Volume: 3, Issue: 2
Page: 138-145
2019

ISSN 2520-4750 (Online) & ISSN 2521-3040 (Print)

International Journal of Science and Business

The Impact of Foreign Aid in Economic Growth: An Econometric Analysis of Bangladesh

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Abstract:

Foreign aid is one of the most important policy tools that rich countries use for helping poor countries to improve population well-being and facilitate economic and institutional development. Bangladesh shows much dependency on the developed countries like as foreign aid. We have a great contribution of foreign aid in our GDP. The empirical evidence on its benefits is mixed and has generated much controversy. This paper estimates six separate models by investigating the 20 years data for 1996-97 to 2015-16 periods in Bangladesh which shows that foreign aid to very poor countries accounts for very little of total global aid; reviews the evidence that foreign aid is often determined by the objectives of donor countries rather than the needs of the recipient countries; argues that the evidence on the impact of aggregate foreign aid is hindered by problems of measurement and identification, which are partly due to the different nature of aid. Application of this study is to identify the role of foreign aid in our economy. This study takes an important role by giving information about the real growth of the economy of Bangladesh after taking foreign aid from foreign countries.

IJSB
Accepted 22 March 2019
Published 24 March 2019
DOI: 10.5281/zenodo.2604487

Keywords: Foreign aid, Effects, Satisfaction, Economic Growth, global aid, GDP, Bilateral, Multilateral

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1. Introduction

Since Bangladesh's independence in 1971, it is a foreign aid recipient country. It receives foreign assistance mainly to finance the budget or trade deficit and the annual development program (ADP) over the period of time. Bangladesh also gets external assistance in form of food and commodity aid for various purposes in different years from the donor's country. Mainly Bangladesh take foreign aid for the development of the country, to overcome the various natural disasters such as flood, famine, cyclones etc. Over the period of time, this is a topic of intense debate that, whether the foreign aid has any positive effect on the economic development of the recipient countries. Such donations can be made for a humanitarian, altruistic purpose, or to advance the national interests of the giving nation. Aid can be between two (bilateral) or many (multilateral) countries/institutions. Bilateral aid is usually tied aid (conditional aid) is when recipients must purchase products/ services from the donor country. Multilateral aid is usually untied aid that can be spent in any sector of the recipient country. The aim of this paper is to know the conceptual side of foreign aids and development, to identify the foreign roles in economic sector of Bangladesh.

2. The Argument of Foreign Assistance

The role of foreign capital is significant in the process of economic development of many developing countries like Bangladesh. In 1950s, foreign assistance started to achieve rapid economic growth. As a result, foreign assistance would be the first criteria for the economic growth. But there was an unsatisfactory result of economic growth. There is a controversy between several economists. Somebody support foreign assistance for economic growth and somebody don't support and they clear about the foreign borrowing.

A review of the existing literature indicates two easily identifiable views.

i. The traditional pro-aid view and
ii. The radical anti-aid view.

The **traditional view** shows the significant beneficial effects on the recipient countries. It is argued that foreign capital not only complements domestic resources of the capital-deficient countries, but also helps to relieve. It helps to access modern technology and managerial skills in the recipient countries. But the economic growth of recipient countries over the last four decades does not show the conventional wisdom. Unfortunately, there is a negative experience of foreign capital flows.

The **radical anti-aid view shows the negative effect of foreign aid.** It occurs import inappropriate technology, distorts domestic income distribution and makes a corrupt government in those recipient countries.

3. The Theoretical Framework

The theoretical model is derived from the supply side of the economy which is outlined as below (Anisul M. Islam, February 1992). There are some behavioral equations.

$Y = f(K, L)$ ..... (1)

$f_1 > 0;\ f_2 > 0;\ f_{12} < 0;\ f_{22} < 0$ ..... (2)

Equation (1) depicts the aggregate production function for a country involving capital stock (K) and the available labor supply (L) as two inputs.

