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Impact of FDI inflow on economic growth of SAARC economies

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Abstract: Economic growth of developing countries primarily depends upon the various socio-economic factors such as level of output, rate of saving and investment, standard of living of people, per capita income as well as national income and finally on industrial development. The economic impact of foreign direct investment (FDI) inflow towards SAARC's individual countries varies from country to country at different time interval. For this a great deal of researchers have confronted the issues and produced their thoughts. However, the major researches failed to effectively examine this relationship within a general macroeconomic framework. In the absence of such attempts, the paper aims to explore the impact of foreign direct investment inflow towards the growth framework of SAARC's individual countries primarily on six economic indicators, i.e. GDP, GDP Per capita, GNI, Export Growth, Financial position, Trade openness from year 1991 to 2012. MANOVA multivariate and Pearson correlation econometric technique have been employed with assuming the three categorical factor FDI Inflow, year and country as fixed factors to draw the results. This paper reveals that FDI inflow has positive and strong relationship with Real GDP, GNI and Export growth while FDI has negative and weak relationship with financial position and Trade openness in SAARC member countries. Further, among the three fix factors i.e. FDI inflow, country specific and year only FDI Inflow consistently effects the dependent variables most and year wise effect is less.

Keywords: socio-economic factor, macroeconomic framework, economic indicators, econometric technique, fixed factors.

I. Introduction

In recent studies, the macro economics issues such as FDI, GDP, Export, BOP have been highlighted widely. However, most of these discussions failed to adequately investigate the positive and negative consequences of FDI over each SAARC countries within a general macroeconomic model. In the absence of such investigations, this paper an attempt has been made to examine the economic impact of foreign direct investment (FDI) on macroeconomic indicators i.e. GDP, GDP Per capita, GNI, Export Growth, Financial position and Trade openness using socioeconomic and investment data with the member countries of SAARC. SAARC had allotted its membership to eight largest countries and because of its size, the scope of FDI inflow varies across the region. However, the inflow accelerates the employment opportunities in SAARC countries along with attempt to mitigate the saving and investment needs and assists in cross border movement of upgraded technologies. The major economy of this region i.e. India, Pakistan and Bangladesh have largely been affected economically by the entrance of FDI inflow during year 1991 to 2012, however, remaining five countries including newly joined member Afghanistan succeed to attract the nominal part of FDI inflow. Along with, Human Capital, good infrastructure, economic stability and liberalized markets have been recognized as the most influansive variables to attract the long term foreign direct investment (Bengoa and Sanchez-Robles, 2003). These factors have molded the status of FDI inflow in SAARC during 1991 to 2000, i.e. from US\$434.65 Millions to US\$ 4670.53 Million and further in 2011 significantly reached to US\$ 40080.60 Million (UNCTAD.'WIR', 2012).

The purpose of this paper is to measure the effect of FDI inflow on economic growth of SAARC country's macroeconomic indicators with a view to get its strength of relationship within described economic indicators. More specifically, the extent to which FDI contributes to growth depends on the economic and social conditions of the recipient country. Countries with high rate of savings, open trade regime and high technological levels get an additional advantage of large FDI inflow. In SAARC every country has its unique characteristics in terms of demographical and economical. Both demographically and economically, India is a largest economy where enormous FDI comes every year which in terms affect the status of economical soundness and purchasing power of peoples.

II. Review of Literature

A great deal of research have been dedicated to measure the economical impact of FDI inflow on growth prospect at different time interval with a view to explore the positive and negative consequences towards host

country and further for framing macroeconomic policies. In this study a specific attempt has been initiated to categories the previous studies on the basis of economical determinants at different time interval for selecting the most effective variable to evaluate the impact of FDI over them in SAARC countries.

