

## **Long Run Effect of Public Debt on Economic Growth In Sri Lanka**

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**Abstract:** Sri Lanka is relying heavily on public debt to finance the budget deficit since its independence from British in 1948. Thus, it is much important to investigate the long run of public debt on economic growth of the country for the period 1977 to 2012 using time series data. Sri Lanka introduced fully liberalized economic policy in 1977. The study used domestic debt, external debt and educational expenditure as explanatory variables to determine their effect on GDP in the long run. Long run is estimated by employing Auto Regressive Distributed Lag (ARDL).

The coefficient of Error Correction Term (ECT) suggests disequilibrium that is corrected at the speed of 52.8 percent over each year. Significant ECT is a proof of the existence of long run relationship.

**Keywords:** External debt, Domestic debt, long run effect

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### **I. Introduction**

Government needs to borrow for two broad categories; macroeconomic purposes such as higher investment, higher consumption (education and health or to finance transitory balance of payments deficits [to lower nominal interest rates abroad, lack of domestic long-term credit, or to circumvent hard budget constraints] (Soludo, 2003). But it has been observed since 1900; most of the countries in both advanced and emerging categories accumulate debt/borrowings mainly for the purpose of financing budget deficits. Situations where advanced economies also happened to depend on the borrowings because of large stock of defense expenditure spent on for world war period in early 20<sup>th</sup> century and to withstand for adverse effects of such as the Oil prices crisis and debt crisis occurred in 1970-1980. However, for those less debt burdened nations association of debt seemed to have higher growth rates where emerging countries and less developed countries kept accumulating debt for promoting economic growth due to their limited capacity to promote economic growth and to bridge budget deficits.

Governments prefer accumulation of debt in financing budget deficits because it is an anti-inflationary mechanism unlike printing money or imposing taxes. Although government can use taxes to finance its budget deficit, taxes tend to distort the structure of relative prices, and borrowing, if pushed beyond the carrying capacity of the economy, create problems of intergenerational equity (Akram, 2011). "Any attempts to reduce the deficit by raising taxes to intolerable levels or cutting down on capital expenditure are ill-advised as they only jeopardize future growth prospects of the economy" (Fonseka & Ranasinghe, 2007) Therefore, it seems that government using of both the strategies simultaneously. Having accumulated public debt for a longer period and considerable proportion of foreign capital inflows (export income and new credit facilities used to service debt annually, it is important to ask how public debt may influence economic growth because policy makers need to be aware of the relationship between these when formulating and implementing macroeconomic policies.

As the importance of the study, debt is improving welfare and enhancing growth at moderate level but there is damage from high level of debt (Stephen et.al., 2011). They further say that there is a threshold for debt as a proportion of GDP and the government should keep well below this level and otherwise it will badly influence on economic growth. Accordingly, this paper is important for decision making to address fiscal problems.

### **II. Research Issue**

Prior literature has shown a mixed impact of public debt on economic growth. Important point is according to the context those studies are carried out the results are varied thus there is no common agreement. A different political parties governing since the independence have been using debt finance to meet budget deficits.

Financing budget deficit through sources such as printing money, increasing taxes and cutting down government expenditure lead to increase price level of the country which may result in deteriorating living standards of the people (Fonseka & Ranasinghe, 2007), therefore in order to balance these adverse effects come through various sources public debt seemed to be playing a significant role in financing fiscal deficit in Sri Lanka. As pointed out by Pathberiya and Wijeweera (2005) reasons for greater accumulation of external debt

are; investment projects undertaken by the government on the areas such as power and energy, irrigation and agriculture and greater depreciation experienced by Sri Lankan rupee against major currencies. These researchers have paid attention in relation to budget financing and the courses for borrowing debt. However, there is a doubt that whether public debt have a significant literature review impact on economic growth in Sri Lanka. Accordingly, researcher has taken this situation the gap as a research issue in the study.

### **III. Empirical Evidence Towards Impact Of Public Debt On Economic Growth**

Positive effects of public debt relate to the fact that in resource-starved economies debt financing if done properly leads to higher growth and adds to their capacity to service and repay external and internal debt (Akram, 2011). Chowdhury (2001) stated that as far as the relationship of public external debt of an economy and economic growth is concerned, a reasonable level of borrowing is likely to enhance economic growth through capital accumulation and productivity growth. [As cited in Akram, (2010) Burnside (2000) pointed out at the initial phase of development countries have small capital stocks and the investment opportunities are also limited, therefore external borrowings for productive investment provide macroeconomic stability. Paudel and Perera (2009) highlighted that foreign debt in developing countries can be used to acquire technology and other factors of production to increase employment opportunities and national productivity. Egbetunde (2012) point out public debt and economic growth are positively related if the government is sincere with the loan obtained and use it for the development of the country rather than channel the funds to their personal interests.

