

# Relationship between FDI and GDP: A Case Study of South Asian Countries

Baig MM, Kiran S and Bilal M\*

Department of Business Management, University of Sargodha, Sub-campus Mianwali, Pakistan

## Abstract

The basic objective of this study is to compute the long run relationship between FDI and GDP for south ASIAN countries (Pakistan, Nepal, Bhutan, India and Maldives). For this purpose, the FDI and GDP data of south Asian countries is collected for the period 1991-2012. The data was analyzed by using technique of unit root test, Johnson co-integration and granger causality test. The unit root test (ADF) augmented test confirmed that data is not stationary at level but it is stationary at first difference. The Result of co integration test indicates that there exist co-integration equations at the 0.05 level. The granger test shows that FDI and GDP in case of Nepal cause a unidirectional causality. The study will help and give guiding principle to policymaker and investor make scheme to prop up economic growth in Pakistan which is suffering from a high ratio of unemployment.

**Keywords:** Foreign direct investment; Gross domestic product; Unit root test; Cointegration test; Granger causality test

## Introduction

In the light of expected benefit of FDI many studies have been conducted the role of FDI in host countries may increase through marketing skills, inflow of managerial know-how, capital with creating new job opportunities, through the inflow of technology, and impact of proficient market. FDI has most established component of capital flows. As a result, FDI has become an important substitute in the development finance process (Global development finance 2001). Inward FDI can increase host countries export which cause to increase foreign exchange earning in developing countries. FDI can also encourage technology transfer and creation of new job and boost overall economic growth. From earlier literature we find that foreign direct investment increase gross domestic product like Falki who lays stress on foreign direct investment. The result shows negative relation of FDI and GDP but positive relation between GDP, domestic capital and labor force. More result of literature deals with relationship between FDI and economic growth, between trade and FDI on economic growth and relationship between trade and economic growth. The important element of cash flow is FDI and important channel through which financial globalization benefit the economy.

Accordingly, some researchers have found either a statistically insignificant or a negative relation between FDI and economic growth and among trade and growth. Current study explores the relationship between trade FDI and economic growth. Our study is different in the way there is little experimental work on this subject in Asian countries. Earlier studies relationship between FDI and economic growth in Middle East and south Mediterranean countries Pakistan found notorious result. The study will help and give guiding principle to policymaker and investor make scheme to prop up economic growth in Asian countries which is suffering from a high ratio of unemployment. The objective of this study is to Identification of the direction of the relationship to understand the changes arise in the trends in the economy so; the relevant scheme shall be devised to overcome any sort of problem at earlier stage.

## Literature Review

Borensztein, et al. tests the effect of FDI on economic growth in cross countries [1]. Utilizing data on FDI flows from industrial countries to 69 developing countries over the last two decades. They

conclude that if advance technology is available in host country then FDI contributes economic growth.

Robles and Pradhan suggest that According to modernization theory transfer of technology through FDI is important in modern countries. Because most developing countries have many problems like lack of necessary infrastructure, liberalized market, economic and social stability which are needed to promote growth [2].

Adams analyzes the impact of FDI on Domestic investment in sub-Saharan Africa. Data use from (1990-2003). This study explore that Domestic investment has positive effect on economic growth in OLS and fixed estimation but FDI is only positive OLS Estimation. He also fined that FDI has initial negative effect on DI but later on positive effect [3].

Arshad and Shujat establish empirical relationship between FDI and economic growth in Pakistan. The data use from (1981-2008). The result support and has positive effect on output in long run [4]. The most striking result in this study is that FDI cause growth in primary service sector and on other hand growth cause FDI in manufacturing sector.

The linkage between FDI and economic growth has been widely discussed in Literature, studies like; Masnoon and Rafique conclude a study to determine empirical linkage between FDI and economic growth. In this regard, they took the sample from 1981-2010 and conclude with the negative linkage between FDI and economic growth in Pakistan. They further conclude the independent of four other variables like debit, trade, inflation and domestic investment that can affect the ordinary relationship between FDI and growth [5].

Mustafa AMM, et al. has conducted a study on Sri-Lankan

**\*Corresponding author:** Muhammad Bilal, Department of Business Management, University of Sargodha, Sub-campus Mianwali, University Road, Sargodha 40100, Pakistan, Tel: +923467189999; E-mail: [bilal\\_uos@yahoo.com](mailto:bilal_uos@yahoo.com)

**Received** March 28, 2016; **Accepted** June 09, 2016; **Published** June 19, 2016

**Citation:** Baig MM, Kiran S, Bilal M (2016) Relationship between FDI and GDP: A Case Study of South Asian Countries. J Bus Fin Aff 5: 199. doi:10.4172/2167-0234.1000199

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economy [6]. In this study he used the data ranging from 1998 to 2012. Findings of the study conclude that FDI has positive effect on economic growth. They also suggest that according to statistically endogenous theory FDI is determined by economic factor which are domestic investment and labor force. Makki and Somwaru conducted a study on impact of foreign direct investment on economic growth. The data was collected from the world development indicators (WDI) database by covering 66 countries for the period 1971-2000. The data was analyzed by using a system of three equations by applying Seemingly Unrelated Regression (SUR) method as well as instrumental variable (Three Stage Least Squares or TSLS) approach [7]. The results show that FDI act as a magnet for the interaction in sense of positively with trade and in terms of domestic investment. Furthermore, this study concluded that if the rates of inflation, tax, and government consumption will be decreases then it brings in economic developments.

