









Long Run and Short Run Relationship among Gross Domestic Saving, Net Bilateral Foreign Aid, External Debt and Economic Growth in Pakistan


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Abstract

This study attempt to establish the long run and short run association among Economic Growth, Foreign Aid, Domestic Saving and External Debt in case of Pakistan for the period of 1980 to 2014. This study uses Gross Domestic Product (GDP) as Dependent Variable followed by Foreign Aid, Domestic Saving and External Debt as explanatory variable. To find the long run and short run association amongst the variables, this study uses Autoregressive Distributive Lags Model (ARDL) and Error Correction Mechanism (ECM). The findings suggest that there exist negative relationship between economic growth and foreign Aid in the long run, while in short run this study found positive association. However, Domestic saving shows negative relationship in the short run while positive relationship with economic growth in the long run. Moreover, external debt displays negative relationship with economic growth equally in long and short run in case of Pakistan.


Keywords: Long run, Short run, External debt, Foreign aid, Domestic savings.


JEL Classification: E21, F35, H63, O4.

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1. Introduction

The theoretical link between foreign aid, external debt and their impacts on economic growth in developing countries is somehow controversial as per empirical literatures. In such case, in order to establish the link between external debt and economic growth according to Qayyum and Haider (2012) who follows some theoretical hypothesis which mainly includes; (i) Direct effect of debt hypothesis (DEDH) (ii) Liquidity constraint hypothesis (LCH) and (iii) Debt overhang hypothesis (DOH). The (DOH) hypothesis suggested that if countries having high existing debt rate then it will make people to rethink about future economic factors and most importantly about high tax rates, in this connection they don't want to increase their saving as well as investment to support economic growth. In addition empirical analysis on the basis of DOH summarize that high rate of external debt reduces investment ratio in country that leads to drop the rate of economic growth. On the other hand, if we look out the suggestion of LCH is that with high obligated of debt countries their debt payment services will be high and it will lead to reduce funds to fulfill investment gap because it makes debt payments services crowd out the rate of investment and makes the progress of economic growth. Finally, DOH suggested that high rates of debt can reduce the power of current capital that leads to decrease productivity of an economy (Qayyum and Haider, 2012).



Graph-1.1. Foreign Aid to Pakistan (1980-2014):

Source: The World Bank (2014)

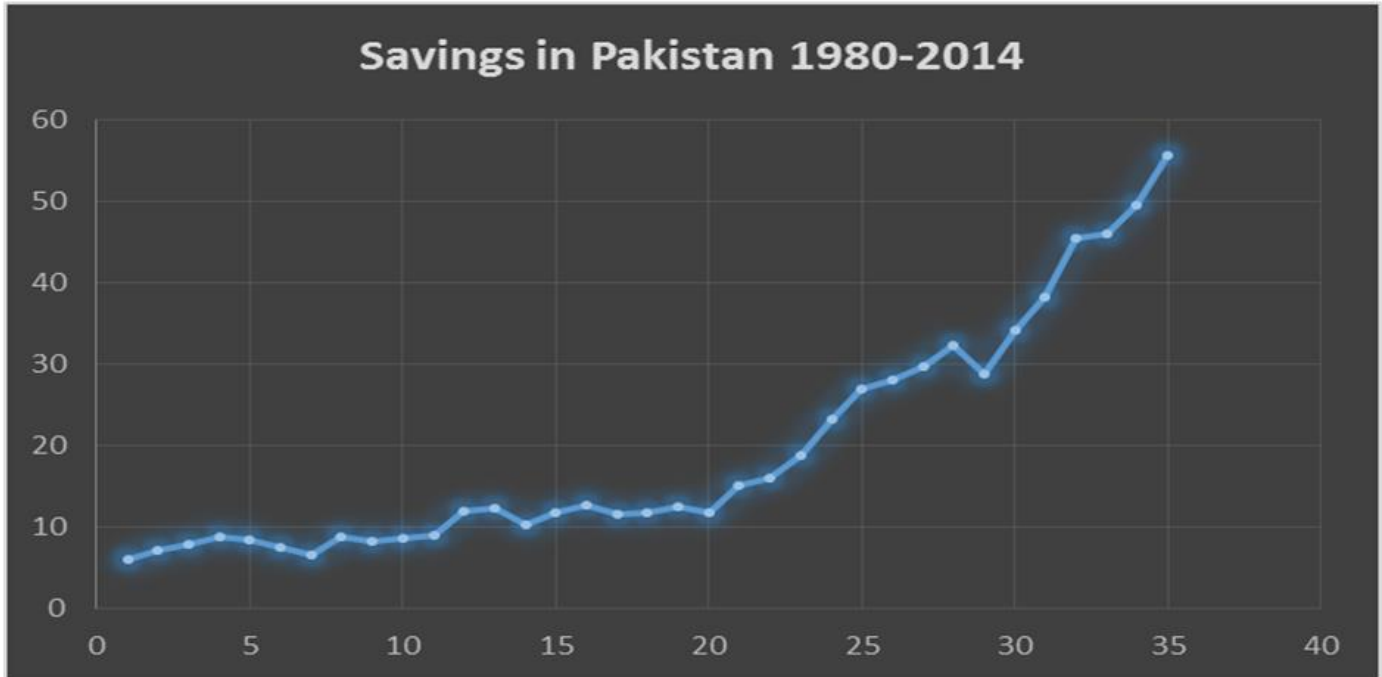
The given graph clearly demonstrate that Pakistan is receiving large amount of foreign aid and it shows an increasing since 1980 till 2014. Similarly, Developing countries receive foreign aid to fulfill different purposes domestically, but the prime objective is to create a bridge between domestic saving and investment to enhance production capacity which further leads to increase growth on an economy. Apart from this foreign aid also makes easy ways to utilize domestic resources properly to improve economic growth meaning that it makes domestic resources available according to the use in economic activities (Ahmad and Asghar, 2004).

