and Lehnert (2013). Zakari, Mohammed and Adamu (2012). Kotrajaras (2010). Bhagwati (1978). Tiwari and Mutascu (2011). Ray (2012). Agrawal (2000). Balasubramanyam et al (1996). Carkovic and Levine (2005)
Governance	Benmamoun and Lehnert (2013). Balasubramanyam et al (1999). Borensztein et al (1998).
Democracy	Benmamoun and Lehnert (2013). Olson (2000). Antić (2004).
Inflation	Benmamoun and Lehnert (2013). Driffield and Jones (2013). Borensztein et al. (1998). Kotrajaras (2010). Sahoo (2006). Khan et al (2013). Ayyoub et al (2011). Faria and Carneiro (2001). Barro (1996).
Life Expectancy (Life)	Barro (2003), Barro (1996)
Education Attainment	Driffield and Jones (2013). Barro and Sala-i-Martin (1995). Fayissa (2008). Hermes and Lensink (2003). Carkovic and Levine (2005). Hermes and Lensink (2003).
Population Growth	Benmamoun and Lehnert (2013). Driffield and Jones (2013). Cincotta and Engelman (1997). Dao (2012). Klasen and Lawson (2007).
Private Credit (PC)	Borensztein et al (1998). Alfaro (2003, 2009). Solomon (2011). Hermes and Lensink (2003). Carkovic and Levine (2005)
Gross Fixed Capital Formation (Domestic investment)	Driffield and Jones (2013). Solomon (2011).
ODA	Driffield and Jones (2013). Benmamoun and Lehnert (2013). Karras (2006).

The Dependent Variable:

GDP: The Real Gross Domestic Product (GDP)(total output of a country); from World Bank.

The Independent/Explanatory Variables:

FDI: Foreign Direct Investment net inflows (current US\$, World Bank). We predict that FDI will have a positive impact on GDP.

REMIT: Personal Remittances inflow (current US\$, World Bank). We predict that remittances will have a positive impact on GDP.

Other Variables:

Openness: (Exports + Imports) / GDP (UNCTAD and World Bank). We predict that openness positively impacts GDP.

Pop_Gwth: Annual population growth (%) (World Bank). We predict that this negatively affects GDP.

Inflation: Inflation as measured by the consumer price index (UNCTAD). We assume inflation negatively impacts GDP.

Democracy: We used the Polity IV project democracy indicators developed by Marshall and Jaggers (2013). It provides measures of political regime for independent countries, home to over 500,000 people. We used the combined polity score, computed by subtracting the autocracy indicator from the democracy indicator (Marshall and Jaggers, 2002 pp.15). This score classifies a country from -10 to +10, where -10 stands for strongly autocratic and +10 is strongly democratic. We cannot predict how democracy will impact GDP.

Governance: This measures the quality of a country's governance. Governance is defined as the "traditions and institutions by which authority in a country is exercised"

(Kaufmann et al, 1999). Kaufmann, Kraay and Mastruzzi developed six indicators of governance, of which we use the aggregate. Each indicator ranges from -2.5 to +2.5 and the higher the value, the better the quality of governance. The indicators are explained in Appendix B1. We predict that higher governance scores will positively impact on GDP.

Life: Life expectancy at birth is how many years the infant would live if the patterns of mortality remained the same as they were at its birth (World Bank and CIA). We assume it positively impacts GDP because if people live for longer, they can contribute more to the GDP.

Education: The percentage of population over 25 who have completed both secondary and tertiary education, obtained from Barro-Lee's educational attainment dataset (Barro and Lee, 2010). We are excluding primary education, as it seems to be statistically insignificant with regards to economic growth even though it is a prerequisite for further education. Barro (2013) explains that "education affects growth by facilitating the absorption of new technologies" (pp.319) so we predict that this variable will positively affect the GDP.

GFCF: Gross Fixed Capital Formation (also known as gross domestic fixed investment) (World Bank). This acts a proxy for domestic investment and we predict that this positively affects GDP.

PC: Domestic credit to private sector (% of GDP) (proxy for financial development) (World Bank). This measures the extent to which financial resources flow from savers to the private sector through private intermediaries such as banks. We predict that countries with higher levels of financial development are able to gain more advantages from FDI in order to impact economic growth positively.

ODA: Official Development Assistance received (current US\$) (World Bank). ODA can impact economic growth directly for example by providing aid for specific health,

education or sanitation interventions. Indirectly, ODA can alter the investment share of GDP. It can also affect government consumption, which can negatively affect economic growth (Djankov et al, 2006) or it could support economic growth via direct budget support or development of specific productive capacities (UNDP, 2012). We predict that foreign aid positively impacts GDP (Karras, 2006).

3.3 Missing Values:

Governance and Education Attainment were missing values for multiple years. We could eliminate the missing data to produce a complete data set (Wayman, 2003) but this causes bias in the results if the remaining values do not represent the complete sample (Wayman, 2003). We could use multiple imputations but this does not follow the trend of the variables, it fills in the missing data without applying logic.

For Governance, we used mean substitution i.e. replaced the missing data with an average of the data for the variable. When the data was missing for continuous years, we assumed that governance remained the same and used the same value. However, this method reduces decreases the variance of the variable in question as well as diminishing relationships with other factors (Wayman, 2003). For Education Attainment, we used compound interest. The formula is:

$$A = P(1+r)^n$$

P = Principal value of Education Attainment

A= Final value of Education Attainment

n = number of years between P & A, which was 5 in this case

r = the rate at which the values increased.

We calculated r for each country and subsequently filled in the gaps for the missing years. This followed the trend we assumed; the percentage of the population who attained education increased over the years.

3.4 Methodology:

Before analysing our data, we determined if there is any multicollinearity. This implies that two variables are almost perfect linear combinations of one another. The estimates of the coefficients become unstable and standard errors can become greatly inflated (UCLA, 2014).

We used the Variance Inflation Factor (VIF) command in STATA to check for any multicollinearity. We should be concerned if variables have a VIF above 10. The degree of collinearity is given by $1/\text{VIF}$ (tolerance). A value lower than 0.1 corresponds to a VIF of 10, which means the variable could be a linear combination of other independent variables (UCLA, 2014). The results for our variables are shown in Table 5 below.