Table: 1 Classification of Literature review

Factors	Condition	Previous studies
GDP	Positive impact of FDI on GDP of host country.	Agarwal, (1980); Laura Alfaro et.al,(2003); Jyun-Yi, Wu and Hsu Chin-Chiang, (2008); Kok and Ersoy,(2009); Anup, (2010); M. sayeed Alam and Mahmud Zubayer,(2010); Abbas et.al.,(2011).
GDP per Capita	Positive Impact of FDI on GDP Per Capita of host country.	Schneider and Frey ,(1985); Martin,(1992); Tsai,(1994); Loree and Guisinger,(1995); Asiedu,(2002); Artige and Nisolini,(2005); M. Azam,(2011).
Export Growth	FDI inflows has positive and significant impact on Export growth	Salman and Feng , (2010); Javed et.al, (2012); Sahoo,(2006); Mucchielli and Soubaya, (2003); Ram and Zhang,(2002); Mohd. Zahid Awanet.al,(2010).
Economic Development	FDI inflow has positive and significant impact on Economic development of SAARC countries.	Kim bang (2008); Katrina and John (2004); Agarwal (2001); Falki (2009); Tweneboah, (2009); Bukley et.al,(2002); Mihir A. Desai (2005).
Labour Force	FDI inflows has positive and significant impact on Labor force Productivity	Borensztein et.al, (1998); Noor bakhsh , Paloni and Yousef, (2001);Bengoa and Sanchez ,(2003); Behra and Parida,(2010).

Source: Author expectation

A. Review of past studies period 1991 to 1999:

Barro, Robert J, (1991) highlighted that FDI plays an important role in the Process of Industrialization and economic growth in the developing countries. Most of the countries in the World have recognized that FDI by Transactional Corporation (TNC) contribute in many ways to the process of Economic growth of host countries.. (Singh and Jun, 1995) found the export orientation is the robust variable for attracting FDI. Yet, it is somewhat heroic to conclude that their findings are "in line with the secular trend toward increasing complementarity between trade and FDI" Surprisingly, the study also supports the tariff jumping hypothesis, which is in conflict with the authors' conclusion. Borensztein *et al.* (1998) had conducted a study over 69 developing countries to investigate the effect of FDI on economic growth and he observed basically the requirement of quantum of FDI depend upon the absorbing capacity of host country.

B. Review of past studies period from 2000 to 2007:

Laura Alfaro (2003) conducted an experiment to measure the effect of FDI flow into different sectors of the economy such as primary, manufacturing and services with a view to exert the strength of effect on economic growth. He further concluded that FDI inflow into the primary sector tend to have a negative effect on growth, whereas FDI inflow in the manufacturing sector a positive one and impact over service sector is ambiguous. Carstensen and Toubal (2004) conducted study on South Asian countries and concluded that traditional determinants such as market potential, low costs labor, skilled workforce and relative endowments had significant effect on growth prospect of South Asian countries. In addition, factors like level and method of privatization and country risk also play vital roles in trends of FDI inflow. Quattara (2005) highlighted in his study that public investment and real income are such determinants that influence positively the level of private investments in Senegal while the credit to private sector and terms of trade are such which negatively influence the private investment. Sahoo (2006) has used a panel co-integration test over major determinants of FDI in South Asia such as market size, labor force growth, infrastructure index and trade openness and found that FDI and its determinants have long run equilibrium relationship in south Asian countries. He further stated that impact of FDI inflow has positive and significant on growth prospect of four south Asian countries. In addition, other significant factors such as exports, gross domestic capital formation and infrastructure also contributed to growth.

C. Review of past studies period from 2008 to 2012:

Jyun-Yi, Wu and Hsu Chin-Chiang (2008) conducted an empirical analysis to examine the effect of FDIs over economic growth of host country, by using threshold regression analysis. They highlighted the findings in reference of major determinants such as initial GDP and human capital that FDI alone play a vital role in boosting the economic growth. The authors further argued, FDI is observed to have a positive and significant impact on growth only if host countries have better level of initial GDP and human capital. M. Sayeed Alam and Mahmud Zubayer (2010) pointed out the complications of FDI inflow in SAARC and evaluated that FDI from outside is more important rather than intra regional investments in most of the SAARC countries (exception is

Nepal), where Indian investments is dominated. They further stated, FDI has a significant impact on GDP of SAARC countries. Abbas *et al.* (2011) conducted an analysis to get the influence of FDI and CPI on the GDP's of SAARC member nations. He developed a general model for this study and found there is positive relationship between Foreign Direct Investment and GDP while negative relationship between Consumer Price Index and GDP.

