

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/354116880>

# Sovereign debt and growth in Zambia: determining the tipping point

Article in *Social Sciences & Humanities Open* · July 2021

DOI: 10.1016/j.ssaho.2021.100188

---

CITATIONS

8

---

READS

287

1 author:



Sydney Chikalipah  
University of Cape Town

19 PUBLICATIONS 531 CITATIONS

SEE PROFILE



# Sovereign debt and growth in Zambia: determining the tipping point

Sydney Chikalipah<sup>a,b,\*</sup>

<sup>a</sup> Department of Accounting, Finance and Economics, Executive Business Centre, Bournemouth University, Bournemouth, Dorset, United Kingdom

<sup>b</sup> Department of Finance and Tax, Faculty of Commerce, University of Cape Town, Private Bag X3, Rondebosch, 7701, Cape Town, Western Cape, South Africa

## ARTICLE INFO

### JEL classification:

C23  
E62  
F34  
H63  
O11

### Keywords:

Economic growth  
Sovereign debt and Zambia

## ABSTRACT

From the mid-1980s to mid-2000s, Zambia was in egregious debt distress, which resulted in debt relief under the HIPC initiative and MDRI in 2005. Surprisingly, Zambia's debt-to-GDP ratio has increased astronomically from about 22 percent in 2011 to 56 percent in 2018. In view of that, we study the long-run effect of sovereign debt on growth by exploring if, at all, the debt-growth nexus varies with the level of indebtedness. This paper estimates the sovereign debt-growth nexus over the period covering 1970 to 2017, by employing the linear and non-linear specifications. The study finds evidence in support of a non-linear relationship between sovereign debt accumulation and growth in Zambia. With regards to the debt-threshold effect, the tipping point for Zambia is around 40 percent of debt-to-GDP, at this point, the positive effect of debt on economic growth becomes negative. Far more importantly, policy recommendations are prescribed from these study findings.

## 1. Introduction

The earlier work by Reinhart and Rogoff (2010) ignited interests in studying the long-run relationship between sovereign debt and economic growth among countries (see inter alia: Checherita-Westphal & Rother, 2012; Baum et al., 2013; Kourtellos et al., 2013; Tchereni et al., 2013; Panizza & Presbitero, 2013, 2014; Herndon et al., 2014; Menzinger et al., 2014; Égert, 2015; Woo & Kumar, 2015; Adamu & Rasiyah, 2016; Shittu et al., 2018). Equally, a number of empirical studies have attempted to investigate whether a tipping point (debt-threshold) exists for sovereign debt beyond which economic growth plummets substantially (for a review see Eberhardt & Presbitero, 2015; Chudik et al., 2017; Yang & Su, 2018.) In economic growth models, high sovereign debt, as a percentage of GDP, can stimulate aggregate demand and growth in the short run, albeit this crowds out private capital expenditure and subdues growth in the long run (Eberhardt & Presbitero, 2015). According to Chudik et al. (2017), the relationship between sovereign debt and economic growth varies across countries due to (i) institutional quality, (ii) degree of financial deepening, (iii) the prevailing economic conditions, (iv) historical records of meeting debt obligations, and (v) political stability and the nature of the political system (Kourtellos et al., 2013).<sup>1</sup>

Like many African countries, Zambia borrowed heavily between

1980 and 1990. Specifically, at the end of 1990, the sovereign debt had reached about USD 8 billion (i.e., 244 percent of GDP), which led to severe financial burden and sluggish economic growth between 1990 and the mid-2000s (Smith et al., 2017; Trading Economics, 2019). In stark contrast to the 1980s, the total sovereign debt marginally increased from USD 8 billion in 1990 to USD 9.1 billion (254 percent of GDP) in 2000. In 2005, Zambia reached the completion point of the Multilateral Debt Relief Initiative (MDRI) and Heavily Indebted Poor Countries' (HIPC) initiative, and qualified for USD 6.6 billion sovereign debt relief (Smith et al., 2017). Over the period 2006 and 2011, the sovereign debt expanded at a modest pace from approximately USD 3.2 billion (25 percent of GDP) in 2006 to around USD 5.1 billion (22 percent of GDP) in 2011. On the contrary, Zambia has accumulated the sovereign debt at an astronomical pace from about USD 5.1 billion at the end of 2011 to USD 14.91 billion at the end of 2018 (Appendix B offers an historical account of Zambian debt). Relatedly, debt servicing is one of the largest components in the 2019 national budget accounting for about 30 percent (i.e., USD 2.13 billion) of total government spending (Smith et al., 2017).<sup>2</sup>

Relative to the global standard, a sovereign debt of USD 14.9 billion (56 percent to GDP) might sound small, yet for a poor country like Zambia, that is extremely high. At the end of 2018, out of a population of 17 million Zambian people, over 60 percent were living below the

\* Department of Accounting, Finance and Economics, Executive Business Centre, Bournemouth University, Bournemouth, Dorset, United Kingdom.  
E-mail address: [chksyd002@myuct.ac.za](mailto:chksyd002@myuct.ac.za).

<sup>1</sup> As claimed by Berg et al. (2012), these are the same factors that lead to sustained economic growth.

<sup>2</sup> Of this amount, USD 1.41 billion is for external debt servicing and USD 0.72 billion (local currency: K8.6 billion) for domestic debt payments.

poverty line, and 42 percent were (are) classified as exceedingly poor (World Bank, 2019). The situation is much worse in rural peripherals where over 80 percent of the population live below the poverty line (Khonje et al., 2018). The high prevalence of HIV/AIDs exacerbates endemic poverty in Zambia, where over 1.5 million children are orphaned due to the disease (Henning et al., 2016). The education and health sectors are poorly managed and funded, and that has a negative effect on human development (Anand & Sen, 2000). Despite the rapid rise in population averaging 3 percent per annum since 1960, the governments in Zambia have consistently been spending less than 4 percent of GDP on both education and the health sector in the last two decades (World Bank, 2019).

The novelty of this paper is that, differently from all of the literature in this area including one by Saungweme and Odhiambo (2019), we model the effect of sovereign debt on 'economic growth' (henceforth, growth) with a sole focus on Zambia. Moreover, a number of studies focusing on sub-Saharan Africa (excluding Zambia) were estimated with strong homogeneity assumptions across countries, and without controlling for individual country-dynamics (see for example: Daud & Podivinsky, 2011; Eberhardt & Presbitero, 2015; Chudik et al., 2017; Shittu et al., 2018). Thus, we posit that country-specific studies are important as they take into account the unique attributes (heterogeneity) of its economy (Chikalipah, 2019). On the basis of this, thereof, there are several reasons why Zambia is an ideal candidate to investigate the relationship between sovereign debt and economic growth. To begin with, the exuberant rate at which Zambia is accumulating sovereign debt is viewed as problematic and has an effect on long-run growth, and that warrants coherent empirical investigations. Second, a search on the public domain shows that there is no single study that has attempted to investigate the debt-threshold effect (tipping point) with specific focus on Zambia.

This paper estimates the relationship between sovereign debt and growth using the following techniques. First, the debt-growth nexus is analysed within the neoclassical (Solow) growth model. This approach is closely related to the most recent empirical studies, which include Checherita-Westphal and Rother (2012); Kourtellos et al. (2013); Panizza and Presbitero (2013); Eberhardt and Presbitero (2015); Chudik et al. (2017); and Shittu et al. (2018). Second, the debt-growth nexus is investigated with a linear and non-linear specification as proposed by Eberhardt & Presbitero (2015). In summary, the study estimates provide the following evidence. First, there exists a robust and non-linear relationship between sovereign debt and growth in Zambia. Second, the effect of debt-thresholds on growth is statistically significant – i.e. a rising debt-to-GDP above 40 percent is negatively associated with growth.

