

Pre-COVID-19 evaluation of external debt, corruption and economic growth in South Africa

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Abstract

Purpose – This study is a pre-COVID-19 exposition of the existing situation about external debt-GDP relationship, incorporating corruption into the hypothesis, making South Africa the object of the study. The aim is to examine the causal relationship between corruption, economic growth and external debt, and in the end proffer solutions to the problems arising therefrom.

Design/methodology/approach – The study employed ARDL technique on time series data running from 1990 to 2019 with real gross domestic product as the dependent variable and external debt, external debt servicing, corruption, inflation and capital formation as regressors. Necessary tests that include unit root, cointegration, CUSUM and CUSUMSq, normality, serial correlation and heteroscedasticity were performed on the model.

Findings – The study shows that corruption, inflation and external debt servicing exert negative influences on economic growth while the effect of investment on growth was positive. External debt's effect in the short run was positive while its long-run effect on growth was negative. Among other things, the need to improve and strengthen public institutions in addition to targeting tax evaders and avoiders for increased government revenue were emphasized.

Originality/value – The study incorporates corruption into the country specific debt-GDP debate as against earlier studies that excluded corruption in their time series analysis or that were cross-country based. The authors also exposit the existing knowledge of the debt-GDP hypothesis before the outbreak of COVID 19 pandemic. This is expected to serve as a precursor to subsequent studies on the rising debt of South Africa during and after the pandemic.

Keywords ARDL, Corruption, Economic growth, External debt, Debt-GDP, Pre-COVID-19

Paper type Research paper

1. Introduction

Just like any other developing country, the rising external debt of South Africa in the face of its dwindling economic growth has become a source of worry to both researchers and policy makers. Added to this worry is the possible adverse effect of corruption on borrowed money and economic growth of the country. While the idea of external borrowing is the consequence of shortfalls in revenue against government expenditures (Van Cauwenbergh and Laleman, 2018; Kharusi and Ada, 2018), studies have shown that there are levels beyond which the debt-GDP ratio could retard a nation's growth expansion (Reinhart and Rogoff, 2010; Akram and Rath, 2018; Chirwa and Odhiambo, 2017; Shkolnyk and Koilo, 2018). In addition, the level of corruption and mismanagement of resources which are becoming more pronounced in South Africa may go a long way in weakening its economic and political institutions.



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Therefore, this study is set out to expound the debt to GDP hypothesis by incorporating corruption in a linear form on time series data spanning the period 1990–2019.

Available statistics have shown that activities of South Africa in terms of public spending have not only increased in absolute and relative terms but also as shares of the GDP (AfDB, 2019). Most distressing is the increasing government spending resulting from the outbreak of COVID-19 which has ravaged the global economy, including South Africa, and which has led to increase in its debt profile in order to meet up with the shortfalls in its financial obligations. Prior to the pandemic lockdown, South Africa had experienced two consecutive quarters of economic contraction – recession (AfDB, 2019). Further, a 60.8% debt-GDP ratio was projected in 2020 fiscal year for the country against the February estimate of 56.2% in the face of borrowing to finance the effects of the pandemic. In June 2020, a loan of US\$4.3bn (about R70bn) was approved by the executive board of the IMF in its Rapid Financing Instrument (RFI) scheme for the country in order to mitigate against the economic and social effects of the pandemic (National Treasury, 2020). In addition, the African Development Bank (AfDB) gave approval for an amount of \$288m (R5b) for South Africa in its first ever Response Support Program. As reported in the five years trend analysis of South Africa Reserve Bank (SARB), the ratio of debt-GDP shows 37.2% (2015), 48% (2016), 48.8% (2017), 48.5% (2018) and 51.4% (2019). With increasing government expenditures, there have been concerns from various quarters regarding the debt-GDP ratio of the government (National Treasury, 2020).

In the face of increasing worries about the sustainability of debt among developing and emerging economies, country based studies about the deleterious consequences of corruption in the debt-to-GDP debate is still scarce. As rightly observed by Hassa *et al.* (2018), the continued neglect of corruption in the developmental literature is a problem because it is a cancer to wealth creation and economic growth of African countries. Corruption in South Africa has assumed a worrying dimension such that the rating of the country slipped from 54th position in 2010 to 70th position in 2019 (Transparency International, 2019). In a study on poverty alleviation and corruption in South Africa, Nicolaides (2016) submitted that the country lost a whopping sum of R385 in the democratic elections of 1994 and 2016 to corruption-related vices. The pre-COVID 19 era was a time the country was heading towards debt spiral just as additional R500bn was announced in April 2020 for the health sector, individuals and enterprises that were adversely affected by the pandemic. Yet, the record by local economy of a negative 0.3% by the end of 2019 as against 2.5% in ten years earlier (2010) is a great concern to policy makers and academic researchers.

