

**NEXUS BETWEEN FDI AND FOREIGN AID:
THE CASE OF FIVE SOUTH ASIAN ECONOMIES**

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ABSTRACT

This study investigates the nexus between foreign direct investment (FDI) and decomposed Official Development Assistance (ODA) in five South Asian countries. Following economic reform and improving FDI policy framework in 90s, the South Asian region becomes as an important destination for investment. Indeed, this region is also destination of official development assistance for several years that directed by donors in order to reach various objectives. Both FDI and official development assistance are seen capital flows can develop physical and human capital in host countries, but at the same time both can effect on each other in the way of the sense that complementary and substitutes. Thus, this study investigates the nexus by employing cointegration and Granger causality tests in five South Asian countries. Using cointegration test we empirically found that there is a long-run relationship between FDI and official development assistance for physical capital development in Nepal, Pakistan, India and Sri Lanka, but not in Bangladesh, while the relationship between FDI and assistance for human capital and infrastructure development is in Bangladesh, Nepal, India and Sri Lanka, but not in Pakistan. Granger causality tests suggest that receiving assistance for human capital and infrastructure development working towards attracting FDI in South Asian countries. The argument that official development assistance for physical capital development crowds out FDI is weak in case of South Asian countries. Conclusively we suggest that receiving foreign aid in the shape of human capital and infrastructure development encourages FDI in South Asian region.

Key words: Foreign aid, FDI, South Asia, Cointegration, Causality

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Introduction

Although the concept of foreign aid and foreign direct investment (FDI) arose 40 years before, time to time numerous theories and analysis related to aid and FDI entering into the scene of research as because of the dynamic trend of regional and global economies. In this respect, these two factors become crucial as South Asian economic trend concerned. In this study, South Asian used to refer Bangladesh, Nepal, Pakistan, India and Sri Lanka. Aid is a voluntary transfer of resources from one country to another, given at least partly with the objective of benefiting the recipients' economy. It is theoretically and empirically believed that aid play vital role in reducing poverty through various channels, fulfil saving gap as well as accumulate physical and human capital stock and develop infrastructure in the economies and also it is seen as an important financing factor in the fiscal sector. Obviously, foreign direct investment also plays an extraordinary and growing role in global business. For a host country it can provide a firm with new markets and marketing channels, cheaper production facilities, access to new technology, products, management skills and financing, and as such can provide a strong impetus to economic development. According to Shan et al.(1997), the capital accumulation of FDI is expected to generate non-convex growth by encouraging the incorporation of new inputs and foreign technologies in the production function of the FDI recipients' countries. In addition, the transfer of advanced technology strengthens the host country's existing stock of knowledge through labor training, skill acquisition, the introduction of alternative management practices and organizational arrangements. Roomer argues that an important part of this technology is the idea or blueprints concerning how to produce new goods, how to increase quality, or how to reduce costs (Daron Acemoglu, 2008). Thus, both official development assistance and FDI are crucial and play vital role in the way of formation of physical and human capital, and directing the recipient countries toward economic growth and development. It is notable point (UN Monetary report, ICFD, 2002) that official development assistance, foreign direct investment and trade are three essential tools for development finance. Therefore, it is emphasized that foreign aid and FDI flow in growing economies have received considerable attention in both academic studies and policy discussions.

Giving attention on the relationship between official development assistance and FDI in the sense of contributing host county development is controversial and debatable. Researchers have various findings and discussions on joint contribution of foreign aid and FDI, and crowding out effect on each other. Aid may raise the marginal productivity of capital by financing complementary inputs, such as public infrastructure projects and human capital investment. However aid may also crowd out productive private investments if it comes in the shape of physical capital flow and on the other hand, aid invested in complementary factors of production has an ambiguous effect on FDI (Pablo Selaya et al, 2008). Kosack and Tobin (2006) found that aid and FDI are unrelated , emphasising that the foreign aid flow in developing countries mainly in the form of supporting government budget, humanitarian activities and human capital development, it makes sense that foreign aid unlikely crowd out FDI which is for physical capital formation in the economies while the arguments of Hidefumi Kasuga ,(2007) is relative impact of financial source such as foreign direct investment ,aid and savings are depends on a countries' income level ,financial structure, and government infrastructure. But, it is difficult to monitor the final destination of aid because of the fungibility of aid in the sense that whether the

objective of donors and recipients are same (Mark McGillivray 2000). According to Caselli and Feyrer (2007), the marginal product of capital is roughly same across countries, and increasing aid flows to developing countries will lower the marginal product of capital in these countries and tend aid and FDI to be substitute rather than being complements. However, foreign aid plays an essential role as a complement to other source of financing for development, especially in those countries with the least capacity to attract private direct investment (UN, 2002, pg.9). There is another function of aid rather than substitute or complementary kept by Elizabeth Asiedu et al (2009), that foreign aid mitigate the risk of FDI in the receiving countries, which includes the violation on contractual agreements, changes in laws and regulations or the right out nationalization of foreign –owned property can be mitigated by receiving foreign aid that could be either from the countries that owned FDI or other donors.