In contrast Shah and Pervin (2012) remarked if the rate of return from public debt is higher than the debt service payment rate, it has greater possibility of affecting positively on economy and vice versa.

Barik (2012) in contrast to direct relationship of public debt and economic growth empirically examined indirect influence of public debt on economic growth through its impact on investment in India for the period of 1981-2011 and regression results indicated that public debt positively affects economic growth; one percent point increase in debt is associated with an increase in real GDP of around 0.08 percentage point per year. Based on the results concludes that government debt has made a significant contribution to the economic growth not only directly but also indirectly via investment and hence debts have positive effects in developing economies because of that funds are allocated for investment purposes.

As per debt guide (2013); debt liabilities owed by residents to residents of same economy are domestic debt. Reinhart, Rogoff, and Savastano (2003) state all debt liabilities of a government that are issued under and subject to- national jurisdiction, regardless of the nationality of the of the creditor where terms of the debt contracts may be market determinate or set unilaterally by the government.

Debt guide (2013); debt liabilities owed by residents to nonresidents are external debt. Reinhart, et al., (2003) define external debt as total liabilities of a country with foreign creditors both public and private. Creditors often determine all the terms of the debt contracts, which are normally subject to the jurisdiction of the foreign creditors or, for multilateral credits, to international law. Shah and Pervin (2012) describe external debt as the total public and private debt owed to nonresidents repayable in foreign currency, goods or service.

In most literature evidence public debt is classified as sum of external debt and domestic debt (Akram 2011, Barik 2012). Total debt liabilities of a government with both domestic and foreign creditors where "government" normally comprises the central administration, provincial and local governments, and all the entities that borrow with an explicit government guarantee are defined as total public debt (Reinhart, et al., 2003).

Basically budget deficits are financed by; printing money, foreign borrowings, domestic borrowings and running down foreign exchange reserves (Akhtar& Hassan, 2012). In this nature (where public debt works in line with the budget deficits Efthimiadis and Tsintzos (2012)highlighted that public debt and economic growth gained much attention over the recent decades as many countries have experienced lasting budget deficits which lead to sharp increases in Debt-to-GDP ratios, and for many, a large share of external debt.

## **IV. Methodology**

### **4. 1. Unit Root Test**

When conducting time series studies prior literature has obliged to check univariate time series of variable by using a unit root test in each series before estimating any equation. It is considered as a problem if there is a unit root because particular series considered being non-stationary. Non-stationary variables may lead to spurious results which produce high  $R^2$  value and  $t$  statistics, but without any coherent economic meaning. In order to perform the unit root test, this study has adopted the Augmented Dickey-Fuller (ADF) test of checking unit root because ADF unit root testing procedure is well established in the literature. The results are analyzed whether the variables are stationary at level or at 1st difference I (1 at 5 per cent significance level).

### 4.2 Lag Length Criterion

The study expects to use Vector Auto Regressive (VAR) Lag Order Selection Criteria to select the optimal lag length. Under that, using Akaike information criterion (AIC), Schwarz information criterion (SIC), Hannan-Quinn information criterion (HQ), Sequential modified LR test statistic (LR) lag length and Final prediction error (FPE) are selected. The lag length provided by most of the information criterion is utilized in the study.

### 4.3 Auto regressive Distributed Lag

The coefficient value of the ECT provides information to identify the rate at which the disequilibrium is corrected i.e. speed of adjustment towards the long run equilibrium after a short run shock. If the variables are stationary at level or first difference, the ARDL model can be applied. Following models have been used in the study.

$$\Delta \ln GDP_t = \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{i=1}^n \beta_{2i} \Delta DD_{t-i} + \sum_{i=1}^n \beta_{3i} \Delta ED_{t-i} + \sum_{i=1}^n \beta_{4i} \Delta EDU_{t-i} + \alpha_1 GDP_{t-1} + \alpha_2 DD_{t-1} + \alpha_3 ED_{t-1} + \alpha_4 EDU_{t-1} + \varepsilon_t - Eq (1)$$

$$\Delta \ln GDP_t = \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{i=1}^n \beta_{2i} \Delta DD_{t-i} + \sum_{i=1}^n \beta_{3i} \Delta ED_{t-i} + \sum_{i=1}^n \beta_{4i} \Delta EDU_{t-i} + \varepsilon_t - EC_{t-1} + \varepsilon_t - Eq (2)$$

Where,

- $GDP_t$ : Natural logarithm of Per capita GDP
- $DD$ : Domestic Debt as a percentage of GDP
- $ED$ : External Debt as a percentage of GDP
- $EDU$ : (Proxy variable for human capital Annual education expenditure
- $\varepsilon_t$ : Random error term
- $EC$ : Error correction term

Researcher applied Eq (1) to determine the joint association of GDP, DD, ED and EDU. Then Eq (2) is the ARDL that has been applied to determine the long run effect or the long run equilibrium.

