External Debt and External Rate of Interest: An Empirical Analysis of Pakistan

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Abstract
External debt is vital source of finance in developing countries and carries potential to play a key role in promoting economic growth. Traditional literature regarding economic growth has emphasised the positive role of debt in process of economic development. It inflows the process of growth by reducing the investment - saving gap, transferring the modern technology and increasing productivity. Pakistan lacks financial, human and physical capital, as well as macroeconomic stability. So, it has to depend on foreign assistance / foreign (Planning & Development Department, 2015). The effective policies of foreign debt are very important because it can have positive impact on growth of an economy if effective fiscal, monetary and trade policies are used. However, higher rates of interest charged by major International Development Partners i. e. World Bank (WB), Asian Development Bank (ADB), International Finance for Agriculture Development (IFAD), International Monetary Fund (IMF), Korean International Cooperation Agency (KOICA), and United Nations Development Program (UNDP) can reduce the propensity of provided assistance and eventually distort the development action. This paper evaluates the impact of interest rate on external debt in case of Pakistan using "Autoregressive Distributed Lag Model" (ARDL) approach. To study this relationship, time series data is used from the period of 1972 to 2013. To make this research applicable, External Debt (Ext-D), Interest Payment (Int-P), GDP, Budget Deficit (BD), Exchange Rate (ER) and Debt Services (DS) are taken as variable to evaluate the relationship. Here, " Interest Payment" data is used as a proxy variable for the actual rate of interest. This study investigates the linkages between External Debt and the interest rate for development projects in Pakistan. This paper also discusses how a government, combined with policies of donor agencies (particularly IMF) effects the development process especially w.r.t. interest rate and servicing etc.

Keywords: External Debt, Interest Payments, Economic Development, Pakistan.
JEL Codes: H60, E4, F63

I. Introduction

Apart from the structural adjustment, external debt primarily secured from the International Monetary Fund (IMF) to restore balance of payment deficits. Foreign assistance is also sought for development projects and programmes in shape of grants, soft loans, commodity aid and technical assistance to increase domestic resources, technical expertise for attaining accelerated growth in the priority areas and for poverty reduction. Specifically in Punjab province, these areas include livestock and agriculture, irrigation and energy, urban development, physical infrastructure, education, governance, skill development, water and sanitation, health and other areas (Planning & Development Department, 2015). External Debt is required to supplement the domestic savings. But the question is why do the countries borrow? Borrowing is indeed as old as nations, the reason behind is the inability of the countries to create enough savings that could be further used for the investment and growth. The explained this argument in a way that income of underdeveloped countries i.e. Pakistan is relatively low. The Countries borrow for promoting economic growth and its development, to ensure that there is enabling environment for the people to invest the money in different sectors of economy. Debt is necessary to fulfil the government`s financial requirements. In case, government is facing the budget deficit, the best alternate is to find other sources (borrow) from where such kind of deficit can be removed. The Government borrows usually in order to minimise the resource gap that exist between investment and savings. Major sources of foreign credit in Pakistan are Bilateral, Multilateral and different Private financial creditors' along with IDA and IBRD as the loan providers. Budget Deficit (BD) was only 2.1 % of GDP in period of 1960`s, on average `BD` was 8.0 % of its GNP during the 1972 - 1980. Afterwards, during the period of 1980`s BD was shortened and on average it was 7.1 % of GDP. In 1990`s, the government accepted proposal of IMF in SAP to decline `BD` to 4 % and tried its best to bring the `BD` to 4 % of GDP, but it was accomplished to decrease the BD to only 6.9 per cent of GDP. Nonetheless, BD sustained to decrease in FY 2003- 04, it was only 2.3 per cent of GDP. Though, after this period BD again started mounting and in FY 2006-07 it becomes 4 per cent of GDP. It was expected that BD would be 6.5 per cent of GDP in FY 2007-08. It is observed that BD for the year 2011 & 2012 is again amplified to the value calculated as 6.6 & 8.5 per cent of GDP respectively (Hamidu, Musa, & Umaru, 2013).

