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THE IMPACT OF PUBLIC DEBT SERVICE ON ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM ZAMBIA

Talknice Saungweme¹ and Nicholas M. Odhiambo

Abstract

This study contributes to existing public debt service-economic growth literature by rendering empirical evidence from Zambia using time-series method covering the period from 1970 to 2017. The study applied the autoregressive distributed lag (ARDL) bounds analysis technique which permits the simultaneous estimation of the long- and short-run model parameters. In overall terms, the empirical results reveal that the impact of government debt service on economic growth in Zambia is time-variant. Whereas the neutrality of public debt service on economic growth is confirmed in the long run, in the short run the relationship is negative. To achieve macroeconomic stability and realise sustainable economic growth rates, the paper recommends the Zambian government to, among other things, undertake active fiscal consolidation to ensure that debt repayments do not cause excessive budget overruns and are not financed from new debt; and continuously improve public debt management strategies and policies to smoothen government debt redemption profile.

Keywords: Public debt service, economic growth, Zambia, ARDL.

JEL Classification : H62, H63, O47

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1. Introduction

Despite repeated analysis, the debt-growth debate is still raging, and the results have been inconclusive. Most recently, the World Bank (2019) stated that the rising cost of public debt service in sub-Saharan African countries will impact negatively on economic growth. Public debt service is projected to rise, and in some countries breach the indicative sustainability threshold levels beginning 2022 (International Monetary Fund “IMF”, 2017a). The rising cost of debt service in this region is in part due to “... bullet repayments falling due on maturing international bond issues, coupled with rising global interest rates...” (World Bank, 2019: 11). The International Monetary Fund (2017a) alluded that excessive exchange rate movements, massive built-up of new debts and high global and domestic interest rates are likely to destabilise most world economies in the foreseeable future.

In literature, the avenues through which sovereign debt affects economic growth have differed depending on the variances in the structure and composition of the debt, structure of fiscal institutions and also in the structure of the economies (see Clements *et al.*, 2003). Further, the effect of public debt, particularly on low-income economies, has been determined by whether the country is a net recipient of resource transfers from the international community or not (see also Clements *et al.*, 2003). According to Feldstein (1986: 4), the economic problem of servicing debts increases remarkably when a debtor country is no longer receiving any financial support from the donor community. Despite these country variations, high debt stocks and huge repayment burdens have resulted in permanent fiscal crisis and heavy administrative burdens in most world economies (see Presbitero, 2005).

Similar to most sub-Saharan African countries, Zambia’s rising public debt stock has been accompanied by significant changes in both domestic and foreign borrowing patterns, as well as changes in debt repayment profile, especially after 2012 (Bank of Zambia, 2017, World Bank, 2019, IMF, 2017b). According to the Bank of Zambia (2017: 15), foreign public debt service accounted the most on the decline in foreign exchange reserves. The central bank added that the decline in gross international reserves was moderated by the bank’s net foreign exchange purchases from the market, amounting to US\$402.6 million in December 2017 (Bank of Zambia, 2017: 15). On the whole, during the period 2008 to 2017, there has been a remarkable increase in government bond issuance and syndicated loans which has changed Zambia’s debt maturity profile (Bank of Zambia, 2017). By end of 2017, the debt sustainability

analysis of Zambia indicated that the country's public sector debt vulnerabilities have increased tremendously, breaching the generally accepted indicative thresholds (IMF, 2017b). The debt repayment risk of Zambia is also envisaged to be unsustainable beginning 2022 when most Eurobond payments fall due (IMF, 2017b).

Thus, in view of the current global economic and financial environment, governments should set up long-term debt management frameworks that permit a steady and sustainable economic growth. Also, to avoid the reversal of the gains from concessionary borrowings, public debt service costs need to be monitored and maintained within growth enhancing levels (see IMF, 2017a; International Bank for Reconstruction and Development, 2017). To this end, this paper aims to empirically test the impact of public debt service in Zambia using one of the modern econometric techniques, the autoregressive distributed lag (ARDL) bound testing approach. The remaining part of the paper proceeds as follows: Section 2 analyses the trends in public debt service and economic growth in Zambia. Section 3 surveys the public debt service-growth literature. The study methodology is dealt with in Section 4. In Section 5, the empirical analysis is conducted, while the conclusion and the policy suggestions are given in Section 6.

