

## External Determinants and Economic Growth in Selected South Asian Countries: A Dynamic Panel Cointegration and Causality Analysis

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### Abstract

*The study focuses on establishing a relationship between external determinants and economic growth for four selected South Asian countries during the period 1980-2017. Panel cointegration and Dynamic Ordinary Least Square (DOLS) techniques are employed for short-run and long-run estimates and vector error correction model (VECM) has been used for the short-run causality analysis. The main finding is that external determinants such as trade openness, foreign direct investment, and remittance matter for South Asian economic growth. Foreign direct investment and foreign remittances have a significant positive impact, while international trade has adversely influenced the South Asian economic growth. This study also finds bi-directional causality between FDI and GDP and between remittance and FDI while unidirectional causality is found from remittance to GDP and from Trade Openness to GDP. This paper also provides policy suggestions to increase the inflow of FDI and foreign remittances in order to achieve the long-run sustainable South Asian economic growth.*

**Keywords:** FDI, Remittance, Growth, Panel Co-integration, VECM, DOLS

### 1. Introduction

In the current world the ultimate macroeconomic goal of all countries is to achieve and sustain economic growth in the long run. In the age of globalization, ‘what factors are actually responsible for economic growth’ is a complex question to answer. There are several factors influencing economic growth in developing countries due to the complex nature of it. Savings, human capital, gross capital formation, etc. are considered vital domestic factors for achieving high economic growth (Solow, 1956 & Romer, 1986). External determinants such as foreign remittance, foreign direct investment, and import are also significant for enhancing economic growth especially for the least developed countries (Erik, 2006; Barajas, 2009; Almfraji, 2014). As economic growth refers to a much better position to improve the standard of living of its people through investing in human capital and receiving aid facilities, developing countries focus on economic growth. Recently

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researchers find that investing in human capital tends to enhance human development that is promoted by economic growth (Nourzad, 2003).

In most of the developing countries, the major sources of finance which are likely to enhance economic growth include foreign direct invest (FDI), remittances and economic openness. Many of the developing economies face two gaps in their economy which they have to fill to attain economic growth. Firstly, there is a gap between savings and investments in the economy. Although developing countries start off with a lower savings rate, they have to highly emphasis on investment. To fill the gap, what ways should the countries follow, is a question of debate. Some economists suggest FDI and foreign aid in such a case. Nothing but FDI is considered as the prime source of job creation, technology transfer, managerial system development and efficiency enhancement of market in the developing countries. Others argued that trade surpluses may be the solution. Trade surpluses lead us to fill the second gap, the gap between exports and imports. In a nutshell, export earnings, remittance, and FDI are found the main sources of revenue for the least developed or developing countries. The developing countries have adopted several policies to enhance economic growth. The role of exports, FDI and foreign remittance are considered critical determinants of improving economic growth (Afzal, 2004; Hulugalle, Lasagabaster & Maimbo, 2005).

Although improvement of FDI, Trade Openness and Remittance is likely to exert positive influences on overall GDP-major determinant of economic growth, the intensity of the relationship is uncertain and has a wide variety from country to country specially in South Asia. South Asia region having more than 20% of the world's population is one of the economically less developed regions of the world. Employment generation is a key concern of the region. Increase in total factor productivity, capital formation, the higher level of GDP, etc. are the main focus of the South Asian countries. Therefore, this paper investigates the relative impact of Foreign Direct Investment (FDI), Remittances (Rem) and Trade Openness (TO) on Gross Domestic Product (GDP) in selected South Asian countries (Bangladesh, India, Pakistan, Sri Lanka) by employing a Panel Granger causality test for the period 1980 to 2017.

The structure of the paper is organized into specific sections. Section two gives an overview of the literature. Thereafter, section three presents the status of the variables in the South Asian perspective followed by economic and econometric issues relating to the variables and section five explains the methodology, data used in the analysis and then discusses the study findings. The final section of the paper contains conclusion and policy implication.

## **2. Literature review**

The relationship between economic growth and export is analyzed by Balasa (1978), Tyler (1981) and Fosu (1990). They studied the interaction between export and growth by using OLS method within the neoclassical framework and found a positive role of export on growth.

