

DOES DEBT PROMOTE OR PREVENT GROWTH: A CASE STUDY OF PAKISTAN

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ABSTRACT: *The long-standing issue about the optimality has attracted renewed attention in the wake recent US congressional debate about debt-ceiling and in Pakistan, Pakistan's loan arrangements with IMF and question of burgeoning circular debt. The existing work on the debt-growth relationship although substantive, lacks pragmatism. The literature published on the topic in the recent past tries to establish a negative linkage between debt and growth in one form or the other. This study has several departures from the earlier work done on this topic. First, we use real GDP growth instead of nominal GDP and real growth instead of nominal growth to make adjustments for inflationary considerations. The use-age of superior econometrical technique concludes a negative U-shaped relationship between debt and growth i.e. one or multiple points of inflections are expected in the economy.*

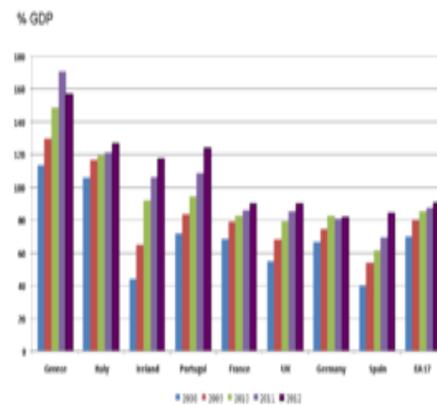
INTRODUCTION

Debt-growth relationship has attracted renewed attention in the wake of congressional debate about debt ceiling in US and burgeoning amount of criticism about Pakistan's arrangement with IMF fresh debt arrangements worth \$6.5 billion under EEF. At present public debt for Pakistan stands around 60% of GDP. According an estimate it is likely to increase to 65.9% by the end of fiscal of 2014. This makes Pakistan more vulnerable to slipping into situation of debt overhang despite paltry/modest growth in remittances,

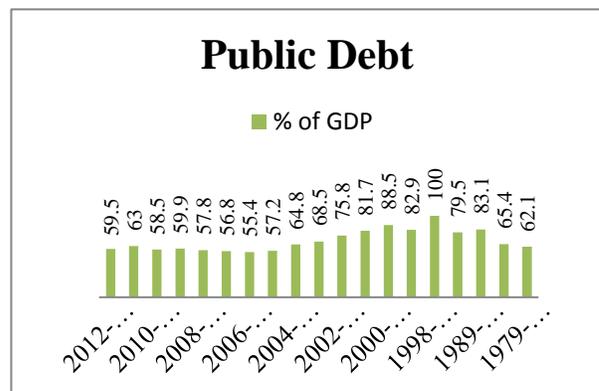
Public debt has become a global problem. Since 2009, world has been in the grip of debt problem. According to CIA fact-book total public debt stands at a level of US \$56,308 billion which is 64 percent of total worlds' GDP. All kinds of economies from LDCs to MDCs countries seem to be either involved or impacted by the debt. In 1992 realizing the graveness of the situation, members of the European Union agreed to contain deficit spending and put a cap on the debt levels. The compliance of the debt containment policy was hard to come by as owing to diverse economic reasons member states of the European Union were unable to comply with the prescribed limit of the Maastricht guidelines and resorted to adopt craftier ways of debt financing by passing the best practice and overlooking international standards. The other unintended consequence of the debt-limiting policy was that it compelled sovereigns to hide true levels through accounting maneuvers. From late 2009 on, after Greece's then newly elected government laid more emphasis on transparency and presented real numbers instead of tainted picture of sovereign indebtedness and budget deficit. Revelation of actual picture of debt and deficit led subsequent substantial down gradation of government debts of the states involved in these practices. Table one presents the picture of rising trends of debt with respect to their GDP ratios of prominent European economies. Sensing the graveness of the situation EU set a debt limit of 60 percent of the GDP. Although, this limit has been breached by several EU member countries.