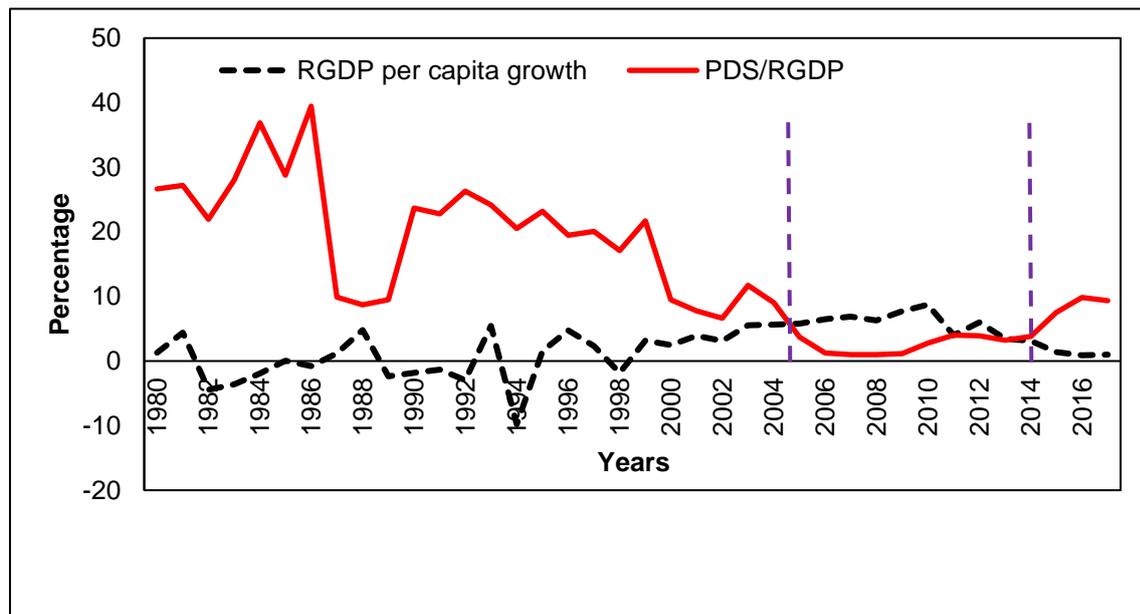
2. Public Debt Service and Economic Growth in Zambia: An Outline

As the stock of public debt was increasing in Zambia since the 1970s, so was the cost of servicing that debt. The cumulative impact of world economic crisis and plummeting international copper prices, as well as the swift rises in world interest rates in the mid-1970s resulted in an unsustainable debt burden and an upsurge in poverty levels in Zambia (World Bank, 2017). Disproportionate public debt repayment costs during the period from 1975 to 2000 directly reduced government budgetary allocations on social services – such as health and education – and on productive sectors (World Bank, 2004). Although the net debt service burden was reduced in 2006, following the massive debt relief to the country, service costs started to rise again after 2012. For instance, in 2013, 9% of domestic revenues were channelled towards public debt interest payments, and in 2017 this had risen to 25% (Ministry of Finance “MOF”, 2017).

The increase in the cost of servicing government debt beginning 2015 was being compounded by both the increase in the size of the bonds and the rise in coupon rate – which increased from 5.4% in 2012 to 8.5% in 2014 and to 9.0% in 2015 (MOF, 2017). Government foreign debt repayments alone increased by 53.3% to US\$585.0 million from US\$381.7 million in 2015,

and further to US\$666.7 million in 2017 (Bank of Zambia, 2017). As reported by the International Bank for Reconstruction and Development (2017: 9), public debt service costs in Zambia constituted 47% of the total foreign currency outflows between January and August 2017. Figure 1 shows the annual gross domestic product (GDP) per capita growth and public debt service-to-real GDP ratio in Zambia, covering the period 1980 – 2017.