Looking at the environment of FDI and official development assistance in South Asian countries, the region has been one of the fastest growing regions in the world in recent years. Evidently, all South Asian economies, excluding Pakistan, have experienced high economic growth and improvement in most macroeconomic indicators in the both domestic and external sector (IMF, 2008). According to the Asian Development Bank (ADB), following the economic reform and improving FDI policy frame work South Asian region become as an important destination for investment. South Asia is also one of the regions receiving official development assistance for fulfilling various objectives which includes socio-economic and political objectives. It should be emphasized that the correlation between GDP growth rates is positively correlated with FDI and foreign aid in South Asian countries Pravakar Sahoo (2006), Dimitrios Asteriou (2008). Since Human capital and economic infrastructure development are the crucial factors among the determinants of FDI and these countries have been receiving official development assistance for human and infrastructure development, we assume that there is a possibility to be coordination between official development assistance and FDI in this region. However, the official development assistance in this region is highly volatile and instability may likely to make environment of FDI to be instable. On the other hand, receiving assistance in the shape of physical capital may likely to impact on the physical capital formation by FDI in this region. At the same time foreign aid flow in the shape of human capital and infrastructure development likely encourage FDI in the region. Therefore, the interest of this study is to investigate whether or not, there is an association between two then, in which direction the capital flows effect on each other.

Data and Method

The data on official development assistance classified into seven categories in the data base of the Organization for Economic Co-operation and Development (OECD). But, we decompose into two broad categories according to the purpose of our study. The first category is physical capital development (AP) proxied by assistance for production sector while the second category is assistance for economic infrastructure, and human capital development (AS) proxied by assistance for multi sector /cross-cutting, commodity aid, action relating to debt and humanitarian aid. This study assumes that AP flows in the shape of physical capital development where as AS flows in the shape of infrastructure and human capital development. The data on FDI obtained from United Nations Conference on Trade and Development (UNCTAD). It

should be noted that in our study the sample size is relatively small, running from 1995 to 2007 because of the availability of sectoral data in the OECD data base and also, FDI started emerging after 1990s in South Asian countries. This study excludes Afghanistan, Bhutan and Maldives due to the dependency on Aid and FDI. Method of data analysis of this study comprises three sections; 1) unit root analysis to test stationarity of the time series. 2) Co-integration analysis to investigate long run equilibrium between FDI and decomposed foreign aid and 3) Granger causality analysis for investigating bilateral causality of the variables.

Unit root tests

First, we employ Augmented Dickey –Fuller (ADF) test to investigate the stationary properties of the time series used in the study. The ADF test here consists of estimating the following regression.

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{j=1}^m \alpha_j \Delta Y_{t-j} + \varepsilon_t \quad (1)$$

Where, Δ is the first difference operator, m is lag, β_1 is constant, t denotes trend, δ and α are parameters and ε denotes stochastic error term. A series Y_t is said to be integrated of order d denoted by $Y_t \sim I(d)$ if it becomes stationary after differencing d times and this Y_t contains d unit roots. A series which is $I(0)$ is said to be stationary. We test stationary properties of the time series of FDI, AP and AS variables of each country. The null hypothesis is each time series has a unit root ($\delta=0$) and nonstationary. If $\delta=0$ is rejected for above equation, it can be concluded that the time series is stationary, means that it doesn't have a stationary properties. The lag levels are selected using the Schwarz Bayesian Criterion (SBIC). The table 1 shows unit root results of the variables AP, AS and FDI. The results reveal that the null hypothesis for the variables of FDI, AP and AS can be rejected under three categories. The time series of AP are stationary in levels, $I(0)$ in case of Nepal, Sri Lanka and Pakistan while are stationary in first difference, $I(1)$ in Bangladesh and India. Time series of AS are stationary in first difference, $I(1)$ in case of Bangladesh, Sri Lanka and India while it is stationary in levels, $I(0)$ in Pakistan and Nepal. When we look at the properties of FDI time series, which is stationary in second difference, $I(2)$ in case of India and Pakistan while are stationary in first difference, $I(1)$ in case of Bangladesh, Nepal and Sri Lanka.

