The Paradox of Foreign Loans and Grants: An Econometric Analysis in the Perspective of Bangladesh

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Abstract: *This paper investigates one of the highly debated arguments of whether foreign loans or foreign grants have significant impact on the economic progression of developing countries that are receiving huge amounts of foreign aid. To explore this, we have conducted an empirical investigation using a time-series analysis of foreign loans and grants for Bangladesh from 1980 to 2016.We find that foreign loans have more significant impact on the economic growth of Bangladesh (measured by per capita GDP) in the long run while foreign grants do not have such significant contribution. We measured the short run and long run elasticity by corroborating previous literature focusing on time series data. We also find invaluable importance of the presence of good governance and robust strategic policy actions to capture the highest utility from the inflow of foreign aid. This study also concludes that Bangladesh benefits highly from the foreign loans but not from foreign grants. We suggest that Bangladesh government should be strategic in maintaining bilateral and multilateral relationship with the donor agencies and countries in the coming days specially focusing on the achievement of Sustainable Development Goals (SDGs). Finally, the study proposed some policy recommendations regarding the use of foreign aid.*

Keywords: *Foreign Loans, Grants, Bangladesh, Sustainable Development Goals Econometric analysis*

JEL Classification Code: *F35, F43, O53*

1. Introduction

The debate of whether foreign loan or foreign grant is more impactful towards the economic development of the developing countries is not new; rather the area has gathered momentum after an upsurge in research regarding the effectiveness of foreign aid in economic development in the early 1960s. Many economists were saying that foreign loans are not good rather is a trap of debt for the developing countries. On the contrary, the supporters of loans were pointing to some astounding results such as loans

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are utilized in countries having better policy and good governance as well as it promotes growth in the overall institutional environment while grants can not do so (Djankov et. al. 2004). The proponents of loans also point to the fact that grants are only used up in the national consumption while has no utilization on investment.

There has been a number of clear evidence that countries receiving the foreign aid, generally view loans as different from grants in the sense that loans carry with them the heavy burden of repayment. Loans restrict the policy makers to use their funds wisely, putting a more serious emphasize on the mobilization of tax collection and a stable growth in the internal revenue sources as because the repayment has to be made from these internal sources. In contrast, grants are seen as much freer to use resources and can be thought of as a very good substitute for the domestic revenue. If the conditions of the loans were not restrictive then the policy makers would think it as almost an equivalent of grants. If any country has to accept excessive level of lending from the donor agencies or nations then that particular country has to bear an excessive amount of debt. This constant accumulation of debt may not be feasible in the long run economic stability and economic growth. So far to the best of our knowledge, the area of foreign loans and grants has remained absent from empirical econometric research in the context of Bangladesh. This research gap has inspired the authors to develop a paper that will contribute to bridge this research gap.

The research question of this study is to figure out which form of foreign aid- foreign loans or foreign grants, is more effective in the long-run sustained economic development of Bangladesh. To do so, this paper has undertaken a rigorous econometric analysis of empirical data of Bangladesh from 1980 to 2016. As there has been mixed results in earlier works done in different country settings, this paper will clarify the riddle in the Bangladeshi context by both short run and long run elasticity estimation of the effects of foreign loans and grants.

This paper contributes in the foreign aid literature in several ways: First, in the case of Bangladesh there is dearth of econometric analysis regarding the effectiveness of foreign loan or grant independently to observe their effect on the economic growth. Yet many qualitative papers are published regarding the effect of foreign aid and economic development but hardly any research was attempted before this to show individually the effect of each element of foreign aid that is foreign loan and grant in the context of Bangladesh. Second, this paper attempts to go for a reality check regarding the long-heated debate of whether the foreign aid should be in the form of loans or grants. Especially for the Bangladeshi perspective, the effectiveness of loan or grant will be observed through rigorous econometric models. Third, this study enriches the existing literature of foreign donation nexus growth. The outcome of this paper helps the various policy makers to develop concrete and clear decisions regarding the impact of foreign loans and grants on growth and overall macroeconomic operation in Bangladesh.