Figure 1: Trends in Public Debt Service and Economic Growth in Zambia (1980-2017)



Source: World Bank (2019; 2018)

In Figure 1, the link between government debt service and economic growth rate appears to be negative. Sovereign debt repayments, according to the IMF (2001), inescapably exert economic growth constraints on debtor countries since they involve huge outflows of financial resources to the creditors. As can be seen in Figure 1, three distinct periods of debt service can be identified; 1980 to 2005, 2006 to 2013 and 2014 to 2017. Between 1980 and 2005, public debt service outlays exceeded the country’s pace of economic growth resulting in depressed growth prospects, which placed the country in a high debt risk category (Government of the Republic of Zambia, 2006; IMF, 2005). In 1987, the government made a resolution to put a cap on foreign debt repayments, hence the noticeable abrupt fall in PDS/RGDP ratio between 1987 and 1990 (World Bank 1993: 60). Again, the sharp drop in the PDS/RGDP ratio in 2000 and 2005 is credited to debt forgiveness by both private and multilateral creditors (IMF and International Development Agency, 2001; IMF, 2005).

Following the massive debt relief in 2005, there was an improvement in economic performance and a substantial reduction in debt service costs as shown in Figure 1. In the period after 2014, however, the negative impact of rising debt repayments on economic growth can be clearly seen in Figure 1. During the period 2015 - 2017, government expenditure on public debt interest payments constituted 3.9%, 3.5% and 4.1% of GDP in 2015, 2016 and 2017, respectively, against 2.8%, 2.2% and 2.0% of GDP spent on goods and services (Bank of Zambia, 2017). Henceforth, Zambia's liquidity risk jumped upwards and economic growth rates deteriorated. According to IMF (2017b), Zambia issued Eurobonds in 2012, 2014 and 2015, which will mature beginning 2022. The associated bullet repayments on these Eurobonds starting 2022 will further result in a protracted breach of the baseline debt sustainability indicative thresholds.

3. A Synopsis of Theoretical and Empirical Literature

In theoretical literature, high public debt negatively affects economic growth through discouraging investment and prompting massive financial outflows to creditors – debt overhang hypothesis (Claessens *et al.*, 1996). This hypothesis states that a large debt burden not only discourages new investments, but it squeezes existing investments returns through taxes with the money transferred to the creditors (Kalemli-Özcan *et al.*, 2017; Krugman, 1988 and Sachs, 1989). Actually, Krugman (1988) posits that, if the debtor country is unable to service its debts when they fall due, then it will have two options, either to contract new debt – with creditors anticipating a loss in future – or to seek debt forgiveness (see also Spilioti and Vamvoukas, 2015; Sachs, 1990). This scenario was referred to by Krugman (1988) as the trade-off between debt financing and forgiveness.

The theoretical literature also supports the view that the public debt-overhang effect causes disastrous budgetary and domestic liquidity constraints which brings about misallocation of capital and deterrence to long-term private investments (see Elbadawi *et al.*, 1997; Cohen, 1993; Bowen *et al.*, 1960; Buchanan, 1958). Diamond (1965) argue that the impact of taxes desired to fund the interest payments on government debt – both domestic and foreign – is to reduce both the purchasing power and gross savings of tax payers, and thus the capital stock (see also Spilioti and Vamvoukas, 2015). Diamond (1965) added that domestic public debt repayments can lead to a substitution of government debt for private investments.

From an empirical outlook, the relationship between government debt service and economic growth has generated mixed evidence for the public debt-overhang conception (see, among

others, Balcilar, 2012; Reinhart *et al.*, 2012; Presbitero, 2005; Clements *et al.*, 2003). Furthermore, most previous studies have been centred on the impact of foreign public debt service on economic growth (see, among other studies, Pattillo *et al.*, 2002; 2004; Clements *et al.*, 2003, and Elbadawi *et al.*, 1997).

Empirical studies that have a strong support for the public debt-overhang supposition affirm that debt repayments create future tax uncertainty, perpetuate financial resource outflows leading to liquidity constraints, and increases new issuance of government securities (Balcilar, 2012; Pattillo *et al.*, 2011; Patenio and Tan-Cruz, 2007; Clements *et al.*, 2003; Sachs 1989; Krugman 1988). The compounding effect of these outcomes is credit rationing, high costs of capital and limited participation of the private sector in developmental issues (Balcilar, 2012; Aizenman *et al.*, 2007; Cohen, 1993). This view is further supported empirically by Serieux and Samy (2001) and Weeks (2000).

Few other studies, however, claim that public debt service has no economic influence on economic growth, arguing that public debt-financed expenditures enhance the payment of taxes to service the debt (Buchanan, 1958). The empirical work which is related to this view includes Pattillo *et al.* (2002) and Hansen (2001). Conclusively, based on previous empirical studies, the evidence of the direct impact of public debt service on economic growth remains unclear.