Berthelemy and Demurger conducted a study on relationship between foreign direct investment and economic growth in china. The data was collected from the world development indicators (WDI) database by covering 24 Chinese provinces, from 1985 to 1996. the data was analyzed by using an empirical test of the theoretical model [8]. The results show that the fundamental role played by foreign investment in provincial economic growth in China, and stresses the importance of potential growth in foreign investment decisions.

Cilar and Altiner conducted a study on relationship between foreign direct investment and economic growth on CCO region. The data was collected from the world development indicators (WDI) database for period of 1995-2011 [9]. The data was analyzed by using a granger Causality Test based on error correction model and Holtz-Eakin, Newey and Rosen Panel Causality Test are applied in analysis. The results indicate that a positive causality from FDI to GDP and a slightly less positive causality from GDP to FDI in ECO region have been perceived.

Matthew and Johnson investigated a study on an Investigation of the Impact of Foreign Direct Investment on Economic Growth in Nigeria. The data was collected published work of Abu and Echegbulu [10]. The data was analyzed by using Granger Causality Test single equation model in their FDI-growth studies. The results ad findings show that the present review will focus more on the relevance of FDI to the Nigeria economy.

Hasnen and Rand conducted a study on Granger causal relationships between foreign direct investment (FDI) and GDP in a sample of 31 developing countries. For this purpose, the data was collected from the sample of 31 developing countries covering 31 years.). The data was analyzed by using Granger Causality Test between the FDI-to-GDP ratios. The results and findings shows that the FDI has a lasting impact on GDP, while GDP has no long run impact on the FDI-to-GDP ratio and concluded that long-run effects from FDI to GDP [11].

## Hypothesis

1. **HA:** There is long run relationship exist between FDI and gross domestic product.
2. **H0:** There is no long run relationship exist between FDI and gross domestic product.

## Methodology

### Data source

This study will base upon the exploration of the relationship

between FDI and economic growth in Pakistan. In this succession, uses the annual time series data ranges from 1991-2012. Data will be extracted from world development index (WDI) of World Bank and different volume of international statistic (IFS). The variables of this study include per capita GDP growth for measurement of economic growth, FDI inflows to GDP for foreign direct investment.

This study will focus the linkage between FDI, trade and economic growth in presence of different control variable. In this regard we use the time series data for such determination and for the sake of convenience use the log linear model to eliminate trends in the data. This relationship is identifying to application of new theory of endogenous growth stating permanent role of FDI in economic progress. In any discussion about causation among variables, the first step is the determination of unit roots in the data. Different approaches are used for calculation of panel unit root test like (ADF), (PHILLIP PERON) etc. Among these approaches, the most appropriate approach with respect to data will be employed in this study to determine the level of integration. Similarly, different approaches of co integration are also (JOHANSAN COINTEGRATION) and granger causality was used. Among these different approaches most suitable approach with respect to the level of integration as defined earlier will be selected for determination of long-run relationship.

### Descriptive statistic

Pakistan: Table 1.

Sri Lanka: Table 2.

Singapore: Table 3.

### Correlation analysis

Correlation of Pakistan: Table 4.

Correlation of Sri Lanka: Table 5.

Correlation of Singapore: Table 6.

Unit root Table 7.

### Co integration

Pakistan: Table 8.

Sri Lanka: Table 9.

Singapore: Table 10.

All above Johnson co integration test shows that FDI and GDP for Pakistan, SRI Lanka and Singapore are co integrated. Since GDP and FDI have long run relationship for Pakistan, SRI Lanka and Singapore countries at 0.05 level.

### Granger causality

Pakistan: Table 11.

Sri Lanka: Table 12.

Singapore: Table 13.

Granger test explores whether the lagged varies of one variable can significantly explain the changes of other variable. Results explore that there is no causal relationship exist among selected variables (GDP, FDI, and Inflation) for Pakistan, Sri Lanka and Singapore.

