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Public Debt and Economic Growth Nexus: Evidence from South Asia

Abstract

It is well established in literature that the public debt and economic growth bear positive and non-linear relationship. However, in recent literature, evidence of no causal relationship is found when accounted for endogeneity in case of advanced economies (Panizza & Presbitero, 2014). Chudik, Mohaddes, Pesaran, & Raissi, (2017) analyse the data on forty countries and find no evidence of universally applicable threshold effect in the relationship between debt and growth. These advancements in the debt-growth literature provides the motivation to re-explore the relationship between public debt and economic growth under non-linearity and endogeneity in context of developing economies of South Asia including Pakistan, India, Bangladesh and Sri-Lanka for the period 1980-2014. There exists a significant, positive but nonlinear relationship between the public debt and economic growth for the selected set of developing countries when accounted for endogeneity and non-linearity. The negative association between the public debt and economic growth for SAARC region is found when the debt level is higher than 61% of GDP which is quite lower than developed economies (90% of GDP). Individual threshold levels for debt-to-GDP ratio divulge that Sri Lanka, Pakistan and India need to control their public borrowings as their current debt levels are higher and/or around the respective threshold levels.

Key Words: Endogeneity, Non-linearity, Threshold, FMOLS

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INTRODUCTION

The hypothesis of nonlinear relationship between debt and economic growth has got its due attention in the literature (Reinhart & Rogoff, 2009; Reinhart & Rogoff, 2010; Checherita-Westphal & Rother, 2012; Kumar & Woo, 2010 and Eberhardt & Presbitero, 2015) and, in general, there is a consensus among the researchers regarding the existence of debt-threshold effect on growth however, Chudik, Mohaddes, Pesaran, & Raissi, (2017) analyse the data on forty countries and find no evidence of universally applicable threshold effect in the relationship between debt and growth.

Endogeneity issue has recently been highlighted in the debt-growth literature (Kumar & Woo, 2010; Panizza & Presbitero, 2014; & Chudik, Mohaddes, Pesaran, & Raissi, 2017). On balance, researchers find significant relationship between public debt and economic growth after catering for endogeneity. On the contrary, for developed economies, Panizza & Presbitero, (2014) establish that debt and economic growth bear no relationship when controlled for endogeneity.

With the given advancements in the debt-growth literature on the threshold effect (non-linearity) and endogeneity issues, we hardly find any study focusing on both the problems simultaneously in context of developing economies of South Asia. This study is an attempt to bridge this gap in literature by exploring the relationship between public debt and economic growth by incorporating non-linearity and endogeneity in the econometric model for the major developing economies of South Asia including India, Pakistan, Bangladesh & Srilanka[1] for the period 1980-2014.

In general, literature related to the aforementioned developing economies establish that the burden of debt is unsustainable and affecting the growth negatively when raised to a certain level. Mahmood, Arby, & Sherazi, (2014) find the large fiscal and current account imbalances as the major reasons behind this negative impact of debt on growth. The study emphasizes to address the long standing issue of twin deficit through credible policy measures to achieve debt sustainability. Siddiqui & Malik, (2001)highlight the mismanagement of resources,

[1]The contribution of these four economies to the total GDP of the region is 99% (Mahmood, Arby, & Sherazi, 2014).