The high VIF values for Life expectancy and Governance suggest these variables may be redundant. A possible explanation could be that good governance increases life expectancy. We omitted life expectancy and entered the VIF command again and the values were better, but VIF for governance was still above 10. We used logic to identify what other variable could be redundant with governance and we thought of education. If the population is better educated, the governance will have to improve. We omitted education and all VIF values were below 10 and standard errors were reduced. Also, coefficients for variables such as ODA have become significant. As a result, we had to omit life expectancy and education attainment from our regression model.

Table 5: VIF values for original model

Variable	VIF	1/VIF
Life Expectancy	15.71	0.063668
Governance	11.47	0.087170
Openness	7.69	0.130056
Population Growth	7.44	0.134454
Democracy	3.62	0.276266
Private Credit	3.61	0.277056
Education Attainment	2.66	0.376559
Absolute Remittances Received	2.65	0.377119
Inflation	1.94	0.514655
Net ODA Received	1.53	0.654758
GFCF	1.31	0.761816
Absolute FDI Received	1.30	0.767829
Mean VIF	5.08	

Source: STATA 12.1

We also checked for linearity because if the relationship between the response variable and predictors is not linear, the linear regression tries to fit a straight line to data that is not linear. We built the regression model as above without the two omitted variables. We then entered 'acprplot,' which graphs an augmented component-plus-residual plot and can be used to identify nonlinearity in the data (UCLA, 2014). We found clear deviations for FDI, Remittances, ODA, Openness, Democracy, Governance

and GFCF. Examining the distribution of these variables using kdensity, we found they were all skewed, which meant we should transform them. We logged each variable (except for governance and democracy since they included negative values), which reduced skewness greatly. When we conducted the basic regression and examined the acprplots again, the nonlinearity problem had been reduced but not completely eradicated.

The new model is:

$$\text{GDP}_{it} = \beta_0 + \beta_1 \text{LFDI}_{i,t} + \beta_2 \text{LREMIT}_{i,t} + \beta_3 \text{LOpenness}_{i,t} + \beta_4 \text{Democracy}_{i,t} + \beta_5 \text{Governance}_{i,t} + \beta_6 \text{Inflation}_{i,t} + \beta_7 \text{Pop_Gwth}_{i,t} + \beta_8 \text{LGFCF}_{i,t} + \beta_9 \text{PC}_{i,t} + \beta_{10} \text{LODA}_{i,t} + \eta_i + \varepsilon_{it}$$

The summary statistics are given below:

Table 6: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	92	2.35E+11	4.01E+11	8.03E+09	1.87E+12
LFDI	92	20.12587	2.142748	14.14513	26.02308
LREMIT	92	21.73607	0.9191156	19.80891	23.36837
LODA	92	20.91857	0.6345649	19.38378	23.18559
LOpenness	92	3.328161	0.2867062	2.54689	4.049232
LGFCF	92	23.20652	1.522996	21	27
Governance	92	-0.4319565	0.5584402	-1.32	0.45
Inflation	92	8.13587	3.762556	2	20.3
Population Growth	92	1.963043	0.5107025	1	3.1
Democracy	92	4.51087	5.304973	-6	9
PC	92	28.02391	9.402178	8.8	51.5

Source: STATA 12.1

Random Effects-GLS Regression

We used RE to calculate our coefficient estimates. The main difference between fixed (FE) and RE is that in RE, the variation across entities is assumed to be uncorrelated with the independent variables in the model. The main advantage is being able to include time invariant variables (Torres-Reyna, 2014). We chose RE because our aim is to see if FDI and Remittances positively impact economic growth in South Asia based on the data we collected between 1990-2012 at random.

The random effects model is:

$$Y_{it} = \beta X_{it} + \alpha + U_{it} + \varepsilon_{it}$$

Where U_{it} is the between-entity error and ε_{it} is the within-entity error.

There are many methods to carry out regression including GLS, Ordinary Least Squares (OLS) and Generalised Method of Moments (GMM). The assumptions are given in Table 7.

We tested the variance of the residuals using the Breusch-Pagan test for heteroscedasticity. Heteroscedasticity occurs when the random variables in the model do not have the same finite variance. The null hypothesis is that the variance is constant but since the value for the chi test is 0.0000, we have to reject H_0 and accept that there exists heteroscedasticity in our data (Torres-Reyna, 2014). This means we cannot use OLS.

To apply GLS, we made sure the residuals are independent of each other to avoid biased results. We used the Pesaran CD (cross-sectional dependence) test using the command `xtcsd, pesaran abs` in STATA and achieved a Pr value of 0.1860, which shows there is no cross-sectional dependence (Torres-Reyna, 2014).

Consequently, we decided on GLS because of heteroscedasticity in our data and the independence of the residuals. In order to account for heteroscedasticity, when we regress our model, we make it robust. This does not change the coefficients by much, but the standard errors are actually reduced, which gives us reasonably accurate p values (Berry and Feldman, 1985).

We will now explain the GLS method, introduced first by Aitken in 1935. The model equation is of the same form as that used in OLS (shown below)

$$y = X\beta + \varepsilon$$

With $r(X) = k < n$ and X is uncorrelated with the error term

GLS produces an optimal unbiased estimator for situations with heterogeneous variance. If we used OLS, the estimates would be inefficient because it usually underestimates the parameter standard errors, which affects hypothesis testing. From Table 7 we can see that OLS is a special case of GLS ($\Omega = \sigma^2 I$).