FDI and remittance is the two major sources to finance in most of the LDCs. Both play an extra ordinary role in accumulating physical capital in the economy. The impact of FDI and remittance on economic growth is studied by Buch,

Kuckulenz & Manchec (2002 & 2004); Alici, Akgue, & Ucal (2003) and Alfaro, Areendam, Sebnem, & Selin (2006) and so on. All the studies conclude that FDI plays a key role in capital accumulation and boost up the total productivity. But some studies found that there is ambiguity in this case. In some countries, FDI plays a negative role.

Chakerborty (2006) viewed the impact of FDI on the economic growth of India. He used the Granger causality method and penal co-integration for a specific industry to observe the relation between the variables and found that, FDI shows causal relationship in the primary sector whereas transitory effect in the service sector (FDI effects as sector-wise).

On the other hand, Rahman (2007) analyzed the relationship among FDI, exports and remittance on economies of Bangladesh, India, Pakistan and Sri Lanka using the autoregressive distributed lag (ARDL) method. Depending on the data for the time period 1976-2006, the results were almost similar both in the short and long run for India and Bangladesh. The case for Pakistan and Sri Lanka were also similar in the short run but different in the long run. In some cases, the variables are positively related while the scenario was totally changed in other cases.

However, Bajwa (2009) investigated on trade openness and its impact on economic growth in selected South Asian countries using a panel data approach. By employing panel co-integration and FMOLS techniques, the study found that there exists bi-directional causality between GDP and Trade Openness in 1986-2007 while it contains a negative sign in the previous periods, 1972-1985.

Tiwari (2012) examined the relationship between economic growth and FDI in Asia using the panel data GCF method for the years 1986-2008. The study found a strong positive relation between FDI and growth and also between exports and growth. Labor and capital play a vital role in Asian growth.

To show the relationship between economic growth and remittances, Jawaid (2012) examined the relationship between the two variables in China and Korea. This study found that in the long run remittance adversely effect on economic growth in China while Korea has seen a significantly positive relationship between them.

Irfan (2012), Ucan (2016) & Tareq (2016) found the relationship between exports and economic growth by using the application of econometric technique Granger causality test. The results from the Granger causality test says that there is unidirectional causality from exports toward GDP and also to economic growth. Ucan (2016) found no causality between import and economic growth.

Foreign remittance, FDI & Imports, all three factors affect economic growth- is the major findings founded by Tahir, Khan & Shah (2015). They used co-integration analysis, ARDL model and panel data approach to investigate. Using 20 years' data, the studies mentioned above found that when all the independent variables (FDI, Imports and foreign remittances) are controlled then only FDI affects the economic growth in Africa while remittances affect growth in Latin America. In Pakistan, imports affect growth adversely while remittances and FDI have a great role in growth.

Diouf & Liu (2017) studied the influence of Asian foreign direct investment and trade on Africa's economic growth. This study examines the relationship among FDI, Trade Openness and Economic growth for selected West African countries with a

focus on Asian FDI and trade. They used FMOLS method using the data for period 1980-2015. The result shows that both FDI and Trade have a great significance to economic growth.

These recent studies focused on the case of developing countries. But none of the studies analyzed the combined and individual effects of the variables like Foreign Direct Investment (FDI), Remittances (Rem) and Trade Openness (TO) on Gross Domestic Product (GDP) in selected South Asian countries (Bangladesh, India, Pakistan, Sri Lanka). On the other hand, these recent studies have not provided consistent evidence in favor of a relationship between external determinants and economic growth for the South Asian economies. The results of some of the studies show that external determinants influence economic growth positively while some others show that external determinants adversely influence economic growth. Therefore, an empirical investigation of the relationship between external determinants and economic growth in the South Asian economy is indeed necessary. The objective of this paper will be to analyze the combined and individual effects of the variables and also empirically investigate the relationship between external determinants and economic growth in the South Asian economies.