The rest of the paper proceeds in the following manner. Section II reviews relevant past empirical studies. Thereafter, section III presents the theoretical model that underpins this study and the estimating framework. Section IV describes the data used in this study and background information. In section V, empirical results are outlined and discussed, while section VI offers concluding remarks. Lastly, appendix A outlines the data sources and descriptive statistics, whereas appendix B provides a discussion of the history of sovereign debt in Zambia over the period 1970 to 2018.

## 2. Related empirical literature

A starting point of our analysis is a study by Reinhart and Rogoff (2010, hereafter RR 2010), who found evidence of a non-linear relationship between sovereign debt and growth among 20 advanced economies. RR's (2010) main finding is that when the Debt-GDP ratio is over 90 percent then growth sharply declines to zero or slightly to

negative when compared to the Debt-to-GDP ratio of below 90 percent. In contrast with RR (2010), Herndon et al. (2014) argued that high sovereign debt ratios do not inevitably entail a sharp decline in output growth. A related study by Panizza and Presbitero (2014) found no evidence of a causal effect running from sovereign debt to growth among OECD countries. Similarly, Égert (2015) argued that the nonlinear relationship between debt and growth is dependent on modelling choice and data coverage.

Consistent with the debt-growth narrative of nonlinearity, Chudik et al. (2017) found a negative association between sovereign debt build-up and output growth, and no evidence of a universally applicable threshold effect between sovereign debt and growth among different countries. By stark contrast, Baum et al. (2013) showed that the short-run impact of debt on GDP growth is positive and highly statistically significant, but it decreases to around zero and loses significance beyond public debt-to-GDP ratios of around 67 percent among eurozone countries. They further argued that for high debt-to-GDP ratios (above 95 percent), additional debt has a negative impact on growth. A similar observation was reported by Checherita-Westphal and Rother (2012), and yet this study found a turning point – beyond which the government debt-GDP ratio has a negative impact on the long-term growth of EU countries – at about 90–100 percent of GDP. In addition, a growing body of empirical studies performed on different economies suggests an inverse relationship between external debt and growth, see for example Mencinger et al. (2014); Eberhardt and Presbitero (2015); Woo and Kumar (2015); Shittu et al. (2018); and Yang and Su (2018).

Between the 1980s and 1990s, many African countries experienced financial crises caused by sovereign debt build-up. Surprisingly, there are limited empirical studies that have been conducted on the African economies on this topic. As the first consideration, Tchereni et al. (2013) established a negative relationship between external debt and growth in Malawi. Consistent with this line of argument, Tilak (1990), Lin & Sosin (2001), Daud and Podivinsky (2011), Presbitero (2012) and Adamu and Rasiyah (2016) found evidence in support of the thesis that elevated sovereign debt is significantly associated with sluggish subsequent growth. Lastly, Saungweme and Odhiambo (2019) argued that there exists a unidirectional Granger-causality from economic growth to public debt in Zambia.

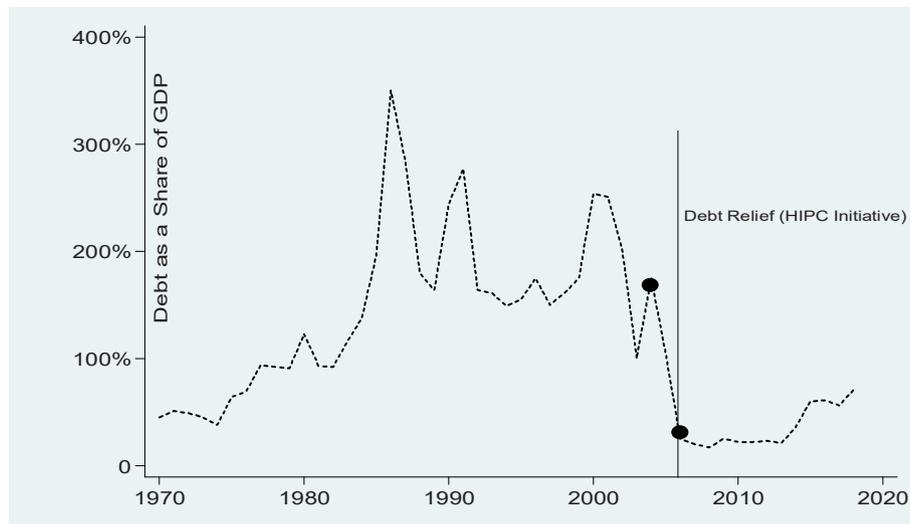
## 3. Theoretical model and estimating framework

### 3.1. Theoretical model

Before outlining the estimating framework, this section describes the motivating theory of interest, which highlights the short-run and long-run implications of increased sovereign debt stock on growth. In a neoclassical (Solow) model, labour and land are supplied inelastically. Thus, economy  $i$  has the constant return to scale aggregate production function

$$y_{it} = [A_{it}H_{it}]^{\alpha} K_{it}^{\beta} L_{it}^{1-\alpha-\beta} \quad (1)$$

Where  $\alpha + \beta \leq 1$ ,  $y_{it}$  symbolise the level of aggregated output produced in time  $t$ ,  $K_{it}$  signify capital,  $L_{it}$  depicts the supply of land,  $A_{it}$  is the labour-augmenting technology or knowledge, and  $H_{it}$  is the effective unit of labour given by  $H_{it} = h_{it}N_{it}$  where  $N_{it}$  is total population and  $h_{it}$  is human capital per person. For simplicity and without loss of generality, normalise  $L_{it} = L_i = 1$  for all  $t$ . Accordingly, we posit that an increase in sovereign debt may augment output (growth) through a number of channels, including more accumulation of capital ( $K_{it}$ ) and a direct effect on total factor productivity (TFP). Ultimately, Equation (1) can be simplified as  $Y = f(A, H, K, L, Debt)$  with  $Debt$  being a sovereign debt-related variable of interest.



**Fig. 1.** Plots the total sovereign debt as a share of GDP over the period 1970 to 2018. The total sovereign debt is a combination of external and domestic borrowings and excludes payment arrears and publicly guaranteed debt.

From Equation (1), we posit two possible effects of sovereign debt accumulation on growth. First, since Zambia has an underdeveloped government bond market, then budget deficit and infrastructure projects are financed, predominantly, through bilateral and multilateral debt. In that instance, it is believed that sovereign debt can stimulate growth, which is achieved through government spending. Second, it is also assumed that when sovereign debt surpasses a certain threshold, the effect on growth turns negative. In the Zambian context, this is often precipitated by capital flight due to debt servicing – which is usually denominated in foreign currency.