The relationship between 'interest rate (r)' and 'BD' is multidimensional. Economists claimed that this association is multifaceted because countries apply various strategies for financing their deficit. With regard to classical system, components of the commodity demand determined rate of interest. In classical system, behaviour of 'r' can be observed with the concept of supply of and demand for loanable funds. Different economists argued that if government intends to finance its deficit through domestic borrowing, loan become limited for private sectors and this leads to crowding out effect and higher 'r' in any economy. A study of World Bank (1993) stated that countries in which financial market are not repressed, the deficit financing from domestic financial market raises the domestic 'r', if external debt is not possible. Alternatively, if domestic financial market incorporates with worlds` capital market, the higher domestic borrowing causes to the higher domestic 'r' and ultimately results capital inflow in the domestic market that cause increase in foreign, so the change in domestic 'r' would not be of a larger amount. Moreover, in economies where markets are suppressed, the higher 'BD' causes to higher "Inflation" with fixed rate of interest. The Pakistan is facing 'BD' like most LDCs as compare to other developing countries. Such problem is confronted to Pakistan economy because of less potential of revenue collection and having low tax ratio to GDP. It is also perceived that 'BD' causes 'interest rate' and 'Inflation' to increase (Lakhan, Shoaib, & Safia, 2014). Debt servicing applies to the Bilateral Creditors, IDA (concessional), IBRD (non-concessional) have shown a positive impact to the investment while Multilateral Creditors and different Private Creditors have negative contribution on investment. However, borrowing / debt has some bad features also. Sometimes, this hinders growth and discourages production and investment. As a large amount of Foreign Exchange (ER) reserves has to paid on the servicing accompanied by the devaluation of currency which increase the bills of import. It is essential to know the degree of relationship of development with the service burdens. Furthermore, the variation in source of fluctuates the effect on aggregate investment. Therefore, if such effect is measured by the proper econometric technique and methodology then it would be easier to define the source which one is more suitable for any country. The availability of external finance should be consistent with policy framework of the country that is mandatory for its sustainability and growth, for example (policies of trade, exchange rate, interest rate, pricing policy, etc.) (Jafri & Habib). The organisation of study is as follows: Section II presents review of literature. Economic Theory and Econometric methodology is presented in section III. The final section concludes the study.

II. Review of Literature

Different empirical studies have discovered the effects of rate of interest on external debt. Verdicts of these different studies are concluded with various results. Following review of literature portrayed the picture of work which has been prepared by different policy makers on our above mentioned topic:- Shehnaz et al. (2013) has an opinion regarding the

significance of and its burden on Pakistan's` economy for the period (1970 to 2005). The consequences pointed out that rising of balance of payment (BoP) deficits, variant rate of exchange and interest payments on loans are the three main variables consider for increases in the liability of government and whole load. Furthermore, outcomes of their study also revealed that the ratio of public is mostly influenced by the factor i.e. rate of exchange which raises public ratio throughout the time period of study and rate of interest variable was to some extent accountable for rises in 'ratio of the external to the GDP'. Indeed, the matter is that, current account deficit and budget are responsible for 'r' and exchange rate fluctuations in the case of Pakistan. (Shehnaz & et al).

Shabbir (2009) examined the effect of external on economic growth by using a sample of 24 different developing countries for the period of 28 years (1976 to 2003). She observed that servicing ratio to GDP hampers the economic growth and due to this less funds may available to finance the private investment in the developing countries which leads to effects of crowding out. These authors have taken some variables as proxy for measuring the ratio of external to GDP and economic growth as an independent variable. The impact of five variables external, Gross Domestic Product, public investment, private investment, and imports on each other for the period of 1974 - 2007. These influences were analyzed by using the Vector Autoregressive Model (VAR). Its results briefed that external and Service Payment on imports of Pakistan had negative effects on economic growth. However, this study explained that the independent variables of public investment and private investment had the positive effect on economic growth (Safdari & Mehrizi, 2011).

