DOES PUBLIC DEBT SERVICE EXPENDITURE CROWD-OUT ECONOMIC GROWTH? EMPIRICAL EVIDENCE FROM AN AFRICAN DEVELOPING COUNTRY

TALKNICE SAUNGWEME[*]
University of South Africa, South Africa

NICHOLAS M. ODHIAMBO
University of South Africa, South Africa

Abstract
This paper contributes to the ongoing debate on the impact of public debt service on economic growth; and it provides an evidence-based approach to public policy formulation in Zimbabwe. The empirical analysis was performed by applying the autoregressive distributed lag (ARDL) technique to annual time-series data from 1970 to 2017. The study findings reveal that the impact of public debt service on economic growth in Zimbabwe is negative in the short run but positive in the long run. The results are suggestive of the existence of a crowding-out effect of public debt service in Zimbabwe in the short run and a crowding-in effect in the long run. In view of these findings, the government should consider fiscal and financial policies that promote a constant supply of long-term finance, long-term fixed investments, and extension of a government securities maturity structure so as to ensure sustainable short- and long-term public debt service expenditures. The study further recommends the strengthening of non-distortionary revenue mobilisation reforms to reduce market distortions and boost domestic investment.

JEL Classification: H62, H63, O47

Keywords: ARDL, economic growth, public debt service, Zimbabwe

1. Introduction

Sub-Saharan Africa (SSA) has experienced a pronounced rise in public debt since 2015, reaching a regional average of 57% of gross domestic product (GDP) at the end of 2017 (International Monetary Fund/IMF, 2018a). This new spike in public debt levels in the region is concerning as it is manifesting in high interest payments, which are diverting resources away from economic development enhancing outlays, such as public sector infrastructural development, research and development activities,

---

[*] Corresponding author. Address: Department of Economics, University of South Africa, P.O. Box 392, UNISA, 0003, Pretoria, South Africa, E-mail: talknice2009@gmail.com

health care and education provision (IMF, 2018a). Additionally, the upward trajectory in non-concessional public debt stocks in SSA can potentially make some economies susceptible to sudden increases in borrowing costs, particularly when they have considerable refinancing needs in future or have debts denominated in foreign currency (World Bank, 2019).

According to the IMF (2018b), six of the 35 low-income countries in sub-Saharan Africa (SSA) are in extreme public debt distress, Zimbabwe included. This is evidenced by difficulties experienced in servicing public debts, leading to arrears and continuous public debt restructuring frameworks (World Bank, 2019). These high levels of public debt in the region, mostly foreign debt, and an increased reliance on commercial loans, continue to make many low-income countries vulnerable to currency, interest rates, and refinancing risks (Devarajan, 2018; Gill and Karakülah, 2018a, 2018b). More so, the anticipated weaker growth in major emerging markets between 2019 and 2021, may slow global demand for metals, which could dampen growth prospects for low-income countries that depend on metals for government and export revenues, such as Zimbabwe (World Bank, 2018a).

Furthermore, an overall assessment of the IMF's Articles IV for SSA countries reveal that sixteen additional countries are categorised as being at high risk of public debt distress. The recent deterioration in public debt indicators suggest a compounding effect of the 2014 – 2016 global economic growth slowdown, exchange rate depreciation, slumps in global commodity prices, and materialisation of contingent liabilities arising from weak monitoring of state-owned enterprises (World Bank, 2018a; IMF, 2016: 25; IMF, 2015: 1, 6).

Zimbabwe is a net exporter of metals, mostly platinum, diamonds, gold, ferrochrome, as well as unprocessed tobacco – a condition which has raised the country's public debt vulnerabilities (Ministry of Finance/MOF, 2018; Reserve Bank of Zimbabwe "RBZ", 2018). Although Zimbabwe had a more diversified economy between 1980 and 1997, relative to other SSA countries, the country underwent severe economic meltdown that began in 1998 and lasted until 2008 (African Development Bank, 2018). Hence, similar to other SSA countries, Zimbabwe could not generate meaningful returns on investments through tax systems, resulting in failure to repay some of its contracted debts (IMF, 2017: 11). In light of the foregoing, the country began to contract new non-concessionary loans from emerging creditors, mostly China, to cover up its fiscal gap and to pay off some of its old debts – particularly its arrears to the IMF (African Development Bank, 2018). The new foreign debt and domestic debt rollovers worsened the country's public debt overhang condition, resulting in ever-increasing public debt service costs – that further weakened investment prospects and lowered annual economic growth rates (African Development Bank, 2018).

Furthermore, the sluggishness in economic performance in Zimbabwe since 2014, and the associated government debt build-up, have exacerbated the country's inability to pay its external obligations (RBZ, 2018; World Bank, 2018b). The implication of the non-payment of international arrears was economic isolation and indefinite suspension of the country from cheap international lines of credit (MOF, 2018; IMF, 2017). In addition to the unsustainable foreign public debt burden, Zimbabwe has, between 2013 and 2017, accumulated substantial domestic public debt, to the extent that domestic financing of the budget deficit has begun to thwart the activities of the private sector (RBZ, 2018; IMF, 2017: 7). The country's budget deficits have partly been financed through overdrafts at the central bank– which led to excessive money creation and intensified foreign currency shortages (MOF, 2018).

Despite such disturbing public debt levels and explosive government debt service costs in Zimbabwe, the country has received limited coverage on the public debt service-economic growth studies. This paper may be the first to test empirically the impact of public debt service on economic growth in Zimbabwe – a highly indebted country in SSA. The few available studies for Zimbabwe have only investigated the optimal growth-maximising public debt threshold (see Mupunga and Le Roux, 2015). Explicitly, the study differs from past studies on this subject in that: (i) it focuses on the public debt service-economic growth linkage – and not public debt and economic growth, as was the norm with most previous studies; and (ii) it utilises one of the more recent estimation techniques, the autoregressive distributed lag (ARDL) method, which has been credited for its favourable response to both large and small samples (Pesaran and Shin, 1999).