The study is organized as follows: Section 2 focuses on a critical analysis regarding literatures on both theoretical and empirical studies regarding foreign loans and grants; Section 3 presents the research methods that includes the research models and data sources used in this study. Section 4 analyzes the data collected from secondary sources using ordinary least square (OLS) method and an econometric model of short and long run elasticity of foreign loans and grants nexus economic growth is accomplished. Section 5 concludes the study by suggesting policy recommendations for the government of Bangladesh on which type of foreign aid is to be capitalized for the sustained economic growth of the country.

2. Literature Review

The empirical literature can be divided into two points of discussions. Some of the authors have found that there is a positive impact in the development of the economy while others show that there has been a major negative impact in the economy due to some policy failures. Empirically, the nexus between loans and grants and economic growth is, at times, found to be positive by several authors (Hansen, 2001; Levy, 1988; Lensink, 1993; Papanek, 1973). On the other hand, interestingly many studies from different authors have found no existence of relationship between these variables at all (Boone, 1994; Mosley et. al., 1987). Mosley, et al., (1987) studied this foreign aid and growth relationship pattern where they found negative results. Burnside and Dollar (2000) after observing the foreign aid growth pattern of developing countries concluded that depending on the policy environment of the government, foreign aid causes growth. This work got a momentum after it was circulated as a World Bank Research Department working paper during mid-1990s. From then the effectiveness of development foreign aid has been a well-researched area. On a different angle, Collier and Dehn (2001) modified the study of Burnside and Dollar's (2000) by incorporating export price shocks. The result showed a significant reverse that is negative relationship between the negative export shocks and the growth. His paper demonstrated that the adverse effects due to those negative shocks could be overcome by an increase in the foreign aid. Therefore, their suggestion is to target foreign aid towards countries having negative experiences of shocks as this has resulted to be more effective than towards good-policy countries. Jacquet (2004) shows that many European donors prefer loans because this increases the responsibility on part of the recipient country to repay the already taken loans. On the opposite note, Lerrick and Meltzer (2002) think that the debt service-related incentives are to be ignored and the only strategy for the developing nations should be to have grants not loans.

Odedokun (2004) attempted analysis of the grants vs. loan debate using panel data of 17 countries that are member of the Development Assistance Committee (DAC) from the period of 1970 to 1999. The paper tried to show the differences in the temporal and cross-

donor mix of the loans and grants issue that was observed in the member countries past foreign aid allocation data. The paper also showed that there is a shift towards grants from loans because the shift does not affect the disbursable resources in the future. In the concluding part of the paper a new loan financing architecture was suggested where concessional loans were separated into two parts. One was pure grants and the other one was non-concessional loans. The donors must also focus the electoral cycle in the borrowing nation so that the borrowing regime could not become the spending regime of the receiving country. Clements et al., (2004) investigate why there has been a new shift towards the grants from loans. They showed that the grants are much more effective in the economic development if the institutions in the developing countries could be strengthened. They studied 107 countries over the periods of 1970-2000 to examine the effects of loans and grants on the domestic effort regarding revenue generation in the country. They also studied the effects of various institutions in the revenue raising process.

Radelet (2005) has taken this stance a one step further as he points that grants are superior to loans as they have something called the "Incentive Effects". In the question of the incentive effect of the grants and loans, Schmidt (1964) says that the proper allocation of a $5 billion is not conditional on whether it was found on the street or not but on the actual benefits that have been derived from its alternative uses. As Schmidt notes, "A rational government would be equally careful with loans and grants."