### **3. Status of GDP, TO, FDI and Remittance in Selected South Asian Countries**

In the early years after independence South Asian countries had seen a fairly restrictive regime. In the last decades, these countries had taken opened up policy and made their FDI policy environment favorable to attract foreign investment. By taking their macroeconomic policies as investment-friendly along with trade & FDI policies, South Asian countries have tried to encourage FDI more since 1990s. They showed potential regions for accelerated growth and remain the global growth hotspot with on average 6.5% growth rate in the recent past. Growth is important to this region but jobless growth may create serious harm to the growing economies of South Asia. Having a long history of migration, Asian migrants are less restricted in their pave toward developed countries. Very few recipients of international remittances among all developing regions are receiving remittances as East Asia and the pacific followed by South Asia as the second-largest recipient. Recent trends of remittances reveal that the stability of remittance flows contribute significantly in the period of an economic downturn in the recipient country. Globalization refers to an increasingly integrated global economy with fewer barriers and unrestricted mobility which allows free trade.

#### **Bangladesh:**

Bangladesh-as a developing country, has seen the increasing trend of the real GDP per capita over time after independence. The rate is growing 6%-7% annually during the last 15 years without any major governmental incubation. Furthermore, Bangladesh is a land of opportunities with an absolute advantage to attract FDI. Government of Bangladesh has taken numerous policies for the rapid growth of FDI inflow such as it allowed joint venture investment from the 1980s, then established the Board of Investment (1989) for easing capital control and bureaucratic environment, and finally established EPZs for declaration of a huge amount of fiscal and non-fiscal incentives. After the implementation of all prerequisites of the free-market economy, Bangladesh's performance in FDI attraction in recent years is not

satisfactory. On the other hand, the increasing trend of the openness of the economy of Bangladesh till 2012 resulted growth of imports higher than the growth of exports. So, it creates an adverse impact on GDP. In contrast, Bangladesh has received foreign remittances amount to over 10% of GDP over the last two decades.

**India:**

The attitude towards FDI in India was liberalized from the 1980s. Although it has the most attractive FDI policies in the South Asia region, the ups and downs of FDI inflow were experienced by India for the last 10 years. GDP growth in India is averaged 1.68 percent from 1996 until 2018. Booming remittances in India is driving South Asia to a strong remittance earner region. According to the World Bank data, India continued to be the World's top remittance recipient from its diaspora, gathering \$69 billion in 2017. As India has a huge population with a high demand for domestic goods its domestic market is expanding day by day. Thus, international trade shares a considerably smaller percentage of GDP. On the other hand, trade liberalization in India is an epic structural change for the country. The trend of trade openness consistently increased in the Indian economy.

**Pakistan:**

In 1984, Pakistan has taken a liberalization policy of FDI but the trend of FDI was started to increase since 2004 and reached the pick position in 2008, the highest level of its history. Remittances have been an important source of foreign exchange for Pakistan and its importance has grown in the last decade. Furthermore, the growth rate of the population is increasing geometrically but GDP growth rate did not increase than that. The growth rate of GDP has been increasing 5 percent annually since 2005. On the other hand, the trade openness of the Pakistani economy, on average, follows a slightly decreasing trend.

**Sri Lanka:**

The trend of FDI inflow in Sri Lanka fluctuates severely. The last two years 2016 and 2017, focused on the fact that the FDI scenario in Sri Lanka is improving day by day. The real GDP growth of Sri Lanka tended to increase through 1998-2017 period ending at 3.3 percent in 2017, though it fluctuated substantially in recent years. On the other hand, Sri Lanka has witnessed the contraction of GDP growth rate in 2001 due to its rising trend of bankruptcy with debt reaching 101% of GDP. This resulted the economy to face a series of domestic recession and global problems. After taking proper measures the economy experienced a gradual recovery in 2002. In addition, Sri Lanka received averaged US\$ 501.42 million from 2009 to 2017. As it is import prone country, the import cost is greater than export earnings. Thus, trade openness is negatively related to GDP in Sri Lanka.