The rest of the paper is arranged as follows: Section 2 examines the patterns in public debt service and economic growth in Zimbabwe. Section 3 reviews theoretical and empirical literature on public debt service-economic growth relationship. Section 4 provides the methodological framework and the empirical analysis. Lastly, Section 5 draws some final conclusions and policy proposals.

2. Public debt service and economic growth trends in Zimbabwe

From 1980 to 2017, the ratios of public debt and public debt service to GDP for Zimbabwe averaged 58.4% and 3.2%, respectively (World Bank, 2018b). During the period from 1998 to 2008, the Zimbabwean government was not actively honouring its financial commitments, which culminated in an accumulation of domestic and foreign payment arrears (IMF, 2011). Deteriorating foreign exchange inflows due to weak export competitiveness and massive capital flight were also a major cause of the country's incapability to pay its dues (IMF, 2011; 2009).

The recent debt sustainability analysis undertaken in 2019 by the World Bank confirms that Zimbabwe continues to be in severe public debt distress (World Bank, 2019: 202). All foreign public debt indicators breached their indicative thresholds, except public debt service to exports and to revenue ratios (see IMF, 2017). As of end-2017, the foreign public debt-to-GDP ratio was 53.1%, the public debt-to-revenue ratio was 198.6%, and the public debt-to-export ratio was 188.6% (IMF, 2017). The high public debt service costs in Zimbabwe compelled the government to speed up efforts to reengage the international community, with the immediate aim of resolving arrears with the IMF, the World Bank Group, and the African Development Bank (MOF, 2010). The government's reengagement plan involves clearing the country's foreign arrears to the above-mentioned three traditional creditors – using a mixture of strategies, such as drawing down of special drawing rights, and new loans from emerging creditors (IMF, 2017; MOF, 2010).

Furthermore, the country's limited access to international finances and widening fiscal deficits since 2013 has caused domestic public debt to increase rapidly, reaching 42.1% of GDP in 2017 (RBZ, 2018). Between 2009 and 2013, the stock of domestic public debt and the corresponding repayment costs were negligible (MOF, 2014). However, from 2014, the rise in central government domestic debt was driven primarily by the excessive issuance of treasury bills, unrestrained overdraft facility from the central bank, and the recapitalisation of both the Reserve Bank of Zimbabwe and selected public enterprises (MOF, 2018; IMF, 2017).

The active participation of the government in both domestic capital and foreign exchange markets exacerbated the scarcity of foreign currency and worsened the country's liquidity crisis – leading to credit rationing and high cost of capital (MOF, 2016). Despite the downward trajectory in government arrears on domestic public debt, the debt payments still constitute a large proportion of the government's recurrent expenditure bill, further worsening the public debt distress condition (MOF, 2018; World Bank, 2018b). Figure 1 shows the evolution of public debt service and the accompanying economic growth pattern in Zimbabwe from 1980 to 2017. Public debt service (PDS) is expressed as a percentage of real gross domestic product (RGDP), while economic growth is measured by the annual growth rate of real GDP per capita.
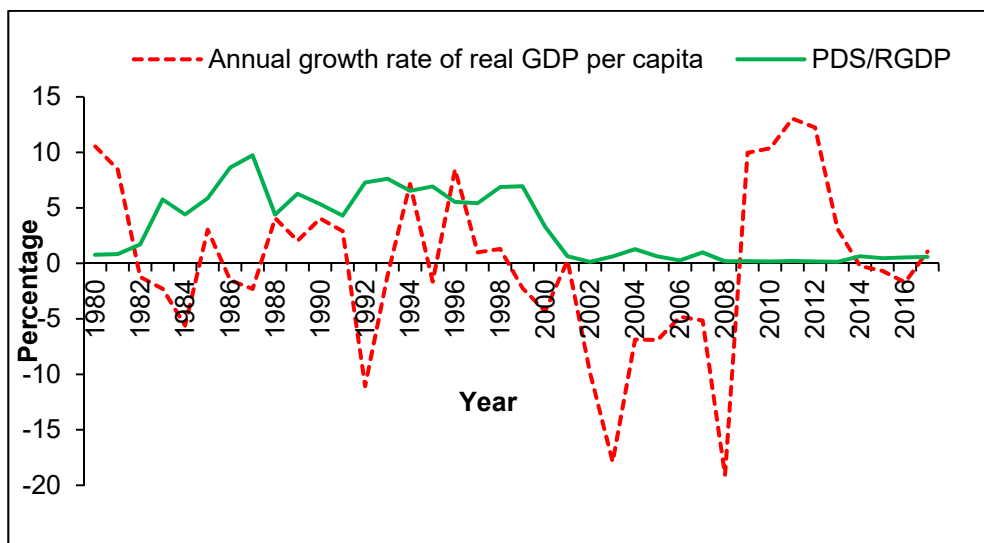

Figure 1: Public debt service and economic growth trends in Zimbabwe (1980-2017)
Source: Own processing based on World Bank (2018b) databank

Figure 1 shows that between 1980 and 2000, the government of Zimbabwe was still honouring its debt liabilities. The abrupt fall in public debt service costs in 2001, however, signify the country's inability to pay its debts rather than a fall in outstanding arrears. This is indicated in Figure 1 by a corresponding deterioration in economic performance. While the domestic public debt costs were gradually shrinking between 2001 and 2008, following hyperinflation and increased seigniorage revenue, the stock of the outstanding foreign public debt arrears was expanding due to non-payment (MOF, 2009). The incapacity to repay foreign debts by the Zimbabwean government was partly worsened by the deterioration in terms of trade and by the non-extension of debt relief initiatives to this country by the International Financial Institutions, the Paris Club and other creditors (IMF, 2016).