4. Methodology

In this analysis, the autoregressive distributed lag (ARDL) testing approach is employed to scrutinise the underlying relationship between public debt service and economic growth in Zambia. The ARDL test procedure is preferred in this study over other substitute econometric techniques due to its strength to estimate concurrently the long-run and short-run coefficients of the model, among other reasons (see Chirwa and Odhiambo, 2017; Odhiambo, 2009; Pesaran *et al.* 2001). The study uses time-series data covering the period 1970 – 2017. The data for all variables was sourced from the World Bank Development Indicators (World Bank, 2018).

Following the theoretical arguments brought about by the neoclassical (Jorgensen, 1967), exogeneous (Solow, 1956; Swan, 1956) and endogenous (Romer, 1986; Lucas, 1988) growth models, and the earlier empirical studies (see among others, Spilioti and Vamvoukas, 2015;

Abbas and Christensen, 2010), the ARDL growth dynamics equation in this study can be expressed as follows:

$$\begin{aligned} \Delta y_t = & \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta y_{t-i} + \sum_{i=0}^n \beta_{2i} \Delta PDS_{t-i} + \sum_{i=0}^n \beta_{3i} \Delta I_{t-i} + \sum_{i=0}^n \beta_{4i} \Delta L_{t-i} \\ & + \sum_{i=0}^n \beta_{5i} \Delta FB_{t-i} + \sum_{i=0}^n \beta_{6i} \Delta TOP_{t-i} + \sum_{i=0}^n \beta_{7i} \Delta S_{t-i} + \sum_{i=0}^n \beta_{8i} \Delta TOT_{t-i} \\ & + \phi_1 y_{t-1} + \phi_2 PDS_{t-1} + \phi_3 I_{t-1} + \phi_4 L_{t-1} + \phi_5 FB_{t-1} + \phi_6 TOP_{t-1} + \phi_7 S_{t-1} \\ & + \phi_8 TOT_{t-1} + \mu_{1t} \dots \dots \dots (1) \end{aligned}$$

Where

- y = Annual growth rate of real GDP per-capita
- PDS = Public debt service as a proportion of GDP
- I = Gross fixed capital formation as a proportion of GDP
- L = Economically active population aged between 15 and 64 years as a proportion of total working age population
- FB = Fiscal balance as a proportion of GDP
- TOP = Trade openness
- S = Gross domestic savings as a proportion of GDP
- TOT = Trade balance as a proportion of GDP
- β_0 = constant
- $\beta_1 - \beta_8$ = short-run regression coefficients
- $\phi_1 - \phi_8$ = long-run regression coefficients
- Δ = change
- n = lag lengths
- μ_{1t} = white-noise error term
- t = time period.

When a long-run association exists between public debt service and economic growth, the error correction model (ECM) in an ARDL framework is expressed as follows:

$$\begin{aligned} \Delta y_t = & \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta y_{t-i} + \sum_{i=0}^n \beta_{2i} \Delta PDS_{t-i} + \sum_{i=0}^n \beta_{3i} \Delta I_{t-i} + \sum_{i=0}^n \beta_{4i} \Delta L_{t-i} \\ & + \sum_{i=0}^n \beta_{5i} \Delta FB_{t-i} + \sum_{i=0}^n \beta_{6i} \Delta TOP_{t-i} + \sum_{i=0}^n \beta_{7i} \Delta S_{t-i} + \sum_{i=0}^n \beta_{8i} \Delta TOT_{t-i} \\ & + \omega_1 ECM_{t-1} + \mu_{2t} \dots \dots \dots (2) \end{aligned}$$

Where ω_2 is a regression coefficient; ECM_{t-1} is the one period lagged error-correction term; and all other variables and parameters are as defined in equation 1.

5. Empirical Analysis

In this segment, the study first performs unit root tests to ascertain the order of integration of all regression variables. The study uses three tests, namely, the Phillips-Perron (PP), the Perron (1997) (PPURoot), and the Dickey-Fuller Generalised Least Square (DF-GLS). The unit root test results are given in Table 1.