Muinga, (2014) examines the liaison between economic growth and external public in Kenya for the period of 1970 to 2010. Explanatory variables are used as labour, capital, interest payments on, service payments, inflation and external public with the econometric technique of Ordinary Least Square (OLS). The results show that there is negative impact of external and interest payments on economic growth in Kenya. The study suggests that the policies for management in Kenya be improved and reviewed. More attention on management needs to pay by the government. Ogunmuyiwa, (2011) investigate that external debt actually encourages economic growth in the developing countries. Time series data from 1970 to 2007 was used with different econometric techniques i.e. Granger Causality Test, Augmented Dickey Fuller (ADF) test, vector error correction method (VECM) and Johansen Co-integration test. According to the study, external loan only discourages the potentials of any country, it doesn't enhance it. The Empirical results have been shown visibly that causation between development and external could not be found in the Nigerian perspective and external could not be useful to forecast improvement / slowdown in the economic growth of Nigeria.

Malik & Hayat, (2010) tried to explain the impact of external debt on economic activities of Pakistan for the period of 1972 - 2005 by using the time series econometric techniques. Results shows that external debt is negatively / significantly relates with economic development, it implies that increase in the external loan will cause to decrease in economic growth. The main and possible reason, according to him, is of servicing that has negative effect on GDP growth. Alferedo & Franisco (2005) empirically test the 20 Caribbean and Latin American economies for the period of 1970 to 2002 by showing the linear / non-linear relationship of economic growth and external. This paper used a Generalize Method of Moments (GMM) panel estimator. The result shows that lower external ranks are related with higher growth rate and there is an insignificant relationship between growth rate of economy and service ratio. They also found that there is no evidence of non-linear impact on them.

The relationship between external, economic growth, labor force, trade and education in short run and long run for Pakistan over the period of 1975 to 2005 has tested by using Autoregressive Distributed Lag Approach (ARDL). The evidence depicted suggests that overall is not an essential element of economic growth either considered in short run or considered in long run. The result explains that the external loan has not been used efficiently and productively in Pakistan which might be one main reason for the slow growth of economy (Hasan & Butt, 2008). Lyoha (1996) investigate the impact of external on economic growth of Sub-Saharan African countries for the period of 1970-1994. The main finding of the study was that increasing external lowers investment through both the crowding out effect and deterrent effect. It was also observed that reduction in stock would have considerably increased economic growth as well as investment. He also emphasised that forgiveness of could deliver a much needed incentive to economic growth and investment recovery in Sub-Saharan African countries.

III. Economic Theory and Econometric Methodology

An economic theory reflects the behavior of an individual which can also be presented in an economic model. Generally, all developing countries are facing the problem of budget deficit due to higher ratio of expenditure and revenues. Governments can supplement revenue by increasing the taxes, printing money and domestic or external

borrowing. While the government takes decision to borrow from any international donor / agency instead of introducing more taxes, to bridge up the deficit, it definitely creates a liability on known as public debt. In simple words, all external liabilities of some known outstanding and maturity at a particular point of time and payable is known as external debt. Growing external debt is worldwide phenomenon. The economists do not cogitate external debt as a major problem; rather issue is of un-sustainability and mismanagement of this debt. The empirical findings suggest that debt is effective if and only if the appropriate policies are formulated to support conditional lending (World Bank, 1998). Since independence Pakistan has the problems of balance of payments deficit. For financing this deficit, the country always adopted to rely on external loan. In 1950, Pakistan joins the International Monetary Fund (IMF) and World Bank. Currently Pakistan is in real debt-trap, it has borrowed the large amount of debt from external sources and borrowing is still continued from IMF, ADB, World Bank and from other developed nations. Simultaneously, a big amount from receipt of borrowings is used to return the debt and its interest. The debt servicing has further increased the deficit which in turn generates the need of additional borrowing. The above discussions show that only a single variable is not enough for explaining the impact of external debt on the economy. It is, therefore, associated with the relationship between external debt, interest payments, debt servicing, budget deficit, GDP and exchange rate. Following the methodology, the model of this study becomes as:

$$EXT\_D_t = f(INT\_P_t, B\_D_t, ER_t, GDP_t, DS_t)$$

Where,
EXT-D = External Debt
INT-P = Interest Payments
B-D = Budget deficit
ER = Exchange Rate
DS = Debt Services
T = Time Period

For finding the responsiveness of dependent variable into independent variables, the equation can be written in the following form:

$$EXT\_D_t = \alpha_0 INT\_P_t^{\alpha_1} B\_D_t^{\alpha_2} ER_t^{\alpha_3} GDP_t^{\alpha_4} DS_t^{\alpha 5} e_t^{\alpha 6}$$

$\boldsymbol{e}$ = represent for the base of log

Following the log linear form of the function the model becomes as:

$$EXT\_D_t = \alpha_0 + \alpha_1 LINT\_P_{t-2} + \alpha_2 LB\_D_{t-2} + \alpha_3 LER_{t-2} + \alpha_4 LGDP_{t-2} + \alpha_5 DS_{t-2} + e_t$$

In most of time series data, the problem of non-stationary may be hold. The involvement of time trend in time series data give regression results that may spurious and make time series non-stationary. According to Nelson and Plosser (1982) most of time series data has unit root problem. In Literature many unit root tests are available that can be used to convert a non-stationary data into stationary data. For this purpose, Augmented Dicky-Fuller unit root test (1981) is appropriate. Moreover, one of the assumptions of OLS estimation is that error terms must be uncorrelated, but this assumption can easily violate under time series data. It is reasonable to think that a prediction that is high in December can also be high in November and January. This kind of cyclical effect is indicated by a positive autocorrelation and quite common in time series data. For positively auto-correlated errors, the inefficiency is fairly insensitive to autocorrelation for predictor but negatively auto-correlated errors, a positively auto-correlated predictor may actually help. The standard errors of estimated parameters may not be correct in the existence of autocorrelation. In literature there are several formal tests that can be used to identify the presence of autocorrelation in residuals. The Durbin Waston D test and Breusch-Godfrey Serial Correlation LM test are highly parametric test for the existence of autocorrelation. To converting Non-stationary data into stationary data;
The General form of Augmented Dickey-Fuller is

$$\Delta X_t = \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{1t}$$

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{2t}$$

$$\Delta X_t = \alpha + \beta t + \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{3t}$$

Where;
Xt = a time series for unit root testing,
t = time period
et = error term with zero Mean and Constant Variance
j = 0, shows the simple DF test. The lagged value of dependent variable is included in the ADF regression equation until the error term becomes white noise. The null and alternative hypotheses of ADF unit roots are:
H0: $\delta \geq 0$ time series is non-stationary; (it has unit root problem).
Ha: $\delta < 0$ time series is stationary.
Computing τ statistics of estimated coefficient X_{t-1} by applying OLS method and comparing it with dicky-Fuller critical values. If the computed τ value is greater than or equal to the critical value, then reject the null hypothesis and conclude that the time series data is stationary. If the computed τ data is less than the critical value than do not reject the null hypothesis and conclude that given time series data is non-stationary. By applying these procedures on all variables we can find the order of integration.