**4. Defining Variables, Data Source and Model Specification****4.1 Defining Variables**

The study consists of four variables where three independent variables such as Foreign Direct Investment (FDI), Trade Openness (TO) & Remittance (Rem) are used to estimate the dependent variable Gross Domestic Product (GDP). The FDI can be defined as the flow of capital from the rest of the world that brings capital formation

advantage, technological advancement and skilled human capital in the developing countries. Trade openness (TO) is the ratio of exports & imports to GDP for the specific time period in a specific currency. Remittances refer to the inflow of foreign currencies due to the export of human capital outside the country. GDP itself is the measure of economic growth of any country. Economic growth drives from capital formation, increase in factors productivity due to technological advancement and growth in skilled human capital, progress in economic activity etc.

#### 4.2 Data Source

All data are collected from World Development Indicators of the World Bank.

#### 4.3 Model Specification:

The long-run impact of Foreign Direct Investment (FDI), Remittance (Rem) and Trade Openness (TO) on Gross Domestic Product (GDP) is investigated by the following equation:

$$GDP_{it} = A.FDI_{it}^{\beta_1}.Rem_{it}^{\beta_2}.TO_{it}^{\beta_3}.e^{\varepsilon_{it}} \quad (1)$$

The logarithmic transformation of the equation (1) will be:

$$\ln GDP_{it} = \alpha_{0,t} + \beta_{1,t} \ln FDI_{i,t} + \beta_{2,t} \ln Rem_{i,t} + \beta_{3,t} \ln TO_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where,  $i=1\dots4$  denotes the specific country,  $t$  (1980.....2017) denotes the time period. Let  $\ln A = \beta_1, \beta_2, \beta_3$  denotes the elasticity of economic growth (GDP) with respect to Foreign Direct Investment (FDI), Remittance (Rem) and Trade Openness (TO) respectively and  $\varepsilon_{i,t}$  is the error term with the usual statistical properties.

### 5. Econometric Methodology

#### 5.1 Panel Unit Root Test:

Panel unit root test is also called stationarity test. The stationarity test is employed to check whether data is stationary or not. For reliability of results and avoiding spurious regression, data should be stationary. If data is non-stationary, then the results will be invalid. The hypothesis formed for unit root test are-

If  $t^* >$  ADF critical value, unit root exists, data is non-stationary.

If  $t^* <$  ADF critical value, unit root does not exist, data is stationary.

For checking stationarity of this series, the study uses four different statistics methods proposed by (1) Im, Pesaran and shin, (2) Levin, Lin and Chu, (3) ADF Fisher Chi square and (4) PP Fisher Chi square panel unit root and stationary tests.

Panel unit root test results are presented in Table-1. All variables test results accept the null hypothesis of non-stationary at level with not only individual effect but also individual linear trend effect except FDI. FDI is stationary at first level with only individual liner trend effect. However, all tests reject the null hypothesis of non-stationary at first difference. That is, all the variables GDP, FDI, Rem and TO are integrated of order one, an I (1) process. As pooled data is stationary in first difference, the series is reliable for any type of investigation and further work.

#### 5.2 Panel Co integration Test:

After checking the stationary of data and it should be confirmed that each series is integrated of the same order. The next step is to check whether these series can be combined into a single series as co-integration that means it has a long run

association and it will move in the same direction in long run and are in equilibrium relationship. In this regard, this study has applied Pedroni's cointegration test (Pedroni, 1995) and Kao residual based cointegration test (Kao, 1999).

Pedroni claims that applying panel unit root tests directly to regression residuals is inappropriate for some reasons. The series may have lack of exogenous aspects of the regressors and the dependency of the residuals among the estimated coefficients. That is why for any testing procedure further co-integration test is mandatory.

In this study Pedroni co-integration test will use as it allows for considerable heterogeneity. The panel co-integration test of Pedroni is as follows:

$$Y_{it} = \alpha_i + \beta_{1i} X_{1i,t} + \beta_{2i} X_{2i,t} + \dots + \beta_{mi,t} X_{mi,t} + e_{i,t} \quad (3)$$

i= 1,2, ..., N  
t= 1, 2, ..., T  
m= 1,2, ..., M

Where M is the number of regression variables, N is the total number of individual units in the panel and T is the number of observations over time. In this equation,  $\alpha_i$  implies a no. specific intercept. Among the seven Pedroni tests, four are based on within dimensions (panel co-integration) and three on between dimensions (group mean panel co-integration). Both categories of tests are based on the null hypothesis of no co-integration.