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macroeconomic imbalances and international uncompetitiveness as the main factors behind the high external debt and its negative impact on growth for three south asian countries including Pakistan, Bangladesh and Sri Lanka for the period 1975-1993.Ramzan & Ahmed, (2014) analyze the effecitveness of economic polices in utilizing the external debt for productive pursposes over the period 1970-2009 for Pakistan. Akram, (2011) finds a negative and significant relationship between external debt and GDP per capita for the period 1972-2009 for Pakistan by using ARDL approach. Shah & Pervin, (2012) analyze the impact of external debt stock and external debt servicing on Bangladesh's economy for the period 1974-2010. The study concludes that the debt stock has positive relation with growth but more debt stock implies more debt service payment in future. This can be growth retarding in future if debt stock is accumulated or increased at very high rate. Hassan & Akhter , (2012) also finds negative impact of external debt on economic growth of Bangladesh with little statistical significance for the time period 1980-2012. Singh, (1999) finds the support for Ricardian equivalence hypothesis between debt and economic growth in India by using cointegration and Granger causality tests over the period 1959-95. Barik, (2011) and Kaur & Kaur, (2015) find the indirect positive impact of debt on economic growth through investment channel suggesting that the Indian public debt is intensively used for investment purpose to achieve sustainable growth. However, Bal & Rath, (2014) find a negative impact of both domestic and external debts on economic growth of India in the longrun by using an ARDL approach. The study by Kumara & Cooray, (2013) establishes nonlinear relationship between public debt and economic growth of Sri Lanka for the period 1960 to 2010. Kumarasinghe & Purankumbura, (2015) also reveal that the debt has a non-linear relationship with economic growth in Sri Lanka for the period 1964-2012.

The well known endogeneity problem is handled by applying the alternative yet controversial instrumental variable technique by Panizza & Presbitero, (2014) and find no causal relationship between high debt and low growth for developed economies. However, they confirm the association between the increase in debt and low growth in OLS results at 10 percent level of significance. To our knowledge, related to selected economies, Kumara & Cooray, (2013) is the only study which caters for the endogeneity issue by using the lags of the variable as instruments for Sri Lankan economy. Given that there are some fundamental difficulties in finding the external instrumental variables for debt (Reinhart, Reinhart, & Rogoff, 2012), this study

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addresses the potential endogeneity problem by using the FMOLS technique which provides consistent long-run estimates under endogeneity.

METHODOLOGY

Mankiw, Romer and Weil (1992) assumed that households fix the saving and educational spending ratios which allows us to have an augmented Solow model by assuming the Cobb-Douglas form:

$$Y = AK^{\alpha}L^{\beta} \qquad where\ \ \alpha > 0, \beta > 0\ \&\ A > 0 \qquad (1)$$

According to Bräuninger, (2003), the steady state growth rate increases if an increase in public debt is used to redistribute tax burden of every individual from youth to middle age. Hence, in context of open economy, public debt may not be harmful for growth.

Bräuninger, (2003) provides the proposition that the steady-state growth is possible if the deficit ratio stays below a critical level by deriving the following result.

$$\hat{K} = \hat{H} = \hat{Y} = A(s[1 + b - g] - b)^{\alpha}(z[1 + b - g])^{\beta} \qquad (2)$$

where, s, b, g and z are the saving ratio, deficit ratio, government purchase ratio and educational spending ratio respectively. The effect of deficit ratio is given by:

$$\frac{d\hat{Y}}{db} = \frac{\beta\hat{Y}}{(1 + b - g)} + \frac{(s - 1)\alpha\hat{Y}}{s(1 + b - g) - b}$$

$$\frac{d\hat{Y}}{db} < 0\ if\ b > b' = \frac{(s - \alpha)(1 - g)}{(1 - s)}$$

It is pertinent to mention the assumption that the budget deficit adds to public debt $\dot{D} = B = bY$ made while deriving the aforementioned results.

Endogeneity

Panizza & Presbitero, (2012) establish that the OLS parameters are biased due to the existence of endogeneity problem in context of a bivariate model in which growth is a function of debt.

$$G = a + bD + u$$

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$$D = m + kG + v$$

where, economic growth (G) is a function of public debt (D) and vice-versa. Where reduced forms of both the equations would be:

$$\mathrm{G} = \frac{a + bm}{1 - bk} + \frac{bv + u}{1 - bk}$$

$$\mathrm{D} = \frac{m + ak}{1 - bk} + \frac{v + ku}{1 - bk}$$

To calculate $\hat{b}$ we know that:

$$\hat{b} = \frac{Cov\ (G, D)}{Var\ (D)}$$

$$\hat{b} = \frac{b\sigma_v^2 + k\sigma_u^2}{\sigma_v^2 + k^2\sigma_u^2}$$

And the bias of the OLS estimator is:

$$E\left(\hat{b}\right) - b = \frac{k(1-bk)}{\frac{\sigma_v^2}{\sigma_u^2} + k^2} \qquad (3)$$

Since stability requires that $bk < 1$shows that OLS estimations are unbiased if and only if $k = 0$. (i.e. if debt is not endogenous).