For the analysis of cointegration the autoregressive distributed lag (ARDL) approach is used. The results show that there is a cointegrating relationship among variables. ARDL bound testing approach presented by Pesaran (1997), Pesaran and Shin (1999), and Pesaran, Shin and Smith (2001). ARDL approach can be applied regardless of the order of integration. It can be applied to small sample size. In ARDL, sufficient number of lags can be taken. This technique is based on Unrestricted Vector Error Correction Model (UVECM) which have better properties for short and long-run equilibrium. After appropriate augmentation of the order of ARDL model, OLS method can easily applied to estimate the parameters.
The general form of ARDL is

$$\Delta lnY_t = £_1 + £_2 t + £_3 lnY_{t-1} + £_4 lnX_{t-1} + £_5 lnZ_{t-1} + \cdots + \sum_{h=1}^{p} £_h \Delta lnY_{t-h} + \sum_{j=0}^{p} \gamma_j \Delta lnX_{t-j} + \sum_{k=0}^{p} \phi_k \Delta lnZ_{t-k} + \cdots + u_{it}$$

Where;
Y_t = dependent variable
Y_{t-1} = dependent variable with one lag
X_{t-1} *and* Z_{t-1} = Independent variables with lag one
The Hypothesis formation is
H_0: £3 = £4 = £5 = 0 (no cointegration among the variables)
H_A: £3 ≠ £4 ≠ £5 ≠ 0 (cointegration among variables exists)
If long-run cointegration relationship among variables exits, then short-run relationship can be find by using the Vector Error Correction Model (VECM). The VECM is explained as under:

$$\Delta \ln Y_{it} = £_1 + £_{2t} + \sum_{h=1}^{p} £_h \Delta \ln Y_{it-h} + \sum_{j=0}^{p} \gamma_j \Delta \ln X_{t-j} + \sum_{k=0}^{p} \phi_k \Delta lnZ_{it-k} + \omega ECT_{t-1} + u_t$$

IV. Empirical Results and Discussion
The results of unit root test of variables are shown in the Table 1. The estimated results of T statistics and probability of External debt shows that it is stationary at level as well as at first difference. The estimated results of interest payments, budget deficit, exchange rate, nominal gross domestic product and debt services show that these variables are non-stationary at level but all these variables are non-stationary at level but stationary at first difference. So these results are appropriate for applying ARDL integration approach.

Table 1: Unit Root Test

Variables	T-Statistics	Probability
At Level		
LEXT_D	-2.935471	0.0499
LINT_P	-2.820094	0.0642
LB_D	-1.085128	0.7127
LER	0.501385	0.9848
LGDP	-1.661787	0.4427
LDS	-1.646241	0.4504
At first difference		
LEXT_D	-4.133422	0.0024
LINT_P	-5.579577	0.0000
LB_D	-4.240247	0.0018
LER	-4.677630	0.0005
LGDP	-5.443483	0.0001
LDS	-7.482875	0.0000

By keeping in view the number of observations and variables the Lag order selection criterion is reported in Table 2. It has shown that maximum 3 lags are allowed to Vector Auto Regressive process. The results show that criterions allow optimal lag length 1 to 3. According to Schwarz and Hannan-Quinn 1 lag criteria should be selected, Sequential modified LR test statistics allow 2 lags. According to Akaike Information criterion and Final prediction error lag 3 can be used for the Variables of this model. Hence there is the mixed picture of lags and we are going to use Lag two criterion in our Model.

Table 2: VAR Lag Order Selection

Criteria
Endogenous variables: LEXT_D LINT_P LB_D LER LGDP LDS
Exogenous variables: C
Date: 01/04/17 Time: 02:40
Sample: 1972 2013
Included observations: 39

Lag	LogL	LR	FPE	AIC	SC	HQ
0	14.30672	NA	2.63e-08	-0.425986	-0.170053	-0.334159
1	262.1991	406.7977	5.14e-13	-11.29226	-9.500731*	-10.64947*
2	301.1823	51.97760*	5.05e-13	-11.44524	-8.118120	-10.25150
3	348.8547	48.89482	4.07e-13*	-12.04383*	-7.181112	-10.29913

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

For investigating the cointegration among external debt, interest payments, budget deficit, exchange rate, nominal gross domestic product and debt services, ARDL Bounds test approach is used. The estimated results of ARDL Bounds test are shown in table 3.