The noticeably low levels of public debt service payments in Figure 1 since 2001, relative to the high stock of public debt, amounting to US$17.7 billion in 2017, explains why the country remains suspended from world capital markets (MOF, 2018; IMF, 2016). Also, the current huge government debt arrears, amounting to $5.5 billion, both domestic and foreign, are making the country more vulnerable to fiscal shocks (African

Development Bank, 2018; MOF, 2018). The efforts to pay off domestic arrears are met with increased cash shortages and credit rationing to the private sector, suggesting that the country's domestic capital markets are still underdeveloped and undiversified.

Also visible in Figure 1 is the increase in government debt repayments after 2013. This is partly due to increased payments to the IMF and to the domestic suppliers, which were made possible by drawing down on special drawing rights, contraction of new loans and increased issuance of government securities (MOF, 2018; IMF, 2017).

3. Literature review

The literature linking public debt service and economic growth is domiciled on the debt overhang hypothesis (see Krugman, 1988; Sachs, 1989). The hypothesis postulates that a heavy debt burden means eminent increases in future taxes to finance the high debt service payments. The resultant high taxes lower the after-tax return on capital and reduce the incentive to invest – leading to depressed investment and lower economic growth rates (Hjertholm *et al.,* 1998; Krugman, 1988; Taylor, 1983). Hjertholm *et al.* (1998) argued further that high public debt servicing costs compel governments to engage in inflationary financing techniques, such as money printing and currency devaluation, to meet the excess demand for foreign currency created by debt servicing needs (see also Cohen, 1995; Borensztein, 1990; Fry, 1989). Similarly, if a country is committing a greater share of its foreign capital towards servicing foreign debts, then very few resources will remain available to finance fixed investment (Akram, 2015). This latter condition is known as the crowding-out effect.

Further, a public debt service burden prompts costly institutional and revenue reforms in a bid to seek either debt rescheduling or debt relief (see Serrieux and Sammy, 2001; 1999). The burden of public debt service financing is to shift public expenditure away from physical and social investments, such as health care and education, which then hampers economic growth (see, among others, Fosu, 2007; Mahdavi, 2004; Elbadawi *et al.*, 1997; Deshpande, 1997; Servén and Solimano, 1993; 1992, and Savvides, 1992).

The empirical literature on the link between public debt service and economic growth is scanty and the available studies have used the conventional estimation methods, such as the ordinary least squares (see among others, Week, 2000; Cohen, 1993 and Savvides, 1992). The results of Week (2000), Cohen (1993) and Savvides (1992) provide evidence supporting the debt overhang hypothesis.

Empirical studies by Jalles (2011), Sen *et al.* (2007), Hansen (2002; 2001) and Pattillo *et al.* (2002) applied the generalised method of moments (GMM) methodology to examine the link between public debt service and economic growth. While Sen *et al.* (2007) and Hansen (2002) found evidence supporting a negative relationship between the two variables, the results of Jalles (2011) and Pattillo *et al.* (2002) are consistent with the public debt service-economic growth neutrality hypothesis.

Sen *et al.* (2007), Fosu (2007) and Serieux and Sammy (2001) employed panel data models to test for the validity of the debt overhang hypothesis. Using Latin America and Asian countries, Sen *et al.* (2007) found that public debt service impedes economic growth in the studied countries. Employing Seemingly Unrelated Regression Models to 1975 – 1994 five-year panel data for 35 African countries, the author found that public debt service burden negatively affects economic growth. Also, the results of

Serieux and Sammy (2001), using a sample comprising low and lower-middle income countries, confirmed the negative impact of public debt service on economic growth in studied economies.

Finally, Pattillo *et al.* (2002) examined the link between public debt service and economic growth to 93 developing countries using a combination of ordinary least squares, the instrumental variable approach, fixed effects and GMM techniques. The authors found no evidence linking public debt service and economic growth in studied countries.

From the review of the literature, this study concludes that the link between public debt service and economic growth is not given. However, the study can broadly summarise that the limited available empirical literature provides alarming evidence supporting a negative relationship between public debt service and economic growth. However, of importance to note is that these studies have been overtaken by time and events, leaving their relevance, on the public debt service and economic growth dynamics, in today's economies, questionable.

4. Methodological framework and the empirical analysis

The impact of public debt service on economic growth is, in this paper, tested using the autoregressive distributed lag (ARDL) technique (see Pesaran and Shin, 1999; Pesaran *et al.,* 2001). Compared to other previous studies on the subject, the chosen methodology in this paper allows for the simultaneous estimation of short- and long-run parameters (Pesaran and Shin, 1999). The short-run impact is captured by the coefficients of the first differenced variables in the error correction model (ECM). The ARDL model used in this study is based on Kharusi and Ada (2018), Ncanywa and Masoga (2018) and Akram (2017) and is specified as follows:

$$\Delta y_t = \hbar_0 + \sum_{i=1}^{n} \hbar_{1i}\Delta y_{t-i} + \sum_{i=0}^{n} \hbar_{2i}\Delta PDS_{t-i} + \sum_{i=0}^{n} \hbar_{3i}\Delta INV_{t-i} + \sum_{i=0}^{n} \hbar_{4i}\Delta LBR_{t-i}$$

$$+ \sum_{i=0}^{n} \hbar_{5i}\Delta FB_{t-i} + \sum_{i=0}^{n} \hbar_{6i}\Delta TOP_{t-i} + \sum_{i=0}^{n} \hbar_{7i}\Delta SAV_{t-i} + \sum_{i=0}^{n} \hbar_{8i}\Delta TOT_{t-i}$$