Apart from this empirical analysis also found the positive and negative impacts of foreign aid on growth of an economy. Foreign aid works positively when county's having good macroeconomic policies and well performing government and private institutions, in such a case foreign aid provides verity of channels to stimulate investment climate for economic growth. If we look toward historical data analysis on foreign aid it has increased official development assistance to underpeopled countries most importantly after the attack of 9/11 on world trade center. Foreign aid also helps to increase the quality of governance in the country by reducing constraint of low tax revenues and creates possible opportunities for the government to boost up bureaucratic quality, reduction in corruption and better law and order by investing foreign aid.

The negative explanation of foreign aid to economic growth is based on current societies in which mostly government is not attempt to enhance the living standard of general public and they have authority to use such a foreign aid in nonproductive activities which also supports to enhance the level of corruption. Rather it will use to accelerate economic growth by investing in productive activities to enhance production capacity of economy. If government will invest in such activities which leads to better contrast between suppliers of foreign technology and domestic firms, then it can improve the quality of economic growth.

Some economists explored that there is positive association among foreign aid and economic growth. On the other hand, Keynesian's view of point explains that domestic saving highly dependent on yearly growth on an economy, and in such a case foreign aid promotes domestic saving (Sajid and Sarfraz, 2008).

If we give a glance towards some previous decades, then in Pakistan household saving was more than 80% and this rate of saving has contributed more in total saving, increment in rate of investment, accumulation of capital and growth of economy in Pakistan. See the structure of gross domestic saving in below graph.



Graph-1.2. Structure of Gross Domestic Saving in Pakistan 1980 to 2014.

Source: [The Global Economy \(2014\)](#)

In the context of Pakistan the dependency of gross domestic saving is not only one factor but also other many factors like Marginal propensity to saving of the country, per capita income, more liberalization of financing stability of macroeconomy and implementation of fiscal policies ([Jilani and Sheikh, 2013](#)). In addition the gross total investment has dropped because of insufficient ratio of gross domestic saving and this tendency has fell 17.7% investment rate in whole economy and also 14.7% in 2000-1. The rate of fixed investment also dropped to 16.26% see also ([Ahmad and Asghar, 2004](#)).