The calculated F-statistics (3.81) is greater than the upper bound (3.79) and (3.35) at 5 percent and 10 percent respectively. So Null hypothesis of no integration is rejected, which confirms that there is cointegration among variables of the model. Now long run relationship among external debt, interest payments, budget deficit, exchange rate, nominal gross domestic product and debt services can be examined. The estimated long run results are presented in Table 4.

Table 3: ARDL Bounds Testing Approach

Dependent Variable LEXT_D, ARDL (1,2,2,2,2,2)		
Critical values	**F-Statistics** 3.809667	
	Lower Bound	**Upper bound**
95%	2.62	3.79
90%	2.26	3.35

Table 4: Estimated Long Run Coefficient using the ADRL Approach

ARDL (1,2,2,2,2,2) Dependent variable is LEXT_D Time Period 1972-2013			
Regressors	**Co-efficients**	**Standard-Errors**	**T-Ratio (Prob)**
LINT_P	0.434902	0.106212	4.094661 (0.0004)
LB_D	0.158194	0.066553	2.376970 (0.0262)
LER	-0.084513	0.115699	-0.730457 (0.4725)
LGDP	0.394052	0.052639	7.485960 (0.0000)
LDS	-0.214305	0.101558	-2.110184 (0.0459)
C	-5.228136	1.267609	-4.124408 (0.0004)

The coefficient of interest payments shows that there is a positive and significant relationship between interest payments and external debt in case of Pakistan. The coefficient of interest payments shows that 1 percent increase in the interest payments leads to the 0.43 percent increase in the external debt. There is a positive and significant relationship between budget deficit and external debt in case of Pakistan. The results show that 1 percent increase in budget deficit leads to the 0.15 percent increase in the external debt. As budget deficit increases government try to cover it by borrowing more. There is insignificant and negative relationship between exchange rate and external debt in case of Pakistan. The coefficient shows that 1 percent increase in exchange rate leads to the 0.08 percent decrease in the external debt in case of Pakistan. There is a positive and significant relationship between gross domestic product and external debt, the coefficient shows that 1 percent increase in the nominal GDP leads to 0.39 percent increase in the external debt. Moreover, there is negative and significant relationship between debt services and external debt in case of Pakistan. The coefficient shows that 1 percent increase in the debt services leads to the 0.21 percent decrease in the external debt. The overall results show that interest payments, budget deficit and GDP has a significant and positive impact on external debt while the exchange rate has a negative and insignificant impact on the external debt. The debt services have a negative but significant impact on the external debt.

Table 5: Vector Error-Correction Model (VECM)

ADRL (1,2,2,2,2,2) Dependent variable is EXT_D Time Period 1972-2013			
Regressor	**Co-efficient**	**Standard-Error**	**T-Ratio (Prob)**
D(LINT_P)	0.207747	0.052826	0. (0.0007)
D(LINT_P(-1))	-0.056472	0.075687	-0.746129 (0.4631)
D(LB_D)	0.041695	0.025356	1.644386 (0.1137)
D(LB_D(-1))	-0.044555	0.035116	-1.268775 (0.2172)
D(LER)	-0.246613	0.149751	-1.646817 (0.1132)
D(LER(-1))	-0.154247	0.111559	-1.382652 (0.1801)
D(LGDP)	0.016892	0.137957	0.122441 (0.9036)
D(LGDP(-1))	-0.157220	0.134188	-1.171635 (0.2533)
D(LDS)	-0.069846	0.038697	-1.804931 (0.0842)
D(LDS(-1))	0.049271	0.037650	1.308656 (0.2036)
Cointeq(-1)	-0.511117	0.172239	-2.967482 (0.0069)

The short run dynamics are presented in the table 5. The study uses Vector Error-Correction Model (VECM) for investigating the short run dynamics among external debt, interest payments, budget deficit, nominal gross domestic product and debt services in case of Pakistan. The estimates show that interest payments have positive and significant impact on external debt. The results show budget deficit has an insignificant and negative impact on external debt. The exchange rate has negative and insignificant impact on external debt in short run in case of Pakistan. The GDP has positive but insignificant impact on external debt in short run in case of Pakistan. The debt services have positive but insignificant impact on external debt in short run in case of Pakistan.