### 3.2. Estimating framework

The estimating framework is motivated by Equation (1). Considering the properties of the data for this study, and the fact that sovereign debt and growth tend to be persistent, this study adopts an estimating framework that takes into account dynamic endogeneity, heteroskedasticity and simultaneity bias. Thus, this study adopts an estimating model that is of the form

$$y_t = \alpha + \beta X_t + \varepsilon_t \quad (2)$$

Where  $y_t$  ( $Y_t - Y_{t-1}$ ) is the dependent variable in time  $t$ ,  $X_t$  is a vector of explanatory Solow regressors and  $\varepsilon_t$  is the error term that is independent and identically distributed (*i.i.d*) with the mean zero and finite variance. Equation (2) is estimated using the Instrumental Variable (IV) technique or Two-Stage Least Squares (2SLS). Econometrically, the IV estimator is accommodative in identifying the sources of endogeneity. Thus, the estimating model is of the form

$$y_t = \alpha + \gamma' Debt_t + \varphi' Debt_t^2 + \sum_{j=1}^V \lambda' CV_{jt} + \varepsilon_t \quad (3)$$

Where  $y_t$  is GDP growth,  $Debt_t$  is Debt-to-GDP ratio<sup>3</sup>;  $Debt_t^2$  is the squared variable of the Debt-to-GDP ratio,  $CV_t$  is a vector of control variables comprising of capital stock growth, copper price growth, inflation and population growth; and  $\varepsilon_t$  is the error term. Whereas,  $V$  conveys the number of control variables entering Equation (3), with

<sup>3</sup> This is a common variable in the existing literature. The use of total debt could be misleading given that countries borrow at different maturities and conditions. Yet, for the robustness check, total sovereign was used to replace the debt-to-GDP ratio.

$X_t = Debt_t + CV_t$ . In order to assess the non-linear relationship between sovereign debt and growth, Equation (3) includes a polynomial in sovereign debt (squared variable of debt). Statistically, if the  $Debt_t^2$  variable is negative and statistically significant, this entails that the relationship between sovereign debt and growth in Zambia is non-linear, and the exact opposite is true. This would imply that there exists a tipping point, where the positive effect of sovereign debt on growth turns into a negative.

Notwithstanding the fact that there is no consensus on which regressors should be included in the Solow growth model specified in Equation (3), we follow the methodology described in Eberhardt and Presbitero (2015). This study includes regressors described in Eberhardt and Presbitero (2015), and experiments with the addition of supplementary control variables as explained above.

## 4. Data and background information

### 4.1. Building dataset and relevant information

This study covers the period 1970 to 2017, and Tables A1 and A2 in Appendix A summarises the dataset and descriptive statistics, respectively.<sup>4</sup> Fig. 1 plots the total sovereign debt as a share of GDP over the period 1970 to 2018. The capital component ( $K_{it}$ ) is calculated using the Perpetual Inventory Method (PIM) that carries the form

$$K_{t+1} = (1 - \delta)K_t + I_t \quad (4)$$

The gross fixed capital formation  $I_t$  data is obtained from the WBDI database. The depreciation rates ( $\delta$ ) and the initial capital stock are taken from the Penn World Tables (PWT) version 9.1.

The empirical experimentation of including inflation and the copper price, in Equation (3), is motivated by the following economic factors. First, the inclusion of inflation in Equation (3) is predicated on the notion that Zambia has an underdeveloped bond market, thus budget deficit financing is sustained through money creation and external borrowings. Theoretically, markedly high levels of sovereign debt elevate inflation, which can insidiously affect growth (Chudik et al., 2017). In Zambia, external debt servicing results in capital flight, which

<sup>4</sup> The study period is confined to the period 1970 to 2017 due to availability of data. For instance, the latest Penn World Tables version 9.1 covers data up to 2017. Yet, for Fig. 1 and Table B1 (in Appendix B) the analysis is extended to 2018.

leads to currency depreciation and that has a transitory effect on inflation – which are symptoms of the “*original sin effect*” (Eberhardt & Presbitero, 2015, p. 46). Second, copper prices are included in Equation (3) while considering the factors that some global benign exogenous factors (including interest rates in the US and commodity prices) play an important role in precipitating sovereign debt crises and it induces a negative effect on growth among African economies (Chudik et al., 2017). Historically, Zambia is not immune to such unfavourable external conditions. For example, lower copper prices induced a negative effect on the domestic economies in the 1980s, 1990s and recently between 2015 and 2016 (for details see Chikalipah, 2019).

#### 4.2. Identifying instrument

The identifying instrument for macro-level studies is always problematic. To investigate the effect of sovereign debt on growth in Zambia requires an instrumental variable that is correlated with fluctuation in debt levels, but otherwise unrelated to output growth. The instrumental variable will break the simultaneity between output growth and debt accumulation. Doing so will accurately identify the causal effect between the two variables. Therefore, this study uses the US federal funds rate as an instrument for the changes in debt level in Zambia.

It seems plausible that US federal funds rates will be related to debt accumulation given that Zambia’s sovereign debt is predominantly procured in USD. Two pieces of evidence support this choice of instrument. First, when the US federal fund rate is low, that signals cheap money (low interest rates) and high liquidity. Thus, international banks, habitually seek high yields in developing countries. This was also the case during the US monetary expansion (Quantitative Easing), which occurred between 2009 and 2014. And the reverse was the case during the QE tapering. Second, post-HIPC initiative and MDRI completion point, Zambia accumulated much of its sovereign debt during the period of ultra-low US federal funds rates. This could indicate that the Zambian government was attracted by low interest rate on US denominated debt.

**Table 1**

Estimation results of the relationship between debt and growth in Zambia – main results.

	OLS (With Robust SEs)	IV (2SLS)
Debt	0.178***	0.181***
	(0.030)	(0.036)
Debt <sup>2</sup>	–0.002**	–0.002**
	(0.001)	(0.001)
Capital Stock	0.013***	0.018***
	(0.004)	(0.006)
Copper Price	0.009***	0.021***
	(0.002)	(0.006)
Inflation	–0.015***	–0.048**
	(0.006)	(0.019)
Population growth	–0.212***	–0.561***
	(0.044)	(0.089)
Observations	46	46
R <sup>2</sup> (within)	0.34	0.17
Kleibergen-Paap rk Wald F Statistic		10.1
Kleibergen-Paap rk LM Statistic		18.6***

**NOTES:** Table 1 reports the estimation results of the effect of the debt on growth in Zambia over the period 1970 to 2017. The dependent variable is real GDP growth. Figures in parentheses represent standard errors (SEs). The symbol \* expresses significance at the 10 percent level, \*\* at 5 percent and \*\*\* at 1 percent level. Year dummies are included in the OLS and IV estimators. The Kleibergen-Paap rk LM and Wald F statistics correspond to tests of underidentification and weak identification, respectively.

Lastly, changes in US federal funds rates appear to affect the lending rates of US denominated debt in Zambia, and not vice versa. Alternatively, for robustness check, this study also experiments with the use of the lagged regressors as instruments, a common practise in empirical studies (Afonso & Jalles, 2013).

#### 5. Empirical results

This section presents the statistical analysis of the effect of sovereign debt on growth in Zambia, using the OLS and IV estimators. The IV approach uses the US Federal Funds rates as instruments, which will lead to consistent and precise estimates. By stark contrast, the OLS estimator does not control for endogeneity of debt. Consequently, the OLS estimates are likely to understate the precise magnitude of the effect of sovereign debt on growth, possibly dramatically. In view of that, the OLS estimates are least preferred and are used to check the consistency of the IV estimates.

##### 5.1. Main results: the effect of sovereign debt on growth

In each of the estimation models of Table 1, the coefficient of the debt is positive and robustly significant at 1 percent, while the coefficient of Debt-squared ( $Debt^2$ ) is negative and statistically significant. This implies that the relationship between sovereign debt and growth in Zambia is non-linear – i.e there exists a tipping point at which the positive effect of debt on growth inverts into a negative. Instrumenting for the sovereign debt has a significant effect on growth estimates – that is 0.181 for the IV estimator versus 0.178 for the OLS estimator. The slight differences between the IV and OLS estimates also confirm the strength of instruments used in the IV estimator.