III. Econometric Methodology

The aim of our paper is to analyze the empirical relationship between FDI and economic variables in SAARC. For this data has been used over the period of twenty two year from 1991 to 2012. More specifically, the six variables used in our model, gross domestic product (GDP), GDP Per Capita (GDP PC), Gross National Income (GNI), Trade openness, Export Growth and Financial position with assuming the three fix factors as FDI inflow, year, country and further a specific experiment has been conducted to evaluate the foremost effect of FDI inflow on economic indicators of SAARC region. To determine the level of significance among above economic variables, the secondary data has been collected from the reliable source such as world development indicators, UNCTAD and economies central banks. In this study, the variables has been tested with specific econometric technique such as GLM Multivariate Model i.e. MANOVA and Pearson correlation matrix which processed with the help of SPSS 22.0 statistical software. The empirically technique used in the study here discussed in nutshell.

A. Multivariate analysis, GLM model:

Multivariate Analysis (MANOVA) has been used in this study to design the relationship between the categorical independent fixed factors i.e. country and year; the covariate FDI inflow and the dependent variables i.e. Real GDP, GDP/Capital, GNI, Exports, Dept/export and Total Trade/GDP. For this some of the popular reported statistics test has been applied-

- **Pillai's Trace:** Pillai-Bartlett criterion = pooled effect variances Often considered most robust and powerful test statistic. It gives most conservative F-statistic.

$$\Lambda_{Pillai} = \sum_{1 \dots p} (1/(1 + \lambda_p)) = \text{tr}((I + A)^{-1})$$

- **Wilks' Lambda:** Wilks' λ = pooled ratio of error variances to effect variance plus error variance. This is the most commonly reported test statistic, but not always the best choice. Gives an exact F-statistic

$$\Lambda_{Wilks} = \prod_{1 \dots p} (1/(1 + \lambda_p)) = \det(I + A)^{-1} = \det(\Sigma_{res}) / \det(\Sigma_{res} + \Sigma_{model})$$

- **Hotelling's Trace statistic:** Hotelling's trace = pooled ratio of effect variance to t_{ii}

$$\Lambda_{LH} = \sum_{1 \dots p} (\lambda_p) = \text{tr}(A)$$

- **Roy's Largest Root:** Roy's Largest Root = largest eigenvalue. Gives an upper-bound of the F-statistic. Disregard if none of the other test statistics are significant

$$\Lambda_{Roy} = \max_p (\lambda_p) = \|A\|_{\infty}$$

B. Correlation Matrix:

In this paper, especially the Pearson correlation and two tailed test of significance have been employed to observe the strength of relationship between dependent variables and independent Variable at 1% and 5% level of significance and further found empirically the degree of relationship within each indicator of SAARC economies.

Table 2: Correlation Matrix Index

Value of r	Condition	Strength of relationship
1.00	r is one	It is a perfect relationship between the two variable
0.50	r is greater than 0.00 but less than 1.00	It is a positive relationship between the two variables
0.00	r is zero	There is no relationship between the two variables
-0.50	r is between 0.00 and -1.00	It is a negative relationship between two variables.
-1.00	r is negative one	It is a perfect negative relationship between the two variables.

Source: Author expectations on the basis of various statistical books

IV. Empirical Results and Discussion

No doubt, FDI inflow always push the host country's economy either positive or negative direction. It does all depend upon the profitability, infrastructure financial sector, Political stability and many more determinants of the host country. For measuring the impact of FDI on economic variables certain mentioned econometric technique has been utilized to get the significance of the study.