With this technique two models are developed-

- i. With no deterministic trend.
- ii. With deterministic trend and intercept.

Table 2.1 reports Pedroni residual co-integration test within and between dimensions. The number of lag used in the calculation of statistics is fixed at 1. The null hypothesis is no co-integration. Results show that the null hypothesis of no co-integration is rejected for ten statistics for the models at (1%/ 5%/ 10%) significance level showing evidence of co-integration for the group as a whole and individual countries of the panel meaning that there exists a long run relationship among GDP, FDI, Rem and TO for the panel data series of selected South Asian countries.

On the other hand, for panel data Kao (1999) argues two tests under the null hypothesis of no co-integration. One is a Dickey-Fuller type test and another is an Augmented Dickey-Fuller (ADF) type test. In this study, ADF type test is preferred. For the ADF test, estimated residual is-

$$e_{it} = \rho e_{it-1} + \sum_{j=1}^p \varphi_j \Delta e_{it-j} + v_{itp} \quad (4)$$

Kao residual co-integration test results are reported in Table 2.2. Here, the probability value of ADF test is 0.0016. So, the null hypothesis of no co-integration is rejected at 1% significance level. This means there exists a long run co-integration imply that these variables will move together in the long run that means there exists a long run relationship among GDP, FDI, Rem and TO for the panel data series of selected South Asian countries.

### 5.3 Panel Granger Causality Test

The co-integration test results suggest that there exists long-run relationship among the variables. However, it cannot determine the direction of causal relationship among the variables. Since all variables are integrated of order one (I(1)), therefore,

to check the direction of causal relationship among the variables, Engle and Granger (1987) F-test is used in the following multivariate VECM framework.

$$\begin{aligned}
 \begin{bmatrix} \Delta \ln GDP_t \\ \Delta \ln FDI_t \\ \Delta \ln Rem_t \\ \Delta \ln TO_t \end{bmatrix} &= \begin{bmatrix} C_1 \\ C_2 \\ C_3 \\ C_4 \end{bmatrix} \\
 &+ \sum_{j=1}^k \begin{bmatrix} \psi_{11j} & \psi_{12j} & \psi_{13j} & \psi_{14j} \\ \psi_{21j} & \psi_{22j} & \psi_{23j} & \psi_{24j} \\ \psi_{31j} & \psi_{32j} & \psi_{33j} & \psi_{34j} \\ \psi_{41j} & \psi_{42j} & \psi_{43j} & \psi_{44j} \end{bmatrix} \begin{bmatrix} \Delta \ln GDP_{t-j} \\ \Delta \ln FDI_{t-j} \\ \Delta \ln Rem_{t-j} \\ \Delta \ln TO_{t-j} \end{bmatrix} \\
 &+ \begin{bmatrix} \lambda_1 \\ \lambda_2 \\ \lambda_3 \\ \lambda_4 \end{bmatrix} ECM_{it-1} + \begin{bmatrix} \varepsilon_{1it} \\ \varepsilon_{2it} \\ \varepsilon_{3it} \\ \varepsilon_{4it} \end{bmatrix}
 \end{aligned} \tag{5}$$

C's,  $\psi$ 's and  $\lambda$ 's are the parameters to be estimated.  $\varepsilon$ 's are the random error terms independently and identically distributed with mean zero and finite covariance matrix.  $ECM_{it-1}$  is the one period lagged error term derived from long-run cointegrating equation. The lag length (k) for equation (3) is selected by AIC and SBIC. The causality test results are provided in Table 3.