### Conclusion

The purpose of this study to relationship between FDI and GDP for

|             | GDP       | FDI       | INF       |
|-------------|-----------|-----------|-----------|
| Mean        | 0.018836  | 0.007156  | 0.019303  |
| Median      | 0.021023  | 0.007873  | 0.019681  |
| Maximum     | 0.046995  | 0.080047  | 0.349526  |
| Minimum     | -0.005225 | -0.042872 | -0.41868  |
| Std. Dev.   | 0.016403  | 0.029167  | 0.237734  |
| Skewness    | 0.117157  | 0.765779  | -0.285461 |
| Kurtosis    | 1.771892  | 3.950546  | 2.170182  |
| Jarque-Bera | 0.97697   | 2.030753  | 0.634094  |
| Probability | 0.613555  | 0.362266  | 0.728297  |

**Table 1:** The descriptive statistic shows that GDP mean value is highest as compared to other variables in Pakistan.

|             | GDP      | FDI       | INF       |
|-------------|----------|-----------|-----------|
| Mean        | 0.030776 | 0.007465  | -0.077061 |
| Median      | 0.030204 | 0.014828  | 0         |
| Maximum     | 0.077179 | 0.125636  | 0.335182  |
| Minimum     | 0        | -0.090705 | -0.733794 |
| Std. Dev.   | 0.022628 | 0.05181   | 0.301151  |
| Skewness    | 0.457486 | 0.261201  | -0.568309 |
| Kurtosis    | 2.399129 | 3.445255  | 2.642479  |
| Jarque-Bera | 0.748888 | 0.294473  | 0.887327  |
| Probability | 0.687672 | 0.86309   | 0.641681  |

**Table 2:** The descriptive stat shows that GDP mean value is highest as compared to other variables in Sri Lanka.

|             | GDP       | FDI       | INF       |
|-------------|-----------|-----------|-----------|
| Mean        | 0.015183  | 0.011042  | 0.019831  |
| Median      | 0.01178   | 0.00258   | 0         |
| Maximum     | 0.039297  | 0.095778  | 2.604992  |
| Minimum     | -0.015637 | -0.112023 | -1.283384 |
| Std. Dev.   | 0.016185  | 0.048375  | 0.974209  |
| Skewness    | 0.004554  | -0.745565 | 1.257484  |
| Kurtosis    | 2.107262  | 4.483326  | 4.968272  |
| Jarque-Bera | 0.498165  | 2.580505  | 5.524547  |
| Probability | 0.779516  | 0.275201  | 0.063148  |

**Table 3:** The descriptive statistic shows that GDP mean value is highest as compared to other variables in Singapore.

|     | GDP         | FDI      | INF      |
|-----|-------------|----------|----------|
| GDP | 1.000000    | -0.37723 | 0.119012 |
| FDI | -0.37723299 | 0.371314 | 1        |
| INF | 0.119011944 | 1.000000 | 0.371314 |

**Table 4:** Above results explore that GDP is negatively correlated with FDI and positively with INF in Pakistan.

|     | GDP      | FDI      | INF      |
|-----|----------|----------|----------|
| GDP | 1        | -0.07607 | 0.231587 |
| FDI | -0.07607 | 1        | -0.01373 |
| INF | 0.231587 | -0.01373 | 1        |

**Table 5:** Above results explore that GDP is negatively correlated with FDI and positively with INF in Sri Lanka.

|     | GDP      | FDI      | INF      |
|-----|----------|----------|----------|
| GDP | 1        | -0.36152 | -0.00684 |
| FDI | -0.36152 | 1        | 0.373519 |
| INF | -0.00684 | 0.373519 | 1        |

**Table 6:** Above results explore that GDP is negatively correlated with FDI and INF in Singapore.

|                        | ADF LEVEL FDI | ADF 1 <sup>st</sup> DIF FDI | ADF LEVEL GDP | ADF 1 <sup>st</sup> DIF GDP |
|------------------------|---------------|-----------------------------|---------------|-----------------------------|
| Pakistan               | -1.83286      | -3.88449                    | 0.842867      | -3.85455                    |
| Nepal                  | -2.63991      | -4.03797                    | 1.716876      | -5.05921                    |
| India                  | -1.89583      | -5.55924                    | 0.737368      | -4.06182                    |
| Maldives               | 0.297584      | -5.05646                    | -0.83123      | -5.72681                    |
| Bhutan                 | -2.98038      | -4.99879                    | 0.953694      | -4.6471                     |
| <b>Critical values</b> |               |                             |               |                             |
| 1%                     | -4.4206       | 4.58265                     | 3.80855       | 3.80855                     |
| 5%                     | 3.25981       | -3.32097                    | -3.02069      | -3.02069                    |
| 10%                    | 2.77113       | -2.80138                    | -2.65041      | -2.65041                    |