According to Phillips & Hansen (1990) and Phillips (1995), in presence of endogeneity, limiting distribution of OLS parameters contains second order bias and non-centrality bias come from the fact that regression errors are serially correlated. Phillips and Hansen (1990) proposed a correction in β^{OLS} formula by applying a transformation which allows for correcting for endogeneity bias and non-centrality bias. The resulting method is known as FMOLS.

Non-linearity

According to Checherita-Westphal & Rother, (2012), the simplest test for non-linearities is to include the quardratic term in the model. Through signs and significance of quadratic

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specification (β_1& β_2), it is easier to establish the existence of non-linear relationship between debt and growth. Threshold or optimal point can be calculated through first order condition.

$$Growth_{it} = \beta_i + \beta_1 Debt_{it} + \beta_2 Debt_{it}^2 + X_{it}\eta + \varepsilon_{it} \quad (4)$$

where, the *X* matrix contains the growth rates of labour and capital, human capital (Govt. expenditure on education as percentage of GDP), inflation, trade openness, and dependency ratio (ratio of population aged 0-14 and 65 above to total population). The data on the aforementioned variables are taken from the World Development Indicators and Penn tables for the time period 1980-2014.

RESULTS& DISCUSSION

Due to regional integration, economic variables start depending on each other and a shock happening in a particular country may have large impact on its neighboring country if integration is very high (Pesaran, 2004). This study is based on panel data which requires the testing for cross-sectional dependence in the error terms and the results divulge to accept the null hypothesis of cross sectional independence (p-value=0.1032). This leads us to the panel unit root test proposed by Im, Pesaran, & Shin, (2003) with the assumption of cross sectional independence. It is evident from the results summarized in table 1 below that growth rate of GDP, human capital, labor growth and inflation are stationary at levels while the other variables are integrated of order one. This further strengthen the power of our selected method as Fully Modified estimators allows modeling variables with different order of intergration reported by Chiang & Kao, (2000).

Fisher's cointegration test proposed by Maddala & Wu, (1999) is the most suitable choice due to its less restrictive alternative hypothesis and mixed order of integration of variables. Both the Fisher's cointegration statistics, trace and maximum eigen value tests, confirm the existance of cointegration among the varaibles (see appendix, Table 1).

Durbin–Wu–Hausman test (augmented regression test) is applied to test the existence of endogeneity issue in the model. The data do not provide enough evidence (p-value=0.049) to support the null hypothesis of exogeneity (see appendix, table 2). This leads to the inconsistency of OLS. Thus, Fully Modified OLS is applied to estimate the empirical model and results are summarized in table 2.

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Table 1: Unit Root Test Results

Variables	Level	First Difference
GDP Growth	-3.04148	
	(0.0012)	
Capital Growth	0.93442	-5.10051
	(0.8250)	(0.0000)
Labor Growth	-3.05048	
	(0.0011)	
Human Capital	-2.39392	
	(0.0083)	
Debt/GDP	-1.20834	-3.45493
	(0.1135)	(0.0003)
Inflation	-3.37978	
	(0.0004)	
Trade Openness	2.27268	-6.37398
	(0.9885)	(0.0000)
Dependency Ratio	3.70669	-11.3786
	(0.9999)	(0.0000)