From the results of causality analysis, it is observed that the test statistic of coefficient ( $\hat{\lambda}$ ) of  $ECM(-1)$  is significant at 10% level. Therefore, it can be said that there exists long-run causality among the variables. Therefore, in the long-run, Foreign Direct Investment (FDI), Remittance (Rem) and Trade Openness (TO) causes economic growth. Table 3 presents the panel granger causality results from estimating panel based error correction model set out in the previous "econometric methodology: granger causality" session. From Engle and Granger (1987) F-test results, it is found that there exists short-run bidirectional causalities from GDP to FDI ( $\Delta \ln GDP \Leftrightarrow \Delta \ln FDI$ ) and from remittance to FDI ( $\Delta \ln FDI \Leftrightarrow \Delta \ln Rem$ ). On the other hand unidirectional causalities from Trade Openness to Gross Domestic Product ( $\Delta \ln TO \Rightarrow \Delta \ln GDP$ ), and from remittance to Gross Domestic Product ( $\Delta \ln Rem \Rightarrow \Delta \ln GDP$ ) are evident. There is no causal relationship between FDI & TO while the same is true for Rem & TO.

#### 5.4 Estimation of Long-run Equation

Since all variables are integrated of order one (I(1)) and there exists cointegrating relationship among the variables, the long-run equation is estimated by Panel Dynamic Ordinary Least Square (DOLS) method (Stock and Watson, 1993). The econometric explanation of the dynamism is that lag terms of the dependent and independent variables may have significant impact on current year economic



growth. To apply DOLS, the long-run equation (2) is augmented in the following form:

$$\begin{aligned} \ln GDP_{i,t} = & \alpha_{0,t} + \beta_{1,t} \ln FDI_{i,t} + \beta_{2,t} \ln Rem_{i,t} + \beta_{3,t} \ln TO_{i,t} \\ & + \sum_{j=-p}^p \gamma_{1,j} \Delta \ln FDI_{i,t-j} + \sum_{j=-q}^q \gamma_{2,j} \Delta \ln REM_{i,t-j} \\ & + \sum_{j=-r}^r \gamma_{3,j} \Delta \ln TO_{i,t-j} \\ & + \varepsilon_{i,t} \end{aligned} \quad (6)$$

The lead and lag difference terms for augmentation are used to control endogenous feedback. The appropriate lead and lag length ( $[-p, +p]$ ,  $[-q, +q]$ ,  $[-r, +r]$ ) in equation (6) is selected by the AIC and SBIC. The estimation results are provided in Table 4.

From the estimated long-run equation results, it can be said that FDI and remittance have significant positive impact on selected South Asian economic growth while trade openness has a significant negative impact on economic growth. For 100% increase in FDI leads to approximately 151.5% increase in South Asian economic growth. Remittance had also a strong effect on GDP during these periods. In ceteris paribus, 100% increase in remittance leads to 564.1% increase in GDP while the role of trade openness (TO) is negative. The responsiveness of GDP due to trade openness is - 0.7521 keeping other things constant. A very high  $R^2$  means that 97.72 percent variation of the dependent variable is explained by the explanatory variables.

### 5.5 Estimation of short-run equation

The short-run equation is estimated in the following form-

$$\Delta \ln GDP_{it} = \beta_{1i} \Delta \ln FDI_{it} + \beta_{2i} \Delta \ln Rem_{it} + \beta_{3i} \Delta \ln TO_{it} + \lambda ECM_{it-1} + \omega_{it} \quad (7)$$

Here,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$  and  $\lambda$  are the parameters to be estimated.  $ECM_{it-1}$  is the one period lagged error term derived from long-run cointegrating equation.

At first the short-run equation is estimated without allowing cross sectional dependence, heteroskedasticity, and autocorrelation problem. Later by taking into account cross sectional dependence, heteroskedasticity, and autocorrelation problem, the short-run equation is estimated. To check cross sectional dependence, Presaran CD test along with Lagrange multiplier CD test is applied. The estimated short-run coefficients are provided in Table 5.

From the estimated short-run equation results, it can be said that, Foreign Direct Investment (FDI) and Remittance (Rem) have significant positive impact on economic growth. In ceteris paribus, for 100% increase in FDI, economic growth increase by 20.38%. From 37.62% increase in economic growth due to 100% increase in remittance. The sign of the coefficient ( $\hat{\lambda}$ ) of the error correction term (ECM (-1)) is negative, magnitude is less than unity, and coefficient is significant at any level. Therefore, long-run relationship is found from the short-run equation (error correction model).