Hassan et al. (2005) found that there is no perfectly good or perfectly bad foreign loan that is outside of national policy. That leads to the conclusion that the national policy regarding the proper use of the loans can truly describe whether a particular loan was good or bad for the recipient country. They suggested that foreign loans must have been operating under some conditions, which are in the national interest. As the discussion has been going on regarding the effectiveness of foreign aid in the true economic development of a country, there has been mixed results. Duc (2006) has attempted to quantify the wide impacts of foreign loans and grants on the economic growth in developing countries through 1975 to 2000 using a cross-country data of 39 selected countries. His conclusion was that foreign aid has significant negative correlations with the economic growth in developing countries. This paper, however, for the first time in Bangladesh, will show in depth the effectiveness of foreign loans and grants in the economic development of Bangladesh.

3. Research Methodology and Data Sources

This research study followed a quantitative approach. Quantitative data that has been used are secondary data. It is regarded to be safer to use secondary data in this type of research as credible sources are available over the internet. Hakim (1982) showed also that secondary data are found to be more accurate and credible and leads to a huge time

saving on part of the researcher. Secondary data were collected from Ministry of planning of Bangladesh, Economic Relation Division (ERD) of Bangladesh and World Development Indicators (WDI). Time series data was collected from the period of 1980 to 2016 from the WDI and ERD. Foreign loans, grants and domestic investment are taken in US$ at the current prices as well as in current exchange rates.

3.1 Research Model

Most of the econometric models that are used in the measurement of the GDP growth with respect to the foreign aid is based on single equation. This paper will take the foreign aid-growth model developed by Mallik (2008). His model included foreign aid, domestic investment, trade openness as a proportion of GDP and per-capita real GDP. Mitra et al. (2015) used this model and got significantly good outcome. However, as this paper will take the contribution of loans and grants differently and so the model developed by Mallik (2008) is not directly applicable. Therefore, the model has been changed as the foreign aid variable is replaced by foreign loans and foreign grants respectively. The nonlinear form of the model is given as follows in the equation (1):

$$\text{PGDP}_t = \alpha_0 \text{FLOAN}_t^{\beta_1} \text{FGRANT}_t^{\beta_2} \text{OPN}_t^{\beta_3} \text{INV}_t^{\beta_4} e_t^{\varepsilon} \tag{1}$$

Where, α_0= Constant term; β_1= Elasticity of GDP per capita with respect to foreign loans; β_2= Elasticity of GDP per capita with respect to foreign grants; β_3 = Elasticity of GDP per capita with respect to trade openness; β_4= Elasticity of GDP per capita with respect to domestic investment and $\varepsilon = $ Random Error Term

As the above model is in non-linear form, to make it linear the logarithmic transformation is used as follows in the equation (2)-

$$\ln \text{PGDP}_t = A_0 + \beta_1 \ln \text{FLOAN}_t + \beta_2 \ln \text{FGRANT}_t + \beta_3 \ln \text{OPN}_t + \beta_4 \ln \text{INV}_t + \varepsilon_t \tag{2}$$

Table 1 below shows the variables that are included in the econometric model set in this paper and show the data sources, explanation of the variables. GDP per capita is used as the dependent variable in this study as using this takes into account the population size of the country and is a comparatively better estimator of economic growth than other measures (Rajarshi et al. 2015).

Table 1: Variables Declaration and Their Sources

Variable	Description	Source
PGDP	GDP per capita	World Bank (WB)
FLOAN	Foreign loans in thousands of dollars	Economic Relations Division
FGRANT	Foreign grants in thousands of dollars	Economic Relations Division
OPN	Trade openness as proportion of GDP	World Bank (WB)
INV	Domestic investment in thousands of dollars	World Bank (WB)

Note that variables are taken in the log form so above-mentioned variables becomes lnPGDP, lnFLOAN, lnGRANT, lnOPN, lnINV respectively. Foreign loan is the total foreign loans disbursed into Bangladesh from different countries over the period of FY1980 to 2016. Foreign grant is the total foreign grants received by Bangladesh as ODA from different countries, and Domestic investment refers to the value of new and existing less disposed fixed assets, which are under govt. supervision and households and other businesses of Bangladesh. In order to measure the trade openness, the index has been constructed by taking the summation of exports and imports of Bangladesh and then dividing it by nominal GDP. (See Appendix 1)

4. Analysis of Results and Implications

Following sections include the results of this study and underlines the implications correspondingly.