We use the method of Maximum Likelihood to estimate the parameter. This selects values of the parameters that are the most compatible with the data i.e. the values of the model parameters that maximise the likelihood function (Burke, 2010). The log-likelihood of a single observation (i where $i = 1, \dots, n$) is stated with regards to the unknown regression parameter (β) and the variance matrix (Ω):

$$l_i(\beta, \Omega) = -1/2 (n \ln(2\pi) + \ln(\det \Omega) + (y_i - X_i \beta) \Omega^{-1} (y_i - X_i \beta))$$

The log-likelihood for the entire dataset is:

$$L(\beta, \Omega) = \sum_{i=1}^n l_i(\beta, \Omega)$$

The score vector is calculated through taking the derivative with respect to the parameters (Burke, 2010 pp.12)

$$\begin{aligned}\frac{\partial}{\partial \beta} L(\beta, \Omega) &= \sum_{i=1}^n \frac{\partial}{\partial \beta} l_j(\beta, \Omega) \\ &= -\frac{1}{2} \sum_{i=1}^n \frac{\partial}{\partial \beta} ((y_i - X_i \beta) \Omega^{-1} (y_i - X_i \beta)) \\ &= \sum_{i=1}^n X_i' \Omega^{-1} (y_i - X_i \beta)\end{aligned}$$

When we set this equal to zero we end up with:

$$\begin{aligned}\beta_{MLE} &= \left(\sum_{i=1}^n X_i' \Omega^{-1} X_i \right)^{-1} \sum_{i=1}^n X_i' \Omega^{-1} y_i \\ &= \hat{\beta}\end{aligned}$$

Where β_{MLE} represents the Maximum Likelihood estimate and the $\hat{\beta}$ is the GLS estimate of the parameters.

The heterogeneous variance of the residuals is taken into account in the GLS estimation of the regression parameter ($\hat{\beta}$) and the standard errors of $\hat{\beta}$ (Burke, 2010 pp. 12):

$$\hat{\beta}_{GLS} = (X' \Omega^{-1} X)^{-1} X' \Omega^{-1} Y$$

and

$$\hat{V}(\hat{\beta}_{GLS}) = (X' \Omega^{-1} X)^{-1}.$$

A serious issue with GLS can be multicollinearity but we reduced this as explained above.

Table 7: Assumptions for OLS, GLS and GMM

Method	Assumptions
OLS	<ul style="list-style-type: none"> • The model is linear in the parameters. • The data are a random sample of the population i.e.: residuals are statistically independent from each other. i.e $Cov(\epsilon_i, \epsilon'_i) = 0 \forall i \neq i'$ • The independent variables are not too strongly collinear. • The independent variables are measured precisely so that measurement error is trivial • The expected value of the residuals is always zero i.e $E(\epsilon) = 0$ • The residuals have constant variance (homogeneous variance) i.e $V(\epsilon) = \sigma^2 I$ • The residuals are Normally distributed i.e: $\epsilon \sim N(0, \sigma^2 I)$
GLS	<ul style="list-style-type: none"> • The model is linear in the parameters • The data are a random sample of the population i.e. $Cov(\epsilon_i, \epsilon'_i) = 0 \forall i \neq i'$ • The independent variables are not strongly collinear • The expected value of the residuals is always zero i.e. $E(\epsilon) = 0$ • The residuals do not have constant variance i.e. $V(\epsilon) = \sigma^2 I$ does not hold. • The residuals are not normally distributed i.e. $\epsilon \sim N(0, \Omega)$
GMM	<ul style="list-style-type: none"> • Mainly used for nonlinear models • Used to correct for bias caused by endogenous explanatory variables

Source: Burke, 2010 pp.3 and pp.11

4. Results and Analysis

This chapter describes and analyses the results, identifying if they are consistent with our predictions and provide possible explanations. The results of the impact of FDI and Remittances and other variables on GDP are shown in column 1 of Table 8. The following columns show results for each country.

The R-squared values explain how well the data points fit the statistical model. Our values show that the model explains 79.12% of variation within the countries, 64.81% of variation between the countries and 76.99% of variation overall. This means that our data points fit well into our model. However, there is serial correlation in our data. This causes standard errors to be smaller and R-squared values to be higher than they actually are, therefore these R-squared values are not accurate for the overall model or for the separate countries.

In column 1, FDI positively and significantly impacts GDP at the 5% level, as expected. This supports many previous studies including Tasneem and Aziz (2011), Balasubramanyam et al (1996) and Zenasni and Benhabib (2013). We can infer that FDI positively enhances economic growth in South Asia, both directly and indirectly.

However, the coefficient for International Remittances is negative and significant (0.021), contrary to our assumptions. This is consistent with the findings of Russell (1986) and Barajas et al (2009); the remittances may actually be used for personal consumption rather than contributing to the economy of the country through investment and savings. Another explanation could be that the large flow of remittances is escalating the exchange rate, causing a decline in relative export competitiveness. Another possibility could be due to migration, if people are leaving the home economy this will have an obvious negative effect (brain drain effect). Also, there are many preconditions for the successful use of remittances, including good governance, prevalence of law and order and low levels of ethnic tensions. However, South Asia is

known for high levels of corruption, poor governance and tensions such as terrorist attacks, which could explain the negative coefficient.

Despite this, we must remember that this variable is relatively underestimated since it does not account for informal remittances. In South Asia, it is estimated that informal remittance inflows could reach to around 42% of the total remittances (ADB, 2012). One informal channel is the ‘hawala’ service network, which transfers money at a fraction of the cost of formal methods. Due to the reduced costs and waiting times, many South Asians prefer informal channels. Also, most of the remittance recipients live in rural areas where remittance outlets are limited (ADB, 2012). The high level of dependency on informal channels does not contribute effectively to capital enhancement in the formal financial system.

The estimate for ODA is positive and significant, as we predicted and supports the results of Benamamoun and Lehnert (2013) and Karras (2006). This shows that despite Remittance inflows being larger than ODA, ODA actually outperforms Remittances in terms of enhancing economic growth. ODA is still a significant pillar of development in South Asia and it cannot be overlooked.

Openness contributes negatively (insignificantly) to economic growth, contradicting our assumptions and findings of Bhagwati (1978) and Agrawal (2000). A possible cause could be the conditionality requirements that institutions such as IMF and World Bank impose for countries. These include opening the domestic economy and increasing domestic interest rates, which can make it extremely difficult for developing countries to escape debt (Dunning and Lundan, 2008). This is due to openness bringing macroeconomic instability through rising inflation, depreciation in exchange rates and balance of payment crisis (Rodrik, 1992). The increased inflation and falling exchange rates negatively impact domestic output due to a reduction in aggregate supply of inputs through increasing prices of the imported inputs used in

production. Additionally, the impact of openness on GDP depends if the country has a strong base in manufacturing and if they have a comparative advantage in the sector that accounts for the large tariff reductions (Wigeborn, 2010). However, since this coefficient is insignificant, we cannot draw a solid conclusion.