Further, the external dependency of financing of the Pakistan is unfortunate for economic growth, which did not support capital accumulation or saving rate in the long run as gross domestic saving supporting ([Khan and Ahmed, 2007](#)). In such a case Pakistan received in term of aid from many developed countries. Majority of aid received from USA and estimated 4\$ billion for training and services as well as 9\$ million to support election. To enhance the economic growth annually Pakistan received 8.647\$ million and also from 1980 to 2011 it received 11.740\$ for economic development ([The Associated Press of Pakistan, 2009](#)).



Graph-3. Structure of External Debt in Pakistan

Source: [TWB \(2014\)](#)

In current scenario Pakistan has borrowed a huge amount from different external sources including IMF. The borrowing of Pakistan is still continuing also from World Bank as well as developed countries. Apart from this if we see the IMF only it gives fund to some other countries on the basis of growth like Portugal, Malaysia and other some countries, but on the other hand it gives debts to the Pakistan on the basis of stabilization policies, in this connection Pakistan has to privatize their resources as the result there is huge burden on whole economy. So these are some technical issues which are primary causes of slow growth in Pakistan.

2. Review of Literature

There is extensive literature that explores the link between external debt, saving, foreign aid with growth of economies in wide range around the world. In most papers foreign and debt are linked in order to encounter the quality of good governance. But in this study little attempt has been done to see short and long run association between External debt, net bilateral foreign aid and economic growth for Pakistan.

2.1. External Debt and Economic Growth

As for as the link between foreign aid, external debt and domestic saving is concern, with permanent increase in foreign aid then in the long run consumption increase and the external debt decreases. But in the short run according to comparative static analysis reported that at the beginning the rate of investment is increases and the rate of external debt decreases whenever foreign aid increases. But in many studies it is found theoretically that the impact of external debt on domestic saving, rate of investment and especially on economic growth which is supported by [Collier and Dollar \(2004\)](#). These studies supported that debt servicing is a burden on economic growth and impacts negatively the production of capital as well as labor either labor intensive or capital intensive economies ([Qayyum and Haider, 2012](#)).

Likewise, in case of Kenya the external debt negatively affect private investment as well as economic growth because of this country has faced debt overhang problem. But in recent years' private investment is stimulated by debt and debt servicing have not negative impact on economic growth but in private investment it shows little crowding out effects ([Qayyum and Haider, 2012](#)).

2.2. Foreign Aid and Economic Growth

Most empirical and theoretical interpretation of aid on economic growth is analyzed by Overlapping Generation Model. According to this model long run production is mostly affected by foreign aid but direction and magnitude of this impact depends on how the country's policies are well, at what extent foreign aid inflows and how organizations of the country working. In recent era contradiction is not for the better policies and aid impacts on economic growth but the conflict and contradict exists in different results in literature and this made economists confused. Some economists suggested that government can increase their size through foreign aid but its impact to boost up investment and economic growth has failed. On the other hand, foreign aid has made unstable the political system in 1980s and in 1990s which leads to ineffectiveness of foreign aid in the current situation of institutions and now there are existing decreasing return to scale in the flows of aid. Some also found that timing of aid and magnitude have negative impact on domestic investment as well as on economic growth ([Qayyum and Haider, 2012](#)).

[Malik \(2010\)](#) explored the association between external debt and economic growth of Pakistan by taking time period of 1972 to 2005. Their methodology suggested that external debt has significant and negative effect on economic growth. The one of cause of the decline in economic growth is external debt. In addition, debt serving also have a negative and significant impact on economic growth in Pakistan because it increases, because return of debt to donors' countries created minimum opportunities for the growth of economy.

[Durbary et al. \(1998\)](#) have examined new evidences of impacts of foreign aid on economic growth by using Fischer-Easterly type of model on panel and cross sectional data. Their methodology found that the positive impact of foreign aid on economic growth is possible when there exist a sound macroeconomic environment or policies. It has also provided from their study that these results are varying according to level of income, geographical importance and level of aid allocation through aid effectiveness programs. [Sajid and Sarfraz \(2008\)](#) reported that is there causality between foreign aid and economics growth by using monthly data from 1973 to 2003. By using co-integration test he found that there exist long run bi-directional causality saving to economic growth and also positive association between saving and growth. [Basnet \(2013\)](#) examined the role of foreign aid on domestic saving and economic growth in the context of selected developing countries, like Pakistan, Bangladesh, Nepal, Sri Lanka by using simultaneous equation modelling for the time 1960 to 2008. Their methodology suggested that aid has positive and significant impact on economic growth.