4.1 Descriptive Statistics

In table 2, the descriptive statistics are provided with the standard deviation, mean, variance and other useful information regarding the data. It is observed that the maximum foreign loan received by the country was $ 3033,000 in 2015 while the maximum amount of grant received was$ 930,000 in the year 2016. The statistics regarding the domestic investment was maximum $ 65655.28 Thousand in the year 2016 while it was $2619.024 Thousand the lowest in 1980 and it shows that the domestic investment has increased substantially over the last decades. The trade openness ratio is showing the highest figure in 2011, which is 49.36% and it is a very promising thing to see that the overall trade with domestic and foreign companies is increasing significantly. Per capita GDP was maximum $1029.578 in 2016 which is indicating that Bangladesh is a least developed country but this figure is increasing rapidly and is expected to reach to the level very soon where she can be called a developing nation. Detailed data set is presented in Appendix 1.

Table 2: Descriptive Statistics

Variables	Mean	Std. Dev.	CV	Minimum (Year)	Maximum (Year)
FGRANT	650.6405	142.3390	0.351994	244.20 (2004)	930 (2016)
FLOAN	1144.562	648.4358	0.566536	534.70 (1983)	3033 (2015)
INV	16459.66	16240.76	0.218767	2619.024 (1980)	65655.28 (2016)
OPN	0.296789	0.103775	0.349658	0.170891 (1987)	0.493676 (2011)
PGDP	550.8635	193.9007	0.986700	351.3761 (1980)	1029.578 (2016)

Source: Authors' Calculation

4.2 Co-integration and Causality Analysis

There is a three steps process to figure out a significant relationship from the perspective of the different types of the variables selected in this study. In the first step, each variable is tested for existence of any unit root test. If there is any evidence that unit root is present, in the next step, long-run co-integration relation is tested among the variables. If any sort of relation is observed among the variables then VECM techniques is used to figure out the short run causal relation among those variables. In the third and final step the OLS technique is used for examining the long run relation among the variables.

4.2.2 Unit Root Test

In the presence of the stochastic trend, it is historically observed by econometricians that the usual process of running a regression analysis may result in unexpected misleading conclusions (Stock, 1988, Granger, 1974). Philips (1986) suggests that if any dependent variable and at a minimum one independent variable has a trend of stochastic along with the problem of not being co-integrated, the results obtained by running the regression will be spurious. Therefore, it is important for the study to be correct to go for finding out the so-called stochastic trend among the variables. For this reason, the ADF test is used to figure out the problem of stochastic trend within those variables.

Null Hypothesis (H_0): The series has a unit root that is it is non-stationary

Alternative Hypothesis (H_A): The series has no unit root that is it is stationary.

Decision Criteria: When the test statistic is found to be larger than that of critical value, then the assumed null hypothesis will be rejected.

Table 3: Summary T-Stat for Augmented Dickey-Fuller, Dickey-Fuller and Phillips-Perron Test

Variable	ADF Test			DF Test		PP Test		
	Case 1*	Case 2**	Case 3***	Case 1	Case 2	Case 1	Case 2	Case 3
lnPGDP	8.1429	0.8620	2.2127	-1.8323	-0.9472	8.0588	0.9024	5.7849
lnFLOAN	0.4333	-1.0127	2.07302	0.8594	-1.3689	-0.0764	-2.2928	1.8127
lnGRANT	-2.956	-2.9106	0.20043	-3.0124	-3.0081	-2.8801	-2.8329	0.4472
lnINV	1.4942	-3.4506	7.4223	2.1097	-2.9010	2.7170	-1.1228	9.4817
lnOPN	-0.6367	-2.755	-1.3247	-0.3870	-2.0703	-0.6556	-2.5414	-1.3065

*Case 1: Constant and Trend terms included in the equation;
**Case 2: Only Constant term is included in the equation;
***Case 3: Neither Constant nor Trend is included in the equation to test the unit root.