Supporting our predictions and previous findings (Kaufmann et al, 2005; Olson et al, 1998; Fayissa and Nsiah, 2010), Governance contributes positively and significantly to economic growth. If a country has good governance, the leaders are incentivised to respond to social needs. Information is openly exchanged; there is more transparency and a greater commitment to the rule of law, therefore possibly lower amounts of corruption.

Democracy negatively impacts economic growth, which contradicts Olson (2000). However, Antić (2004) stated that countries adopting a democratic regime should not expect enhanced economic growth. A possible suggestion for this relationship is offered from the 'conflict perspective', which states that for development, you require a large amount of investment that needs substitution away from current consumption. However, democratic governments do not employ this strategy in fear of being voted out (Abeyasinghe, 2004). Governments make decisions that increase vote shares; therefore are more exposed to the demands of interest groups. This approach forms policies to preserve the interests of some groups, but may not be growth enhancing, causing inefficiencies and reducing national incomes. Another explanation could be that democracy could cause political instability and ethnic conflict. The majority voting system leads to the empowerment of the impoverished majority, and this can lead to ethnic conflict and in worst cases, genocide. In addition, political pluralism and competition in democracy can enhance conservative and primitive allegiances such as reinforcing the caste system in India, which can create obstacles in the way of adopting growth-policies.

Private Credit and GFCF contribute positively to economic growth, supporting the findings of Solomon (2011), Hermes and Lensink (2003) and Carkovic and Levine (2005). When people obtain credit, they can use this for investment or consumption purposes, which contribute to GDP since GDP is made up of investment and consumption.

GFCF includes expenditure on land improvements, equipment, and construction of transport systems such as roads. It is obvious that this will enhance economic growth since people are provided with better infrastructure, living conditions and more opportunities for work. However, the coefficient is insignificant, which could be due to FDI replacing domestic investment since FDI is significant for South Asia. Another possibility could be due to corruption. The score on the Corruption Perception Index created by Transparency International illustrates this; Bangladesh, India, Pakistan and Sri Lanka score 27,36, 28 and 37 (Transparency International, 2014), respectively (0 is very corrupt and 100 is very clean). This means GFCF may actually not be accountable e.g. the government may not build roads where they are needed but just keep replacing ones which are already built so this would not account for growth.

As assumed, Inflation contributes negatively to economic growth and it validates the results of many studies (Barro, 1995; Ayyoub et al, 2011; Benmamoun and Lehnert, 2013), however it is insignificant. High inflation is always linked to increasing price variability, which usually causes doubtfulness about the future profitability of investment projects. This leads to cautious investment decisions, which ultimately decreases the amount of investment and negatively impacts economic growth. In addition, inflation can distort balance of payments by making the country's exports more costly. Furthermore, inflation can also interrupt borrowing and lending decisions through its interaction with the tax system.

Inconsistent with previous findings (Cincotta and Engelman, 1997; Dao, 2012; Klasen and Lawson, 2007) and our assumptions, Population Growth positively affects economic growth, but insignificantly. A possible explanation could be that population growth can enhance economic growth through 'economies of scale.' The market size of country increases due to the larger population, which means manufacturing plants will have to be larger to meet the demands of more people and so the production and setup costs will tend to decline. A second channel through which economies of scale can be achieved is labour specialisation due to the larger labour force. They can advance their skills quickly, saving time and money. Thirdly, a large population leads to a more dense population. This pressurises the government to expand the systems such as infrastructure and education, which will in turn lead to economic growth (Simon, 1998). Another way in which population growth can positively impact GDP is through technological growth. This is because the government has to spend more on educational facilities, which leads to an accumulation of human capital that can contribute to economic growth through two ways. The first is through being a productive factor such as machines and the second is that human capital can contribute to the development of new technology, which increases productivity.

Now we will look at the results for each individual country.

4.1 Bangladesh

The R-squared value shows that 99.43% of variation is explained through the model. As expected, the FDI coefficient is positive (Adhikary, 2011) but not significant, which means that one of the other two pillars of development could be more important in enhancing economic growth.

ODA and Remittances are both positive and significant and ODA outperforms Remittances in impacting economic growth. This supports the findings of Ukeje and Obiechina (2013), Jawaid and Raza (2012) and Driffield and Jones (2013). We can infer that ODA is the most important pillar of development for Bangladesh. This could be because ODA flows are actually increasing while the FDI and Remittance flows have been decreasing. Also, in Bangladesh, most remittances are spent on consumption instead of investment and savings. In 2003, 50-60% of remittances were used for consumption, compared to only 10% for investment (Demary, cited in Siddiqui and Abrar 2003, pp.46). Despite the low proportion of remittance spending on investment, even a small proportion can help reduce liquidity constraints and directly impact growth. This is true for Bangladesh since overseas employment does help somewhat in easing unemployment pressures at home.

Governance, Democracy, Private Credit, Population growth all positively and significantly impact economic growth. This is consistent with most of our assumptions, excluding population growth. The World Bank (2013) has stated that in the past 10 years, Bangladesh has managed to make significant progress in governance indicators but there is still space for improvement.

There is general agreement on what a democratic culture should include such as respect for equal justice and rule of law, belief that citizens have the right to rule their country and intolerance for illegality. Bangladeshis have fully embraced these expectations, especially the young generation. However, Bangladeshis have also

accepted the underlying social and cultural factors. These include the fact that corruption is endemic, expecting justice is malleable and the government is the exclusive preserve of the ruling class. These practices go against the democratic and legal framework but this ordering of society is expected and accepted in Bangladesh, which is not surprising since Bangladesh is transforming from rural to urban and traditional to modern. Therefore, any efforts at achieving democracy have to take into account these various cultural and social factors in order to be successful.

Private credit plays a critical role in most developing countries and it provides the resources for investment to the private sector therefore is sometimes considered as the 'engine of economic growth' which could be true for Bangladesh (Younus, 2007).

Population growth positively impacts GDP, possibly through economies of scale as explained above. 56.8% of the population is between 15-54 years (CIA, 2014) and this bulge of people in their productive prime can be viewed optimistically as the labour force is increasing. This also means that more of the national budget is spent on education, which improves rates of literacy. The health sector is also improved, which reduces mortality rates. However, this increasing population will pose numerous challenges, some of which are already occurring. There are pressures on the already scarce resources and land, limitations in agricultural growth and food grain production and an increasing number of poor people.