3. Data, Model Specification and Research Methodology

To check the short as well as long run relationship between net bilateral aid, gross domestic saving and economics growth in Pakistan we took the data for the time period 1980 to 2014. We used world development indicator (WDI) as data source. For the empirical analysis this study has gone through autoregressive distributive lag Model (ARDL) to check both long run as well as short run relationship among variables. For the econometric analysis we developed a model as follow:

$$\ln GDP_T = \alpha_0 + \beta_1 \ln GDS_t + \beta_2 \ln NBA_t + \ln ED_t + \varepsilon_t$$

Where GDP is economic growth which is also dependent variable. GDS is Pakistan's gross domestic saving which is independent variable in above equation. NBA is Net bilateral foreign aid also independent variable finally ED is external debt as independent in equation. From the theoretical perspective, the effects of external debt, gross domestic saving and foreign aid is presented in introduction part of this study that how these variables are interacting with each other based on some hypothetical theories like Liquidity constraint hypothesis, Direct Effect of debt Hypothesis and Debt Overhang Hypothesis, which shows it theoretical linkages among these variables.

Autoregressive Distributive lag model is applied in this study on the basis of its some advantages which has introduced by [Pesaran and Shin \(1998\)](#). ARDL has applied in this study, because it can be used regardless of variable's stationarity properties from the sample as well as it also makes us enable to use inferences based on long run estimation. On the other hand, such an advantage is not possible in all those tests which can be applied to see long run association between variables. Another advantage to use ARDL is that it uses appropriate number of lags in the selected model to detention of data generating process, because it evaluates $(p+1)^K$ number of regression to get

maximum length of lags for the selected model, in which p is optimal lags and k is variable's number in a model. Finally, its advantage is that it gives robust estimated results for small sample size.

In addition, Error Correction Model for short run analysis has driven from ARDL going through simple linear transformation of equation 1, in this study which encounters long equilibrium without effecting long run equilibrium information. So the error correction model is written by ARDL equation is as follow.