P-values are in the parenthesis

Table 2: Fully Modified Ordinary Least Square

Variables	Coefficients	Standard Error	t-values	Prob.
Capital Growth	0.007897	0.003112	2.537477	0.0124
Labor Growth	0.696475	0.148292	4.696642	0.0000
Human Capital	0.017182	0.008989	1.911413	0.0582
Debt/GDP	0.258933	0.020798	12.44971	0.0000
Debt/GDP^2	-0.002069	0.000163	-12.66404	0.0000
Dependency Ratio	-0.054461	0.009907	-5.496966	0.0000
Inflation	-0.057829	0.021281	-2.717459	0.0075
Trade Openness	0.022279	0.006296	3.538805	0.0006
R-squared				0.232839
Adjusted R-squared				0.190885
Long-run Variance				1.073117
Durbin-Watson stat				1.772961

Dependent Variable: GDP Growth

All the conventional variables carry the expected signs and significance. For instance, labour, capital, human capital and trade openness have positive and significant impact on growth. On the other hand, dependency ratio and inflation are growth retarding. The coefficient for capital is positive and significant which show that increase in capital accelerate economic growth. The increase in capital formation will enhance the production capacity of an economy. The increase in overall output level of country induces positive effect on growth. The estimated coefficient on

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labour is slightly larger than one would expect to predict from neoclassical theory. The possible explanation could be the rise in labour reduces the rate in technological progress. These results are in line with the findings in Shahzad & Javed, (2015); Salotti & Trecroci, (2012); and Panizza & Presbitero (2014). The R square of model is quite low but that is not an issue in our research as low R-squared values are problematic when you need precise predictions established by Florian, (2016).

Statistical significance and the opposite signs of debt-to-GDP ratio and its squared form prove the existence of nonlinear relationship between debt and growth. This is in line with the finding in Kumara & Cooray, (2013) and Panizza & Presbitero, (2014). The positive sign of debt to GDP is indicative of the fact that debt helps to accelerate the growth however, the negative sign of its square form divulges the existence of a threshold point beyond that the debt will bring deleterious impacts on the economy. Differentiating the growth model with respect to debt-to-GDP variable allows us to compute the threshold levels for the selected set of countries. Results are summarized in table 3.

Table 3: Threshold levels

Countries	Threshold level	Current Level (2014)
SAARC	61%	--
Pakistan	62%	64%
India	66%	66%
Bangladesh	40%	19%
Sri-Lanka	66%	75%

In case of Pakistan, the level of debt sustainability is 62% of GDP which is in line with the findings in Saqib, (2014). The debt sustainability level for Sri-Lanka is 66% of GDP which is slightly lower than the findings in Kumara & Cooray, (2013) which was 68% of GDP. This difference of two percentage points may be due to the use of non-overlapping growth spells by Kumara & Cooray, (2013) and the difference in time period. The threshold level for India is 66% of GDP which is equal to the current debt level of country. In case of Bangladesh, the level is lowest that is 40% of GDP, which can be backed by the fact that overtime the heavy reliance of economy on debt has decreased in Bangladesh and the statistics show that the debt-to-GDP share remain lower than 50% of GDP during the selected time period.

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While comparing with the current situation, India and Pakistan, has debt levels approximately equal to their respective threshold levels which reveals that further debt will bring negative impacts on economy. In case of Sri-Lanka the situation is a worst as the threshold level is 66% of GDP and current level of debt is 75% of GDP which mean that the government need to take steps to lower down overall debt of country to avoid its negative impacts.

CONCLUSION

We explore the link between economic process and debt beneath the assumptions of endogeneity & nonlinearity and therefore the results reveal the many dependence of economic process on debt for the chosen developing countries of the SAARC region. The brink levels for individual countries indicate that the Sri Lanka's current level of debt (75% of GDP) is way on the far side the benchmark level (66% of GDP). Asian country and Asian nation square measure around their various threshold levels (62% & 66% of GDP). Any borrowing can bring negative impacts on their economies. However, Bangladesh's current debt level (19% of GDP) is well below the brink level (40% of GDP). Reinhart and Rogoff, (2010) conclude that the low level of debt appears to own terribly little impact on rate as compare to countries that have accumulated high quantity of debt. But, accumulation of debt is simply property once it's unbroken beneath the brink level. We discover the negative association between debt and economic process once the general public debt-to-GDP quantitative relation is beyond the benchmark that is in line with the findings in Reinhart and Rogoff, (2010).