Openness and GFCF are positively related to GDP but not significant. This could be due to openness depreciating the exchange rates or negatively affecting Bangladesh's trade balance position. A possible reason for GFCF could be due to errors within the data. It can also be inferred that domestic investment proxied by GFCF is not favourable to economic growth due to the mismatch between capital requirement and saving capacity (Roy and Mandal, 2009). Another reason could be that FDI is replacing the domestic investment in Bangladesh since this is significant. Alternatively, it could

be due to the corruption levels in Bangladesh, which means that government investment is unaccountable and they only use it for their own benefit.

Finally, inflation's impact is as expected, negative but insignificant. Inflation is obviously harmful to the overall economy since it can make it difficult for companies to plan for the long-term due to uncertainty about the future. This discourages investment and inflation can impose hidden tax increases.

4.2 India

The R-squared value of 0.9613 shows that 96.13% of the variation is explained in our model for India which is an almost perfect fit.

The FDI coefficient is negative but insignificant which contradicts our assumption and findings of Agrawal (2000) and Borensztein et al (1998). The negative relationship could be due to underdeveloped infrastructure, lack of entrepreneurial knowledge and resource constraints. If countries do not have adequate infrastructure such as good transport links then they cannot benefit from FDI, as MNEs will face major difficulties in carrying out their operations. Further research is needed into the policies of each country and about the infrastructure present. Another explanation is provided by the dependency theory (Adhikary, 2011). India has capitulated to the demands of investors on fiscal prudence and reforms such as deregulating the economy. Relying on FDI can be disastrous given the recent recession since FDI flows have ebbed rapidly. FDI inflows into India slumped by 43.3% in April-November 2012 (The Times of India, 2013), which burdens the balance of payments and could also impact the Rupee.

ODA and Remittances both positively and insignificantly impact GDP and Remittances outperforms ODA. The reason for the insignificance of ODA may be due to ODA being influenced by external, climatic and political conditions and its effectiveness depending on institutional quality (McGillivray et al, 2006). Another possibility could be because India is such a large economy that the ratio of ODA to GDP may be too small to be significant.

The insignificance of Remittances may be because the positive impacts of remittances are more concentrated in certain parts of India. For example, Kerala received 39.9% of household remittances and these accounted for 22% of the state domestic product, which means they had a higher per capita income here in comparison

to the whole of India (Chisthi, 2007). Another possibility could be due to the fact that over 90% of rural and urban households who receive remittances use it for some form of household consumer expenditure, such as food and durable goods (Tumbe, 2011), not contributing to India's economic growth. However, there are still multiplier effects increasing the demand for goods, which explains why we found a positive coefficient. This does not undermine the importance of remittances at the household level; remittance income by the expatriates does significantly improve the economic wellbeing of millions, which is not captured by a highly aggregated analysis like ours.

Openness, Democracy, GFCF and Population Growth are all positively and insignificantly related to economic growth. The insignificance of Openness may be due to it depreciating exchange rates or negatively affecting India's trade balance position.

The estimate for the GFCF coefficient is insignificant as in Bangladesh. This could be because Private Credit is both positive and significant and the investment done from credit in the private sector could be capturing GFCF, which makes it insignificant. Another possible explanation is that GFCF may be unaccountable due to corruption.

Population growth could positively impact GDP through economies of scale and improved technology as explained above. A possible explanation for its insignificance could be because that India is the most developed country compared to most of the other South Asian countries and it may have already experienced the benefits of a growing population.

Private Credit and Inflation are both positively and significantly related to GDP. The reason for positive inflation could be statistical errors with the data. However, some inflation is needed to stimulate economic growth, but only up to a certain extent (Hussain and Malik, 2011).

4.3 Pakistan

The R-squared value shows that 93.16% of variation is explained through the model.

As expected, the FDI, ODA and Remittances coefficients are positive (Agrawal, 2000; Aurangzeb and Ul Haq, 2012; Rahman, 2009) but insignificant. FDI outperforms Remittances and ODA. FDI may not be significantly contributing to economic growth due to a lack of absorptive capacity, adequate infrastructure and stable political environment. Political instability has been a widely cited phenomenon due to widespread corruption and poor leadership. Terrorism is also a huge issue: 2451 people were killed in terrorist attacks in Pakistan in 2013 alone (The Express Tribune, 2013). This impacts Pakistan's economic growth since it could deter investors from the country but also any FDI that does enter could be used for reasons other than economic growth.

ODA may insignificantly impact economic growth since it could be displacing domestic savings; hence more domestic consumption would be encouraged. This could occur if the cost of foreign resources is lower than the marginal rate of return and so these resources would be preferred substitutes for domestic resources (savings) (Rahman, 1967; Griffin, 1970).

Remittances may be insignificant as most are transferred through unofficial channels. Amjad et al (2013) carried out surveys in different areas of Pakistan and found that many migrants and their families hesitate to use the banking channel due to it being too difficult for them. 9.78% of households in Gujrat gave the reason of high transaction costs for not using a bank and 20.65% of the households said that they had to wait a long time in order to transfer money through the banks. Their study also revealed that many migrants live abroad in informal groups who have a leader who manages the transfer of money through informal channels (Amjad et al, 2013). This means they create their own network by which they can send money through a friend visiting Pakistan. Another possibility could be that remittances as a percentage of GDP

has declined due to diminishing remittance receipts (attributed to political and economic instability).

Openness, Governance, Inflation and GFCF positively but insignificantly impact economic growth; only Inflation is inconsistent with our assumptions. Some inflation is needed in order to promote economic growth but only up to a certain extent.

Democracy and Population growth are negatively but insignificantly impacting economic growth and the reasons for democracy's potential negative impact are discussed with the case of South Asia overall.