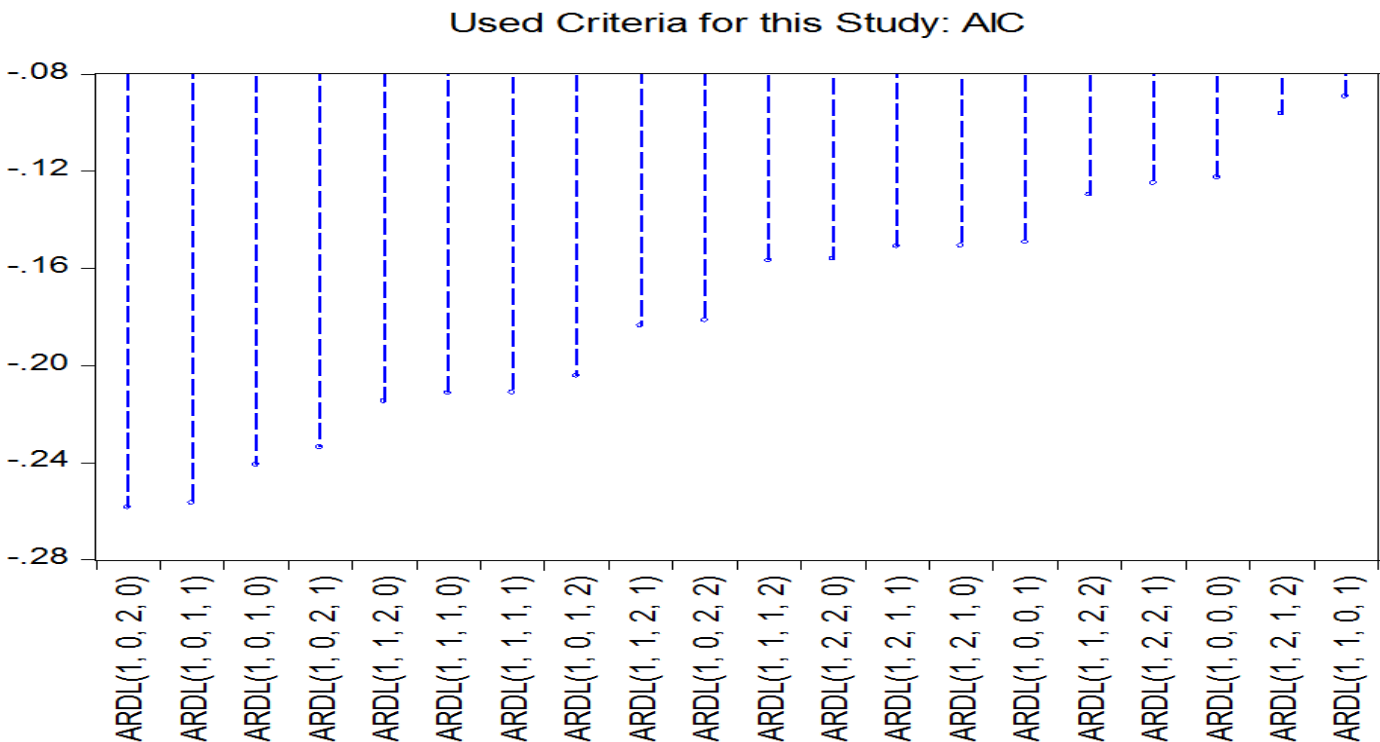
$$\Delta \ln GDP_t = \alpha_0 + \sum_{j=1}^{k1} e_j \Delta \ln GDP_{t-j} + \sum_{j=0}^{k2} f_j \Delta \ln GDS_{t-j} + \sum_{j=0}^{k3} g_j \Delta \ln NBA_{t-j} + \sum_{j=0}^{k4} h_j \Delta \ln ED_{t-j} + S_1 \ln GDP_{t-i} + S_2 \ln GDS_{t-i} + S_3 \ln NBA_{t-i} + S_4 \ln ED_{t-i} + \epsilon_t$$

Where all those variables with sign of summation are error correction terms in above model, on the other hand without summation sign variables are all long run terms. Now the null hypothesis is (H₀: S₁=S₂=S₃=S₄=0) this indicates there no long run association between variables and alternative is existence of long run association. This will be found if our F-stats is greater than critical value of bond testing then it will be concluded that there exist long run association among variables.

For the implication of ARDL it has some basic assumption regarding the order of integration of the selected variables that some variables should have integration of I(0) and some variables should be I(1), but not I(2) any of the variables. In such a case we used augmented Dickey fuller test (ADF) to the level of integration of variables. In addition to select optimum lags for best fitted model we used Akaike information criteria.

4. Results and Discussions

We reported the results of AIC through Graph. No. 4.1 in order to select maximum lags on the basis of which it has recommended us to select lags where AIC is minimum and their adjusted R-Square is high. It also recommended to use model having order of (1,0,2,0) for the analysis of ARDL in this study. So in this connection current study will use above selected model to encounter the long and short run relationship between Net Bilateral Aid, Gross Domestic Product, External debt and economic Growth.



Graph-4.1. Model Selection Graph

Source: Authors Calculation through Eviews.

Tabl-4.1. Unit Root Test Results:

Variables	Coefficient (P-Value)	Coefficient (P-Value)	Level	1 st Difference
GDP	-3.743664 (0.0077)	-	I(0)	-
GDS	-1.764819 (0.3909)	-6.814518 (0.0000)	-	I(1)
ED	-0.190884 (0.9303)	-4.238292 (0.0022)	-	I(1)
NBA	-2.042043 (0.2684)	-8.110739 (0.0000)	-	I(1)

Source: Authors Calculation through Eviews.

The above table shows the results of Unit root test, the results depicts that GDP is stationary at the level that is I(0), as shown by its probability value. On the other hand, remaining variables like gross domestic saving, Net Bilateral Aid and external Debt are stationary at their first differences that is I(1). The requirement of the ARDL has fulfilled to estimate the model.