Source: Authors' Calculation

From the above result, we can say that some of the variables are stationary while most of the variables are not stationary. Therefore, we need to go for the first difference of the above-mentioned variables and the results are shown in the table below individually for each of the variables. Note that all the cases are now for only the Augmented Dickey-Fuller Test.

Table 4: Summary T-Stat and P-Value for Augmented Dickey-Fuller with Variables in First Difference

Variables	Unit Root Test in	Case 1	Case 2	Case 3	Remark
ΔlnPGDP	1st Difference	-1.122140 (0.0001)	-7.644626 (0.0000)	0.541537 (0.0000)	Stationary
ΔlnFLOAN	1st Difference	-9.190041 (0.0000)	-5.619771 (0.0003)	-8.565422 (0.0000)	Stationary
ΔlnGRANT	1st Difference	-7.108055 (0.0000)	-6.990516 (0.0000)	-7.213469 (0.0000)	Stationary
ΔlnINV	1st Difference	-5.530424 (0.0001)	-6.637919 (0.0000)	-3.179422 (0.0023)	Stationary
ΔlnOPN	1st Difference	-5.591688 (0.0000)	-5.481724 (0.0004)	-5.390283 (0.0000)	Stationary

Source: Authors' Calculation

From table 4 above, we can see that at their first differences all the included variables are found to be stationary. It is clearly observable from the table that included variables of the model have been integrated of order one I (1) as the null hypothesis is rejected for all the variables at a very high significant level. Nelson (1982) found that the macroeconomic data are integrated of order 1 and the above findings confirm this.

4.2.3 Lag Selection Criterion

In order to run the correct Co-integration, test it is important to get the correct lag length for the model. In the following table, we have summarized the five different lag selection models that are used for the proper lag selection of the model. From table 5 it is clearly

understandable that the best number of lags to select for this model is four. From the result we can see that based on the four criterions namely- LR, FPE (Final Prediction Error), AIC and HQ the appropriate lag selection is four. As four criterions suggest taking four lags for this model, we have selected to choose 4 lags for the next step.

Table 5: Var Lag Order Selection Criterion and Summary Statistics.

Lag	LogL	LR	FPE	AIC	SIC	HQ
0	44.43999	NA	6.76e-08	-2.319999	-2.095535	-2.243450
1	237.5354	318.0395	3.50e-12	-12.20797	-11.1003*	-11.74867
2	264.1005	35.94099	3.53e-12	-12.30003	-9.830917	-11.45799
3	291.2693	28.76691	4.12e-12	-12.42760	-8.836167	-11.20282
4	330.407	89.392*	2.6e-12*	-13.6611*	-8.89944	-12.0589*

* Represents lag order selected by the criterion.

4.2.4 Johansen Co-integration Test

In this step to check the Co-integration issue of the variables the widely used Johansen and Juselius's (1990) test is applied. In the literature, a good number of discussions is available regarding this test so only the equation that is used in this test is shown here with a small interpretation-

$$\Delta X_t = B_0 + \Pi X_{t-p} + \sum_{i=1}^{p} B \Delta X_{t-i} + \eta_t \qquad (3)$$

Here, X_t is a vector of external integrated of order 1 or, I (1) variables of the model, B_0 is a vector that consists of constant terms, B is simply a vector of coefficients, n_t is the vector of error terms (residuals), and finally p is the length of lag. It is to be mentioned here that all the variables are endogenous. In the earlier equation the length of lag to be used is finalized using AIC and other supporting criterions.

The test results are provided and analyzed in Table 6 that shows the summary of the findings with intercept and no trend model in the equation. The table has Trace statistics and Max-Eigen statistics recorded along with their respective critical values. From table 6 it can be seen that there exist two co-integrating equations at the 0.05 (5%) level of significance.