The only significant variable for Pakistan is Private Credit but this is negative. There are two possible explanations as to why large financial systems may negatively impact economic growth. The first is related to economic volatility and the increased risk of economic crashes (Minsky, 1974 and Kindleberger, 1978) and the second is to do with the possibility of misallocating resources, even in good economic conditions (Tobin, 1984).

de la Torre and Ize (2011) expand on the first explanation by stating that providing too much finance can lead to positive but decreasing returns of financial depth which can eventually become smaller than the cost of instability caused by the 'dark side.' The negative relationship could also be explained by the fact that, the correlation between financial depth and economic growth depends on the method through which finance is actually provided. Discussions post-financial crisis in 2008 stated that derivative instruments and the 'originate and distribute' model, which were meant to improve resilience of the banking system, actually reduced credit quality and enhanced fragility in the financial market (de la Torre and Ize, 2011). Arcand et al (2011) also postulated the possibility that the correlation between financial depth and economic growth is dependent on whether finance is utilised to invest in productive assets to feed speculative bubbles.

4.4 Sri Lanka

The R-squared value shows that 97.87% of variation is explained through the model which is a near perfect fit.

The FDI coefficient is not as expected; it is negative but insignificant, which supports findings of Carkovic and Levine (2002) and Bornschier et al (1978). This could be due to underdeveloped infrastructure, lack of entrepreneurial knowledge, resource constraints and political instability. If countries do not have adequate infrastructure in place they cannot benefit fully from FDI since MNEs will face major difficulties in carrying out their operations. Also, policies in Sri Lanka are still relatively protectionist compared to other countries and regulatory barriers have increased the capital cost of foreign firms, which impede FDI (Pursell and Ziaul Ahsan, 2011).

Coefficients for ODA and Remittances are positive but only significant for Remittances, therefore Remittances outperforms ODA. Remittances can substitute inefficient or non-existent credit markets, allowing consumers to reduce credit constraints and find an alternative form of financing investment. This can lead to a positive relationship between remittances and GDP as we have found. Another way in which remittances can positively affect Sri Lanka's economic growth is when they are used for education and welfare expenses such as health care. This increases long-term labour productivity and causes positive growth.

Openness, Democracy and GFCF all positively but insignificantly impact GDP. Openness may be insignificant because Sri Lanka may be unable to gain productivity through trade liberalisation. In order to achieve this, countries have to invest in education facilities, ensure property rights and build up institutions. It is known that developing countries do not enforce property rights and Sri Lanka is no different. The main cause of this is because intellectual property law does not reflect the general will of the people and so is discarded (Talagala, 2012).

Democracy may be insignificant because Sri Lankans have not accepted democratic values, respect for the rule of law is at a minimum and violence is used to resolve conflicts.

Population growth positively and significantly impacts GDP and this could be through the economies of scale phenomena as explained above. Sri Lanka is far ahead of many other South Asian countries including India in terms of accomplishing human development goals. Increasing population has pressurised the government to spend more on education and improve health standards. Total literacy rate is now 91% and crude death rate has declined from 7.5 in 1970 to 5.8 in 2002 (Somayajulu et al, 2005).

Governance and inflation both negatively but insignificantly impact economic growth. Governance may be negative due to the fact that residents have lost faith in the governing system due to years of conflict. This could further explain the insignificance of ODA because for ODA to be effective there needs to be a good institutional framework and governance in place. The insignificance of Inflation could allow to us to infer that inflation is not a meaningful variable in explaining the economic growth of Sri Lanka.

Finally, Private Credit has a significantly negative impact on Sri Lanka's GDP. There are two possible explanations as to why large financial systems may negatively impact economic growth. The first is related to economic volatility and the increased risk of economic crashes (Minsky, 1974, and Kindleberger, 1978) and the second is to do with the possibility of misallocating resources, even in good economic conditions (Tobin, 1984).

Table 8: Random-Effects GLS Estimates

Dependent Variable: GDP	1. Overall	2. Bangladesh	3. India	4. Pakistan	5. Sri Lanka
	Coefficient Estimates (and t-ratios)				
Independent Variable					
LFDI	0.000** (5.27)	0.763 (0.31)	0.724 (-0.36)	0.099 (1.79)	0.229 (-1.27)
LREMIT	0.021** (-2.31)	0.006** (3.33)	0.152 (1.53)	0.267 (1.17)	0.000** (12.46)
LODA	0.018** (2.37)	0.001** (4.36)	0.799 (0.26)	0.331 (-1.01)	0.670 (0.44)
LOpenness	0.961 (-0.05)	0.400 (0.87)	0.298 (1.09)	0.618 (0.51)	0.087 (1.86)
Governance	0.000** (4.76)	0.001** (4.52)	0.472 (-0.74)	0.665 (0.44)	0.997 (-0.00)
Democracy	0.534 (-0.62)	0.003** (3.68)	0.621 (0.51)	0.954 (-0.06)	0.244 (1.22)
LGFCF	0.553 (0.59)	0.725 (0.36)	0.901 (0.13)	0.563 (0.59)	0.335 (1.00)
Private Credit	0.000** (4.50)	0.031** (2.44)	0.010** (3.08)	0.011** (-2.99)	0.026** (-2.55)
Inflation	0.742 (-0.33)	0.757 (-0.32)	0.041** (2.29)	0.801 (0.26)	0.251 (-1.21)
Population Growth	0.132 (1.51)	0.002** (3.82)	0.350 (0.97)	0.278 (-1.14)	0.010** (3.06)
Constant	0.048** (-1.27)	0.000** (-5.48)	0.132 (-1.62)	0.634 (-0.49)	0.000** (7.03)
R-sq within	0.7912				
R-sq between	0.6481				
R-sq overall	0.7699	0.9943	0.9613	0.9316	0.9787
** Significant at 5%					

Source: STATA 12.1

5. Limitations

As with any study, there are limitations. Remittances may be overestimated in some ways. The compensation of employees consists of migrants' gross earnings, some of which are spent in the host country. This includes income of non-migrants, such as home country people who work for international organisations, which are treated as extraterritorial entities (OECD, 2006). However, Remittances could also be underestimated since they do not account for transfers through informal channels, which are significant in South Asia.

There are also problems with the measurement of FDI. There are three main components of FDI: equity capital, reinvested earnings and intra-company loans. However, some countries do not report all these components, which makes it difficult to compare countries. IMF (2003) stated that 16 out of the 61 countries researched did not report reinvested earnings and only 59% of countries that reported their inward investment position stated their values at market price, which is the recommended comparability standard.