It makes ostensible sense for some of the developing economies to be in the grip of public debt as these economies experience low saving rates and have to borrow to finance investment expenditures. However, some of the mature economies are facing this dilemma either to finance hefty social security programs or foreign direct investment. Table 1, depicts the average of IMF and CIA fact book Public Debt to GDP ratio in the world.

Debt to GDP Ratio for Selected European Countries

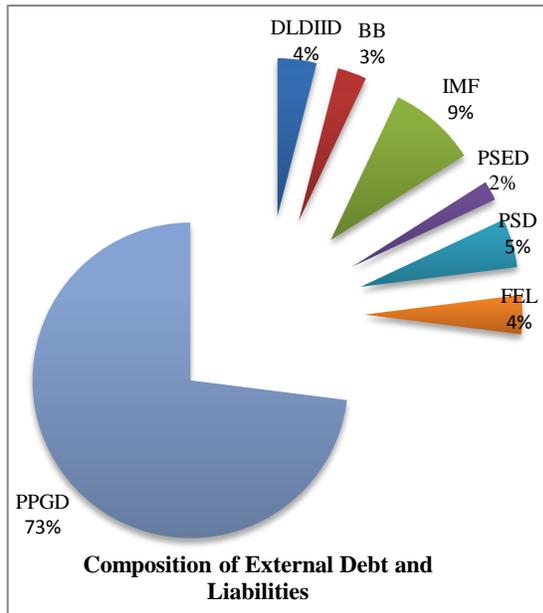


Graph 1: Debt to GDP for Selected European Countries



Graph 2: Pakistan's Public Debt as %age of GDP

Source: Pakistan Economic Survey Reports (Various Issues)



Graph 3: Composition of External Debt and Liabilities of Pakistan

This brings up two important questions. First some of the high debt economies didn't slip into a situation of debt overhang despite being high debt economies for a considerable period of time. Second, should some of the developing economies continue to borrow to finance developmental expenditure to a point where either they no longer need debt to finance growth or they cannot sustain more debt. In the wake of second point we need to examine the magnitude of the debt-service that an economy can bear and there is point of inflection i.e. a point beyond which debt starts impacting growth adversely. Pakistan is estimated to spend \$6485 million in debt servicing during the fiscal year of 2013 that is way high compared with \$2300 million spent in year 2012[ZaheerAbbasi, Business Recorder]. Since the debt-paying capability is heterogeneous across countries, so the optimal level of debt is likely to be heterogeneous across countries[RR 2010]

Public Debt typically comprises of two kinds of debt i.e. internal debt and external debt. Internal debt can be in several different form: Reverse repo mechanism, Most plausible reason and rationale behind getting debt as highlighted by Edwin Arkoh[1] include tilting, smoothing, stability, and political budget cycles. Cashin, Haque, and Olekalns[2] find some evidence of Govt. of Pakistan indulging in smoothing behavior over a period of time. This manifests that Govt. of Pakistan resorted to borrow money and run budgetary imbalances instead of altering or improving contemporaneous revenues as preferred to response to expected future changes. This could be construed as the inability of GOP(Government of Pakistan) to satisfy its inter-temporal budget

PPGD: Public and Publically Guaranteed Debt 73%
 DLDIID: Debt Liabilities to Direct Investors
 Intercompany Debt 4%
 BB: Bank Borrowing 3%
 IMF: International Monetary Fund 9%
 PSED: Public Sector Enterprise Debt 2%
 PSD: Private Sector Debt 5%
 FEL: Foreign Exchange Liabilities 4%

constraint from traditional avenues of revenues and thereby enhance the chances of public borrowing as an easier way to handle unanticipated governmental spending-needs which is in conformity with tax smoothing doctrine. As per their findings, by 1995 Government of Pakistan had accumulated stock of liabilities 56% higher than it should have been under optimal tax smoothing. This implies that fiscal surpluses or smaller deficits will need to be run in future to ensure inter-temporal solvency. Cashin, Haque, and Olekalns [2] found that the Govt. of Pakistan was charging 23% lesser tax to this generation and would have to charge later generations more to clear of the stock of liability.