## V. Data Presentation And Analysis

### 5.1. Source of the data

Main source of the debt data are obtained from the publications of Public Debt Department of Central Bank of Sri Lanka (CBSL). The reliability of the publication “Public Debt Department in Sri Lanka, Performance in 2012 and Strategies for 2013 and beyond” for debt data is high because CBSL remains the responsibility of managing public debt in Sri Lanka under the Monetary Law Act No. 58 of 1949. Education Expenditure (proxy variable for Human Capital) is acquired from the publications of Census and Statistic Department of Sri Lanka. Researcher used annual data in the study.

### 5.2. Result for Unit Root Test

**Table: 1** Unit root test results

Variables	At level	At first difference
GDP	0.3095	0.0082***
DD	0.4492	0.0006***
ED	0.2042	0.0000***
Edu	0.9999	0.0172**

Note: \*\*\* and\*\* indicate statistically significant at 1% level and 5% level respectively

Augmented Dickey Fuller (ADF) unit root analysis has been applied to test the stationarity of data. Probabilities at level are insignificant and the variables are non-stationary. They are stationary at first difference as the P values are significant. Therefore, all the variables are non-stationary at level and stationary at first difference. These results indicate that they are I (1) variables. Accordingly; ARDL model can be applied to determine the long run effect. Graphical presentations of data are provided by figure 1 and they are having trend.

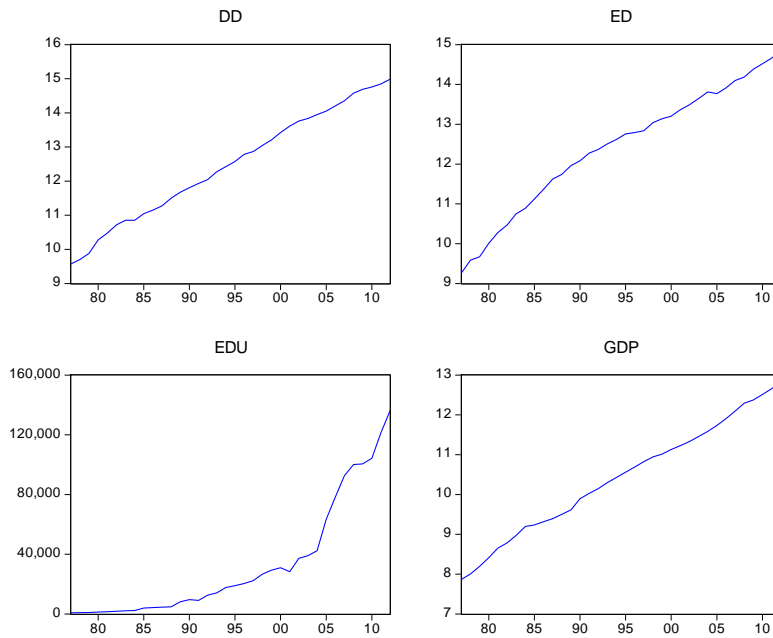


Figure: 1 Line graphs of the data

5.3. Optimal Lag Length Selection

Table: 2 Information criteria results

VAR Lag Order Selection Criteria						
Endogenous variables: GDP DD ED EDU						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-375.0981	NA	111771.2	22.97564	23.15704	23.03668
1	-164.3427	357.6456	0.843816	11.17228	12.07926*	11.47745*
2	-152.9286	16.60231	1.168070	11.45022	13.08277	11.99952
3	-128.1870	29.98981*	0.778050*	10.92042*	13.27856	11.71386

Note: \* indicates the number of lag length

According to the Schwarz information criterion (SC), and Hannanquinn information criterion (HQ), there is one lag length. Akaike information criterion (AIC, Final prediction error (FPE and Sequential modified LR test statistics (LR) represent three lag lengths. As many criteria recommend three lag lengths, researcher applied three in restricted VAR.

5.4. Joint association

Table: 3 Wald coefficient restriction test

Test Statistic	Value	df	Probability
F-statistic	2.426888	(4, 15)	0.0935
Chi-square	9.707553	4	0.0457

Probability of Chi-Square is 0.0457 and significant at 5%. This indicates that there is a joint association among GDP, ED, DD and EDU. Therefore, ARDL model has been constructed to determine the long run effect on economic growth. Result is given by table 4.