Another limitation is that our model does not account for sectoral variations in FDI and Remittance flows. Also, we had to exclude some variables due to multicollinearity, which means our model needs improving in order to examine what impacts education and life expectancy have on the relationships we examined.

6. Conclusion and Recommendations

The aim of this study was to determine which pillar of development, FDI or Remittances, contributes the most to economic growth in South Asia using data from Bangladesh, India, Pakistan and Sri Lanka between 1990 and 2012. We conducted our analysis through employing Random Effects GLS.

The key finding was that FDI outperforms Remittances in enhancing economic growth in South Asia. In terms of our research questions, our first research question was validated; FDI positively contributes to economic growth in South Asia and that too significantly. However, our second and third research questions were not supported; Remittances do not positively impact economic growth and Remittances do not outperform FDI in enhancing economic growth in South Asia. With regards to our fourth research question: in which country does FDI or Remittances positively enhance economic growth the most? It is Sri Lanka.

Our findings about FDI in South Asia support many studies such as Tasneem and Aziz (2011), Balasubramanyam et al (1996) and Tiwari and Mutascu (2011). We can infer that an increase in FDI leads enhances economic growth and as such we suggest policies that open up the economy. For example, engage in more trade agreements, improve the quality of the infrastructure – both physical and political, and provide incentives for investors and so on. These policies could improve the attraction of FDI thereby enhancing economic growth.

Remittances impacted GDP negatively and this supports the studies of Barajas et al (2009), Russell (1986) and Catrinescu et al (2002). However, the remittance inflows are large in volume so governments should implement policies to increase financial literacy, establish easier but formal methods of remittance transfers, and provide savings' incentives to migrant workers to further increase remittances transmitted through formal channels and promote growth. For Remittances to enhance economic

development and growth, South Asia needs higher quality economic and political institutions.

For Bangladesh and Pakistan, FDI is crucial in enhancing economic growth. They should focus on policies to continue attracting more FDI such as engaging in more trade agreements and enhancing their infrastructure. However, in India and Sri Lanka, FDI did not positively contribute to GDP and this could be for a variety of reasons. They should improve their institutional framework and infrastructure to absorb more of the benefits from FDI. However, if they are over-dependent on FDI then they should focus on finding alternative sources of capital.

For Bangladesh and Sri Lanka, Remittances are pivotal in providing capital to achieve economic growth as well as poverty alleviation. Governments should make it easier for migrants to transfer remittances. For India and Pakistan, the significance of Remittances is inconclusive. However this does not undermine their importance and they still need to improve many factors such as government policies and infrastructure since it is evident that Remittances are not being utilised in a manner conducive to maximum growth. Despite the importance of remittances, policy makers have not given them the attention they deserve. Policies for all these countries include providing incentives for migrants to save and invest their remittances, improving the access to financial services, educating residents about formal remittance channels and encouraging further market competition in the international remittance market to reduce costs.

Overall, we suggest that Bangladesh and Pakistan should focus on improving the necessary conditions to maximize the benefits from FDI since it positively impacts GDP. FDI and Remittances can provide the necessary tools to aid development and achieve higher growth levels through using its resources in the most efficient way. India and Sri Lanka need to enhance their human capital and improve: governance, physical

and technical infrastructure and administrative capabilities to positively utilise FDI.

However, India and Sri Lanka may be over-dependent on FDI and potentially should focus on improving the use of and attracting more Remittances, ODA and exports to finance their economic growth.

Future research could investigate the impact of FDI and Remittances on GDP in different sectors of the economy. It could also include more South Asian countries and perhaps split the countries according to their income levels and compare results. Other recommendations include comparing the impacts to other regions in the world and using interaction terms between FDI and Remittances and the various explanatory variables we included in this study. This model itself could also be improved so as to include the omitted variables, Education Attainment and Life Expectancy, and examine their impact on GDP as well.

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Appendices

Appendix A

Table A1: Summary of Literature about FDI and economic growth

Authors	Countries	Period	Method	Results
Rizvi and Nishat (2009)	Pakistan, India and China	1985-2008	Im-Pesaran-shin Test and Seemingly Unrelated Regressions (SUR)	FDI does not create employment directly
Borensztein, Gregorio and Lee (1998)	69 developing countries	1978-1988	SUR	FDI makes more contribution to economic growth than domestic investment and is important for technology transfers
Tasneem and Aziz (2011)	Pakistan	1972-2008	OLS	FDI has positive impact on exports, GDP, employment, manufacturing and PCI but negative on imports.
Zenasni and Benhabib (2013)	Algeria, Morocco and Tunisia	1980-2010	GMM estimator	FDI has positive impact on economic growth and is important for technology etc. Political stability is needed.
Bornschieer, Chase-Dunn and Robinson (1978)	76 less developed countries	1960-1975	OLS	FDI has negative impact on economic growth. Impact increases as income levels increase.
Agrawal, 2000.	5 South Asian countries	1965-86	Cross section analysis	FDI has negative impact on GDP prior to 1980, mildly positive for early eighties and increasingly positive for rest of period. Since 1980, FDI contributed more to investment and GDP growth than foreign borrowing.
Aurangzeb and Ul Haq, A. (2012)	Pakistan	1981-2010	OLS, Granger Causality test	Bidirectional relationship of GDP with FDI and public investment. Unidirectional r/ship of GDP with private investment.