Table 3. Correlation Matrix analysis

Parameters	Correlations	FDI Investment	Real GDP	GDP Per Capita	Gross National Income	Export	Financial Position (Debt / Export)	Trade openness Total Trade / GDP
FDI Investment	Pearson Correlation	1	.898**	0.007	0.897	.924**	-0.172	-0.154
	Sig. (2-tailed)		0	0.922	0	0	0.023	0.041
	N	176	176	176	176	176	176	176
Real GDP	Pearson Correlation	.898**	1	-0.037	.999**	0.983	-0.119	-.261**
	Sig. (2-tailed)	0		0.622	0	0	0.117	0
	N	176	176	176	176	176	176	176
GDP Per Capita	Pearson Correlation	0.007	-0.037	1	-0.039	-0.003	-0.399	0.632
	Sig. (2-tailed)	0.922	0.622		0.609	0.973	0	0
	N	176	176	176	176	176	176	176
Gross National Income	Pearson Correlation	.897**	.999**	-0.039	1**	.983**	-0.118	-.260**
	Sig. (2-tailed)	0	0	0.609		0	0.118	0
	N	176	176	176	176	176	176	176
Export	Pearson Correlation	.924**	.983**	-0.003	.983**	1**	-0.16	-.197**
	Sig. (2-tailed)	0	0	0.973	0		0.034	0.009
	N	176	176	176	176	176	176	176
Financial Position (Debt / Export)	Pearson Correlation	-.172*	-0.119	-.399**	-.118*	-0.16	1**	-.675*
	Sig. (2-tailed)	0.023	0.117	0	0.118	0.034		0
	N	176	176	176	176	176	176	176
Trade openness Total Trade / GDP	Pearson Correlation	-.154*	-.261**	.632**	-.260*	-.197**	-.675**	1*
	Sig. (2-tailed)	0.041	0	0	0	0.009	0	
	N	176	176	176	176	176	176	176

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

From the above correlation table it is clear that relationship between following variables are significant at 0.01 and 0.05 levels

Variables	Value of r
FDI and Real GDP	0.898**
FDI and Gross National Income (GNI)	0.897**
FDI and Exports	0.924**
FDI and Financial Position (Total Debt/Export)	0.172*
FDI and Total Trade / GDP	-0.154

From the above table it is also evident that relationship between the other variables

- Real GDP and Gross National Income has been found to be Positive with strong correlation, value of coefficient $r = 0.999^{**}$.
- Real GDP and Total Trade / GDP has been found to be Negative with week correlation, value of correlation coefficient $r = -0.261^{**}$.
- Gross National Income and Exports has been found to be Positive with strong correlation, value of correlation coefficient $r = 0.983^{**}$.
- Gross National Income and Total Trade / GDP has been found to be Positive with week correlation, value of correlation coefficient $r = 0.260^{**}$.
- Exports and Real GDP has been found to be Positive with strong correlation, value of correlation coefficient $r = 0.983^{**}$.
- Exports and Total Trade / GDP has been found to be Negative with week correlation, value of coefficient $r = -0.197^{**}$.
- Financial Position and GNI has been found to be Negative with week correlation, value of correlation coefficient $r = -0.118^{**}$.

- h. Total Trade / GDP and Financial Position has been found to be Negative with strong correlation, value of correlation coefficient $r = -0.675^{**}$.
- i. Financial Position and GDP per Capita has been found to be Negative with weak correlation, value of correlation coefficient $r = -0.399^{**}$.
- j. Total Trade / GDP and GDP per Capita has been found to be Positive with strong correlation, value of correlation coefficient $r = 0.632^{**}$.

Finally, since the correlation is positive, therefore we can conclude that Real GDP, GDP Per capita, Gross National Income, Export, Financial Position (Total Debt/Export), and Trade openness (Total Trade/GDP) are dependent on FDI inflow in SAARC countries.

Table: 4 GLM Model : Multivariate Tests^a

	Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	0.982	1289.568 ^b	6	141	0	0.982
	Wilks' Lambda	0.018	1289.568 ^b	6	141	0	0.982
	Hotelling's Trace	54.875	1289.568 ^b	6	141	0	0.982
	Roy's Largest Root	54.875	1289.568 ^b	6	141	0	0.982
Country	Pillai's Trace	2.82	18.497	42	876	0	0.470
	Wilks' Lambda	0.002	46.89	42	664.801	0	0.659
	Hotelling's Trace	24.369	80.844	42	836	0	0.802
	Roy's Largest Root	14.044	292.922 ^c	7	146	0	0.934
Year	Pillai's Trace	1.184	1.709	126	876	0	0.197
	Wilks' Lambda	0.21	2.02	126	825.23	0	0.229
	Hotelling's Trace	2.176	2.406	126	836	0	0.266
	Roy's Largest Root	1.337	9.293 ^c	21	146	0	0.572
FDI Investment	Pillai's Trace	0.783	85.021 ^b	6	141	0	0.783
	Wilks' Lambda	0.217	85.021 ^b	6	141	0	0.783
	Hotelling's Trace	3.618	85.021 ^b	6	141	0	0.783
	Roy's Largest Root	3.618	85.021 ^b	6	141	0	0.783

