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IMPACT OF FOREIGN DEBT ON ECONOMIC GROWTH: EVIDENCE FROM PAKISTAN

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ABSTRACT

This study analyzes the impact of foreign debt on economic growth of Pakistan, using annual time series data from1972 to 2013. The research question is tested through ARDL econometric framework and the estimated result shows that foreign debt exerts significant negative impact on economic growth which confirms the existences of debt overhang in Pakistan. Both physical and human capital has strong association with economic growth of Pakistan. The coefficient of Error Correction Term (ECT) suggested that any deviation from the long term inequality is corrected by a moderate speed over each year. Significant ECT is further proof of the existence of stable long run relationship. It can be suggested that the proper management of debt may help the government in attaining the desirable growth of the economy.

Contribution/ Originality: This study contributes to the existing literature by (i) employing estimation technique that helps in small size sample case and recognizes the uncertainty irrespective of the stationarity status of variables, (ii) distinguish between both short run and long run effects and (iii) considering the possible existence and implications of cointegration between the different aspects of foreign debt.

1. INTRODUCTION

The key objective of developing economies is to achieve high growth but because of weak economic systems and low level of per capita they can't achieve the desirable growth. Therefore they opt for foreign debts from international agencies and financial institutions. One of the imperative policy questions is that what should be the effects of foreign debt on economic growth of a country? Expansionary government policies are although effective in short period but reduce long run growth by crowding out private investment and thus nullify the positive effects of fiscal incentives. Foreign debt is needed by a country to enhance the growth capacity by utilizing it in various developmental projects, to meet its obligations and to fulfill saving and investment gap.

Foreign debt is of great concern for both policy makers and academicians. So far no common consensus on public debt and growth relationship has been develop amongst the researchers. On one side it is viewed that it

brings capital and the productive utilization of this capital helps the economy to grow faster. Brings technology which helps in industrial growth and furthermore it helps in mobilizing the human and physical capital which are the engines of growth. On the other side it is viewed that excessive accrual of foreign debt retard growth by outcrop the private investment.

This inconsistency in the existing literature is the base for conduction of this particular study. The current study focused on empirical analysis of relationship between external debt and economic growth of Pakistan, amongst the largest debt receiving economies. This study will be a helpful contribution addressing the foreign debt and growth relationship to the existing literature in general and to literature on Pakistan economy in particular. In light of the findings of this study the policy makers will be guided towards the right policy for handling foreign debt to achieve the desirable macroeconomics goals.

2. REVIEW OF LITERATURE

Growth and foreign debt relationship has been investigated by many academician and researchers. Mostly the findings of these researches found negative relationship between the two suggesting foreign debt a big hindrance to economic growth because it discourage private investment, a source of economic activity bringing growth in the economy. Cunningham (1993) studied the growth and debt relationship. He took the sample period from 1971 to 1987 for highly indebted countries. His conclusion was very exciting one, one hand he found negative association between the two during the period from 1971 to 1979 and on the other hand during 1980 to 1987 there was no significant role played by external debt in growth of the economies. lyoha (1999) and Maureen (2001) found that external debt retard growth in sub Saharan African countries during 1974 to 1994 and in Kenyan economy in the period from 1970 to 1995 respectively. Karagöl (2002) found that the foreign debt services slow down the growth pace of Turkish economy and the causality run from debt service to level of GNP. Ogunmuyiwa (2010) and Ezeabasili *et al.* (2011) concluded that in Nigerian economy, the foreign debt does not affect growth as both are exogenous to each other in the period of 1971 to 2007 and 1975 to 2006 respectively. Wijeweera (2005); Hasssan and Safdar (2008) found that external debt and economic growth has insignificant association in Sri Lankan and Pakistan Economies respectively. Malik (2010); Ahmed and Maryam (2011) found that External Debt by crowding out private investment deteriorate the growth of Pakistan economy. Shah and Pervin (2012) concluded that external debts reduce the growth pace of Bangladesh economy as both are negatively associated. Boboye and Ojo (2012) also found negative relationship between foreign debt and economic growth of Nigeria. They concluded that because of debt burden the domestic currency devalued and thus decrease the national income of Nigeria. Safia (2013) taking the panel analysis of 70 developing economies found that during 1976 to 2011 there exist negative relation between external debt and economic growth and external debt services and growth of the sample countries.