Table-4.2. Estimated Long-Run Results: Dependent Variable: Gross Domestic Product (GDP) Selected ARDL Model: (1, 0, 2, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NBA	-0.101860	0.217500	-0.468322	0.6435
GDS	0.360766*	0.124207	2.904553	0.0074
ED	-0.612120**	0.275415	-2.222534	0.0352
C	4.869485**	2.333766	2.086535	0.0499

Serial-correlation LM test value: F-stats: 0.108873 P-value:(0.8973)

Heteroscedasticity Test value: F-stats: 1.231944 P-value: (0.3154)

*, **, *** indicates significance level at 1, 5 and 10% respectively.

In the above Table we estimated the results of long run relationship among variables by applying ARDL methodology, the results suggests that there is negative association between Net Bilateral Aid and economic growth as 1 % increase in Net Bilateral Aid leads to drop economic growth by -0.10% in the long run. Gross domestic saving is statistically significant and have positive association with economic growth of Pakistan, as 1% rise in gross domestic saving leads to increase economic growth by 36% in the long run. External debt has also negative association and statistically insignificant with economic growth in Pakistan as 1% increase in external debt leads to decrease economic growth by -0.61% in the long run these results are also supported by [Malik \(2010\)](#).

Table-4.3. Estimated Short-Run Results: Dependent Variable: Gross Domestic Product (GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NBA)	0.084292	0.172928	0.487443	0.6300
D(GDS)	0.522062	0.315614	1.654115	0.1101
D(GDS(-1))	-0.457994	0.315049	1.453723	0.1580
D(NED)	-0.506548***	0.292734	-1.730402	0.0954
$\lambda(-1)$	-0.827531***	0.226008	-3.661515	0.0011

*, **, *** indicates significance level at 1, 5 and 10% respectively.

Table No. 4.3. Shows the short run association between dependent and independent variables ad Net Bilateral Aid is positive but statistically not significant in the short run. As it supports economic growth by .08%. On the other hand, gross domestic saving has also positive association with economic growth in the short run but statistically not significant as 1% increase in gross domestic saving leads to increase economic growth by 0.52% only, most importantly if we take its lag it gives negative association in the short run. In addition, Net bilateral aid has significant association at 10% level of significant in the short run. Finally the value of $\lambda(-1)$ confirms short run relationship among variables because of their negative coefficient and significant P-value, it also reported the yearly adjustment toward the equilibrium by -0.82% which showed 82% correction take place annually such a results are also supported by [Qayyum and Haider \(2012\)](#).

Table-4.4. Bound Test Results with Table:

Test Statistic	Value	K
F-statistic	3.174467*	3
Bound Test Table		
Significance	I ₀ (lower)Bound	I ₁ (upper)Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

****, ***, **, * indicates level of significant at 1%, 2.5%, 5% and 10% respectively.

The above results shows the values of Bound test for the long run relationship among the variables. As if F-statistic comes more than any significant level at 1%, 2.5%, 5% and 10% then we conclude there exist long run association between variables. Here our F-stats is greater that lower bond at 10% level of significance, indicating the existence of long run association amongst dependent and independent variables.

5. Conclusion

In this study, an attempt is made to determine the long run and short run relationship between gross domestic saving, net bilateral foreign aid, external debt and economic growth for the country Pakistan by taking yearly data from 1980 to 2014. Gross domestic product has been used as a dependent variable, while gross domestic saving, net bilateral foreign aid and external debt are all independent variables. In this paper it is found that variables have different order of integration as I(0) and I(1) which is basic assumption of ARDL. The results indicates the presence of both short run and long run results amongst the variables which is supportive to the findings of [Malik \(2010\)](#). In the long run external debt and foreign aid give negative impact to economic growth but gross domestic saving has positive associate on with economic growth. On the other hand, in the short run gross domestic saving, external debt and net bilateral aid are also insignificant to the economic growth in Pakistan. 0.82% correction towards equilibrium takes place yearly in Pakistan.

Our results are associated with the findings of [Malik \(2010\)](#); [Durberry et al. \(1998\)](#); [Basnet \(2013\)](#); [Kolawole \(2013\)](#); [Taslim and Weliwita \(2000\)](#) and [Fayissa and Nsiah \(2010\)](#).

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