## 6. Conclusion and Policy Implication

Determination of the direction of causal relationship among GDP, FDI, Rem and TO in four South Asian countries during the period of 1980-2017 is the goal of this study. The panel co-integration technique and panel granger causality method are used to find out the causation results. To find out the long run responsiveness relationship we used dynamic modified ordinary least squares (DOLS) technique. The DOLS results explored the long run positive relationship between FDI & GDP and also between remittance and GDP. The magnitude of long run elasticity is very high between remittance & GDP. But DOLS shows negative responsiveness in GDP due to trade openness (TO). The DOLS technique prescribed the presence of long run elasticity between FDI & GDP, remittances & GDP, TO & GDP. In both short and long run FDI and remittances play a major role to boost up GDP growth in the selected South Asian countries and the variables move together in the long run. While FDI and remittances are positively related to GDP, the co-efficient of trade openness in DOLS test contains a negative sign.

The study highlights on some important policy levers to boost the productivity and overall macroeconomic scenario of the countries. Accordingly, to better connect the economy of the four selected countries to international trade, economic reforms, and liberalization is necessary. Additionally, the development of the investment climate & infrastructure in selected South Asian economies is also important. The South Asian emerging market countries should invest in human capital to increase the number of the skilled labor force and to export trained labor force to expand their remittance earnings. As the remittances have a strong impact on economic growth, policymakers should make appropriate policies to reduce transaction costs to welcome remittances in this region. Since substantial share of remittances is coming to the country through informal channels, the government, regulators and financial authorities should take urgent actions in progressing formal financial systems. The countries should invest in human capital to expand remittance markets and achieve foreign exchanges.

Introduction of export-oriented policies are of utmost necessary for the countries to enhance more and more exports that will help in the earnings of foreign exchange. By increasing exports, countries can improve their openness of the economy. So, export diversification and import substitution strategy should be taken urgently. In addition, establishments of EPZ's and their proper management can improve the trade performance of South Asia. FDI friendly environment should be provided to attract foreign investors. Import substitution policy can be used for the enhancement of FDI in the economies of the selected countries. Countries should emphasize on the job training in order to facilitate technology transfer and job creation as all the four selected countries have experienced jobless growth. On the other hand, the development of human capital and the establishment of labor-intensive industries can boost up the countries competitiveness in the world market. The problems related to out-migration should be solved and the process of migration should smoothen enough to enhance the export of labor. Proper measures should be taken to divert remittances to formal channels from informal one as well as to encourage entrepreneurial activities among the youth to provide proper environment to them. The government should establish

vocational institutes to increase the number of effective labor by providing training which can contribute towards the trade sector as well as GDP.

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## Appendix:

Table-1: Panel unit root test results

Variables	LLC		IPS		ADF- Fisher Chi-square		PP-fisher Chi-square		Remarks
	Intercept	Intercept & trend	Intercept	Intercept & trend	Intercept	Intercept & trend	Intercept	Intercept & trend	
ln GDP	3.499 (0.999)	0.273 (0.607)	5.989 (1)	1.307 (0.904)	0.059 (1)	2.384 (0.966)	0.084 (1)	1.607 (0.990)	---
ln FDI	-0.374 (0.354)	-2.806*** (0.0025)	1.443 (0.925)	-3.619*** (0.0001)	1.973 (0.981)	27.72*** (0.0005)	1.744 (0.987)	23.72*** (0.0025)	---
ln Rem	0.905 (0.817)	-0.125 (0.450)	3.321 (0.999)	0.273 (0.607)	0.502 (0.999)	6.382 (0.604)	0.746 (0.999)	4.861 (0.772)	---
ln TO	0.121 (0.548)	2.617 (0.995)	1.341 (0.910)	1.436 (0.924)	2.106 (0.977)	2.158 (0.975)	3.338 (0.911)	6.605 (0.579)	---
D(ln GDP)	-4.768*** (0.000)	-4.687*** (0.000)	-4.856*** (0.000)	-4.426*** (0.000)	39.52*** (0.000)	34.76*** (0.000)	73.19*** (0.000)	67.05*** (0.000)	I(1)
D(ln FDI)	-7.167*** (0.000)	-5.725*** (0.000)	-9.213*** (0.000)	-8.224*** (0.000)	81.86*** (0.000)	66.61*** (0.000)	121.58*** (0.000)	153.94*** (0.000)	I(1)
D(ln Rem)	-3.272*** (0.000)	-2.444*** (0.007)	-5.147*** (0.000)	-4.229*** (0.000)	41.46*** (0.000)	31.70*** (0.0001)	71.06*** (0.000)	57.25*** (0.000)	I(1)
D(ln TO)	-3.790*** (0.001)	-3.432*** (0.000)	-5.304*** (0.000)	-4.291*** (0.000)	43.45*** (0.000)	33.06*** (0.000)	90.33*** (0.000)	76.69*** (0.000)	I(1)