Balasubramanyam, Salisu, Sapsford (1996)	46 developing countries	1970-1985	OLS	FDI has positive impact on economic growth but country must have export led policy
Tiwari and Mutascu (2011)	23 Asian countries	1986-2008	Production function framework	FDI and exports enhance growth. Labour and capital also play an important role in growth of Asian countries.
Falki (2009)	Pakistan	1980-2006	Production function based on endogenous growth theory	FDI has negative impact on economic growth
Ray (2012)	India	1990-91 to 2010-11	Granger Causality Test	FDI has not contributed much to India's economic growth.
Carkovic and Levine (2002)	Various countries	1960-2005	GMM estimator	FDI does not contribute to economic growth directly
Ahmad et al (2012)	Pakistan	2001-2010	Co-integration and error correction model	FDI has positive impact on economic growth in SR and LR.
Mottaleb (2007)	60 low-income and lower-middle income countries	1997-2005	OLS	FDI affects economic growth positively and significantly
Kotrajaras (2010)	15 East Asian countries	1990-2009	Panel co-integration based on endogenous growth theory	FDI does not necessarily enhance economic growth. The countries need the right economic conditions
Lan (2006)	Vietnam	1996-2003	GMM estimator	FDI has a positive and significant impact on economic growth
Hansen and Rand (2006)	31 Developing countries	1970-2000	Granger causality test	FDI has a positive impact on economic growth
Asheghian (2004)	USA	1960-2000	Production function based on endogenous growth theory	FDI has a positive impact on economic growth

Roy and Van der Berg (2006)	USA	1970-2001	SEM Time Series	FDI has a positive impact on economic growth
Andraz and Rodrigues (2010)	Portugal	1977-2004	Granger Causality Test, cointegration	FDI has a positive impact on economic growth in SR and LR
Alfaro (2003)	47 countries	1981-1999	Cross section regressions	FDI has a negative impact on growth in the primary sector but positive in the manufacturing sector and in the service sector, the effect is ambiguous.
Khan and Khan (2011)	Pakistan	1981-2008	Granger Causality Test	FDI has a positive effect on output in the LR. Bi-directional causality in the SR between FDI and GDP. FDI enhances growth in the primary and services sector but growth causes FDI in the manufacturing sector.
Durham (2004)	80 countries	1979-1998	OLS	FDI does not have direct effects on economic growth but effects of FDI are contingent on the absorptive capacity of host countries, with respect to financial or institutional development
Hermes and Lensink (2003)	67 countries	1970-1995	Various regression models	37 countries have a financial system that is sufficiently developed to let FDI positively impact economic growth
Adhikary (2011)	Bangladesh	1986-2008	Johansen-Juselius procedure	Volume of FDI and capital formation have a positive effect on changes in real GDP

Table A2: Summary of Literature about Remittances and economic growth

Author	Country	Period	Method	Results
Fayissa and Nsiah (2008)	37 African countries	1980-2004	Neo-classical growth framework	Remittances boost growth in countries where the financial systems are less developed by providing an alternative way to finance investment and helping overcome liquidity constraints.
Barajas, Chami, Fullenkamp, Gapen and Montiel (2009)	84 countries	1970-2004	Panel growth regressions	Worker's remittances have no impact on econ growth
Ukeje and Obiechina (2013)	Nigeria	1970-2010	Error correction methodology	Long-run static model indicates that workers' remittances is significant and has positive impacts on economic growth. Short-run dynamic model revealed that the lagged value of workers' remittances is significant and impacts positively on economic growth
Jawaid and Raza (2012)	Bangladesh, Pakistan, India, Sri Lanka, Nepal	1975-2009	Production function framework --> Granger causality	Cointegration results confirm that there exist significant positive LR r/ship b/w remittances and econ growth in India, Bangladesh, Sri Lanka and Nepal but is -ve for Pakistan. Bidirectional causality between remittances and econ growth in Nepal and SL. unidirectional causality runs from remittances to growth in Pak, India and Bang.

Author	Country	Period	Method	Results
Rahman (2009)	Bangladesh, India, Pakistan and Sri Lanka	1976-2006	ARDL	Bang and India - exports impact FDI more than remittances and in Pakistan - remittances impact more than exports. SL - remittances have more impact in SR
Catrinescu, Leon-Ledesma, Piracha, Quillin (2008)	162 countries	1970-2003	Panel growth regressions	Remittances boost economic growth in countries with high quality economic and political institutions
Driffield and Jones (2013)	148 countries	1984-2007	Production function	Both FDI and remittances have positive impact
Benmamoun and Lehnert (2013)	180 countries	1990-2006	GMM	International remittances, FDI, and ODA are positively and significantly associated with the econ growth of low-income countries. Intl remittances contributed more to econ growth than ODA and FDI even when countries are highly dependent on FDI
Ahmad, Ahmad, Hayat (2013)	Pakistan	1978-2011	ADF, OLS (production function)	Remittances have a +ve and significant impact on econ growth
Azam, Hassan, Khairuzzaman (2012)	5 South and South East-Asian countries	1985-2011	Fixed effects and random effects model	+ve and significant effect of remittances on econ growth
Page and Adams (2003)	74 developing countries	Different survey years	Growth poverty model - OLS	Remittances lead to reduction in income inequalities and poverty reduction

Author	Country	Period	Method	Results
Russell (1986)	-	-	Review	Remittances do not have a positive effect on economic growth since they are spent on personal consumption which includes imported goods
Adams (2007)	115 developing countries	1998-2003	Analysis and review of previous studies	Positive relationship between remittances and economic growth. Remittances are spent on consumption and investment
Adams (2002)	Pakistan	1986-87, 1990-91	2 period consumption-saving model	Remittances are spent on investment, consumption, savings
Dustmann and Kirchamp (2002)	Returned migrants to Turkey	1988	Survey	Remittances are spent on investment, consumption, savings
Cooray (2012)	South Asia	1970-2008	Neoclassical growth framework	Remittances have a positive significant effect on economic growth. This is detected through education and financial sector development.
Giuliano and Arranz (2009)	100 developing countries	1975-2002	OLS	Remittances have promoted economic growth in less financially developed countries through providing an alternative way to finance investment
Catrinescu et al (2009)	162 countries	1970-2003	Cross-sectional OLS	Remittances positively impact economic growth. Institutions play an important part - a sound one has affected volume and efficiency of investment positively.

Author	Country	Period	Method	Results
Barguelli et al (2013)	2 groups of countries	1990-2006	GMM	Positive but not significant relationship between education and economic growth Remittances positively affect economic growth through positive effect on education

Appendix B:

Governance: The indicators are (Kaufmann et al, 1999):

- Voice and Accountability - the ability of citizens to participate in government elections, freedom of speech and media.
- Political Instability and Violence - the probability of the government being displaced by violence.
- Government Effectiveness - the quality of public service availability and the capability of the bureaucracy.
- Regulatory Quality - the incidence of market policies that advocate private sector development.
- Rule of Law - the extent to which people abide by the laws and the quality of contract enforcement, property rights, and possibility of crime and violence.
- Control of Corruption - the extent to which public power is used for private interests.