Where, Y stands for real gross domestic product (GDP). The usual regularity conditions are specified in equation (2) to ensure that the production function is well behaved.

Totally differentiating equation (1) and dividing both sides by Y. Rearranging terms and assuming (dk/dt=l). Where I stands for domestic capital formation (investment).

$$GR = a + b\left(\frac{I}{Y}\right) + c(GL) \quad \text{.....(3)}$$

Where,

GR stands for the annual rate of growth of real GDP, ***a*** is the intercept term representing the effect of excluded variables including technological change. ***I/Y*** stands for the investment-GDP ratio. ***GL*** stands for the annual rate of growth of the labor force. The coefficient of ***b*** measures the marginal productivity of investment and the coefficient of ***GL***, ***c*** reflects the share of labor in the GDP.

Since data on ***GL*** is not available for Bangladesh. So, Population growth rate is used as a proxy variable for it. A similar approach has been taken by other researchers in the field (Gupta and Islam. 1983; Ram.. 1986).

Here, replacing ***GL*** by population growth rate ***(PG)*** and designating ***(I/Y)*** as simply ***I Y*** and adding a stochastic error term (U_i), gives

$$GR = a + b(IY) + c(PG) + u_i \quad \text{.....(4.1)}$$

After taking difference of the independent variables to show the effect on dependent variable, the model will be:

$$GR = a + b(\Delta IY) + c(\Delta PG) + u_i \quad \text{.....(4.2)}$$

This is the final equation which will be subjected to econometric estimation. Several other versions of equation (4) will also be estimated based on disaggregating the ***Y*** variable into its specific components such as investment arising from domestic sources and those arising from foreign sources.

Here, Investment from domestic sources can be proxies by the domestic savings-GDP ratio ***(SY)*** and foreign investment can be reflected by the total amount of foreign aid disbursed to GDP ratio ***(AIDDY).***

Modified equation:

$$GR = d + e(SY) + f(AIDDY) + g(PG) + u_i \quad \text{.....(5.1)}$$

After taking difference of the independent variables to show the effect on dependent variable, the model will be:

$$GR = d + e(\Delta SY) + f(\Delta AIDDY) + g(\Delta PG) + u_i \quad \text{.....(5.2)}$$

Where, u_i is the stochastic error term. Here, foreign private investment is ignored because Bangladesh has received only a negligible amount of it since her independence.

Total aid disbursed as a proportion of GDP ***(AIDDY)*** can be decomposed further into grants as a proportion of GDP ***(GRNTDY)*** and loans disbursed as a proportion of GDP ***(LOANDY)*** in order to quantify their separate effects on ***GR***.

Modified equation:

$$GR = h + i(SY) + j(GRNTDY) + k(LOANDY) + I(PG) + u_i \quad \text{.....(6.1)}$$

After taking difference of the independent variables to show the effect on dependent variable, the model will be:

$$GR = h + i(\Delta SY) + j(\Delta GRNTDY) + k(\Delta LOANDY) + I(\Delta PG) + u_i \quad \text{.....(6.2)}$$

Where, u_i is the stochastic error term.

4. Methodology

Annual time series data covering the period 1996-97 to 2015-16 were used in this study. Data formation was a major task in this project because of the non-availability of a consistent and easily comparable data set. Data were collected from the publications by the Government of Bangladesh such as Ministry of Finance, The Bangladesh Bank, the World Bank, The IMF and the UN. Equations 4-6 provide the basis for the econometric estimation. Initially, these equations were estimated by the ordinary least squares (OLS) method. Then the residuals were tested for the presence of autocorrelation by applying the Durbin-Watson test. This test shows that there is a small presence of autocorrelation in the residuals. Therefore, OLS estimates were used for the interpretation of the empirical results.