3. MODEL SPECIFICATION, DATA AND METHODOLOGY

3.1. Model Specification

This study used the neo- classical production function for modeling the external debt and growth relationship. The same model is also used by Cunningham (1993); lyoha (1999) and Shah and Pervin (2012). Because debt affects the productivity of both labor and capital so it is rational to include debt in the production function.

$Y = f(K, L, FD)$

Where,

Y is output, K is capital, L is used for labor, and FD represents Foreign Debt

It has to be mention that this particular model included only the foreign debt while Cunningham includes both foreign and domestic debts in his model to capture the effects of debt on economic growth. lyoha (1999) also did the same. The specific econometric model for estimation is as following;

$$Y_t = \beta_0 + \beta_1 FD_t + \beta_2 HK_t + \beta_3 PI_t + \beta_4 PG_t + \mu_t \text{----------} 1$$

Where

Y_t: Gross Domestic Product (GDP)

FDt: Foreign Debt

HK_t: Human capital

PI$_t$: Public Investment

PG_t: Population Growth

3.2. Data

A time series data from 1972 to 2013 is taken for empirical analysis of the foreign debt and economic growth relationship in case of Pakistan economy. Real GDP, Foreign Debt, Public Investment, Population Growth, and Spending on Education are the variables selected for the completion of analysis. Real GDP is used as a proxy for growth and the data on this variable is taken from World Development Indicator (WDI). The data on Foreign Debt, a most concerned variable, is taken from the various issues of Economic Survey of Pakistan and same source is consulted for the data on Public investment too. Data source consulted for Population Growth (Labor) and Public Spending on Education (Human Capital) is World Development Indicators Data Bank (n.d).

3.3. Methodology

3.3.1. Bound Test for Cointegration

This study used ARDL technique develop by Pesaran and Shin (2001). This particular technique is prior over others because of; its application in case of small sample size (Gathak and Siddiki, 2001). Don't consider the unit root analysis before estimation and can be applicable although the variables have different order of integration. Specification of the estimated model is as under;

$$\Delta y_t = \alpha + \sum_{i=1}^{m} \beta_{1i} \Delta y_{t-1} + \sum_{i=1}^{m} \beta_{2i} \Delta FD_{t-1} + \sum_{i=1}^{m} \beta_{3i} \Delta PI_{t-1} + \sum_{i=1}^{m} \beta_{4i} \Delta HK_{t-1} + \sum_{i=1}^{m} \beta_{5i} \Delta PG_{t-1} + \beta_{6i} Y_{t-1} + \beta_{7i} FD_{t-1} + \beta_{8i} PI_{t-1} + \beta_{9i} HK_{t-1} + \beta_{10i} + \mu_t \ldots$$

..2

Where m is lag length and under Bound testing approach the null hypothesis for no long run relationship in the model is;

$$H_0: \beta_i = 0$$

$$H_1: \beta_i \neq 0$$

Where i= 6, 7, 8,9,10

The decision of the existence of long run cointegration is made through Wald F-Statistics. Three different decisions can be made on the basis of the calculated value of the Wald F- stat. In case the calculated value is greater than the tabulated value of Wald F-statistic, at 5% level of significance, the null hypothesis for no long run cointegration is rejected and vice versa is the case where the calculated value of the Wald F-statistic is less than the tabulated value of Wald F-statistic. In case the calculated value of Wald F-statistics lies in between the lower and upper boundaries of the critical Wald F-Statistics, the decision will be inconclusive. Once the long run decision is made, the β_i is normalized to find out the long run elasticities;

$$Y_{t-1} = \frac{\beta_8}{\beta_6} FD_{t-1} + \frac{\beta_9}{\beta_6} PI_{t-1} + \frac{\beta_{10}}{\beta_6} PG_{t-1} + \frac{\beta_{11}}{\beta_6} HK_{t-1} \quad \ldots\ldots 3$$

3.3.2. Error Correction Mechanism

Error Correction Mechanism is used to capture the short run elasticity. This technique not only helps in explaining the changes in regressand because of regressors but also capture the deviations from the long run too. Furthermore this technique is helpful in minimizing the loss of degree of freedom as well.