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References

1. Akram, N. (2011). Impact of Public Debt on the economic growth of Pakistan. *The Pakistan Development Review, 50*(4), 599-615.

2. Bal, D. P., & Rath, B. N. (2014). Public debt and economic growth in India: A reassessment. *Economic Analysis and Policy, 44*(3), 292–300.

3. Barik, A. (2011). Government Debt and Economic Growth in India. Retrieved from http://www.punjabiuniversity.ac.in/cdeiswebsite/papers/31%20Anirudha%20Barik%20Punjabi%20University%20Paper-.pdf

4. Bräuninger, M. (2003). *Public Debt and Endogenous Growth.* New York: Physica-Verlag.

5. Checherita-Westphal, C., & Rother, P. (2012, August). The impact of high government debt on economic growth and its channels: an empirical investigation for the euro area. *Eur. Econ. Rev., 56*(7), 1392–1405.

6. Chudik, A., Mohaddes, K., Pesaran, M. H., & Raissi, M. (2017). Is There a Debt-Threshold Effect on Output Growth? *Review of Economics and Statistics, 99*(1), 135-150.

7. Eberhardt, M., & Presbitero, A. F. (2015). Public debt and growth: Heterogeneity and non-linearity. *Journal of International Economics, 97*(1), 45–58.

8. Hassan , M. H., & Akhter , T. (2012). Impact of Public Debt Burden on Economic Growth: Evidence from Bangladesh. *Journal of Finance and Banking, 10*(1 & 2).

9. Im, K. S., Pesaran, M., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics, 115*(1), 53-74.

10. Kao, C. (1999). Spurious Regression and Residual Based Tests for Cointegration in Panel Data. *Journal of Econometrics, 90*, 1-44.

11. Kaur, A., & Kaur, B. (2015). The Effects of Public Debt on Economic Growth and Gross Investment in India: An Empirical Evidence. *Pacific Business Review International, 8*(1), 50-56.

12. Kumar, M., & Woo, J. (2010). Public Debt and Growth. *IMF Working Papers 10/174 International Monetary Fund*.

13. Kumara, H., & Cooray, N. S. (2013). Public Debt and Economic Growth in Sri Lanka: Is There Any Threshold Level for Pubic Debt? *Economics & Management Series, EMS-2013-22*.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 27 April 2018 doi:10.20944/preprints201804.0361.v1

14. Kumarasinghe, P. J., & Purankumbura , P. R. (2015). The Effect of the Public Debt on Economic Growth in Sri Lankan Economy. *Proceedings of 12th International Conference on Business Management*, (pp. 1-22). Colombo. Retrieved from http://ssrn.com/link/12th-ICBM-2015.html

15. Levin, A., Lin, C.-F., & Chu, C.-S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics, 108*(1), 1-24.

16. Maddala, G. S., & Wu, S. (1999). A Comparative Study of Unit Root Tests with Panel Data and A New Simple Test. *OXFORD BULLETIN OF ECONOMICS AND STATISTICS*(Special Issue), 631-652.

17. Mahmood, T., Arby, M. F., & Sherazi, H. (2014). Debt Sustainability Acomparative Analysis of SAARC Countries. *Pakistan Economic and Social Review, 52*(1), 15-34.

18. Mankiw, N. G., Romer, D., & Weil, N. D. (1992). A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics, 107*(2), 407-437.

19. McCoskey, S., & Kao, C. (1998a). A Residual-Based Test of the Null of Cointegration in Panel Data. *Econometric Reviews, 17*, 57-84.