a. Design: Intercept + Country + Year + FDI Investment

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

The multivariate tests table 4 displays four tests of significance for each model effect. Pillai's trace is a positive-valued statistic. Increasing values of the statistic indicate effects that contribute more to the model. Country, year and FDI effects the GDP, exports and the overall financial position of SAARC. Wilks' Lambda is a positive-valued statistic that ranges from 0 to 1. Decreasing values of the statistic indicate effects that contribute more to the model. Hotelling's trace is the sum of the eigenvalues of the test matrix. It is a positive-valued statistic for which increasing values indicate effects that contribute more to the model. Hotelling's trace is always larger than Pillai's trace, but when the eigenvalues of the test matrix are small, these two statistics will be nearly equal. This indicates that the effect probably does not contribute much to the model. Roy's largest root is the largest eigenvalue of the test matrix. Thus, it is a positive-valued statistic for which increasing values indicate effects that contribute more to the model.

Roy's largest root is always less than or equal to Hotelling's trace. When these two statistics are equal, the effect is predominantly associated with just one of the dependent variables, there is a strong correlation between the dependent variables, or the effect does not contribute much to the model.

Each multivariate statistic is transformed into a test statistic with an approximate or exact F distribution. The hypothesis (numerator) and error (denominator) degrees of freedom for that F distribution are shown. The significance values of the main effects, Country, year and FDI Inflows, are less than 0.05, indicating that the effects contribute to the model. Since there is a difference in the Pillai's trace Hotelling's trace values for all the three factors country, year and FDI, it can be concluded that all of them contribute to the model. A more straightforward way to see this is to look at partial eta squared. The partial eta squared statistic reports the "practical" significance of each term, based upon the "ratio" of the variation accounted for by the effect to the sum of the variation accounted for by the effect and the variation left to error. More specifically, partial eta squared is the matrix product of the hypothesis SSCP matrix and the inverse of the sum of the hypothesis and error SSCP matrix. Since the partial eta values of factor 'year' is least (0.197 – 0.517) and maximum in case of country (0.470 -0.934) and FDI (0.783) inflow respectively, we can conclude that among the three factors FDI Inflow consistently effects the dependent variables most and year wise effect is less, however each of the three factors contributes to the model but catching to the Pillai's trace (2.82) and Hotelling's trace value (24.369) that

are maximum in case of factor country, we can conclude that dependent variables Real GDP, GDP/Capital, GNI, Exports, Dept/export and Total Trade/GDP are more country specific and variation among them is largely is to region specific rather than year specific, however the clear effect of FDI Inflow on these factors and there variation among the years depending upon the FDI inflow in different SAARC countries is surely evident.

V. Conclusion

The purpose of this study is to measure the effect of FDI inflow on economic growth of SAARC. Despite of many factors such as availability of labour force, large market size, and successive determinants in SAARC, the countries except India and Pakistan failed to generate the substantial amount of foreign investment. In this study, the author conducted an experiment with using MANOVA i.e. multivariate analysis statics and correlation matrix on pre determined economic variables i.e. Real GDP, GDP/Capital, GNI, Exports, Dept/export and Total Trade/GDP and found empirically that the entrance of FDI strongly influenced the status of GDP, Gross national income and export growth of SAARC countries while other variables are likely or negatively affected which means there are many other reason that may contributed largely in the growth of SAARC rather than FDI investment only. More specifically as per multivariate analysis among the three factors i.e. FDI inflow, country specific and year only FDI Inflow consistently effects the dependent variables most and year wise effect is less. On the hand, effects within parameters shows that Real GDP and Gross National Income, Gross National Income and Exports, Exports and Real GDP, Total Trade / GDP and GDP per Capita have been found to be Positive with strong correlation whereas Real GDP and Total Trade / GDP, Exports and Total Trade / GDP, Financial Position and GNI and Financial Position and GDP per Capita have been found to be Negative with week correlation.

At last, we can say that dependent variables Real GDP, GDP/Capital, GNI, Exports, Dept/export and Total Trade/GDP are more country specific and variation among them is largely is to region specific rather than year specific, however the clear effect of FDI Inflow on these factors and there variation among the years depending upon the FDI inflow in different SAARC countries is surely evident.

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