We using the better econometrical technique and using Ramsey Regression Equation Specification Error Test (RESET) test Ramsey, (3), conclude the existence of inverted U shaped relation between Public debt and growth of economy. The model yields relatively lower R^2 of 0.41 which suggestive of the fact there other factors impacting growth. These factors could include Foreign Direct Investment, private local investments and more. In case of Pakistan, however, the public debt having curvilinear relationship with growth remains the single largest determinant of GDP growth.

Literature Review

The literature establishing linkage between debt and growth is recent and rich. The burgeoning amount of literature on the topic asserts and establishes negative relationship between public-debt and growth. Country specific studies like M.S. Ogunmiya[3], using quarterly data from 1970 to 2007 for Nigeria documented negative relationship between growth and debt by using ADF and Error approach.

Mehdi Safdri et al[4] drew similar conclusions from their Iran specific studies through the use-age of data from 1974 to 2007. The study empirically proves that GDP growth and private investments are negatively impacted by debt.

Khadija and Tariq[5] using OLS, document "positive relationship between debt and growth and negative relationship between debt-servicing and growth". Consequent upon Krugman[6] assertion that low economic growth leads to high level of debt sparked debate as some of the mature economies in the world are leading debtor nations as well. Ironically, some of the low-growth economies are relatively lower debtor nations.

Reinhart and Rogoff[7] were the first one to give the idea of debt-ceiling i.e. upper bound debt limit. The study suggests debt-gdp ratio of 90% as the upper limit. However, they do hint out the limit not an absolute bench mark. Further, the consequences of crossing the debt-ceiling are gradual rather than sudden. They assert that its' not like at 89% economy shall be experiencing fast growth and 90% debt level run into debt overhang situation. While the Carmen Reinhart and Keneth Rogoff work leans toward having one-size fit-all solution for diverse economic conditions and countries.

Panizza and Presbitero[8] argue for some flexibility to assimilate cross-country heterogeneity. They take hard stance that cross-country heterogeneity should be taken into account in assessing debt-threshold. To identify and assess the factors impacting the optimal debt level of a particularly economy are beyond the scope of this paper. For now, suffice to we have enough evidence to believe that debt-servicing capability is not uniform so we need to find country specific threshold. Reinhart and Rogoff[9] assert that establishment of country-specific debt threshold is an empirical issue.

Eberhardt and Presbitero[10] found out that debt-growth relationship systematically and significantly differ across countries. However, they did not find pragmatic support for within-country nonlinearities in the debt-growth relationship. They conceivably argue that debt-growth relationship could take several different form depending upon the structure of the economy, however, one thing for sure is that this differs across countries. Consequently, appropriate policies for one country may not work well for the country having similar debt to gdp ratio.

This lack of consistency makes us find answers for important questions about the economy of Pakistan. First, do economy of Pakistan follows the typical pattern of developing nation's i.e. inverted u-shaped curve in terms of debt-growth relationship. Second, what is the optimal debt-threshold for the economy of Pakistan? Third what policy measures in terms of debt – restructuring needs to be done in pursuance of proactive rather than reactive debt policy?

Methodology and Data Description

In this paper we use ARDL(Autoregressive Distributive Lag Model). In ARDL, the variable in questions are supposed to be dependent of past values of itself(auto-regressive) and the current and past values of other variables(distributed lag). They can relatively easily be extended to incorporate panel data.