Table 1: Stationarity Test Results – All variables

Variable	Stationarity of variables in levels						Stationarity of variables in first difference					
	PP		PPURoot		DF-GLS		PP		PPURoot		DF-GLS	
	Without trend	With trend	Without trend	With trend	Without trend	With trend	Without trend	With trend	Without trend	With trend	Without trend	With trend
y	-	-	-	-	-	-	-	-	-	-	-	-
PDS	5.592***	6.116***	6.831***	6.917***	3.295***	6.219***	-	-	-	-	-	-
I	-1.752	-3.673**	-4.590	-4.614	-1.757	-3.739	13.435***	-	6.444***	6.368***	8.682***	8.744***
L	-1.065	-1.436	-	-	-1.078	-1.394	-6.576***	-6.819***	-	-	-	-
FB	-1.702	-0.164	6.979***	6.865***	-1.615	-2.039	-5.930***	-7.617***	-5.361*	-5.480*	6.476***	6.771***
TOP	-3.302**	-	-3.860	-3.668	-	-	-	-	-	-	-1.866*	-2.900*
S	-2.888**	5.204***	-5.802**	-	3.267***	5.167***	-	-	-	-	-	-
TOT	-2.714*	-2.999	-3.084	-3.292	-2.045**	-2.874	-	10.254***	6.812***	6.787***	-	6.307***
	-3.532**	-3.272*	-	-	-1.513	-3.263**	-	10.161***	8.906***	9.087***	5.953***	7.935***
			6.897***	7.717***							4.570***	

Note that: ***, ** and * signify rejection of the null hypothesis of the presence of a unit root at 1%, 5% and 10% significance levels, respectively.

As illustrated in Table 1, the unit root test results imply that all study variables are either integrated of order zero or one, despite the unit root test method employed. The results of the stationarity tests validate the use of the ARDL framework in the study analysis. The study proceeds to investigate the presence of cointegration relationships among variables using the bounds F-statistic test. The null hypothesis that no long-run relationship exists between public debt service and economic growth is tested against the alternative hypothesis that a long-run relationship exists. The results of the bounds F-statistic test are presented in Table 2.

Table 2: Bounds F-Statistic Test Results

Dependent variable	Selection criterion	Function	F-statistic	Cointegration status		
y	AIC	F(y PDS, INV, LBR, FB, TOP, SAV, TOT)	4.318***	Cointegrated		
Asymptotic critical values						
Pesaran <i>et al.</i> (2001: 300) Table CI (iii) Case III	1%		5%		10%	
	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>
	2.96	4.26	2.32	3.50	2.03	3.13

Note: *** denote significance at 1%.

The results reported in Table 2 reveal that there is a distinct long-run relationship between public debt service and economic growth in Zambia. The AIC based ARDL (1, 2, 3, 1, 2, 3, 3, 2) model was selected since it was more parsimonious compared to the BIC model. The long-run results (equation 1) and the short-run results (equation 2) are presented in Table 3 Panels A and B, respectively.

Table 3: Long-Run and Short-Run Results

Panel A: Long-run regression coefficients – Regressand is y				
Regressor	Coefficient	Standard error	T-ratio	Probability
C	-11.459	11.931	-0.9604	0.251
PDS	-0.200	0.123	-1.615	0.119
I	0.255*	0.122	2.087	0.051
L	0.090*	0.050	1.7933	0.085
FB	0.018	0.148	0.122	0.904
TOP	-0.475***	0.144	-3.295	0.004
S	0.556**	0.235	2.370	0.024
TOT	-0.348	0.552	-0.631	0.536
Panel B: Short-run regression coefficients – Regressand is Δy				
Regressor	Coefficient	Standard error	T-ratio	Probability
Δ PDS	-0.098*	0.057	-1.733	0.094
Δ PDS1	-0.087	0.122	-0.713	0.482
Δ I	-0.137	0.142	-0.965	0.344
Δ I1	-0.300	0.189	-1.590	0.124
Δ I2	0.113*	0.058	1.962	0.062
Δ L	0.088	0.053	1.661	0.109
Δ FB	0.105	0.104	1.011	0.322
Δ FB1	0.261**	0.094	2.780	0.010
Δ TOP	-0.161	0.130	-1.236	0.228
Δ TOP1	0.277**	0.103	2.700	0.012
Δ TOP2	0.236**	0.092	2.560	0.017
Δ S	-0.021	0.177	-0.117	0.908
Δ S1	-0.392*	0.219	-1.791	0.085
Δ S2	-0.042	0.180	-0.234	0.817
Δ TOT	0.707	0.429	1.649	0.112
Δ TOT1	0.065	0.625	0.104	0.918
ECM (-1)	-0.249***	0.052	-4.807	0.000
R-squared	0.822	F-statistic	3.460[0.005]	
R-bar-squared	0.584	DW statistic	1.907	
Panel C: ECM-ARDL diagnostic test results				
Serial Correlation: CHSQ (1)	0.006 [0.940]			
Functional Form: CHSQ (1)	1.603* [0.082]			
Normality: CHSQ (2)	0.004 [0.998]			
Heteroscedasticity: CHSQ (1)	0.022 [0.883]			