$$\Delta y_t = \alpha + \sum_{i=1}^{m} \beta_{1i}\, \Delta Y_{t-1} + \sum_{i=1}^{m} \beta_{2i} \Delta\, FD_{t-1} + \sum_{i=1}^{m} \beta_{3i}\, \Delta PI_{t-1} + \sum_{i=1}^{m} \beta_{4i}\, \Delta HK_{t-1} + \sum_{i=1}^{m} \beta_{5i} \Delta PG_{t-1} + \beta_{6i} Y_{t-1} + \beta_{7i} FD_{t-1} + \beta_{8i} PI_{t-1} + \beta_{9i} HK_{t-1} + \beta_{10i} PG_{t-1} + \theta EC_{t-1} + \mu_t \quad \ldots\ldots 4$$

In the above model y_t is real GDP. Coefficients from $\beta 1$ *to*, $\beta 6$, denoted short run dynamics. Δ is used for difference and β_0 is constant/intercept and θ is expected to be enter with negative sign. Whereas error correction term is formulated as;

$$EC_t = y_t - \left(\frac{\beta_7}{\beta_6} FD_{t-1} + \frac{\beta_8}{\beta_6} PG_{t-1} + \frac{\beta_9}{\beta_6} PI_{t-1} + \frac{\beta_{10}}{\beta_6} HK_{t-1}\right) \ldots\ldots 5$$

4. RESULTS AND DISCUSSION

4.1. Unit Root Analysis

Although the Bound test for Cointegration does need for prior test of the data but it is a fact that time series data without analyzing for unit root, mislead, because of its non-stationary nature. For sidestepping from the haziness in results, this study checked the data for unit root. Secondly this will give the idea about order of integrations of a particular variable, which will further guide for a suitable technique, to be applied. Unit root analysis is made by employing both Augmented Dicky and Fuller (ADF) and Phillips-Perron (PP) tests. The results displayed in table 4.1 suggest that GDP, FD, PI and HK are integrated of order one i.e. 1(1) while the PG is stationary at level 1(0). The results extracted from Phillips Peron test are also similar to the findings of ADF. Based on these findings the ARDL/Bound test for Cointegration is best suited for analysis.

Table-4.1. Unit Root Analysis

ADF Test			Phillips-Peron Test	
Variables	**Level**	**First difference**	**Level**	**First difference**
GDP	-1.1438 (0.9087)	-5.6030 (0.0002)	-1.3443 (0.8622)	-5.6012 (0.002)
PG	-4.5009 (0.0010)	.....	-4.6542 (0.0091)	.....
FD	1.3245 (0.9456)	-5.1135 (0.0001)	-1.3025 (0.8623)	-5.2832 (0.0009)
PI	1.6825 (0.6469)	-4.0471 (0.0007)	-1.4250 (0.6005)	-4.0641 (0.0006)
HK	1.5438 (0.7126)	-3.1452 (0.0056)	-1.4280 (0.6841)	-3.1245 (0.0043)

Note: P values in parenthesis

4.2. Lag Length and Criteria Selection

There are different criterions for selection of optimal lag length. The results displayed in table 4.2 below suggest that at Akaike Information Criterion (AIC) information criterion at lag length two is the optimal criteria to be used for estimation purposes

Table-4.2. Selection of Lag Length

Lag	LR	FPF	AIC	SC	HQ
0	69.85	10.31	17.17	29.98	20.69
1	52.36	4.64*	5.35	7.22	8.33*
2	12.92*	6.28	4.29*	4.78*	8.92

* indicates lag order selected by the criterion. *LR: sequential modified, FPE: Finalprediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion.*

4.3. Long Run Cointegration Analysis

The long run Cointegration decision is made through Wald-F-statistics. In this approach, we compare our F value with lower and upper bound critical values calculated by Narayan (2005).[1] The results presented in table 4.3 shows that calculated F-statistic (5.23) exceeds the upper bound of the tabulated value of F-statistics at 5% level of significance and thus there exist long run cointegration as suggested by Pesaran and Shin (2001). Moreover, when rest of the variables are normalized to check whether there exist a long run cointegration or not, it is found that in all the other specifications (taking each one dependent) the null hypothesis for no long run cointegration is accepted because the values of calculated F-statistics lies below the lower bound of tabulated F-statistic at 5% level of significance.

Table-4.3. The Bound Test for Cointegration

Specification	Lower bound	Upper bound	F-statistic	Decision
GDP/FD,PI,HK,PG	3.51	4.58	5.23	Cointegration
FD/GDP,PI,HK,PG	-------	--------	2.00	NO Cointegration
PI/GDP,FD,HK,PG	-------	--------	1.23	NO Cointegration
HK/GDP,FD,PI,PG	-------	--------	0.41	NO Cointegration
PG/GDP,FD,PI,HK	-------	--------	1.58	NO Cointegration

Note: Critical values are obtained from Narayan (2005).