$$+ \Theta_1 y_{t-1} + \Theta_2 PDS_{t-1} + \Theta_3 INV_{t-1} + \Theta_4 LBR_{t-1} + \Theta_5 FB_{t-1} + \Theta_6 TOP_{t-1}$$

$$+ \Theta_7 SAV_{t-1} + \Theta_8 TOT_{t-1} + \mu_{1t} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (1)$$

where y is the annual growth rate of real GDP per-capita, proxy for economic growth; PDS is public debt service as a percentage of GDP; INV is gross fixed capital formation as a percentage of GDP; LBR is economically active population aged between 15 and 64 years as a percentage of total working age population; FB is fiscal balance as a percentage of GDP; TOP is trade openness as a percentage of GDP; SAV is gross domestic savings as a percentage of GDP; TOT is trade balance as a percentage of GDP; $\hbar_0$ is a constant; $\hbar_1 - \hbar_8$ and $\Theta_1 - \Theta_8$ are short-run and long-run regression coefficients, respectively; Δ is the difference operator; n is the lag length; μ_{1t} is the white-noise error term and t is the time period.

The associated ECM expression for Equation 1 is presented as follows:

$$\Delta y_t = \hbar_0 + \sum_{i=1}^{n} \hbar_{1i}\Delta y_{t-i} + \sum_{i=0}^{n} \hbar_{2i}\Delta PDS_{t-i} + \sum_{i=0}^{n} \hbar_{3i}\Delta INV_{t-i} + \sum_{i=0}^{n} \hbar_{4i}\,\Delta LBR_{t-i}$$

$$+ \sum_{i=0}^{n} \hbar_{5i}\Delta FB_{t-i} + \sum_{i=0}^{n} \hbar_{6i}\Delta TOP_{t-i} + \sum_{i=0}^{n} \hbar_{7i}\Delta SAV_{t-i} + \sum_{i=0}^{n} \hbar_{8i}\Delta TOT_{t-i}$$

$$+ \delta_1 ECM_{t-1} + \mu_{2t} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (2)$$

where δ_1 is coefficient of the ECM_{t-1}; ECM_{t-1} is the one period lagged error-correction term; and all other variables and parameters are as defined in Equation 1.

The analysis in this study uses annual time-series data covering the period from 1970 to 2017. The data was obtained from the World Bank Development Indicators (World Bank, 2018b). Prior to the empirical analysis, the variables were tested for stationarity using the Perron (1997) (PPURoot) and the Dickey-Fuller Generalised Least Square (DF-GLS) unit root tests. The purpose of undertaking stationarity tests was to establish the order of integration in the series. The results of stationarity checks are displayed in Tables 1 and 2.

Table 1. Unit root test results for the variables in levels

Variable	PPURoot		DF-GLS	
	No trend	*Trend*	*No trend*	*Trend*
y	-6.169***	-6.429***	-3.656***	-4.201***
PDS	-4.532	-4.515	-1.681*	-1.809
INV	-3.516	-3.517	-2.480**	-2.605
LBR	-3.586	-3.691	-0.120	-3.187**
FB	-4.259	-3.515	-2.626***	-2.127
TOP	-3.781	-4.000	-1.244	-2.205
SAV	-5.217*	-4.889	-0.879	-1.996
TOT	-3.451	-3.225	-1.244	-2.062

*Notes: *, ** and *** denote the rejection of non-stationarity at 10%, 5% and 1% significant levels, respectively.*
Source: authors' computation by using Microfit 5.0 software

Table 2. Unit root test results for the variables in first differences

Variable	PPURoot		DF-GLS	
	No trend	*Trend*	*No trend*	*Trend*
y	-	-	-	-
PDS	-8.187***	-8.575***	-	-7.316***
INV	-5.660**	-5.408*	-	-5.933***
LBR	-5.163*	-5.448*	-4.390***	-
FB	-6.327***	-6.725***	-	-5.482***
TOP	-9.393***	-9.558***	-7.291***	-8.327***
SAV	-	-10.555***	-9.737***	-9.954***
TOT	-7.608***	-7.525***	-6.563***	-6.648***

*Notes: *, ** and *** denote the rejection of non-stationarity at 10%, 5% and 1% significant levels, respectively.*
Source: authors' computation by using Microfit 5.0 software

The results presented in Tables 1 and 2 show that all regression variables are either integrated of order zero [*I(0)*] or one [*I(1)*], using both unit-root tests. The paper, therefore, concludes that all the variables are stationary either in levels or in first difference, hence the ARDL approach can be satisfactorily applied. Therefore, the paper proceeds to conduct the bounds test for the null hypothesis of no co-integration; that is, $\Theta_1 = \Theta_2 = \Theta_3 = \Theta_4 = \Theta_5 = \Theta_6 = \Theta_7 = \Theta_8$, against the alternative hypothesis that $\Theta_1 \neq \Theta_2 \neq \Theta_3 \neq \Theta_4 \neq \Theta_5 \neq \Theta_6 \neq \Theta_7 \neq \Theta_8$. The bounds F-statistic test results are presented in Table 3.