Notes: ***, ** and * signify statistical significance at the 1%; 5%; and 10%, respectively.

The long-run empirical results presented in Table 3 Panel A reveal that the coefficient of public debt service (PDS) is statistically insignificant. This infers that public debt service has a neutral long-run impact on the economic growth (y) process of Zambia. There are three possible explanations to this result. First, the financial outlays towards public debt payments may have been too little – due to inability to repay the loans – to create long-run crowding effect on economic growth in Zambia (see IMF, 2017b). Second, the debt relief initiatives may have implicitly reduced the debt service costs such that they could not influence economic growth initiatives in this country. Finally, there are possibilities that the borrowed funds were put into productive sectors thereby enhancing the country's capacity to repay the loans without depressing economic growth.

It could be argued, however, that despite the insignificant long-run impact of public debt service on economic growth in Zambia, the debt service costs have adversely affected social expenditures – such as health, education and other welfare programs (MOF, 2014). This is evidenced by the extension of debt relief initiatives to this country by the creditor community during the period from 1990 to 2006 in a move meant to alleviate poverty (see IMF, 2001; 2005). This study finding is in line with other empirical results on the subject reported by Jalles (2011) and Pattillo *et al.* (2002), among others.

The long-run results of other variables presented in Panel A of Table 3 indicate that the coefficients of investment (I), labour (L) and savings (S) are positive and statistically significant as presumed. This insinuates that gross domestic investment, labour and gross domestic savings positively influence the rate of economic growth in Zambia in the long run. Against study expectation, the coefficient of trade openness (TOP) turned out to be negative and statistically significant at 1%. This finding is not an exception. Studies by Zanotho (2017) and Adhikary (2011), among others, have shown evidence that point to a negative long-run association between trade openness and economic growth. Further, the study results reveal that fiscal balance (FB) and terms of trade (TOT) have no long-run impact on economic growth in Zambia.

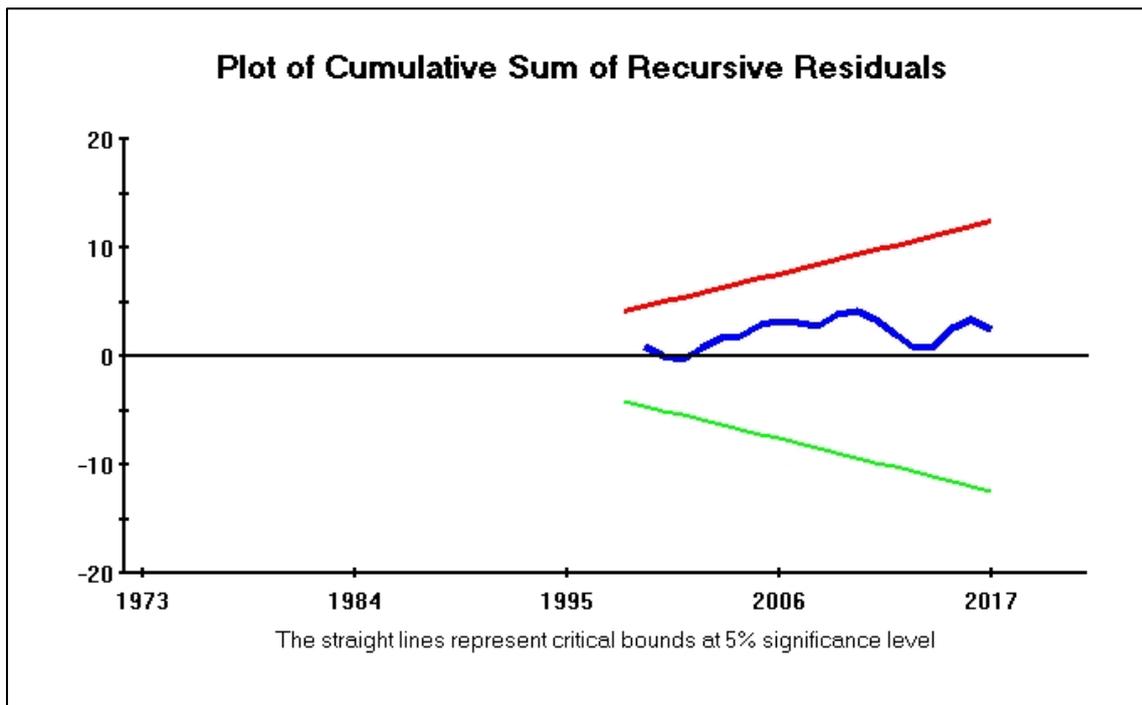
The short-run results presented in Panel B of Table 3 indicate that the coefficient of public debt service (Δ PDS) is negative and is statistically significant, implying that an increase in public debt service in Zambia in the current period can lead to an economic decline in the short run. Though unanticipated in this study, the result compares favourably with the findings of Karagol