20. Panizza, U., & Presbitero A. F. (2012). Public Debt and Economic Growth: Is There a Causal Effect? *Mo.Fi.R.Working Papers 65.*

21. Panizza, U., & Presbitero, A. F. (2014). Public debt and economic growth: Is there a causal effect? *Journal of Macroeconomics, 41*, 21–41.

22. Pedroni, P. (2000). Fully Modified OLS for Heterogeneous Cointegrated Panels. In B. H. Baltagi, T. B. Fomby, & R. C. Hill, *Nonstationary Panels, Panel Cointegration, and Dynamic Panels* (Vol. 15, pp. 93–130). Elsevier Science Inc.

23. Pesaran, M. H. (2004). General diagnostic tests for cross section dependence in panels. *University of Cambridge, Faculty of Economics, Cambridge Working Papers in Economics, No. 0435*.

24. Phillips, P. C., & Hansen, B. E. (1990). Statistical inference in instrumental variables regression with I (1) processes. *The Review of Economic Studies, 57*(1), 99-125.

25. Phillips, P. C. (1995). Fully modified least squares and vector autoregression. *Econometrica: Journal of the Econometric Society*, 1023-1078.

26. Ramzan, M., & Ahmed, E. (2014). External debt growth nexus: Role of macroeconomic polices. *Economic Modelling, 38*, 204-210.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 27 April 2018 doi:10.20944/preprints201804.0361.v1

27. Reinhart, C., & Rogoff, K. (2009). This Time is Different – Eight Centuries of Financial Folly. *Princeton University Press, Princeton, New Jersey* .

28. Reinhart, C., & Rogoff, K. (2010). Growth in a time of debt. *Am. Econ. Rev., 100*(2), 573–578.

29. Reinhart, C., Reinhart, V., & Rogoff, K. (2012). Public debt overhangs: advanced-economy episodes since 1800. *Journal of Economic Perspectives, 26*(3), 69-86.

30. Salotti, S., & Trecroci, C. (2012, April). Even worse than you thought: The impact of government debt on aggregate investment and productivity. Retrieved from http://ssrn.com/abstract=2033107

31. Saqib, W. (2014). When Public Debt Turns Bad. *UnPublished MS Thesis, Economics Department, National University of Sciences & Technology*.

32. Shah, M. H., & Pervin, S. (2012). EXTERNAL PUBLIC DEBT AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM BANGLADESH, 1974 TO 2010. *Academic Research International, 3*(2), 508-515.

33. Shahzad, H., & Javed, A. Y. (2015). Impact of Debt on Aggregate Investment and Productivity in Developing Asian Countries. *Pide Working Papers, No. 127*.

34. Siddiqui, R., & Malik, A. (2001). Debt and Economic Growth in South Asia. *The Pakistan Development Review, 40*(4), 677–688.

35. Singh, C. (1999). Domestic Debt and Economic Growth in India. *Economic and Political Weekly, 34*(23), 1445-1453.

36. Solow, M. R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics., 70*(1), 65-94.

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Appendix

Table 1: Panel Co-integration Test Results

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	131.7	0.0000	200.1	0.0000
At most 1	206.7	0.0000	76.87	0.0000
At most 2	119.0	0.0000	60.37	0.0000
At most 3	70.51	0.0000	25.71	0.0012
At most 4	48.03	0.0000	20.01	0.0103
At most 5	31.34	0.0001	12.48	0.1309
At most 6	23.38	0.0029	12.76	0.1204
At most 7	17.68	0.0237	15.34	0.0528
At most 8	12.68	0.1233	12.68	0.1233

Table 2: Endogeneity Test results

Null hypothesis: Debt/GDP is exogenous				
	Coefficient	Std. Error	t-Statistic	Prob.
2SLS Residuals Stats	-0.018911	0.011516	-1.982178	0.0489