ARDL models have embedded ability to handle broad range of lag structures and include well-known models such as static regressions as special cases.

$$Y = \mu + \sum_{k=1}^p \rho_k Y_{t-k} + \sum_{j=0}^q \beta_j X_{t-j} + \epsilon_t$$

Data:

The data used in this paper have been extracted and obtained from the various issues of annual reports of State Bank of Pakistan. The following specification is used in the empirical model to examine the relationship between public debt and GDP:

$$Gdp = f(pd)(1)$$

The following equation represents the simple linear functional formulation of the model.

$$Lgdp_t = \alpha_0 + \alpha_1 pd_t + \epsilon_t(2)$$

Where gdp is the gross domestic product used as a proxy for economic growth while pd is the public debt. Following the methodology of Clarke [11, 12], we also test the non-linear specification:

$$Lgdp_t = \beta_0 + \beta_1 pd_t + \beta_2 pd_t^2 + \beta_3 pd_t^3 + \mu_t \quad (3)$$

Equation (3) predicts the non-linear relationship. The inverted U-shaped hypothesis requires that $\beta_1 > 0$ and $\beta_2 < 0$; but if $\beta_1 < 0$ and $\beta_2 > 0$, we end up with U-shaped relationship between public debt and economic growth.

This paper follows the Auto Regressive Distributed Lag (ARDL) bounds testing approach to co-integration developed by Pesaran et al. [13] to examine the long run relationship between economic growth and public debt in the context of Pakistan. Inherent advantages ARDL make it a superior estimation mechanism. First, ARDL has the built-in capability to estimate the short- and long-runs parameters simultaneously. Second, its application is not contingent upon the series to be integrated of order 1 or zero. This implies series don't necessarily have to be either I(0) or I(1). Third, this estimation technique does particularly well when the sample size is small in the context of multivariate analysis. Fourth, ARDL bounds testing approach to co-integration does not have shortcomings typically found in some relatively older approaches such as Engle-Granger [14] Philips and Hansen [15]; Johansen and Juselius [16]; Johansen [17] and Johansen [1992] maximum likelihood ratio.

Table 1: Unit Root Test Results

Variable	ADF Test				DFGLS			
	At level		At 1 st diff		At level		At 1 st diff	
	In	T&I	In	T&I	In	T&I	In	T&I
PD	0.45	-1.8	6.23	6.55	0.65	-1.7	-6.2	-6.7
GDP	-4.0	-4.0			2.82	3.63		

Variable	PP Test			
	At level		At 1 st diff	
	In	T&I	In	T&I
PD	1.53	1.69	-6.2	-6.5
GDP	-4.0	-3.9		

In this paper, Augmented Dickey Fuller (ADF) test is used to test the stationarity of variables along with DF-GLS, and Phillips-Perron tests. The potential shortcoming of ADF as pointed out by Dejong et al, [19], and Harris [20] that for small sample data set, these tests seem to over-reject the null hypotheses when it is true and accept it when it is false. Consequently, we have used two new tests, i.e., Dicky-Fuller Generalized Least Square (DF-GLS) and Phillips-Perron test could solve the problems of data size and power properties. The Dicky-Fuller Generalized Least Square (DF-GLS) has also called de-trending test that was developed by Elliot et al. [21], and PP test by Phillips and Perron (1988). All three test results show that gdp is stationary at level whereas public debt (pd) is stationary at 1st difference as depicted in table 1. The lag order has been selected on the both SIC & HQ and estimated results did not allow us to take more than one lag because of small sample data.

Table 2: Lag Order Selection

Lag order	SIC	HQ	AIC
K= 1	-1.114*	-1.8384*	-1.4112*
K= 2	-0.556	-0.9827	-1.0509

Note: * denotes significance at 5% level and the rejection of the null hypothesis of non-stationary critical values obtained from Fuller (1976) are -2.88 and -3.45 for the cases of intercept and trend and intercept respectively.

We use the ARDL developed by Pesaran to track down the presence of co-integration either in long run or in short time horizons. The outcome of ARDL co-integration test is summarized in Table 3 given below. Here we commence our analysis with the null hypothesis that there is no co-integration between gdp (lgdp) and public debt (lpd). Our calculations depict that "t" value of public debt variable is 2.12, with an associated probability closer to zero probability. Consequently we reject our null hypothesis of no co-integration between gdp and public debt and conclude that the two variables are cointegrated. Our results are consistent with the findings of the other economies and support and substantiate the fact that level of debt does impact gdp.