The debt-growth non-linear relationship is plausible given that the elevated cost of servicing the high sovereign debt reduces government domestic expenditure. In Zambia, higher sovereign debt often results in the following: low liquidity in the economy, fiscal consolidation, a wage freeze for public workers and higher taxes.<sup>5</sup> These factors converge and ultimately lead to a sluggish economy growth. Table 1 also presents the results of the coefficients of the control variables ( $CV_{it}$ ), which are capital stock, copper price, inflation and population growth, and are in line with priori expectation and in all cases statistically significant.

**Table 2**

Real GDP growth as the level of sovereign debt varies over the period 1970–2017.

	Ratio of Sovereign Debt-to-GDP			
	Below 30 Percent	30 to 60 Percent	60 to 90 Percent	90 Percent and above
Average Real GDP growth (%)	7.92	4.21	2.84	1.91
Observations (years) = N	8	7	6	27

**NOTES:** Table 2 reports the methodical analysis of real GDP growth, as the level of debt-to-GDP ratio varies in Zambia over the period 1970 to 2017.

<sup>5</sup> Historically, debt accumulation in several African economies results in high taxes. This phenomenon discourages private investment for fear of future taxes (Collier & Gunning, 1999). This is also the case with Zambia; as of 2019, a variety of taxes were the highest in the Southern African Development Community (SADC), and the inflows of Foreign Direct Investment (FDI) between 2015 and 2018 have somewhat declined (World Bank, 2019).

5.2. The effect of debt on growth using the RR (2010) approach and exploring the optimal debt-threshold

This section provides further evidence on the debt-threshold effect on growth and the possible tipping point at which the sovereign debt build-up turns from a positive to a negative effect on growth. To do so, this study utilises a statistical approach adopted by RR (2010). The study by RR (2010) has generated a substantial degree of debates in the debt-growth nexus literature and in some cases, it has been widely discredited. A notable critique of RR (2010) is a study by Herndon et al. (2014).<sup>6</sup> In spite of that, the RR' (2010) study methodology can still be applicable in empirical studies. In a nutshell, RR's (2010) methodology involves a methodical matching of the annual GDP growth rates into four groups of debt-to-GDP ratio: below 30 percent, between 30 and 60 percent, between 60 and 90 percent, and above 90 percent. Statistically, the RR (2010) framework according to Chudik et al. (2017) is of the form

$$y_t = \sum_{j=1}^L a_j I\{(\tau_{j-1}) < Debt_t \leq (\tau_j)\} + \varepsilon_t \tag{5}$$

As earlier parameterised in Equation (3),  $y_t$  is GDP growth and  $Debt_t$  is Debt-to-GDP ratio. Whereas  $L$  epitomises the number of groups considered,  $\tau_j$  for  $j = 0, 1, \dots, L$  are the debt-to-GDP thresholds levels, debt-to-GDP thresholds levels,  $I(\mathcal{A})$  is an indicator variable that takes the value of unity if event  $\mathcal{A}$  occurs and zero otherwise, with the end condition,  $I\{Debt_t \leq (\tau_0)\} = 0$ , and  $I\{Debt_t \leq (\tau_L)\} = 1$ . The average growth in the group is represented by  $a_j$ , for  $j = 1, 2, \dots, L$ . Notably, RR (2010) set  $L = 4$ ,  $\tau_0 = -\infty$ ,  $\tau_1 = 30$  percent,  $\tau_2 = 60$  percent,  $\tau_3 = 90$  percent and  $\tau_4 = \infty$ , thereby treating the threshold levels as given.

The results of applying the RR (2010) methodology are shown in Table 2. Unsurprisingly, the results shown in Table 2 are consistent with the baseline results in Table 1. The results illustrate the non-linear relationship between sovereign debt and growth in Zambia over the period 1970 to 2017. Remarkably, between 1970 and 2017, debt-to-GDP ratios above 90 percent are characteristically been associated with a mean (average) growth of 2 percent versus 8 percent when the debt-to-GDP ratios are below 30 percent, and when the debt-to-GDP ratios are between 30 and 90 percent, GDP growth rate hovers around 3 and 4 percent. In summary, high sovereign debt is found to be significantly associated with slower subsequent growth in Zambia.

The results obtained, reported in Table 2, of applying the RR (2010) methodology are inconclusive. It can be reasoned that the analysis is non-parametric and results do not highlight the causal and threshold effect of sovereign debt accumulation on growth. Henceforth, to investigate the tipping point, the full sample was divided into four canonical

**Table 3**  
Results of the debt-growth nexus using sub-samples of debt-thresholds (period: 1970–2017).

	OLS ESTIMATES					
	CANONICAL THRESHOLDS				TIPPING POINT	
	(1) Below 30 percent	(2) 30 to 60 percent	(3) 60 to 90 percent	(4) 90 percent and above	(5) 0 to 40 percent	(6) 40 percent and above
Debt	0.037*** (0.003)	-0.011*** (0.004)	-0.015 (0.022)	-0.052*** (0.008)	0.025** (0.06)	-0.036*** (0.007)
Capital Stock	0.012** (0.005)	0.068 (0.137)	0.004 (0.023)	0.094* (0.053)	0.054* (0.022)	0.004 (0.009)
Observations	8	7	6	27	10	38
R <sup>2</sup> (Adj. R <sup>2</sup> )	0.78 (0.46)	0.88 (0.63)	0.66 (0.44)	0.25 (0.23)	0.54 (0.53)	0.48 (0.35)

**NOTES:** Table 3 reports the estimation results of the relationship between sovereign debt and growth using the sub-samples of debt-thresholds. The dependent variable is real GDP growth, and the study covers the period 1970 to 2017. The symbol \* expresses significance at the 10 percent level, \*\* at 5 percent and \*\*\* at 1 percent level. The figures in parentheses represent standard errors (SEs). Year dummies are included in the OLS estimators.

<sup>6</sup> Some critics focus on (i) the debt bracket used, data frequency, econometric specifications, and reverse causality (Chudik et al., 2017).

categories of debt-to-GDP ratio: below 30 percent, between 30 and 60 percent, between 60 and 90 percent, and above 90 percent. These groups are empirically analysed using the OLS estimator. This is against the preferred IV estimator, owing to the fact that the sub-samples became small and the IV estimator could not run. The OLS method is of the form

$$y_t = \alpha + \gamma' Debt_t + \lambda' Cap_t + \varepsilon_t \tag{6}$$

In Equation (6), only capital stock growth ( $Cap_t$ ) and debt-GDP ratio ( $Debt_t$ ) are included as regressors due to limited observations in some of the sub-samples outlined above. This approach improves the degrees of freedom for sub-samples that contain few observations. Moreover, this approach is consistent with the methodology that was adopted by Eberhardt and Presbitero (2015). Table 3 shows the results of estimating Equation (6) on the sub-samples of debt-thresholds.