5.5. Results of Auto Regressive Distributed Lag (ARDL)

Table: 4 ARDL regression results

Dependent Variable: D(GDP)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.040984	0.037091	1.104953	0.2837
D(GDP(-1	0.382278**	0.167302	2.284958	0.0347
D(GDP(-2	0.058839	0.165918	0.354629	0.7270
D(GDP(-3	0.274722 *	0.144576	1.900190	0.0735
D(ED(-1	0.046979	0.105133	0.446858	0.6603
D(ED(-2	-0.310856***	0.102196	-3.041761	0.0070
D(ED(-3	0.138130	0.110519	1.249833	0.2274
D(DD(-1	-0.076346	0.112056	-0.681320	0.5043
D(DD(-2	0.140569	0.123784	1.135603	0.2710
D(DD(-3	-0.001188	0.110672	-0.010737	0.9916
D(EDU(-1	3.53E-06*	1.72E-06	2.050334	0.0552
D(EDU(-2	-3.21E-06	1.84E-06	-1.741897	0.0986
D(EDU(-3	6.77E-07	1.74E-06	0.390069	0.7011
ECT(-1	-0.528063***	0.170249	-3.101716	0.0062
R-squared	0.730761	Mean dependent var	0.137969	
Adjusted R-squared	0.536310	S.D. dependent var	0.050610	
S.E. of regression	0.034463	Akaike info criterion	-3.598220	
Sum squared resid	0.021379	Schwarz criterion	-2.956960	
Log likelihood	71.57151	Hannan-Quinn criter.	-3.385660	
F-statistic	3.758081	Durbin-Watson stat	2.250325	
Prob(F-statistic)	0.005250			

Note: \*\*\*, \*\* and\* indicate statistically significant at 1% level, 5% level and 10% level respectively

Probability of error correction term that is 0.006 with negative beta of -0.528 and it is significant at 1% level. This indicates that there is a long run association between GDP and public debt. When there is a shock in the previous year, 52.8% of disequilibrium is adjusted in the current year to the long run equilibrium. Other coefficients represent the short run impact of lagged periods. In the short run one period lagged of GDP has a significant effect on economic growth. Three period lagged of GDP has a marginal effect on economic growth in the short run. Two periods lagged of external debt is significant at 1% and there is a short run negative impact on economic growth. One period lagged of education has a positive impact on economic growth at 10%.

5.6. Diagnostic tests

Table: 5 Heteroscedasticity test results

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.199447	Prob. F(13,18)	0.3531
Obs*R-squared	14.85347	Prob. Chi-Square(13)	0.3166
Scaled explained SS	3.677642	Prob. Chi-Square(13)	0.9942

Probability of observed R-squared is 0.58 and the result is insignificant. This says that variance of residual is constant and the model is not having heteroscedasticity problem. Therefore, model is appropriate.

Table: 6 Serial correlation test results

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. *  .	. *  .	1	-0.131	-0.131	0.6046	0.437
. *  .	. *  .	2	-0.119	-0.139	1.1207	0.571
.   .	.   .	3	0.031	-0.005	1.1575	0.763
.   .	.   .	4	0.023	0.011	1.1780	0.882

. *   .	. *   .	5	-0.131	-0.127	1.8672	0.867
. *   .	. *   .	6	-0.143	-0.186	2.7243	0.843
.   * .	.   * .	7	0.187	0.113	4.2492	0.751
.   .	.   .	8	0.020	0.031	4.2668	0.832
. * *   .	. * *   .	9	-0.331	-0.316	9.4339	0.398
.   .	.   .	10	0.057	-0.060	9.5966	0.477

Correlogram Q statistics indicate that all the probabilities are insignificant and no serial correlation or auto correlation in the residuals. Therefore, the model is appropriate and results are valid.