5. Regression results on foreign aid and growth rate

Table 1: Ordinary least square result of six regression models

	Regression equation	R^2	F	D.W	N
4.1	$-0.677+0.192IY+0.968PG$ $(-0.440)\ (4.444)\quad (1.968)$	0.549	10.344	1.837	20
4.2	$5.754+0.303\Delta IY+0.721\Delta PG$ $(0.258)\ (0.417)\quad (0.818)$	0.103	0.922	0.984	19
5.1	$-1.129+0.275SY+0.040AIDDY+0.793PG$ $(-0.337)\ (2.154)\quad (0.238)\qquad (1.689)$	0.565	6.924	1.925	20
5.2	$5.820+0.285\Delta SY+0.209\Delta AIDDY+1.136\Delta PG$ $(0212)\quad (0.244)\quad (0.287)\qquad (0.861)$	0.170	1.021	1.098	19
6.1	$-1.819+0.314SY+0.479GRNTDY-0.335LOANDY+0.906PG$ $(-0.566)\ (2.538)\quad (1.540)\qquad (-1.203)\qquad (1.890)$	0.632	6.427	1.928	20
62	$5.809+0.375\Delta SY+0.682\Delta GRNTDY-0.174\Delta LOANDY+0.817\Delta PG$ $(0.205)\ (0.245)\quad (0.437)\qquad (0.389)\qquad (0.864)$	0.272	1.310	1.373	19

Source: Author's own calculation with the help of Stata/SE 12.0 software

Here, the above equations suffer from simultaneous equations bias because some explanatory variables may not be truly exogenous. In order to minimize this problem, we have also estimated the above three equations after replacing the current values of the explanatory variables by their lagged values. These equations were again estimated by the OLS method

and tested for autocorrelation. The Durbin-Watson tests do not show any significant autocorrelation in the residuals. Therefore, the OLS estimates were used for further analysis. Thus, each one of the above six equations has two regression estimates, one using current values of the explanatory variables and the other using their lagged values. From the six estimated equations (Table 1) indicates that the performance of some of the equations was not very satisfactory. This judgment is calculated on the basis of R^2 values, F values, and the sign and -magnitude of the regression coefficients.

The unsatisfactory equations, shown in Table 1, include Equation 4.2 with lagged regressors', 5.2 with lagged regressor's, and 6.2 with lagged regressor's. Poor performance of **Equations 4.1** (the presence of some collinearity between IY and PG (simple correlation coefficient (r = -0.72)), **5.1** (the presence of some collinearity between SY and AIDDY, SY and PG), **6.1** (the presence of some collinearity between SY and GRNTDY, SY and LOANDY, SY and PG), **6.2** (the presence of some collinearity between GRNTDY (-1) and PG (-1)).

The satisfactory results were obtained from the remaining estimates.
These include Equation 4.1 (R^2=0.549 and F=10.344), Equation 5.1 with current regressors (R^2 =0.565, F=6.924), Equation 6.1 (R^2 =0.632 and F = 6.427). The F values indicate that overall regressions were statistically significant and it is to be noted that the R^2 values were not very high but can be considered as reasonably acceptable while keeping in mind that a substantial proportion of the variation of the dependent variable could not be explained by the included regressors. Focusing on the issue of the relative contribution of domestic vis-a-vis foreign resources in promoting economic growth. It appears that domestic resources as proxies by ***SY*** performs better than foreign resources. In most regressions, the savings ratio came out with positive and statistically significant (at 5% level) coefficients. Similar results were obtained in other studies as well (Weisskoff, 1972; Papanek. 1973; Gupta and Islam, 1983). The aggregate aid ratio ***(AIDDY)*** is not statistically significant. This insignificance may be caused by the aggregation of different kinds of foreign aid into one single category. However its decomposition into grants ***(GRNTDY)*** and loans ***(LOANDY)*** doesn't improve the regression results significantly. In our country, ***GRNTS*** are more effective than ***LOAN***s. Since grants are not to be repaid, it is possible that the government authorities may have allowed various administrative slacks and perhaps tolerated a greater degree of corruption in its utilization.