Table 6: Statistics of the Johansen and Juseliues's Test of Cointegration*

Hypothesized No. of Cointegrated Equation(s)	Trace Statistic	5% Critical Values	Max-Eigen Statistic	5% Critical Value
None *	90.67387*	69.81889	36.85924*	33.87687

At most 1 *	53.81462*	47.85613	28.67327*	27.58434
At most 2	25.14135	29.79707	13.86713	21.13162
At most 3	11.27422	15.49471	10.52504	14.26460
At most 4	0.749184	3.841466	0.749184	3.841466

4.2.5 Granger Causality Test

The co-integration relationship, which has been derived earlier from the Johansen test, shows the presence of a causal relation that exists within the selected variables. However, we cannot say the exact direction of this so-called causal relationship between the variables. In the next table, the result of running the Granger causality test has been summarized. One thing should be made clear here is that there are four steps towards the Granger-Causality test. First, to check for stationarity of data which has already been done earlier, second step to test for Co- integration which is done here using the popular Johansen test, third step is to test VECM model and then finally to go for the Granger-Causality test. As all the three prerequisites are completed, variables are now run for a Paired Granger-Causality and all the results are summarized in table 7.

Table 7: Pairwise Granger Causality Check

Null Hypothesis	F-Statistic	Prob.	Decision
lnFloan does not Granger Cause lnPGDP	0.62558	0.5418	Accept
lnPGDP does not Granger Cause lnFloan	3.11965	0.0588**	Reject
lnGrant does not Granger Cause lnPGDP	1.66599	0.2060	Accept
lnPGDP does not Granger Cause lnGrant	0.00434	0.9957	Accept
lnINV does not Granger Cause lnPGDP	5.15824	0.0119*	Reject
lnPGDP does not Granger Cause lnINV	0.67343	0.5175	Accept
lnOPN does not Granger Cause lnPGDP	3.78589	0.12293	Accept
lnPGDP does not Granger Cause lnOPN	0.12293	0.8848	Accept

(**) indicates significant at 10% level and (*) indicates significant at 5% level.

From the table the test results can be analyzed. No bi-directional relationship was found to be existing between the foreign loans and Per capita GDP while a unidirectional relationship was seen present as per capita GDP cause foreign loan inflows. In addition, there is no relationship found in between the foreign grants and per capita GDP but it was seen a unidirectional relation exists between domestic investment and per capita GDP growth. Trade openness has no relationship with the per capita GDP as per the Granger Causality test. Therefore, the findings indicate a short-term relationship between loan and per capita growth of national GDP, domestic investment and per capita GDP growth.

4.3 Long Run and Short Run Association Estimation

Ordinary least square method has been applied in this study in order to find out a more conclusive evidence of the impact of foreign loans and grants of per capita GDP growth of Bangladesh. Long run equation is estimated using the equation no. (2) And the short run elasticity is measured using the following equation (4):

$$\Delta \ln PGDP_t = \beta_1 \Delta \ln FLOAN_t + \beta_2 \Delta \ln FGRANT_t + \beta_3 \Delta \ln OPN_t + \beta_4 \Delta \ln INV_t + \lambda ECT_{it-1} + \varepsilon_t \qquad (4)$$

Where, ε_t represents the random error term, $\beta_1, \beta_2, \beta_3, \beta_4$ represents short run elasticity of per capita GDP with respect to FLOAN, FGRANT, OPN, INV respectively. The parameter λ represents the speed of adjustment of per capita GDP get to the equilibrium of long run from the short run.