It is observable in Table 3 that some capital stock estimates are insignificant; however, they yield expected signs. The lack of such consistency is due to the Simpson-Yule (Simpson Paradox) effect, which

**Table 4**  
Robustness results - the relationship between sovereign debt and growth in Zambia.

	IV (SLS)		
	(1)	(2)	(3)
Debt	0.244*** (0.051)	0.183*** (0.029)	0.191*** (0.036)
Capital Stock	0.024*** (0.009)	0.014*** (0.005)	0.011*** (0.002)
Debt <sup>2</sup>		-0.002** (0.001)	-0.002** (0.001)
Copper Price		0.016*** (0.006)	0.015*** (0.003)
Inflation		-0.059** (0.022)	-0.013** (0.006)
Population growth		-0.598*** (0.101)	-0.475*** (0.061)
Observations	46	46	46
R <sup>2</sup> (within)	0.31	0.29	0.26
Kleibergen-Paap rk LM Statistic	17.8***	18.1***	19.8***
Kleibergen-Paap rk Wald F Statistic	12.8	10.3	11.7

**NOTES:** Table 4 reports the robustness results of the effect of the debt on growth in Zambia over the period 1970 to 2017. The dependent variable is real GDP growth and total GDP output. Figures in parentheses represent standard errors (SEs). The symbol \* expresses significance at the 10 percent level, \*\* at 5 percent and \*\*\* at 1 percent level. Year dummies are included in the OLS and IV estimators. The Kleibergen-Paap rk LM and Wald F statistics correspond to tests of underidentification and weak identification, respectively.

often occurs when the results of full samples differ from their sub-samples (Wagner, 1982). Overall, the results in Table 3 indicate the non-linear relationship between sovereign debt and growth in Zambia. Specifically, when the debt-to-GDP ratio is below 30 percent, the impact on growth is about 4 percent. By stark contrast, any additional debt beyond the 30 percent of debt-to-GDP ratio turns the positive effect of debt on growth into a negative effect. The magnitude of the negative effect becomes pronounced above 90 percent of the debt-to-GDP ratio – whereas a 1 percent increase in the debt-to-GDP ratio is robustly associated with a 5 percent decline in output growth. To identify the precise tipping point, the following approach was employed. The sub-sample of a 30 percent Debt-to-GDP ratio was extended to 40 percent, and the effect on debt was still positive. However, the effect turned negative when the sub-sample was extended beyond 40 percent of debt-to-GDP (see column 5 and 6 in Table 3). This indicates that the tipping point for Zambia is a debt-to-GDP ratio of around 40 percent. At this point or below, growth is likely to be persistently above 7 percent, which is the recommended growth rate by the World Bank for effective poverty reduction.

### 5.3. Robustness check and further results

The possible objection to the results presented in the previous sections is that the estimates are not robust. Thus, this section addresses that concern by performing different estimation techniques to verify the stability or fragility of the baseline results reported in Table 1. For brevity only IV estimates are reported in Table 4.

Table 4, column (1), for comparison with the results reported in Table 3, reports the results of re-estimating Equation (3) without debt squared, copper price, inflation and population growth. The results are vastly similar with those reported in Table 1, suggesting that: (i) the effect of debt on growth in Zambia does not work through these variables, and (ii) the exclusion of these control variables does not make Equation (3) fragile. Table 4, column (2), the variables entering Equation (3) were either interchanged with variables which are listed in Table A2 in Appendix A. Specifically, (i) the Debt-to-GDP ratio was replaced with total debt; (ii) total capital stock growth rate was replaced with total capital stock; (iii) copper price growth rate was replaced with actual copper price (USD) per tonne; and (iv) population growth rate was replaced with total population. Table 4, column (3), reports the results of re-estimating Equation (3) with lagged regressors as instruments, replacing the US federal funds rate. In all the specification of Table 4, columns (1) to (3), the coefficient of debt is statistically significant at 1 percent, and generally consistent with the baseline results reported in Table 1. Thus, it would be fair to conclude that the study results are robust and not fragile to different estimation techniques.

## 6. Concluding remarks and policy implications

The astronomical rise in sovereign debt between 2011 and 2018 has revived the public debate on the economic consequence of high sovereign debt on inclusive growth and sustainable development. There has been a rise in the number of empirical studies that investigated the relationship between sovereign debt and growth in developed economies. Nonetheless, the empirical literature on this topic remains scarce

among African countries and Zambia, in particular. Investigating the effect of sovereign debt accumulation on growth is crucial in the design of optimal fiscal policies that balance short-run gain from debt build-up and any possible adverse effect on growth in the long-run (Chudik et al., 2017).

Against that background, this study investigated the effect of sovereign debt on growth in Zambia over the period 1970 to 2017. By employing the OLS and IV estimators, the study's findings suggest the following. First, without considering the debt-threshold, there exists a statistically significant negative relationship between sovereign debt accumulation and growth in Zambia. Second, the results of the non-linear debt-threshold effect show that the debt-to-GDP ratio beyond 40 percent (tipping point) turns the positive effect of debt on economic growth into a negative effect. In a nutshell, the optimal debt-to-GDP ratio for Zambia is around 40 percent.

Much of the sovereign debt that Zambia has procured in the last decade is for infrastructure projects. Of course, Zambia needs infrastructure to cater for an exponentially growing population, albeit such projects must be paced sustainably and free from corruption. The austerity measures are not the solution to the debt problem in Zambia. On the contrary, Zambia must improve the quality of investment to get stellar growth. And, if there is a slowdown in debt accumulation, subsequent output growth could proportionately lower the Debt-to-GDP ratio in the long-run to the 40 percent optimal level. Thus, to make meaningful progress on human development, government expenditure must be focussed on agriculture, health and education sectors. Last but not least, due to the lack of coherent macroeconomic research, and a credible debt policy that is backed by action, it is hoped that this study will contribute to policy formulation in Zambia.

To the best of our knowledge, there exists no empirical studies that have explored the effect of external debt servicing on the local currency. Thus, future research could explore the external debt-local currency nexus with a specific focus on Zambia. We posit that external debt servicing increases currency risk; thus, an empirical investigation is warranted, which will contribute to improved monetary policy formulation.

### CRedit authorship contribution statement

**Sydney Chikalipah:** Conceptualization, Methodology, Data curation, Writing – review & editing.

### Acknowledgement

This paper was previously circulated under the title “Sovereign debt and growth under myopic governments: time series evidence from Zambia.” I would like to thank, without implications, Gregory Smith, Godwin Okafor, the editor, Jennifer Hornett, and anonymous referees for helpful comments on earlier drafts. I am also grateful for comments and suggestions from seminar participants at the University of Cape Town. This paper's findings, interpretations and conclusions are solely those of the author and cannot be taken to represent those of the University of Cape Town. I acknowledge the academic support rendered by the University of Cape Town. All remaining errors are my own.

## APPENDIX A - DATA SOURCES AND DESCRIPTIVE STATISTICS

**Table A1**  
VARIABLES AND SOURCES

VARIABLES	MEASUREMENT	SOURCE
Capital Stock	Own Construction	PWT & WBDI
Copper price	Copper prices in USD	LME
Debt	Total national (sovereign) debt in USD	†
GDP	Monetary value of final goods and services	WBDI
Inflation (CPI)	Annual % change in consumer price Index (CPI)	WBDI
Population	Total population of Zambia in million	WBDI
US federal funds rate	The USA Federal Reserve Banks central interest rate	FRB-NY

**NOTES:** Table A1 presents the summary of the variables entering our estimation framework. The primary sources of the data in the sample are: (i) the London Metal Exchange (LME); (ii) the Penn World Tables (PWT) version 9.0; and (iii) the World Bank Development Indicators (WBDI). The symbol † denotes the sources of data: IMF, Ministry of Finance of Zambia, Trading Economics, and the WBDI. USA signifies the United State of America, while FRB-NY stands for Federal Reserve Bank of New York. The real copper price of grade A is geometrically deflated by the United States (US) consumer price index (CPI).