6. Foreign Aid and Economic Growth

The graphical representation of Foreign aid and Economic growth is given below-

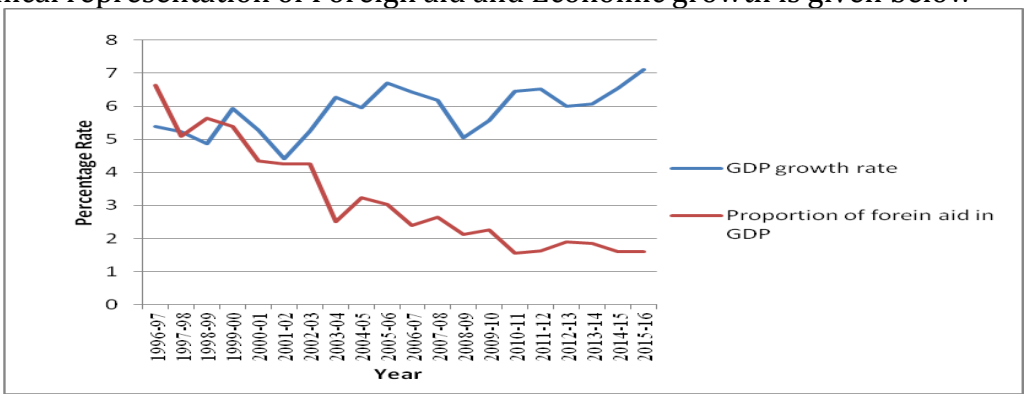

Fig. 1: Graphical representation of Foreign aid and Economic growth from 1996-97 to 2015-16

Here, the X-axis represents year and Y-axis represents percentage rate. The aim of this graph is to show the relationship between GDP growth rate and proportion of foreign aid in GDP. From this graph we can see that our GDP growth rate always fluctuates and the proportion of foreign aid in GDP has been declined from before. At the very first, the contribution of foreign aid was very high. With the change of time this proportion has been declined because we have a stable economic structure than before. In 2015-16 fiscal year the GDP growth rate is 7.2% and the proportion of foreign aid has a less contribution on the total economic growth of Bangladesh. At present, the contribution of foreign aid in Bangladesh is 1.6%.

7. Limitations of Foreign Aid

There are some limitations have found when this study have been done. Bangladesh depends on the donor countries which can bring a negative sign for our economy. We know in or country every sector of the economy faces a problem named corruption. For collecting foreign aid, this country have to take this risk. For this reason country can't utilize the getting amount as foreign aid. Political harassment is also an important obstacle for the improvement of our economy. There have many types of hidden agenda of foreign owned corporations with donor countries like Bangladesh. For this reason, we can't use the foreign aid properly.

8. Recommendations

Some recommendations have been identified to reduce or remove the limitations. We know Bangladesh is a developing country and we hope that it will be a developed country one day. To be a developed country it has to reduce the dependency on foreign assistance. So, government and policy makers have to take important policy to reduce the dependency on the foreign countries for the purpose of foreign aid. Because of our country's corruption, the total aid doesn't reached properly to those who really need this. This corruption should be minimized and the aid should be properly distributed. At the same time political harassment must be stopped.

9. Conclusion

Foreign aid positively affects in some countries and also has a negatives affects. In the early of Bangladesh's liberation, foreign aid had a great contribution in our Gross Domestic Product. But from the year 1996-1997, the contribution of foreign aid is decreasing gradually only because of more innovative and infrastructure development, increasing literacy rate, increasing labor skills. At present, there is a just 1.6% foreign aid contribution in our GDP which is so small amount regarding our large GDP. In our country, foreign countries want to give aid as loan, not as grant. We need more grant amount which is useful for our economy. We need more multilateral amount as foreign aid because there is no extra condition to use this amount in our country. Our government should take necessary steps and be more punctual communicating with developed countries.