Table 3: ARDL Co-integration Testing (1, 1) selected based on Schwarz Bayesian Criterion

Dependent variable is lgdp			
Regressors	Coefficient	t-stat	Probability
IPd	3.06	2.12	0.04
IPd(-1)	-0.72	-0.49	0.625
lgdp(-1)	0.68	4.19	0.0005
Adjusted R ²	0.27	D.W	Stat
		1.90	

Table 3: Results of Non-Linear Model

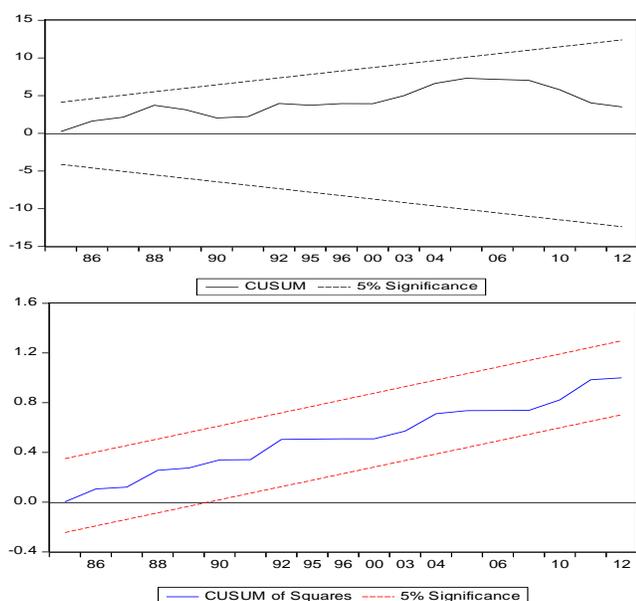
Dependent variable is GDP			
Variable	Coefficient	t-stat	Prob
C	3.48	1.85	0.080
Lpd	-75.6	1.88	0.075
Lgdp(-1)	0.32	1.81	0.085
Lpd ²	5.45	1.92	0.071
Lpd ³	-0.13	1.96	0.065
Adjusted R ²	0.41	D.W	Stat
		2.49	
Serial Correlation LM, F = 0.931.64 (0.41)			
ARCH Test: 0.07 (0.79)			
Normality J-B Value = 0.90 (0.687)			
Heteroscedasticity Test, F = 2.65 (0.0296)			
Ramsey RESET Test, F = 1.175 (0.296)			

Finally, non-linear relationship between economic growth and public debt has been examined by incorporating squared term of public debt (lpd^2) in basic double log model. Our evidence on non-linear relationship between economic growth and public debt is U-shaped while ignoring the coefficient of lpd^3 because results show that lpd^3 is statistically insignificant.

The whole model can be described as:

$$GDP = 3.48 + .32Lgdp_{t-1} - .75.6Lpd + 5.45Lpd^2 - .13Lpd^3$$

The diagnostic tests such as LM test for serial correlation, normality of residual term, white heteroscedasticity and model specification test have been conducted. The empirical findings show that short-run model seems to pass all diagnostic tests successfully. The evidence indicates about no confirmation of serial correlation and residual term is normally distributed. Furthermore, model has passed the Ramsey test which indicates that functional form of model is well specific. The stability tests have used to investigate the stability of long and short run parameters. In doing so, cumulative sum (CUSUM) and cumulative sum of squares (CUSUMsq) tests have been employed.



CONCLUSION

This paper gives some insight significance of debt threshold and its contribution to growth in the economy of Pakistan. However, we need to calculate the debt elasticity of growth. The debt elasticity of growth shall portray a better picture of contribution of debt in growth. Further, the direct impact of debt on growth might be insignificant however, the contribution of education or other infrastructural projects on which the borrowed money is spent might be significant. It would be interesting to examine the nexus of GFCF (Gross Fixed Capital Formation), Public Debt and FDI in case of Pakistan.

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