Table 3. Bounds F-statistic test results

Dependent variable	Function				F-statistic	Cointegration status
y	F(y|PDS,INV,LBR,FB,TOP,SAV,TOT)				3.284*	Cointegrated
	Asymptotic critical values					
Pesaran *et al.*	**1%**		**5%**		**10%**	
(2001: 300)	*I(0)*	*I(1)*	*I(0)*	*I(1)*	*I(0)*	*I(1)*
Table CI(iii) Case III	2.96	4.26	2.32	3.50	2.03	3.13

*Note: * denotes significance at 10%.*
Source: authors' computation by using Microfit 5.0 software

The cointegration results reported in Table 3 show that the calculated F-statistic exceeds the upper bound critical value at 10% significance level, portraying the existence of a long-run relationship among the variables in the model. The AIC and the BIC optimal lag-length selection techniques were employed and the BIC-based ARDL (1, 3, 0, 0, 2, 1, 2, 0) model was chosen as it was more parsimonious than the AIC-based model. The long-run and short-run estimates of the selected model are summarised in Tables 4 and 5, respectively.

Table 4. Long-run regression coefficients – Dependent variable: y

Regressor	Coefficient	Standard error	T-ratio	Probability
C	60.655*	31.612	1.919	0.065
PDS	0.694**	0.256	2.713	0.011
INV	0.476**	0.228	2.092	0.046
LBR	-0.682*	0.373	-1.830	0.078
FB	-0.750**	0.345	-2.174	0.038
TOP	-0.149	0.100	-1.498	0.145
SAV	-0.141**	0.053	-2.643	0.013
TOT	0.198	0.325	0.611	0.546

*Notes: ** and * signify statistical significance at the 5% and 10%, respectively.*
Source: authors' computation by using Microfit 5.0 software

Table 5. Short-run regression coefficients – Dependent variable: Δy

Regressor	Coefficient	Standard error	T-ratio	Probability
ΔPDS	-0.095*	0.053	-1.779	0.085
ΔPDS1	-0.060***	0.021	-2.923	0.006
ΔPDS2	-0.656	0.612	-1.073	0.291
ΔINV	0.439*	0.227	1.936	0.062
ΔLBR	-0.629*	0.365	-1.722	0.095
ΔFB	-0.146**	0.060	-2.451	0.021
ΔFB1	-0.572*	0.288	-1.985	0.056
ΔTOP	-0.357**	0.138	-2.595	0.014
ΔSAV	0.023	0.219	0.106	0.916
ΔSAV1	0.479*	0.241	1.992	0.055
ΔTOT	0.183	0.305	0.600	0.552
ECM (-1)	-0.622***	0.110	-5.657	0.000
R-Squared: 0.749	R-bar-squared: 0.548	F-statistic: 3.235 [0.003]	DW-statistic: 2.149	

Notes: ***, ** and * signify statistical significance at the 1%, 5% and 10%, respectively.
Source: authors' computation by using Microfit 5.0 software

The empirical results presented in Tables 4 and 5 reveal that public debt service (PDS) has a positive impact on economic growth (y) in the long run. However, a negative and statistically significant relationship was established in the short run. The results imply that public debt payments crowd-out economic growth in Zimbabwe only in the short run, as signified by the negative coefficients of ΔPDS and ΔPDS1. This means that the negative impact of an increase in public debt service servicing in Zimbabwe is not only felt in the present period but has spill over effects to the next period, in the short run. On the contrary, the long-run results suggest that a rise in public debt service leads to an increase in economic growth in Zimbabwe. This finding is unexpected in this study and it contradicts the theoretical and empirical underpinnings on this subject – particularly the debt overhang hypothesis (see Baldacci and Kumar, 2010; Agénor and Montiel, 2008; Patenio and Tan-cruz, 2007). From 2000, Zimbabwe was not meaningfully servicing its domestic and foreign public debts; hence, the study expected public debt service to have a neutral effect on economic growth (see World Bank, 2018b; IMF, 2010).

Long-run and short-run results for other regression variables show that: (i) investment (INV) is positive and statistically significant in both the long run and short run; labour (LBR) and fiscal balance (FB, ΔFB, ΔFB1) are negative and statistically significant in both the long run and short run; trade openness (TOP) is insignificant in the long run, although, in the short run, the coefficient of trade openness is negative and statistically significant; savings (SAV) is negative and has a statistically significant impact on economic growth in Zimbabwe in the long run, while in the short run, a positively significant impact was confirmed; and terms of trade (TOT) is insignificant in both the long run and the short run. The negative and significant coefficient of the error correction term lagged once (ECM_{t-1}) further approves the presence of a stable long-run relationship among the variables. These results suggest that when there is disequilibrium in the economy, about 62% of the adjustment towards the long-run equilibrium is accomplished per year.

The model passes all diagnostic tests for serial correlation, functional form, normality and heteroscedasticity performed as shown by the results displayed in Table 6.

Table 6. ARDL-ECM model diagnostic tests

LM Test Statistic	Results
Serial Correlation: CHSQ(1)	0.923[0.337]
Functional Form: CHSQ(1)	0.413[0.520]
Normality: CHSQ (2)	0.922[0.631]
Heteroscedasticity: CHSQ(1)	2.024[0.155]