Descriptive statistics is presented in table 6. The estimated results show that external debt, interest payments, budget deficit, gross domestic product and debt services are negatively skewed while the exchange rate is positively skewed. The results also show that all variables have positive kurtosis. The estimated kurtosis and skewness are insignificant and different from zero so we reject the null hypothesis of normality. The Jarque-Bera values show that external debt, exchange rate, gross domestic product is normally distributed with zero Mean and constant variance while interest payments, budget deficit and domestic services are not normally distributed.

Table 6: Descriptive Statistics

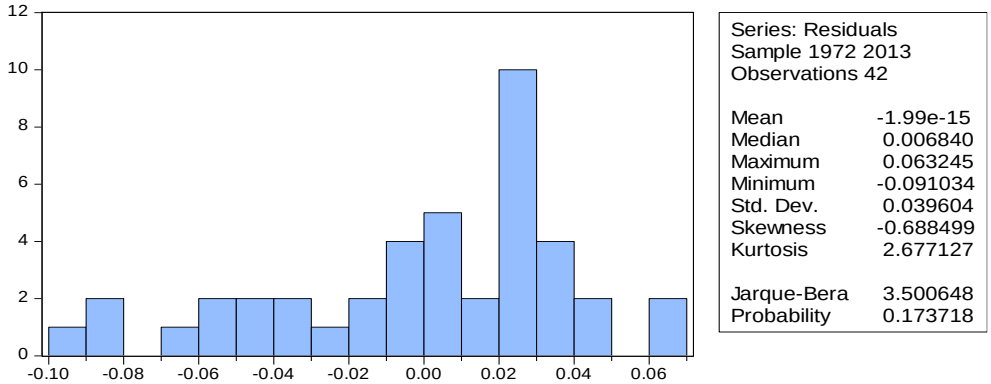
	LEXT_D	LINT_P	LB_D	LER	LGDP	LDS
Mean	9.678304	19.91645	1.787723	3.306263	27.86064	21.23144
Median	9.808244	20.31897	1.871802	3.279104	27.86808	21.55828
Maximum	10.75026	20.75433	2.258633	4.621328	30.73944	22.80675
Minimum	8.233769	18.14716	0.095310	2.161181	24.71332	19.12276
Std. Dev.	0.736627	0.786168	0.412690	0.809953	1.720721	0.904209
Skewness	-0.302158	-0.893948	-2.039467	0.039070	-0.037511	-0.887199
Kurtosis	2.008517	2.550523	8.299463	1.535048	1.914351	2.909580
Jarque-Bera	2.359413	5.947551	78.26354	3.766334	2.072460	5.524162
Probability	0.307369	0.051110	0.000000	0.152108	0.354790	0.063160
Sum	406.4888	836.4910	75.08438	138.8631	1170.147	891.7207
Sum Sq. Dev.	22.24740	25.34048	6.982831	26.89695	121.3962	33.52136
Observations	42	42	42	42	42	42