(2002) and Hansen (2001), among others, on the subject. Further, the short-run results presented in Panel B of Table 3 reveal that the coefficients of investment ($\Delta I(2)$), fiscal balance ($\Delta FB(1)$) and trade openness ($\Delta TOP(1)$ and $\Delta TOP(2)$) are positive and statistically significant. These results infer that investment, fiscal balance and trade openness in the past period have a positive impact on economic growth in the short run.

According to Barro (1979), the short-run positive impact of fiscal balance on economic growth could be through a positive effect of budget deficit on inflation and domestic public debt service cost. Thus, a combination of seignorage revenue, intensive control of domestic interest rates and significant inflationary effects in the Zambian economy in the 1980s and 1990s might have helped to reduce the value of domestic public debt, meaning also reduced overall debt repayment costs (see Sill, 2005; Hamburger and Zwick, 1981). Furthermore, the short-run coefficient of savings ($\Delta S(1)$) is unexpectedly negative and statistically significant at 10% significance level. This result suggests that savings ratio in the past period is negatively related to economic growth in the short run in Zambia. Lastly, as hypothesised, the error correction term $ECM(-1)$ is found to be negative and statistically significant at 1%, implying that in the event of a shock to the Zambian economy, economic growth adjusts to equilibrium at a rate of 24.9% per annum.

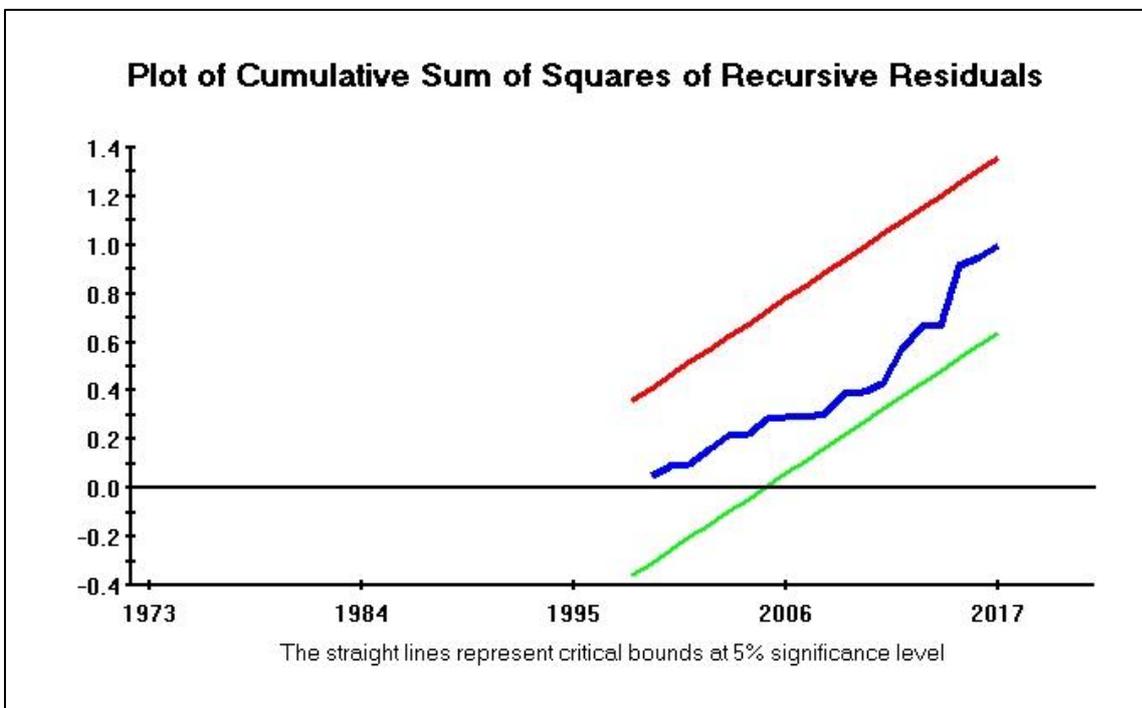
In Panel C of Table 3, the diagnostic test results show that the study model passed serial correlation, normality and heteroscedasticity tests but failed the test on functional form. Therefore, in order to confirm the robustness of the ARDL model, the study checked for the stability of the estimated parameters by applying the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests (see Brown *et al.*, 1975). The results are presented in Figures 2 and 3, respectively.