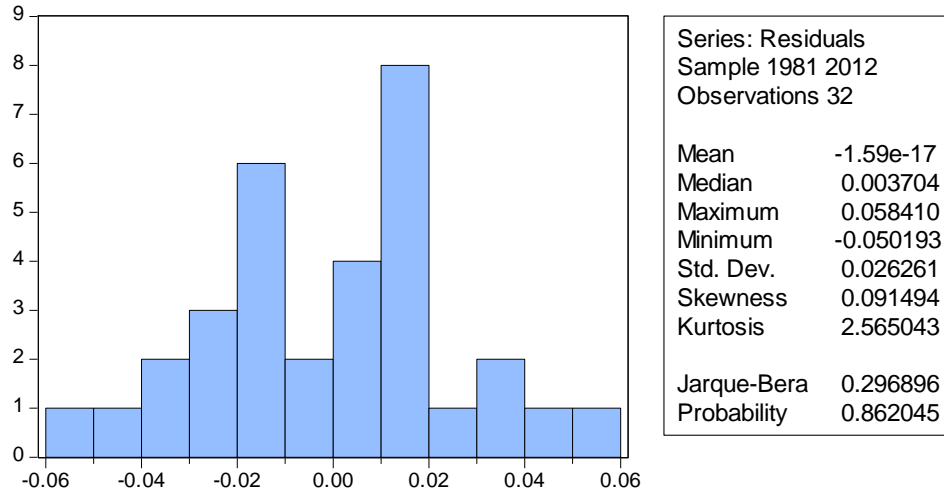


Figure: 3

Probability of Jarque-Bera test statistics is 0.805 and result is insignificant. This indicates that residuals are normally distributed with zero mean and the regression model is highly valid.

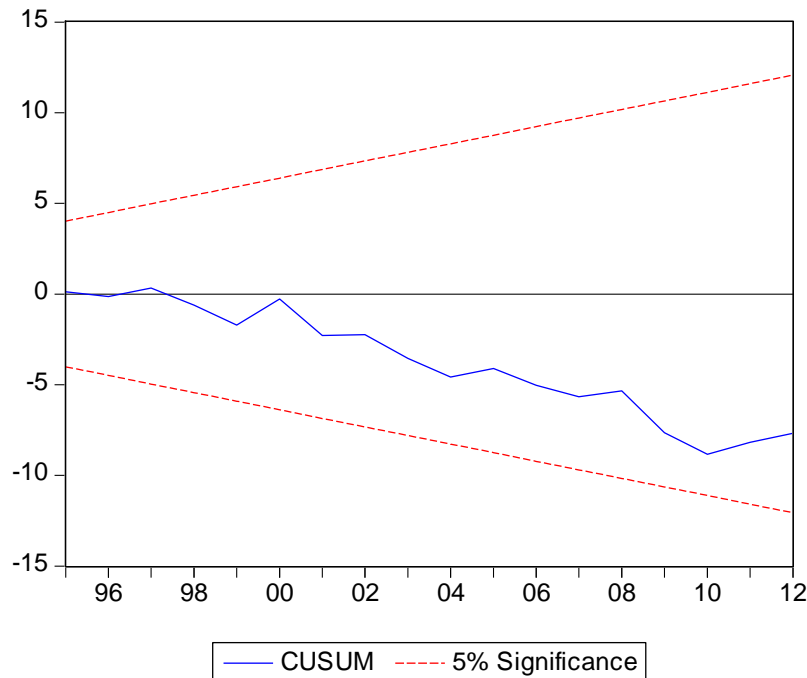


Figure: 4

In the figure 4, line of cumulative sum of recursive residuals is between the two borders line and parameters are stabilized. Accordingly, there are appropriate results of the ARDL.

## **VI. Conclusion**

This study examines the impact of public debt on economic growth in Sri Lanka over the period of 1977 to 2012. Public debt is classified as public domestic debt and public external debt and their impacts towards economic growth in long run. For this purpose, the study adapted Auto Regressive Distributed Lag model. Finally, Error Correction Term was used to capture the speed of adjustment.

In addressing research objective, the study finds domestic debt, external debt and educational expenditure significantly affect economic growth in long run. As the policy implication, the results of the study are providing strategic information for the government in making policy decisions with regard to borrowing debt. The government of Sri Lanka needs to pay attention to the financing budget deficit by properly maintaining the threshold for debt as a proportion of GDP. Foreign and domestic borrowings will influence on economic growth in the long run but threshold for debt is a factor to be evaluated in financial decisions. Public debt and economic growth gained must be paid attention over the time in budgetary decision making. This is vital to lead an appropriate "Debt-to-GDP" ratio; otherwise debt will drag economic growth negatively.

From the policy prospective it is recommended to refrain from adverse effects of external debt and public domestic debt on economic growth. The negative effect on economic growth is more severe. As foreign exchange reserves are very important for paying back external debt the revenue generated from export can help Sri Lanka to overcome the issue. Therefore, export diversification strategies and value added export must be strongly promoted. Also good relations with other countries to reduce trade barriers must be encouraged. At the same time value of Sri Lanka Rupee in foreign exchange market should be protected because currency devaluation strategy to enhance exports has not been helpful against competitive devaluations. As external and domestic debt have negative impact on GDP, policy makers' heavy reliance of debt to finance fiscal deficit must be discouraged because there is dire need to stimulate revenue.

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