\*\*\*significant at 1% level, \*\*significant at 5% level and \*significant at 10% level. Probability values are in parenthesis

## Table-2: Panel Co integration Test

## 2.1 Pedroni Residual Co integration Test

(Newey-west automatic bandwidth selection and Bartlett kernel: within dimension)

Test statistics	No deterministic trend		Deterministic trend and intercept	
		Weighted		Weighted
Panel v-statistics	1.1566 (0.123)	1.441* (0.074)	2.885*** (0.002)	2.592*** (0.0048)
Panel rho-statistics	0.1727** (0.006)	-0.307 (0.379)	1.296* (0.0902)	0.520 (0.698)
Panel PP-statistics	-0.066 (0.473)	-0.807* (0.029)	0.873* (0.088)	-5.550 (0.291)
Panel ADF-statistics	0.116* (0.056)	-0.571* (0.083)	1.061 (0.855)	-0.316** (0.037)
<b>Pedroni Residual Co integration Test</b>				
Newey-west automatic bandwidth selection and Bartlett kernel test: between dimension				
Group rho-statistics	0.268* (0.056)		1.111 (0.266)	
Group PP-statistics	-0.467 (0.120)		0.123* (0.049)	
Group ADF-statistics	-0.179*** (0.000)		0.364*** (0.000)	

\*\*\*significant at 1% level, \*\*significant at 5% level and \*significant at 10% level.

## 2.2 Kao Residual Co integration Test

Test Name	t- statistic
ADF	-2.953356*** (0.0016)

\*\*\*significant at 1% level.

**Table 3: Panel Granger Causality Test Results**

	$\Delta \ln \text{GDP}$	$\Delta \ln \text{FDI}$	$\Delta \ln \text{Rem}$	$\Delta \ln \text{TO}$	ECM (-1) (t-statistics)
$\Delta \ln \text{GDP}$		5.18965** (0.0242)	12.3206*** (0.0006)	7.88348*** (0.0057)	0.00897* (0.0947)
$\Delta \ln \text{FDI}$	4.69564** (0.0319)		6.07638 (0.0149)	0.85750 (0.3560)	0.00510* (0.0932)
$\Delta \ln \text{Rem}$	0.67258 (0.4135)	8.18219** (0.0049)		0.28301 (0.5956)	0.02547 (0.8734)
$\Delta \ln \text{TO}$	0.25954 (0.6112)	0.00616 (0.9376)	0.56944 (0.4517)		0.00346 (0.9532)

\*\*\*significant at 1% level, \*\*significant at 5% level and \*significant at 10% level.

**Table 4: Panel Dynamic Ordinary Least Squares (DOLS)**

Variables	Coefficient	P-value
lnFDI	0.161579***	0.0004
ln Rem	0.514162***	0.0000
ln TO	-0.702184***	0.0001

\*\*\*significant at 1% level

**Table 5: Panel Short Run Equation Estimation Result**

Dependent Variable: lnGDP

Variables	Coefficients	P-value
lnFDI	0.020380***	0.0003
lnRem	0.037615***	0.0004
lnTO	-0.005004***	0.0001
ECM(-1)	-0.203034*	0.0921

. \*\*\*significant at 1% level, \*significant at 10% level. The lag length for each test is selected by AIC and SBIC.