Figure 2: Cumulative Sum of Recursive Residuals Plot



Source: Generated using Microfit 5.01

Figure 3: Cumulative Sum of Squares of Recursive Residuals Plot



Source: Generated using Microfit 5.01

Figure 2 and Figure 3 show that the CUSUM and CUMUMSQ plots are within the boundaries at 5% significance level, signifying that the study cannot reject the null hypothesis of model stability. This finding confirms the stability of the regression coefficients in this study.

6. Conclusion and Policy Suggestions

The net impact of public debt service on economic growth continue to be an open subject for debate among policy makers and academics. Even though the relationship between public debt and economic growth has received remarkable analyses in recent years, only a few studies have examined the impact of public debt service on economic growth. To contribute to the ongoing public debt-economic growth debate, this paper investigated the impact of public debt service on economic growth in Zambia employing a time-series approach, covering the period 1970 – 2017. Zambia is among the lower-middle income countries in sub-Saharan Africa that received substantial public debt relief from its creditors between 1990 and 2006.

This study is among the first to empirically test the dynamic impact of public debt service on economic growth in Zambia. Applying the ARDL model, the empirical results reveal that the impact of government debt service on economic growth in Zambia is time-variant. Whereas the neutrality of public debt service on economic growth is confirmed in the long run, in the short run the relationship is negative. The study results further reveal that investment, labour and savings ratios are positively related to economic growth in Zambia in the long run. This finding is in line with both theoretical and empirical foundations that back public debt service-economic growth linkage. Finally, contrary to theoretical underpinnings and also to the study projections, trade openness is found to negatively affect economic growth in Zambia, in the long run.

The empirical evidence provided in this study suggests that new public debt in Zambia should be matched with an expansion of the production and export base of the country in order to comply with public debt service responsibilities. If the revenue base is thin, then taxes must rise to service total debt obligations which is strongly discouraged in this study. The results also imply that the government should limit its public debt service/gross domestic product ratio to levels that are consistent with the pace of economic growth. Furthermore, since the impact of savings is negative and significant in the short run, the study strongly discourages the use of private savings to settle public debt obligations.

Additionally, the study recommends the undertaking of active fiscal consolidation to ensure that debt repayments do not cause excessive budget overruns in the short run and are not financed from new debt. This is because borrowing to service previous debts puts the country's future economic competitiveness at risk since it creates tax uncertainties. The study further recommends the broadening of the domestic revenue base by attracting long-term investments. Furthermore, the study subscribes to the continuous improvement of public debt management strategies and policies to smoothen the government's debt redemption profile.

Finally, sound foreign reserves management strategies should also be formulated by the central bank to ensure that the country's liquid resources are adequate to meet foreign debt financing. This includes comprehensive debt recording. The build-up of foreign exchange reserves can take the form of putting in legislature clauses that stipulates the depositing of a certain proportion of government total revenue collections in a sinking fund on an annual basis. The proceeds of the sinking fund should then be used to pay-off Eurobonds and other foreign currency denominated debts when they fall due. This suggested initiative is a cautious way of minimising the risk of public debt service trap in Zambia beginning 2022.

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