Table 1. ADF Unit root results for AP, AS and FDI

Country	t-ADF in levels	t-ADF in difference	I(d)	t-ADF in levels	t-ADF in difference	I(d)	t-ADF In levels	t-ADF in difference	I(d)
	AP L	Δ AP L		AS L	Δ AS L		FDI	Δ FDI L	
Bangladesh	-1.484 [3]	-3.438 [0]	I(1)	-2.060 [1]	-3.541 [0]	I(1)	-2.529 (1)	-3.461 [0]	I(1)
Nepal	-4.345 [0]	-8.048 [0]	I(0)	-2.213 [0]	-5.354 [0]	I(1)	-3.586 (1)	-6.836 [0]	I(1)
Sri Lanka	-4.909 [0]	-6.243 [0]	I(0)	-2.060 [1]	-4.716 [0]	I(1)	-1.120 (1)	-4.036 [0]	I(1)
Pakistan	-5.920 [3]	-5.492 [0]	I(0)	-3.610 [0]	-6.096 [0]	I(0)	0.394 (1)	-3.921 [0]	I(2)
India	-1.388 [1]	-4.611 [0]	I(1)	-0.667 [1]	-5.377 [0]	I(1)	-0.439 (1)	-4.595 [0]	I(2)

Note: L denotes lag length. MacKinnon critical value is -3.000 at 5% level.

Table 2. Results of Cointegration analysis

Country	FDI -AP		Cointegration	FDI-AS		Cointegration
	t value	CV		t value	CV	
Bangladesh	-2.192	[-3.000]	No	-3.614	[-3.000]	Yes
Nepal	-3.929	[-3.000]	Yes	-4.093	[-3.000]	Yes
Sri Lanka	-3.880	[-3.000]	Yes	-4.205	[-3.000]	Yes
Pakistan	-4.029	[-3.000]	Yes	-2.590	[-3.000]	No
India	-2.801	[-3.000]	Yes	-3.327	[-3.000]	Yes

Note: CV denotes Mackinnon critical value at 5% level and the lag length for all variables is zero,(0)

Co-integration analysis

Next, we investigate long-run equilibrium relationship between FDI and AP, and FDI and SP. The Engle-Granger's residuals analysis obtained by regressing FDI on AP and FDI on SP is used to find long run equilibrium properties by hypothesizing that the residuals obtained by regression is stationary ,I(0) means that there is a co-integration between the variables. The co-integration results presented in table 2 ,suggest the null hypothesis that residuals is stationary can be rejected of the variables between FDI and AP in case of Bangladesh and can't be rejected in case of Pakistan, Nepal, Sri Lanka and India ,means that the variables are co-integrated. Therefore, there is a long run relationship between FDI and AP in case of four countries.

When we look at the results of the variables of FDI and AS, the null hypothesis can't be rejected in case of Bangladesh Nepal Sri Lanka and India, suggest that there is a long-run relationship between FDI and AS in these countries while not in case of Pakistan.

Granger Causality analysis

Having results of co-integration test of Bangladesh, Nepal, Sri Lanka, Pakistan and India, we are interested to investigate whether there is a bilateral causality between the variables. Since no evidence of cointegration between FDI and AP, and FDI and AS in case of Bangladesh and Pakistan respectively, these two relations are excluded from causality analysis. Since the variables which we use in this study have different stationary properties and as they are considered as endogenous variables entering the VAR model, in order to perform the Granger causality test, we have to ensure that all the variables included in the system are stationary (Granger, 1969, 1988). Therefore in this section of analysis the non-stationary variables are differenced to make them stationary. The Wald test, which follows the chi-square distribution, is computed to test the causal relationship among the variables based on the bilateral VAR framework. The optimal lag length is chosen based up on Schwarz criterion (SBIC). In order to perform the test; we consider the systems of equations as;

$$y_t = \alpha + \sum_{j=1}^k \delta_j y_{t-j} + \sum_{j=1}^k \beta_j x_{it-j} + \varepsilon_t \quad (2)$$

$$x_{it} = \alpha + \sum_{j=1}^k \delta_j x_{it-j} + \sum_{j=1}^k \beta_j y_{t-j} + u_t \quad (3)$$