4.4. Long Run Estimates

After establishing the long run Cointegration among the series, in next step we explore long run impacts of public debt on economic growth, the results are displayed below;

$$RGDP_t = 3.572 - 0.315FD_t + 0.43PI_t - 0.129PG_t + 0.671\,HK_t$$

t- Statistic: (1.920) (3.088) (4.659) (2.080) (2.541)

P value : (0.087) (0.007) (0.002) (0.032) (0.008)

R^2 0.63 AdjustedR^2 0.41 DW-Stat: 2.04 F-Statistics: 12.67 (0.000)

The result shows that there exist negative and statistically significant relationship between foreign debt and economic growth. The results suggest that every 1% increase in foreign debt slow down the pace of growth by 31%.These findings are in line with Malik (2010); Shah and Pervin (2012); Shabir and Safia (2013). Negative impacts of foreign debt on economic growth of Pakistan may be of the fact that mostly the government got foreign debt to maintain its reserves but because of huge expenditures on its imports it could not maintain it at the desired level. This phenomenon leads the government for more debt and hence debt is accrued which retard the growth of economy. Proper utilization of foreign debt especially for productive purposes helps in growth. Amongst the other variables, public investment and economic growth has a strong positive association. The results suggest that every 1% increase in public investment contributed 43% in growth. These results are very much in line to the theoretical debate on public investment and economic growth relationship. More the government invests greater will be the

[1] The critical value of Narayan (2005). are calculated on the basis of small as well as large sample size (30 to 80).

productivity which will increase jobs and aggregate spending and thus economic activity will boost up. Human capital has positive and significant impact on GDP which strengthen Lucas (1993) idea that human capital accumulation serve as an engine of economic growth. In light of these findings it is suggested that the government may increase the share of spending on education and that will help in providing a skillful and productive society which further helps in increasing not only the individual's income but also national income too and thus the economy will grow. Population growth has negative impacts on economic growth of a country. It retards the growth pace by 12% with every 1% increase in it. The results support the Mankiew (1992) findings. Higher the population growth less will be the per capita income and thus it suggested that government should discourage the high population growth as it is not only a burden on economy but also a hurdle in the provision of better services too. *(See Appendix for a results table)*

4.5. Short Run Estimates

The Error Correction Model for short run impacts of public debt on economic growth is presented below;

$$DRGDP_t = \quad 0.424 + \quad 0.630ED_t \quad + 1.931PI_t + 0.217PG_t + 0.485HK_t - 0.561ECM_{t-1}$$

t- Statistic: (2.09) (2.150) (1.908) (2.028) (1.57) (-4.524)
P value (0.079) (0.071) (0.087) (0.054) (0.413) (0.000)

R^2 : 0.482, Adjusted R^2 : 0.278, DW-Stat: 2.21 F-Statistics: 7.342 (0.004)

The results presented in above equation suggest that foreign debt in short run promote growth. The contribution of foreign debt in economic growth of Pakistan is 63% in a short run. These findings support the theoretical debate of the traditional economist who said that in short run with the increase of debt the consumer increase their consumption which further leads to increase interest rate and increase in interest rate results in capital inflows and ultimately growth of economy boosted up. Amongst the other variables public investment (physical capital) and population growth contributes positively. The results show that with every 1% increase, the contribution of public investment is more than unity while population growth contribution is 21%. The coefficient of ECM enter in the model with negative sign (-0.561), which is statistically significant and shows high convergence to the long run equilibrium within a short period of time by 56%. Similarly, the overall goodness of the model as shown by the adjusted coefficient of determination is 0.48, which shows that about 48 percent of the variation experienced in the gross domestic product of Pakistan is explained by the explanatory variables included in our model. The value of F-statistic is 7.34 which show that the explanatory variables are important determinant of economic growth. *(See Appendix for a results table)*

4.6. Diagnostic Test

Our model specification satisfied all the diagnostic tests .Table below represent the results of these tests. The results presents in table below suggest that the estimation of long-run coefficients and *ECM* are free from serial correlation, heteroscedasticity functional form and non-normality.