Source: authors' computation by using Microfit 5.0 software

The stability of the model used in this study is tested by plotting the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMQ) and the results are displayed in Figures 2 and 3.
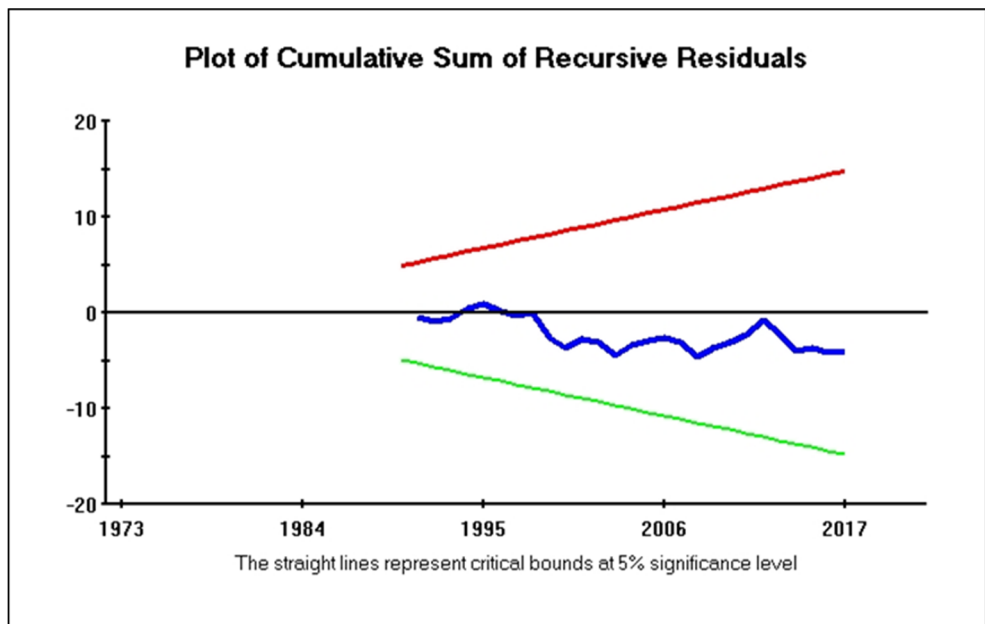

Figure 2
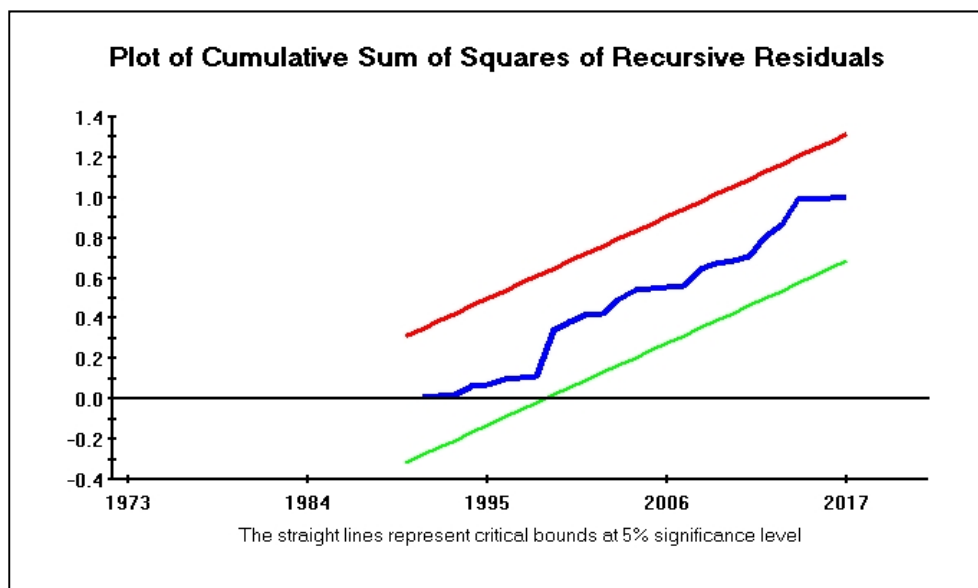*Source: authors' computation by using Microfit 5.0 software*

Figure 3
Source: authors' computation by using Microfit 5.0 software

An inspection of the CUSUM and the CUSUMSQ graphs (see Figures 2 and 3) shows that there is model stability; and that at 5% significance level there is no evidence of a systematic change in the coefficients over the study period.

5. Discussions of results and implications

Government debt repayment difficulties have affected many developing countries, particularly African and South American countries (Fosu, 2007). In literature, however, there is a large cross-country variation regarding the impact of public debt service on economic growth. Early theoretical submissions by Sachs (1989), Krugman (1988) and Diamond (1965) support the view that public debt service and economic growth are negatively related. Later, the foregoing hypothesis has been supported by the writing of Clements *et al.* (2003), Pattillo *et al*. (2002), Weeks (2000), and Elbadawi *et al.* (1997), among others.

The channels through which public debt service adversely impacts on economic growth are future tax uncertainties and financial resource outflows to creditors – leading to debt-induced liquidity constraints (see Kalemli-Özcan *et al.,* 2017; Cohen, 1995; Taylor, 1993). Thus, public debt service represents a shift of the budget away from critical productive and social sectors. There is also another branch of theoretical literature that purports the relationship between public debt service and economic growth to be non-existent – the Ricardian Equivalence Hypothesis (see Barro, 1989; 1974).

Regarding empirical evidence on the impact of public debt service on economic growth, the bulk of the studies have been done between 1995 and 2006.

The studies were largely meant to test the effectiveness of public debt relief initiatives on economic growth. Since then, few empirical works have been done on the subject (see, for example, Akram, 2015; Balcilar, 2012; Fosu, 2007).

In view of the above considerations, it can be concluded that the discussion on public debt service and economic growth remains unsettled. Whereas the theoretical literature predominantly supports a negative relationship between public debt service and economic growth, the available empirical findings on the subject are mixed and at best inconclusive. Therefore, this study adds to the existing literature on the topic by applying one of the recently developed econometric techniques, the ARDL method.

This study revealed that the impact of public debt service on economic growth in Zimbabwe is time-variant – negative in the short run but positive in the long run. The results are suggestive of the existence of a crowding-out effect of public debt service on economic growth in Zimbabwe in the short run but a crowding-in effect in the long run. Based on the findings and the foregoing discussions, the study concludes that the impact of public debt service on economic growth is not given but varies across countries and is time-variant. The study findings are expected to bring the debate on this subject close to its conclusion.