**Table A2**  
DESCRIPTIVE STATISTICS

	N	MEAN	S.D	MIN	MEDIAN	MAX
Capital stock (USD billions)	48	83.13	93.74	12.39	41.89	362.14
Capital stock growth (%)	48	0.08	0.13	-0.09	0.07	0.63
Capital stock per capita (USD)	48	7014.1	5323.2	2370.4	4763.7	21185.3
Copper prices (USD/tonne)	48	3198.5	2298.9	1130.0	2130.0	8950.0
Copper price growth (%)	48	1.88	19.58	-50.75	-1.29	44.81
Debt (total) – (USD billions)	48	5.41	3.10	0.81	5.75	14.56
Debt per capita (USD)	48	565.2	227.5	195.0	586.9	997.9
Debt/GDP ratio	48	117.9	83.0	17.0	97.0	350
Debt growth (%)	48	0.08	0.19	-0.40	0.06	0.63
GDP (USD billions)	48	11.83	6.32	6.60	8.48	27.96
GDP growth (%)	48	3.32	4.18	-8.63	4.00	10.30
GDP per capita (USD)	48	1248.2	252.7	903.89	1199.8	1635.5
GDP pc growth (%)	48	0.18	4.10	-10.96	0.96	7.16
Inflation (%)	48	30.11	40.77	-14.17	18.14	183.31
Population growth (%)	48	3.01	0.31	2.53	2.95	3.51
Population (total in millions)	48	9.39	3.72	4.17	8.78	17.10
US federal funds rate	48	5.29	3.87	0.09	5.18	16.39

**NOTES:** Table A2 reports the descriptive statistics {number of observations (N), Mean (MEAN), Standard Deviation (S.D), Minimum (MIN), Median and Maximum (MAX)} for the full sample of over 48 annual observations. The data covers the period 1970 to 2017. The monetary data is dollarised using the constant 2011 national prices (2011 USD). The US federal funds rates are annualised averages.

## APPENDIX B - THE HISTORY OF THE SOVEREIGN DEBT IN ZAMBIA

## (A). The early evolution of sovereign debt (1964–1990)

Since gaining political independence in 1964, the Zambian government at this time embarked on huge investments in human capital and infrastructure such as housing, schools, hospitals, roads, railway lines, an oil pipeline and manufacturing industries (Kragelund, 2017). In spite of those capital projects, Zambia's sovereign debt grew steadily to about USD 0.8 billion at the end of 1970 (i.e., slightly above 40 percent of GDP). The slow build-up of sovereign debt during that period was mainly attributed to the large revenue from copper mining – the 1960s were an era of high copper prices (Chikalipah, 2019).<sup>7</sup> The golden era of stellar economic growth that average 7 percent per annum lasted only for a decade: that is 1964 through to 1974. Thereafter, between 1975 and 1980, the price of copper plummeted dramatically, and the price of crude oil surged to an all-time high. These two chaotic events forced the government to borrow in order to stimulate the fundamentally weak economy. Consequently, the Zambian sovereign debt increased from around USD 0.8 billion in 1970 to about USD 4 billion (123 percent of GDP) towards the end of 1970 (Makgetla, 1986; Trading Economics, 2019).

Sovereign debt tripled from USD 4 billion at the beginning of 1981 to about USD 8 billion (244 percent of GDP) at the end of 1990. The rapid growth in the sovereign debt was mainly attributed to (i) food subsidies as the government adopted the socialist policy of humanism, and (ii) weakness in the price of copper that exacerbated the budget deficit. Relatedly, the UNIP government continued bailing-out poorly performing State-Owned Enterprises (SOEs), locally known as parastatal companies (Seshamani, 1992; Rakner, 2003). By mid-1980s, the debt stock led to a severe financial challenge and recovery plans were instituted by the IMF. In 1986, the IMF introduced austerity measures that included the suspension of food

<sup>7</sup> Since the 1920s, Zambia has been a mono-economy and heavily relies on copper mining as a significant driver of the economy. For example, between 1960 and 2018, copper exports accounted for over two-thirds of foreign exchange earnings, a source of formal employment and government revenue. Historically, any slump in copper prices often induces a negative effect on the economy of Zambia. The salient examples of economic shocks in Zambia that were induced by low copper prices were recorded in the late 1970s, mid-1980s, throughout 1990s and between 2015 and 2016 (Chikalipah, 2019).

subsidies, but riots broke out and subsidies were reintroduced (Good, 1989). In 1987, when the sovereign debt crisis deepened, the government suspended dealings with the IMF, but that decision was later rescinded in 1989 (Parfitt & Riley, 2010). During the period 1987 to 1989, the government restricted its debt service to 10 percent of exports, which was interpreted by creditors as default and penalties were levied on sovereign debt (Good, 1989; Parfitt & Riley, 2010).

At the start of 1990s, the economy of Zambia was in a precarious condition: (i) the domestic currency depreciated considerably, (ii) inflation was hovering above 100 percent, (iii) corruption reached high levels, (iv) poverty and inequality worsened, (v) life expectancy declined from 53 years in 1980s to 48 years in the early 1990s, and (vi) there were severe shortages of essential products (Muuka, 1997; Seshamani, 1998). The deteriorating state of the economy precipitated the change of government from the United National Independence Party (UNIP) led by Kenneth Kaunda to the Movement for Multi-party Democracy (MMD) led by Frederick Chiluba in 1991 (Larmer, 2016). The new regime dedicated the entire decade, post-1991 election, to economic stabilisation and debt servicing (Panter-Brick, 1994).

#### (B). Sovereign debt consolidation and debt relief (1991–2011)

In the Zambian context, the period between 1991 and 2001 is best described as the most wasted decade for socio-economic transformation (Chikalipah, 2019). Taken together, the 1980s and 1990s typified high debt burden, economic and political crises and endemic diseases, such as tuberculosis, malaria, and HIV/AIDS (Bosman, 2000). As a result of debt distress, the new government that was formed in 1991 implemented massive financial sector reforms, which largely involved (i) a rapid and simultaneous liberalisation of both the current and capital account, (ii) the rushed privatisation of State-Owned Enterprises (SOEs) including mines, and (iii) the liberalisation of markets (Chitonge, 2016). The slow economic growth between 1990 and 2000s was partly amplified by low copper prices over the same period.

In the 1990s, the government was wholly committed to (i) debt serving, (ii) Structural Adjustment Programmes (SAPs) imposed by the IMF and the World Bank, and (iii) the conditionalities set out for the HIPC initiative and MDRI, and debt relief for low-income countries (Bhattacharya & Clements, 2004). Consequently, sovereign debt in Zambia increased steadily from USD 8 billion (244 percent of GDP) in 1990 to about USD 9.1 billion in 2000 (254 percent of GDP). In 2005, Zambia qualified for debt relief under the HIPC initiative and MDRI, and the USD 6.6 billion debt was cancelled (Smith et al., 2017). The sovereign debt that written-off was mainly owed to the World Bank, IMF and Paris Club. Thereafter, the debt build-up was growing at a modest pace and increased from approximately USD 3.2 billion (25 percent of GDP) in 2006 to around USD 5.1 billion (23 percent of GDP) in 2011 (IMF, 2017).