Table 7: Pair Wise Correlation

Covariance Analysis: Ordinary						
LEXT_D		LINT_P	LB_D	LER	LGDP	LDS
LEXT_D	1.000000					
LINT_P	0.942992	1.000000				
	17.91979	-----				
	0.0000	-----				
LB_D	-0.555222	-0.472188	1.000000			
	-4.222101	-3.387842	-----			
	0.0001	0.0016	-----			
LER	0.970189	0.876945	-0.597877	1.000000		
	25.31897	11.54055	-4.717268	-----		
	0.0000	0.0000	0.0000	-----		
LGDP	0.992740	0.905091	-0.587836	0.983528	1.000000	
	52.19951	13.46207	-4.595668	34.41353	-----	
	0.0000	0.0000	0.0000	0.0000	-----	
LDS	0.933200	0.967408	-0.552613	0.869482	0.906456	1.000000
	16.42401	24.16223	-4.193510	11.13258	13.57548	-----
	0.0000	0.0000	0.0001	0.0000	0.0000	-----

Table 6 shows the correlation matrix of variables, the results show that external debt has a positive and significant relationship with Interest payments, exchange rate, gross domestic product and debt services while it is negatively related to the Budget Deficit. It also shows that interest payments are negatively related to the budget deficit but positively related to the exchange rate, gross domestic product and debt services. It also shows that budget deficit is negatively related to the exchange rate, gross domestic product and debt services. Moreover, exchange rate is positively related to the gross domestic product and debt services in case of Pakistan. All the Variables are highly significant and positively related to the External debt. There is weak multicolinearity exits among different independent variables which can be ignored.

HISTOGRAM



Breusch-Godfrey Serial Correlation test is used to check the autocorrelation in disturbance terms. In Table 7 the results show that the estimated values are insignificant at chosen level of significance. So we do not reject the hypothesis that there is no auto correlation in disturbance terms.

Table 8: BREUSH-GODFREY SERIAL CORRELATION

F-statistic	8.830902	Prob. F(2,36)	0.3913
Obs*R-squared	14.35869	Prob. Chi-Square(2)	0.3913

In table 8 we used White heteroscedasticty test to check whether there exists heteroscedasticity or not. The estimated values are insignificant at chosen level which shows that there is no heteroscedasticity in the estimated results.

Table 9: HETEROSCEDASTICITY WHITE TEST

F-statistic	1.158964	Prob. F(20,21)	0.3694
Obs*R-squared	22.03589	Prob. Chi-Square(20)	0.3386
Scaled explained SS	13.57604	Prob. Chi-Square(20)	0.8513

V. Conclusions

The results of the ARDL bound testing approach shows that there is cointegration among the variables of the model. The long-run results indicate that interest payments, budget deficit and GDP has a significant and positive impact on external debt while the exchange rate has a negative and insignificant impact on the external debt. The long-run estimates briefed that the debt services have a negative but significant impact on the external debt. The short-run dynamics show that interest payments have positive and significant impact on external debt. The results show budget deficit has an insignificant and negative impact on external debt. The exchange rate has negative and insignificant impact on external debt in short run in case of Pakistan. The GDP has positive but insignificant impact on external debt in short run in case of Pakistan. The debt services have positive but insignificant impact on external debt in short run in case of Pakistan. The value of ECM shows that external debt, interest payments, budget deficit, gross domestic product and debt services are negatively skewed while the exchange rate is positively skewed. The results also show that all variables have positive kurtosis. The estimated kurtosis and skewness are insignificant and different from zero so we reject the null hypothesis of normality. The Jarque-Bera values show that external debt, exchange rate, and gross domestic product are normally distributed with zero mean and constant variance while interest payments, budget deficit and domestic services are not normally distributed. The diagnostic tests show that there is no hetroscedasticity but weak

multicollinearity exists among different variables which can be ignored. However, auto-correlation also exists in disturbance term but is eliminated by taking the lag values. The results confirm that for getting maximum benefit from external debt, Government should prefer the financing tools having low interest rate so that interest payment, debt financing and finally the exchange rate can be minimised for targeted GDP. The study concludes that government has to prioritize the need for attaining the external debt which should be demand- driven instead of supply- driven. For this purpose, the effective and appropriate policies should be formulated to achieve the desired targets of growth strategy in Pakistan.

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