6. Conclusions and policy proposals

This paper analysed the impact of public debt service on economic growth in Zimbabwe for the period 1970 – 2017. Public debt servicing problems in Zimbabwe have reached alarming levels where the country is refinancing existing debt through issuing new debt or contracting new loans to obtain foreign exchange. Following long periods of protracted arrears, Zimbabwe's credit worthiness has diminished, resulting in the drying up of cheap foreign finances. The cut-off in the flow of developmental finances and balance of payment support to this country has compounded the public debt servicing problems.

Therefore, this paper tests the crowding-out or crowding-in effect of public debt service on economic growth in Zimbabwe using an autoregressive distributed lag cointegration approach. The main outcome that emerged from this study is that public debt service has a negative relationship with economic growth in the short run in Zimbabwe. However, public debt service was found to have a positive relationship with economic growth in the long run. The results are suggestive of the existence of a crowding-out effect of public debt service on economic growth in Zimbabwe in the short run and crowding-in effect in the long run. In view of these findings, it means that in order to stimulate economic growth in Zimbabwe, the government is encouraged to adopt policies that reduce the existing debt burden until it reaches sustainable levels. This can be achieved by broadening the country's tax base through economic diversification, improving the administration of taxes, and strengthening government debt and foreign exchange reserve management capacity. The latter includes comprehensive recording of public debt data and debt exposure.

Collectively, the study strongly recommends the government of Zimbabwe to solicit for grants from its bilateral and multilateral development partners and to increase the concessionality of new borrowing. In future, the government is recommended to consider the establishment of a "Debt Repayment Fund" where returns from investments and other revenues are deposited for purposes of servicing debt. The study results

also suggest that the implementation of austerity measures to clear current debt arrears be followed with sound economic policies. These economic policies should improve prospects for investment by promulgating sound regulatory frameworks and deepening access to credit.

References

African Development Bank. (2018) 2018 African Economic Outlook: Zimbabwe country note, African Development Bank.

Agénor, P.R., Montiel, P.J. (2008) Development Macroeconomics, Princeton University Press, Princeton and Oxford.

Akram, N. (2015) Is public debt hindering economic growth of the Philippines? *International Journal of Social Economics*, 42(3), 202-221.

Akram, N. (2017) Role of public debt in economic growth of Sri Lanka: An ARDL Approach, *Pakistan Journal of Applied Economics*, 27(2), 189-212.

Baldacci, E., Kumar, M. (2010) Fiscal deficits, public debt and sovereign bond yields, IMF Working Paper, forthcoming, International Monetary Fund.

Balcilar, M. (2012) The difficult quest for an answer to low growth dilemma in Turkey: The channel of debt and productivity, *International Journal of Economic Perspectives,* 6(4), 93-113.

Barro, R.J. (1974) Are government bonds net wealth? *Journal of Political Economy*, 82(6), 1095-1117.

Barro, R.J. (1989) The Ricardian approach to budget deficits, *The Journal of Economic Perspectives,* 3(2): 37-54.

Borensztein, E. (1990) Debt overhang, credit rationing and investment, *Journal of Development Economics,* 32, 315-335.

Clements, B., Bhattacharya, R. & Nguyen, T.Q. (2003) External debt, public investment and growth in low-income countries. IMF Working Paper No. 03/249. Washington DC. International Monetary Fund.

Cohen, D. (1993) Low investment and large LDC Debt in the 1980s, *American Economic Review*, 83(3), 437-449.

Cohen, D. (1995) Large external debt and (slow) domestic growth: A theoretical analysis, *Journal of Economic Dynamics and Control*, 19, 1141-1163.

Deshpande, A. (1997) The debt overhang and the disincentive to invest, *Journal of Development Economics*, 52, 169-187.

Devarajan, S. (2018) Low-income country debt: Déjà vu all over again? Washington DC, Future Development, Brookings Institution.

Diamond, P. (1965) National debt in a neoclassical growth model, *American Economic Review*, 55(5), 1126-1150.

Elbadawi, I. A., Ndulu, B. J. & Ndungu, N. (1997) Debt overhang and economic growth in sub-Saharan Africa, Washington DC, International Monetary Fund.

Fosu, A.K (2007). The External Debt Servicing Constraint and Public Expenditure Composition: Evidence from African Economies. UNU-WIDER. Research Paper No. 2007/36.

Fry, M.J. (1989) Foreign debt instability: An analysis of national saving and domestic investment responses to foreign debt accumulation in 28 developing countries, *Journal of International Money and Finance*, 8, 315-344.

Gill, I., Karakülah, K. (2018a) Is Africa Headed for Another Debt Crisis? Duke Centre for International Development, Durham NC.

Gill, I., Karakülah, K. (2018b) Sounding the alarm on Africa's debt, Washington DC, Future Development, Brookings Institution.

Hansen, H. (2001) The impact of aid and external debt on growth and investment: Insights from cross-country regression analysis. Presented at the WIDER Conference on Debt Relief, United Nations University, Helsinki, Finland, August 17.

Hansen, H. (2002) The impact of aid and external debt on growth and investment, Centre for Research in Economic Development and International Trade, University of Nottingham.

Hjertholm, P., Laursen, J. & White, H. (1998) Macroeconomic issues in foreign aid, Paper presented at a conference on Foreign Aid and Development: Lessons of Experience and Directions for the Future, Development Economics Research Group (DERG), Institute of Economics, University of Copenhagen.

International Monetary Fund. (2009) Zimbabwe overdue financial obligations to the PRGF-ESF Trust, Washington DC, International Monetary Fund.

International Monetary Fund. (2010) Zimbabwe: Challenges and Policy Options after Hyperinflation, Washington DC, International Monetary Fund.