**Table 7:** Above results explore the unit root values with ADF level and 1<sup>st</sup> DIF.

| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.  |                  |
|--------------|------------|-----------|----------------|--------|------------------|
| None         | 0.817795   | 32.68655  | 29.79707       | 0.0226 | COINTEGRATION    |
| At most 1    | 0.480394   | 10.55245  | 15.49471       | 0.2406 | NO COINTEGRATION |
| At most 2    | 0.145332   | 2.041546  | 3.841466       | 0.1531 | NO COINTEGRATION |

**Table 8:** The above result show that there is one co integration at 0.05 level in Pakistan.

| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.  |                  |
|--------------|------------|-----------|----------------|--------|------------------|
| None         | 0.79876    | 30.16888  | 29.79707       | 0.0453 | COINTEGRATION    |
| At most 1    | 0.379862   | 9.326544  | 15.49471       | 0.336  | NO COINTEGRATION |
| At most 2    | 0.213068   | 3.114981  | 3.841466       | 0.0776 | NO COINTEGRATION |

**Table 9:** The above result shows that there is one co integration at 0.05 level in Sri Lanka.

| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.  |               |
|--------------|------------|-----------|----------------|--------|---------------|
| None         | 0.827991   | 42.71008  | 29.79707       | 0.001  | COINTEGRATION |
| At most 1    | 0.676894   | 19.8274   | 15.49471       | 0.0104 | COINTEGRATION |
| At most 2    | 0.326596   | 5.140333  | 3.841466       | 0.0234 | COINTEGRATION |

**Table 10:** The above result shows that there is co integration at 0.05 level in Singapore.

| Null Hypothesis:                                                                             |  | Obs | F-Statistic | Prob.  |
|----------------------------------------------------------------------------------------------|--|-----|-------------|--------|
| FDI_PAK does not Granger Cause GDP_PK<br>GDP_PK does not Granger Cause FDI_PAK               |  | 14  | 0.0482      | 0.8303 |
|                                                                                              |  |     | 4.26861     | 0.0632 |
| INFLATION_PAK does not Granger Cause GDP_PK<br>GDP_PK does not Granger Cause INFLATION_PAK   |  | 14  | 1.51749     | 0.2437 |
|                                                                                              |  |     | 0.01902     | 0.8928 |
| INFLATION_PAK does not Granger Cause FDI_PAK<br>FDI_PAK does not Granger Cause INFLATION_PAK |  | 14  | 0.07916     | 0.7837 |
|                                                                                              |  |     | 1.68832     | 0.2204 |

**Table 11:** Granger causality of Pakistan.

| Null Hypothesis:                                                                             |  | Obs | F-Statistic | Prob.  |
|----------------------------------------------------------------------------------------------|--|-----|-------------|--------|
| SR_FDI does not Granger Cause SRI_LANKA_GDP<br>SRI_LANKA_GDP does not Granger Cause SR_FDI   |  | 14  | 0.7383      | 0.4085 |
|                                                                                              |  |     | 0.93127     | 0.3553 |
| INFLATION_PAK does not Granger Cause GDP_PK<br>GDP_PK does not Granger Cause INFLATION_PAK   |  | 14  | 0.00992     | 0.9224 |
|                                                                                              |  |     | 4.60272     | 0.0551 |
| INFLATION_PAK does not Granger Cause FDI_PAK<br>FDI_PAK does not Granger Cause INFLATION_PAK |  | 14  | 2.73239     | 0.1266 |
|                                                                                              |  |     | 0.34283     | 0.57   |

**Table 12:** Granger causality of Sri Lanka.

Asian countries (Pakistan, Nepal, Bhutan, India and Maldives). For this purpose, the FDI and GDP data of south Asian countries is collected. The augmented test confirmed that data is not stationary at level but it is stationary at first difference. The Result of co integration test indicates that there exist co-integration equations at the 0.05 level. The granger test shows that FDI and GDP in case of Nepal cause a unidirectional

| Null Hypothesis:                           | Obs | F-Statistic | Prob.  |
|--------------------------------------------|-----|-------------|--------|
| SINGA_FDI does not Granger Cause SINGA_GDP | 14  | 0.30235     | 0.5934 |
| SINGA_GDP does not Granger Cause SINGA_FDI |     | 3.11723     | 0.1052 |
| SINGA_IF does not Granger Cause SINGA_GDP  | 14  | 1.35239     | 0.9224 |
| SINGA_GDP does not Granger Cause SINGA_IF  |     | 0.71349     | 0.4163 |
| SINGA_IF does not Granger Cause SINGA_FDI  | 14  | 1.42325     | 0.258  |
| SINGA_FDI does not Granger Cause SINGA_IF  |     | 0.20824     | 0.657  |

**Table 13:** Granger causality of Singapore.

causality. The study will help and give guiding principle to policymaker and investor make scheme to prop up economic growth in Pakistan which is suffering from a high ratio of unemployment.

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