Where y denotes FDI and x_i denotes AP and AS as we test causality analysis between FDI and AP, and FDI and AS individually. α is constant ,δ and β are parameters, k

denotes lag term ,and ε_t and u_t are error terms. In equation (2) the null hypothesis that x doesn't Granger cause y if $\beta_1 = \beta_2 = \dots \beta_k = 0$. Similarly in equation (3) y doesn't Granger cause x if $\delta_1 = \delta_2 = \dots \delta_k = 0$. The results in table 3 suggest that in Bangladesh, the null hypothesis can be rejected in both direction considering FDI and AS that there is a evidence of causality between FDI and AP in both directions . AP and AS Granger cause FDI in Nepal but not in reverse direction in both cases. There is an evidence of causation in Sri Lanka, running from FDI to AP and AS to FDI, but not in reverse directions in both cases. In case of Pakistan, FDI Granger causes AS, but not in reverse direction. In case of India, there is a bilateral causality between FDI and AP where as AS Granger causes FDI. Concluding this part of analysis, foreign aid flow in the shape of human and infrastructure development Granger cause FDI in all the countries, Pakistan is excluded from the analysis, and only in Bangladesh there is Granger causality in reverse direction. Foreign aid flow in the shape of physical capital development Granger causes FDI only in Nepal and India, but it should be

Table 3. Results of Granger causality analysis.

Country	Direction of Causality				Direction of causality			
		p-value	L	chi2		p-value	L	chi2
Bangladesh	AP → FDI	--		--	AS → FDI	0.000	[3]	78.12
	FDI → AP	--		--	FDI → AS	0.010	[3]	11.243
Nepal	AP → FDI	0.000	[3]	60.806	AS → FDI	0.000	[3]	22.077
	FDI → AP	0.313	[3]	4.8823	FDI → AS	0.126	[3]	5.7243
Sri Lanka	AP → FDI	0.554	[3]	2.0877	AS → FDI	0.000	[3]	84.416
	FDI → AP	0.000	[3]	192.1	FDI → AS	0.364	[3]	3.1818
Pakistan	AP → FDI	0.185	[3]	4.8228	AS → FDI	--		--
	FDI → AP	0.003	[3]	14.072	FDI → AS	--		--
India	AP → FDI	0.001	[3]	17.264	AS → FDI	0.001	[3]	44.136
	FDI → AP	0.000	[3]	19.925	FDI → AS	0.464	[3]	2.5639

Note: L denotes lag length. The conclusion of causality based upon low level of p value.

notified that the percentage share of foreign aid flow in the shape of physical capital is averagely 15% in total aid flow in Nepal where as it is averagely 38 % in India while those are 8%, 11% and 21% in Bangladesh, Pakistan and Sri Lanka respectively. So that, the argument that aid flow in the shape of physical capital may likely crowd out FDI is valuable only in case of India .However, as we have finding that FDI Granger causes aid for physical capital development in India, Pakistan and Sri Lanka, we can argue that FDI and aid for physical capital development could travel in same the direction supporting Elizabeth Asiedu et al (2009) arguments that aid mitigates risk of FDI.

Conclusion

In this study, we investigate the nexus between FDI and official development assistance for physical capital development, human capital and infrastructure development for a group of five South Asian countries. For these five countries we get results on cointegration and Granger causality analysis. In case of Bangladesh there is no evidence for cointegration between FDI and assistance for physical capital

development whilst FDI and assistance for human capital and infrastructure development in Sri Lanka. In other countries, we found that there is a long-run relationship between the variables. Upon investigating the direction of causation, using Wald test, we found that assistance for physical capital development Granger causes FDI only in India and Nepal where as assistance for human capital and infrastructure development Granger causes FDI in all the countries. When we look at the reverse direction FDI Granger causes assistance for physical capital development in Sri Lanka, Pakistan and Indian while FDI Granger causes assistance for human capital and infrastructure development only in Bangladesh and Pakistan. Conclusively, our findings suggest that flow of official development assistance on human capital and infrastructure development encourage foreign direct investment in South Asian countries. Findings on FDI Granger causes aid flow on physical capital development direct us to conclude that both could travel same track rather than crowding out each other. However, more analysis is needed to find the relationship between FDI and aid flow in the shape of physical capital development in case of India, Pakistan and Sri Lanka. Arguments that assistance on physical capital development crowds out FDI is weak in case of South Asian countries as only two countries have this situation.

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