International Monetary Fund. (2011), 2011 Article IV Report-Debt Sustainability Analysis Zimbabwe: Joint IMF/World Bank Debt Sustainability Analysis, Washington DC, International Monetary Fund.

International Monetary Fund. (2015) Adjusting to lower commodity prices. World Economic and Financial Surveys, World Economic Outlook, Washington DC, International Monetary Fund.

International Monetary Fund. (2016) Sub-Saharan Africa: Time for a policy reset: Weathering the commodity price slump, Regional Economic Outlook, Chapter 2, Washington DC, International Monetary Fund. [Online]. Retrieved from: <https://www.imf.org/en/Publications/REO/SSA/Issues/2016/04/05/Time-for-a-Policy-Reset> [Assessed 24 March 2019].

International Monetary Fund. (2017) 2017 Article IV Report-Debt Sustainability Analysis Zimbabwe: Joint IMF/World Bank Debt Sustainability Analysis, Washington DC, International Monetary Fund.

International Monetary Fund. (2018a) The debt challenge to African growth. [Online]. Retrieved from: <https://www.imf.org/en/News/Articles/2018/07/31/vc052318-the-debt-challenge-to-african-growth> [Assessed 17 March 2019].

International Monetary Fund. (2018b) Regional economic outlook: Domestic revenue mobilisation and private investment. [Online]. Retrieved from: <https://www.imf.org/en/Publications/REO/SSA/Issues/2018/04/30/sreo0518> [Assessed 17 March 2019].

Jalles, J.T. (2011) The impact of democracy and corruption on the debt-growth relationship in developing countries, *Journal of Economic Development*, 36(4), 41-72.

Kalemli-Özcan, S., Laeven, L. & Moreno, D. (2017) Debt overhang, rollover risk, and corporate investment: *Evidence from the European crisis. Background paper*, 1-38.

Kharusi, S.A. & Ada, M.S. (2018) External debt and economic growth: The case of emerging economy, *Journal of Economic Integration,* 33(1), 1141-1157.

Krugman, P. (1988) Financing vs. forgiving a debt overhang, *Journal of Development Economics,* 29(3), 253-268.

Ministry of Finance. (2009) 2010 National Budget Statement, Ministry of Finance and Economic Development, Harare, Government Printers.

Ministry of Finance. (2010) Medium-Term Plan, Ministry of Finance and Economic Development, Harare, Government Printers.

Ministry of Finance. (2014) National Budget Statements, 2009-2013, Ministry of Finance and Economic Development, Harare, Government Printers.

Ministry of Finance. (2016) The 2016 National Budget Statement, Ministry of Finance and Economic Development, Harare, Government Printers.

Ministry of Finance. (2018) The 2019 National Budget Statement – Austerity for Prosperity, Ministry of Finance and Economic Development, Harare, Government Printers.

Mupunga, N. & Le Roux, P. (2015) Estimating the optimal growth-maximising public debt threshold for Zimbabwe. *Southern African Business Review,* 19(3), 102-128.

Ncanywa, T. & Masoga, M.M. (2018) Can public debt stimulate public investment and economic growth in South Africa? *Cogent Economics and Finance*, 6, 1-13.

Patenio, J.S. & Tan-Cruz, A. (2007) Economic growth and external debt servicing of the Philippines: 1981-2005, 10th National Convention on Statistics (NCS) EDSA Shangri-La Hotel, October 1-2, 2007.

Pattillo, C., Poirson, H. & Ricci, L. (2002) External debt and growth, IMF Working Paper 02/69, Washington DC, International Monetary Fund.

Pesaran, M.H. & Shin, Y. (1999) An autoregressive distributed lag modelling approach to cointegration analysis. In: Storm, S. (Ed.) *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium,* Cambridge University Press, Chapter 11: 1-31.

Pesaran, M.H., Shin, Y. & Smith, R.J. (2001) Bounds testing approaches to the analysis of level relationships, *Journal of Applied Econometrics*, 16, 289-326.

Reserve Bank of Zimbabwe. (2018) 2018 Monetary Policy Statement: Enhancing financial stability to promote business confidence, Harare, Fidelity Printers.

Sachs, J.D. (1989) The debt overhang of developing countries, in Debt, stabilisation and development, ed. by Calvo, G.A., Findlay, R., Kouri, P., and De Macedo, J.B. Basil Blackwell, Oxford.

Savvides, A. (1992) Investment slowdown in developing countries during the 1980s: Debt overhang or foreign capital inflows, *Kyklos*, 45, 363-378.

Sen, S., Kasibhatla, K.M. & Stewart, D.B. (2007) Debt overhang and economic growth–the Asian and the Latin American experiences, *Economic Systems,* 31(1), 3-11.

Serieux, J. & Samy, Y. (2001) The debt service burden and growth: Evidence from low-income countries, The North-South Institute Working Paper, Ottawa: Canada.

Servén, L. & Solimano, A. (1993) Debt crisis, adjustment policies and capital formation in developing countries: Where do we stand? *World Development,* 21(1), 127-140.

Taylor, L. (1983) Structuralist Macroeconomics, New York, Basic Books.

Taylor, L. (1993) The rocky road to reform: Adjustment, income distribution and growth in the developing world. London, The MIT Press for UNU-WIDER.

Weeks, J. (2000) Latin America and high performing Asian economies: growth and debt, Journal of International Development, 12(5), 625-654.

World Bank. (2017) Global Economic Prospects: Weak investment in uncertain times, Washington DC, World Bank.

World Bank. (2018a) Are Poor countries headed towards another external debt crisis? Internal note, Washington DC, World Bank.

World Bank. (2018b) World Development Indicators, Washington DC, World Bank.

World Bank. (2019) Debt in low-income countries: Evolution, implication and remedies, Chapter 4, Global Economic Prospects, World Bank.