Table 8: Long Run and Short Run Elasticities of the Model Along with Sensitivity Analysis

Dependent variable lnPGDP *Long-run Elasticities*	Coefficient	t-statistics	Probability
Constant	5.631522	12.03	0.000*
lnFLOAN	.14323	4.20	0.000*
lnFGRANT	.0273675	0.91	0.371
lnINV	.213625	7.45	0.000*
lnOPN	.6055775	3.05	0.005*
Dependent variable ΔlnPGDP *Short-run Elasticities*	**Coefficient**	**z-statistics**	**Probability**
ΔlnFLOAN	.2895071	0.54	0.587
ΔlnGRANT	-.2288701	-1.02	0.307
ΔlnINV	.2316342	0.31	0.757
ΔlnOPN	2.172463	1.86	0.063**
ΔlnPGDP	-.9237335	-0.19	0.846
ECT	-0.161363	-1.79	0.073**
Sensitivity Analysis	**The short run diagnostic test result**		
LM test for Autocorrelation	0.080254		0.8944
Breusch-Pagan-Godfrey	1.159774		0.3576
JB statisitcs of Normality	0.902122		0.6369
(*) denotes significant at 1% level and (**) denotes significant at 10% level.			

From the analysis represented in Table 8 above it is observed that in the long run the foreign loans are having positive association with the economic development of

Bangladesh and it is found to be statistically significant. For 100% increase in foreign loan, the per capita GDP increases by 14.32%. However, in the short run this elasticity is found to be positive but insignificant, meaning that the proper impact of taking foreign loans cannot be seen immediately rather we need to look towards a long-time horizon to experience the impact of foreign loans on the economic development of the country. Then looking at the elasticity of foreign grants, we see that it is completely the reverse. In the long run grants are having some positive effect towards the per capita GDP growth but the impact is insignificant and in the short run there is a negative impact. This result justifies the increased inflow of foreign loans rather grants in Bangladesh in the last decade. Domestic investment contributes positively towards the economic development in the long run as 100% increase will lead to 21.36% increase of per capita GDP but the short run effect is found to be positive but statistically insignificant. Trade openness has a positive and statistically significant impact in per capita GDP in both the short run and long run. In the long run 100% increase in trade openness ratio will lead to 60.56% increase in per capita GDP. This implies that in this era of globalization, trade openness is very significant towards the economic growth of any country and it is evident for Bangladesh from this study. The error correction term (ECT) is having a negative sign as expected and this is showing that the speed of adjustment from the short-term disequilibrium position to the long run equilibrium position of per capita GDP is nearly 16.14% within the first year and it is statistically significant.

4.4 Sensitivity Analysis

There was no evidence of serial correlation and heteroscedasticity in the model. The Jaraqa-Berra (JB) test statistics confirm the normality of the model. This model has not violated any assumptions of the classical linear regression models and thus based on the diagnostic test results it is concluded that the model is applicable in real world policy making. The following figure shows the cumulative sum and Cumulative sum of square test for the normality of the model. The results are showing the usual pattern that is observed in econometric analysis.
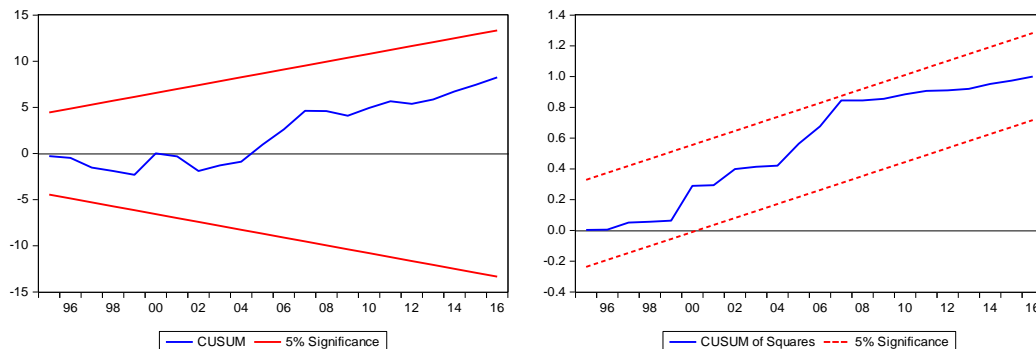
Figure 1: Cumulative Sum of Squares test for normality of the model