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Appendix-

Table: Data on dependent, independent variables and difference of the independent variables from 1996-97 to 2015-16 of the above six models

Year	GR	IY	PG	SY	AIDDY	GRNTDY	LOANDY	ΔIY	ΔPG	ΔSY	ΔAIDDY	ΔGRNTDY	ΔLOANDY
1996-97	5.39	20.72	1.8	15.9	6.6444	3.302	3.3424						
1997-98	5.23	20.63	1.78	17.41	5.086	2.045	3.041	-0.09	-0.02	1.51	-1.5584	-1.257	-0.3014
1998-99	4.87	22.19	1.69	17.71	5.6351	2.4544	3.1808	1.56	-0.09	0.3	0.5491	0.4094	0.1398
1999-00	5.94	23.02	1.64	17.88	5.3986	2.4681	2.9305	0.83	-0.05	0.17	-0.2365	0.0137	-0.2503
2000-01	5.27	23.09	1.59	18	4.3519	1.6022	2.7498	0.07	-0.05	0.12	-1.0467	-0.8659	-0.1807
2001-02	4.42	23.15	1.59	18.16	4.2542	1.4131	2.8411	0.06	0	0.16	-0.0977	-0.1891	0.0913
2002-03	5.26	23.41	1.59	18.63	4.2502	1.3676	2.8826	0.26	0	0.47	-0.004	-0.0455	0.0415
2003-04	6.27	24.02	2.06	19.53	2.5005	0.8182	1.6823	0.61	0.47	0.9	-1.7497	-0.5494	-1.2003
2004-05	5.96	24.53	2.08	20.01	3.2352	0.5305	2.7047	0.51	0.02	0.48	0.7347	-0.2877	1.0224
2005-06	6.71	24.97	2.09	20.26	3.0369	0.9703	2.0665	0.44	0.01	0.25	-0.1983	0.4398	-0.6382
2006-07	6.43	25.52	2.09	20.29	2.391	0.8649	1.5246	0.55	0	0.03	-0.6459	-0.1054	-0.5419
2007-08	6.19	25.82	2.06	20.34	2.6423	0.8436	1.7987	0.3	-0.03	0.05	0.2513	-0.0213	0.2741

2008-09	5.05	26.19	2.02	20.39	2.1114	0.7522	1.3603	0.37	-0.04	0.05	-0.5309	-0.0914	-0.4384
2009-10	5.57	26.23	1.29	20.86	2.2516	0.6458	1.6059	0.04	-0.73	0.47	0.1402	-0.1064	0.2456
2010-11	6.46	27.39	1.55	20.7	1.5639	0.6557	0.9082	1.16	0.26	-0.16	-0.6877	0.0099	-0.6977
2011-12	6.52	28.26	1.57	21.22	1.6239	0.4491	1.1748	0.87	0.02	0.52	0.06	-0.2066	0.2666
2012-13	6.01	28.39	1.58	22.04	1.8898	0.4881	1.4017	0.13	0.01	0.82	0.2659	0.039	0.2269
2013-14	6.06	28.58	1.59	22.09	1.8499	0.4085	1.442	0.19	0.01	0.05	-0.0399	-0.0796	0.0403
2014-15	6.55	28.86	1.6	22.16	1.6106	0.2962	1.3144	0.28	0.01	0.07	-0.2393	-0.1123	-0.1276
2015-16	7.11	29.65	1.6	24.98	1.6047	0.254	1.3507	0.79	0	2.82	-0.0059	-0.0422	0.0363

Source: Bangladesh Bureau of Statistics (1996-97 to 2015-16), Bangladesh Economic Review (2000-01 to 2015-16), IMF, (2005). World economic outlook and differences are author's own calculation

Cite this article:

Sen, B. R., Islam, T., Nahar, A. & Dewan, M. F. (2019). The Impact of Foreign Aid in Economic Growth: An Econometric Analysis of Bangladesh. ***International Journal of Science and Business,*** *3(2), 138-145*. doi: https://doi.org/10.5281/zenodo.2604487

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