#### (C). The Redux of buccaneer borrowing (2011–2018)

The change of government in 2011 from MMD to the Patriotic Front (PF) party came with a renewed policy of infrastructure development that was wholly financed by debt (Goldring & Wahman, 2016; Fraser, 2017). Within a short period of time, sovereign debt increased from USD 5.1 billion (i.e., 25 percent of GDP) in 2011 to about USD 14.91 billion (i.e., 56 percent of GDP) at the end of 2018. The consolidated USD 14.91 billion sovereign debt that was reported at the end of 2018 consists of (i) USD 10.05 billion external, of which USD 3 billion is for the Euro bonds, and (ii) approximately USD 4.9 billion domestic debt.<sup>8</sup> The current sovereign debt is within the revised debt ceiling, which was approved by Parliament in February 2016: (i) the external debt cap is currently K160 billion (USD 14.1 billion), and (ii) there is a combined domestic debt cap of K70 billion (USD 6.2 billion) of which K40 billion (USD 3.5 billion) is for government bonds, and K30 billion (USD 2.7 billion) is for treasury bills (MoFNP, 2017).<sup>9</sup>

The 2017 IMF report puts Zambia at a high risk of debt distress, signifying there are elevated vulnerabilities associated with the sovereign debt. As it was previously mentioned, debt servicing currently forms the largest component in the 2019 national budget, accounting for about 30 percent of government spending (MoFNP, 2018). According to the IMF and World Bank, Zambia's sovereign debt is likely to increase dramatically as there is over USD 7 billion of pipeline debt yet to accrue by 2022, which is principally for infrastructure projects currently being undertaken by the Chinese State-owned Contractors (e.g., AVIC). On top of that, there is lack of transparency on the terms and conditions of the Chinese loans, which are classified and borrowed funds that are characteristically used to pay Chinese State-owned contractors (Gu et al., 2016; Mlambo et al., 2016). Over two-thirds of the current Zambian debt was spent on infrastructure projects: airports, hospitals, roads and schools. Moreover, the government spent over USD 5 billion between 2012 and 2018 on the construction of truck roads (Smith et al., 2017).<sup>10</sup>

**Table B1**  
SUMMARY OF SOVEREIGN DEBT IN ZAMBIA (1970–2018)

PERIOD	AMOUNT	DEBT-TO-GDP RATIO	NOTES
1970	\$0.8 billion	40%	
1980	\$4.0 billion	123%	
1990	\$8.0 billion	244%	
2000	\$9.1 billion	254%	
2005	\$3.2 billion	25%	Debt relief of \$6.6 billion
2011	\$5.2 billion	25%	
2018	\$14.9 billion	56%	

**NOTES:** Table B1 lists the total sovereign debt with corresponding Debt-to-GDP ratios in Zambia from 1970 to 2018. The total sovereign debt is a combination of external and domestic borrowings.

<sup>8</sup> The domestic debt stood at K58.3 billion, using the USD/ZMW exchange rate of K12 at the end of 2018, which translate to USD 4.9 billion. Unless indicated otherwise, throughout this paper we apply the USD/ZMW exchange rate of K12 as at the end of December 2018.

<sup>9</sup> We apply the USD/ZMW exchange rate of K11.38 as at the end of February 2016: the month in which the debt ceiling was adjusted.

<sup>10</sup> International evidence indicates that the costs of constructing roads in Zambia are significantly higher than other countries in the SADC region (for further evidence see Muya et al., 2013; Smith et al., 2017). The reasons for high costs relate to poor public investment management, rampant corruption, single sourcing and long delays in paying constructors (Kaliba et al., 2009; Muya et al., 2013). Nearly all large-scale infrastructure projects in Zambia are constructed by Chinese State-owned companies with no public bidding process (Mohan & Tan-Mullins, 2016). It is now widely agreed that Chinese State-owned and associate companies, significantly inflate the costs of projects (Beech, 2018; Chellaney, 2017).

In sum, the past and present governments have borrowed to finance projects that focus on their self-preservation of power and self-enrichment. Specifically, the UNIP government borrowed in the 1980s to finance food subsidies, resulting in the debt-to-GDP ratio reaching an all-time high of 350 percent in 1986. The government's myopic policy of food subsidies was focussed on prolonging the presidency of Kenneth Kaunda at the time (Hulme et al., 1994; Rakner, 2003). Not only did debt accumulation result in financial distress, but the food subsidy policy also gave birth to the dependence syndrome overtly seen among Zambians today (Bratton & Liatto-Katundu, 1994). Second, the current wave of sovereign debt procured by the PF government since 2011 is predicated on a similar myopic policy of appeasing voters with visible inflated infrastructure projects like roads, which have no multiplier effect on sustainable and inclusive growth (Chikulo, 2000; Bwalya, 2017; Kaliba et al., 2009; Muya et al., 2013).

### Declaration of funding and interest

The authors confirm that there are no known conflicts of interest associated with this article and there has been no financial support for this work that could have influenced its outcome.