5. Conclusion and Policy Implications

The short run and long run equations suggested that foreign loans are statistically significant towards the economic development of Bangladesh but grants are statistically insignificant. In fact, in the short run, the foreign loans had a greater effect on per capita GDP indicating a relationship between them. In addition, the impact of trade openness and domestic investment used in the model was highly significant in the long run. Foreign loans that are coming in Bangladesh from different donor countries should be handled more carefully if the trend of long-term benefit observed here is to be continued in the near future. A new dimension of further inquiry to the effectiveness of foreign loans and grants in developing parts of the world should be introduced. Policy makers can use the results of this study as an important source of information for setting new decisions in future regarding the foreign aid mix. Bangladesh should focus on internal revenue sources while an increasing pattern of current trade openness ratio is expected. Domestic investments need greater scrutiny and the newly enacted National Industrial Policy (NIP) 2016 should be effectively implemented for developing a fruitful investment framework in Bangladesh. Meanwhile the govt. should take a cautious eye on loan pushing, as the amount of foreign loans that are coming into Bangladesh over the last decade is much higher in proportion than grants. A close eye on the loan pushing behavior of the donors will help to identify a potential debt trap in advance. Most importantly as the govt. of Bangladesh is committed towards achievement of Sustainable Development Goals (SDGs) as early as possible, the strategic plans blending a perfect mixture of foreign aid is necessary. Project foreign aid should be tailored to specific needs of the country so that the full utilization of the funds can be made possible.

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Appendix 1

Year	Per Capita GDP in $	Foreign Loan (in thousands of $)	Foreign Grant (in thousands of $)	Trade Openness Ratio	Domestic Investment (in thousands of $)
1980	351.376	552.8	593.7	0.21119	2619.023882
1981	366.666	585.8	653.8	0.19443	3473.990208
1982	364.538	589.9	587.5	0.19438	3216.616766
1983	368.694	534.7	733.7	0.18869	2916.540404
1984	376.208	566.1	703.3	0.1829	3118.96
1985	378.487	760.3	545.6	0.17793	3526.884615
1986	383.812	933.6	661.6	0.18059	3522.266667
1987	387.756	816.6	823.8	0.17089	3759.741935
1988	386.776	995.5	673	0.18023	4182.467846
1989	387.673	1043.7	765.9	0.1953	4639.87561
1990	399.484	901.1	831.5	0.1844	5200.668452
1991	403.754	794.2	817.3	0.1884	5230.560113
1992	416.181	856.8	818.3	0.20651	5487.229921
1993	426.309	848.6	710.1	0.22855	5952.339643
1994	433.412	849	890.1	0.2492	6214.29703
1995	445.919	766.3	677.5	0.30866	7254.002363
1996	456.238	745.2	736.1	0.25751	9626.674457
1997	466.773	748.5	502.8	0.26759	10525.08178
1998	480.869	866.7	669.3	0.27668	11057.29075
1999	493.255	861.9	726.1	0.2918	11649.37604
2000	509.293	864.7	504.1	0.30469	12706.57921
2001	525.072	963.4	478.8	0.31269	13052.02001
2002	535.247	1074.9	510.1	0.29075	13320.6164
2003	550.863	695	338.5	0.29832	14846.73575
2004	570.337	1244.2	244.2	0.31071	16271.81926
2005	598.617	1067.1	500.5	0.36073	17937.41463

2006	630.048	1040.4	590.2	0.39723	18776.48591
2007	666.401	1403.4	658.1	0.41556	20841.19582
2008	698.565	1189.5	657.8	0.45125	24009.47621
2009	725.766	1588.6	639.2	0.39455	26855.38846
2010	757.672	1031.6	745.1	0.41589	30256.90311
2011	797.412	1538.5	588	0.49368	35273.77492
2012	839.514	2084.7	726.3	0.48469	37689.44867
2013	879.582	2403.7	680.7	0.47252	42581.72021
2014	922.161	2561.8	630.5	0.45121	49406.99043
2015	971.642	3033	530.6	0.40699	56351.7717
2016	1029.58	2947	930	0.38389	65655.28327

Source: World Development Indicators, Economic Relations Division (ERD)

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