Table-4.5. Diagnostic Test Results

TEST STATISTICS	F-Statistics	
LM test	1.523	(0.217)
Ramsey's test	0.258	(0.502)
Jarque-Bera test	1.804	(0.228)
White test	1.147	(0.363)

Source: Authors Construction

4.7. Stability Test

To test stability of model this study estimates the CUSUM and COSUMQ stability test. In present study the variables and data are stable because the plot of cumulative sum of recursive residuals CUSUM does not cross the critical boundaries. The results of this test is presented below;

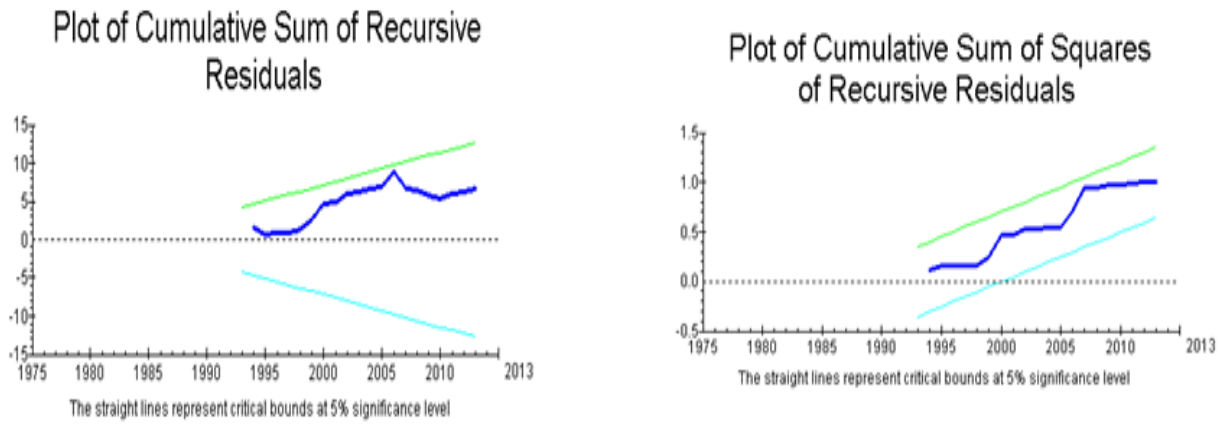

Fig-1. CUSUM and CUSUM Sq. Plot

Source: Authors Construction

5. CONCLUSION AND RECOMMENDATIONS

This study focused on foreign debt and economic growth of Pakistan. Empirical analysis covers the period from 1972 to 2013. ARDL co-integration technique and Error Correction Method are employed for estimation purposes. Diagnostic test were also applied to check the validity of the selected model. Extracted results revealed that, foreign debt and economic growth are negatively associated in long run while in a shorter span of time the foreign debt contributes positively towards economic growth of Pakistan. Human capital and physical capital both contribute positively in the growth of Pakistan economy Population growth as expected is the burden on economy of Pakistan. A long run relation between foreign debt and economic growth is confirmed by ECM and suggested a high speeds that correct the disequilibria in a year. In light of the findings of this study, it is suggested that the government may utilize the debt in a proper productive way to achieve the desirable growth. Furthermore reduction in corruption, controlling the ever crippling inflation, minimization of imports exports gap and reduction in growing security spending will help in achieving the desired level of macroeconomic goals.

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Appendix: Long Run and Short Run Relationship between External Debt & Economic Growth

DEPENDENT VARAIBLE RGDP			
Long Run Estimates (ARDL)		**Short Run Estimates (ECM**	
Variables	**Coefficients**	**Variables**	**Coefficients**
FD_t	- .315 (0.007)	ΔFD	0.630 (0.071)
PI_t	0.438 (0.002)	ΔPI	1. 931(0.087)
PG_t	-0.1.29 (0.032)	ΔPG	0.217 (0.054)
HK_t	0.671 (0.008)	ΔHK	0.485 (0.413)
		ECM (-1)	-0.561 (0.000)
R-Square	0.632	R-square	0.482
R-Bar-Squared	0.419	R-Bar-Squared	0.278
DW statistic	2.04	DW statistic	2.21
F-statistic	12.67 (0.000)	F-statistic	7.342 (0.004)
LM test 1.592 (0.304)		Ramsey test 0.215 (0.627)	
Jarque-Bera test 0.4936 (0.237)		White test 1.853(0.162)	