### References

- Adamu, I. M., & Rasiyah, R. (2016). External debt and growth dynamics in Nigeria. *African Development Review*, 28(3), 291–303.
- Afonso, A., & Jalles, J. T. (2013). Growth and productivity: The role of government debt. *International Review of Economics & Finance*, 25, 384–407.
- Anand, S., & Sen, A. (2000). Human development and economic sustainability. *World Development*, 28(12), 2029–2049.
- Baum, A., Checherita-Westphal, C., & Rother, P. (2013). Debt and growth: New evidence for the euro area. *Journal of International Money and Finance*, 32, 809–821.
- Beech, H. (2018). We cannot afford this: Malaysia pushes back against China's vision. <https://www.nytimes.com/2018/08/20/world/asia/china-malaysia.html>.
- Berg, A., Ostry, J. D., & Zettelmeyer, J. (2012). What makes growth sustained? *Journal of Development Economics*, 98(2), 149–166.
- Bhattacharya, R., & Clements, B. (2004). Calculating the benefits of debt relief. *Finance & Development*, 41(4), 48–50.
- Bosman, M. C. J. (2000). Health sector reform and tuberculosis control: The case of Zambia (country case report). *International Journal of Tuberculosis & Lung Disease*, 4(7), 606–614.
- Bratton, M., & Liatto-Katundu, B. (1994). A focus group assessment of political attitudes in Zambia. *African Affairs*, 93(373), 535–563.
- Bwalya, J. (2017). Unravelling clientelism in the Zambian electoral campaigns. *Third World Quarterly*, 38(7), 1551–1565.
- Checherita-Westphal, C., & Rother, P. (2012). The impact of high government debt on economic growth and its channels: An empirical investigation for the euro area. *European Economic Review*, 56(7), 1392–1405.
- Chellaney, B. (2017). *China's debt-trap diplomacy*. Project Syndicate. <https://www.project-syndicate.org/commentary/china-one-belt-one-road-loans-debt-by-brahma-chellaney-2017-01?barrier=accesspaylog>.
- Chikalipah, S. (2019). Does a meaningful relationship exist between copper prices and economic growth in Zambia? *African Journal of Economic and Management Studies*, 10(1), 72–84.
- Chikulo, B. C. (2000). Corruption and accumulation in Zambia. In *Corruption and development in Africa* (pp. 161–182). London: Palgrave Macmillan.
- Chitonge, H. (2016). Zambia at 50: The persisting challenges of economic structural transformation. *Development Southern Africa*, 33(6), 790–805.
- Chudik, A., Mohaddes, K., Pesaran, M. H., & Raissi, M. (2017). Is there a debt-threshold effect on output growth? *The Review of Economics and Statistics*, 99(1), 135–150.
- Collier, P., & Gunning, J. W. (1999). Why has Africa grown slowly? *The Journal of Economic Perspectives*, 13(3), 3–22.
- Daud, S. N. M., & Podivinsky, J. M. (2011). Debt–growth nexus: A spatial econometrics approach for developing countries. *Transition Studies Review*, 18(1), 1–15.
- Eberhardt, M., & Presbitero, A. F. (2015). Public debt and growth: Heterogeneity and non-linearity. *Journal of International Economics*, 97(1), 45–58.
- Égert, B. (2015). Public debt, economic growth and nonlinear effects: Myth or reality? *Journal of Macroeconomics*, 43, 226–238.
- Fraser, A. (2017). Post-populism in Zambia: Michael Sata's rise, demise and legacy. *International Political Science Review*, 38(4), 456–472.
- Goldring, E., & Wahman, M. (2016). Democracy in reverse: The 2016 general election in Zambia. *Africa Spectrum*, 51(3), 107–121.
- Good, K. (1989). Debt and the one-party state in Zambia. *The Journal of Modern African Studies*, 27(2), 297–313.
- Gu, J., Zhang, C., Vaz, A., & Mukwereza, L. (2016). Chinese state capitalism? Rethinking the role of the state and business in Chinese development cooperation in Africa. *World Development*, 81, 24–34.
- Henning, M. J., Betancourt, T. S., & Khanna, S. K. (2016). Protective factors that contribute to improved school attendance for children that are HIV/AIDS affected in Zambia. *International Journal of Health Promotion and Education*, 54(6), 318–334.
- Herndon, T., Ash, M., & Pollin, R. (2014). Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff. *Cambridge Journal of Economics*, 38(2), 257–279.
- Hulme, D., Sanderatne, N., & Cromwell, E. (1994). Food subsidy policy and democracy: A comparative study of Sri Lanka and Zambia. *Democratization*, 1(2), 461–484.
- (IMF) (International Monetary Fund). (2017). Zambia: Debt sustainability analysis. Staff report on the 2017 article IV consultation, country report No. 17/327. <https://www.imf.org/external/pubs/ft/dsa/pdf/2017/dsacr17327.pdf>.
- Kaliba, C., Muya, M., & Mumba, K. (2009). Cost escalation and schedule delays in road construction projects in Zambia. *International Journal of Project Management*, 27(5), 522–531.
- Khonje, M. G., Manda, J., Mkandawire, P., Tufa, A. H., & Alene, A. D. (2018). Adoption and welfare impacts of multiple agricultural technologies: Evidence from eastern Zambia. *Agricultural Economics*, 49(5), 599–609.
- Kourtellos, A., Stengos, T., & Tan, C. M. (2013). The effect of public debt on growth in multiple regimes. *Journal of Macroeconomics*, 38, 35–43.
- Kragelund, P. (2017). The making of local content policies in Zambia's copper sector: Institutional impediments to resource-led development. *Resources Policy*, 51(C), 57–66.
- Larmer, M. (2016). *Rethinking African politics: A history of opposition in Zambia*. Routledge.
- Lin, S., & Sosin, K. (2001). Foreign debt and economic growth. *The Economics of Transition*, 9(3), 635–655.
- Makgetla, N. S. (1986). Theoretical and practical implications of IMF conditionality in Zambia. *The Journal of Modern African Studies*, 24(3), 395–422.
- Mencinger, J., Aristovnik, A., & Verbic, M. (2014). The impact of growing public debt on economic growth in the European Union. *Amfiteatru Economic Journal*, 16(35), 403–414.
- Mlambo, C., Kushamba, A., & Simawu, M. B. (2016). China-africa relations: What lies beneath? *The Chinese Economy*, 49(4), 257–276.
- MoFNP (Ministry of Finance and National Planning). (2017). *Zambia's debt management strategy for 2017-2019*. <http://www.mof.gov.zm/?p=5412>.
- MoFNP (Ministry of Finance and National Planning). (2018). *Zambian national budget 2019*. <http://www.mof.gov.zm/?p=5813>.
- Mohan, G., & Tan-Mullins, M. (2016). Chinese migrants in Africa as new agents of development? An analytical framework. In *The power of the Chinese dragon* (pp. 174–198). London: Palgrave Macmillan.
- Muuka, G. N. (1997). Wrong-footing MNCs and local manufacturing: Zambia's 1992–1994 structural adjustment program. *International Business Review*, 6(6), 667–687.
- Muya, M., Kaliba, C., Sichombo, B., & Shakantu, W. (2013). Cost escalation, schedule overruns and quality shortfalls on construction projects: The case of Zambia. *International Journal of Construction Management*, 13(1), 53–68.
- Panizza, U., & Presbitero, A. F. (2013). Public debt and economic growth in advanced economies: A survey. *Swiss Journal of Economics and Statistics*, 149(2), 175–204.
- Panizza, U., & Presbitero, A. F. (2014). Public debt and economic growth: Is there a causal effect? *Journal of Macroeconomics*, 41, 21–41.
- Panter-Brick, K. (1994). Prospects for democracy in Zambia. *Government and Opposition*, 29(2), 231–247.
- Parfitt, T. W., & Riley, S. P. (2010). *The African debt crisis*. London, United Kingdom: Routledge.
- Presbitero, A. F. (2012). Total public debt and growth in developing countries. *European Journal of Development Research*, 24(4), 606–626.
- Rakner, L. (2003). *Political and economic liberalisation in Zambia 1991-2001*. Uppsala, Sweden: Nordic Africa Institute.
- Reinhart, C. M., & Rogoff, K. S. (2010). Growth in a time of debt. *The American Economic Review*, 100(2), 573–578.
- Saungweme, T., & Odhiambo, N. M. (2019). Government debt, government debt service and economic growth nexus in Zambia: A multivariate analysis. *Cogent Economics & Finance*, 7(1), 1622998.
- Seshamani, V. (1992). The economic policies of Zambia in the 1980s: Towards structural transformation with a human focus?. In *Africa's recovery in the 1990s* (pp. 116–134). London: Palgrave Macmillan.
- Seshamani, V. (1998). The impact of market liberalisation on food security in Zambia. *Food Policy*, 23(6), 539–551.
- Shittu, W. O., Hassan, S., & Nawaz, M. A. (2018). The nexus between external debt, corruption and economic growth: Evidence from five SSA countries. *African Journal of Economic and Management Studies*, 9(3), 319–334.
- Smith, G., Jessen, L., & Chinzara, Z. (2017). *How Zambia can borrow without sorrow*. <http://www.saipar.org:8080/eprc/handle/123456789/652>.

- Tchereni, B. H. M., Sekhampu, T. J., & Ndovi, R. F. (2013). The impact of foreign debt on economic growth in Malawi. *African Development Review*, 25(1), 85–90.
- Tilak, J. B. (1990). External debt and public investment in education in Sub-Saharan Africa. *Journal of Education Finance*, 15(4), 470–486.
- Trading Economics. (2019). *Government debt of Zambia*. <https://tradingeconomics.com/zambia/government-debt>. (Accessed 8 March 2019).
- Wagner, C. H. (1982). Simpson's paradox in real life. *The American Statistician*, 36(1), 46–48.
- Woo, J., & Kumar, M. S. (2015). Public debt and growth. *Economica*, 82(328), 705–739.
- World Bank. (2019). *Economic indicators*. Washington, DC – USA: World Bank Databank. <https://data.worldbank.org/indicator/bx.klt.dinv.wd.gd.zs>.
- Yang, L., & Su, J. J. (2018). Debt and growth: Is there a constant tipping point? *Journal of International Money and Finance*, 87, 133–143.