Another disturbing issue is the increasing amount of debt servicing. For instance, between 2018 and 2019, a whopping sum of R180b was spent on debt servicing (National Treasury, 2020). This is almost the amount of the budget for the health sector for that period. Also, between 2008/2009 and 2018/2019 fiscal years, external debt-GDP ratio increased to 63.5% from 26% (Burger and Calitz, 2020). The COVID-19 effect on debt servicing could also be deleterious to the country. In the revised 2020 budget done in June 2020, National Treasury cautioned that “Government is spending far more than it collects in revenue. As a result, debt has mushroomed. A failure to halt and reverse this pattern will harm the livelihoods of South Africans for many years to come. Left unchecked, the interest payments on that debt will become one of government’s largest expenditure items over the medium term . . .”.

It is crystal clear from the above narrative that the issues of external debt and corruption are new challenges confronting the growth aspiration of South Africa as a country. To this end, the study aims at examining the causal relationship between increasing external debt, corruption and economic growth of South Africa before the outbreak of COVID-19 with special focus on the likely damaging effects of corruption on the economy. Consequently, the contributions of this study towards the achievement of its goals are in four-folds. To start with, we exposit the existing knowledge of the debt-GDP hypothesis before the outbreak of

COVID 19 pandemic. This is expected to serve as a precursor to subsequent studies on the rising debt of South Africa during and after the pandemic. Secondly, we research on the effect of corruption in the debt-GDP debate based on the country's contexts which is an area that is completely missing in the extant literature. This is a vital gap this study intends to fill. Thirdly, findings on how public debt affects economic growth are inconclusive in previous researches. While some studies concluded that the relationship is unidirectional (Saungweme and Odhiambo, 2019a), others revealed bidirectional association (Baharumshah *et al.*, 2016; Phiri, 2017; Omoshoro-Jones, 2020), yet, some maintained a neutral position in their findings, claiming that the relationship is a nonlinear one (Chirwa and Odhiambo, 2017; Rahaman *et al.*, 2019). Finally, and in the authors' understanding, this study seems to be the first to incorporate corruption into the time series debt-GDP analysis making use of South Africa as a case study.

The study is therefore structured with the introduction in section one, recent empirical evidences in section two, data issue and methodology in section three, estimated results in the fourth section and section five capped it with conclusion and policy recommendations.

2. Theoretical and empirical review

The theoretical exposition of this study stems from the Solow growth model as it allows us to incorporate the variables of interest that determine economic growth (GDP). According to this model, Gross Domestic Product (GDP) is the dependent variable and it is expressed as a function of Capital (K) and Labour (L). In simple expression, the Solow growth model is usually expressed as $Y = f(K, AL)$ where Y is GDP symbol, K symbolizes capital (where fixed capital formation forms part of the components for the proxy for capital as in Rafindadi and Yusof (2015) and AL represents effective labour since labour in African countries was seen to be an effective one due to the availability of trade liberalisation and the advent of technological know-how (Romer, 2006). Further and according to the debt overhang hypothesis, if debt is more than what an economy can sustain, the required debt service amount will vary along with the nation's productivity level (Hassan *et al.*, 2018). The argument here is that domestic investor's income is taxed away by the increasing foreign debts such that local and external investments are distorted and thereby reducing GDP. Put in another sense, relying on financial assistance such as debt for economic rejuvenation is tantamount to growth procrastination and escalation (Rafindadi and Aliyu, 2017). To the Keynesian theorists, one way of stimulating economic growth is to inject more money into the economy and this can be achieved through borrowing if the expected revenues fall short of government expenditures. By and large and in line with existing economic theories, three major relationships have been established between economic growth and debt. The relationship could either follow the Keynesian hypothesis (positive), debt overhang hypothesis (negative) or Ricardian-equivalence hypothesis (neutral). For developing economies such as that of South Africa however, most of the theories about growth-debt relationship tend towards being negative. Also and in order to avoid the pitfall of biased omitted variables, inflation was also included and theoretically, the effect of inflation in a developing country like South Africa is expected to be negative. Hassan *et al.* (2018) expanded the GDP-debt hypothesis by incorporating corruption as an exogenous variables whose effect on productivity is on the downward trend.

From empirical review perspective, opinions differ on how external debt influences economic growth as well as the relationship between corruption and economic growth. By implication, there seems to be no consensus about these relationships, hence one of the reasons for this study. On the debt-growth debate, researches have validated the Keynesian theory that a certain level of debt is required for economic advancement while some argued that debt in whatever form is detrimental to the growth aspiration of any country (Amann

and Middleditch, 2017; Liaqat, 2019; Asteriou *et al.*, 2020). Also, the results of studies such as Bardhan (2018) and Saengchai *et al.* (2019) produced mixed outcomes about the growth-corruption hypothesis. Below is a review of relevant literatures on the growth-debt-corruption debate.

2.1 Public debt and economic growth

Bal and Rath (2018) employed two different approaches in their analysis of the nexus between public debt and economic growth in India. The outcome of the nonlinear 2SLS approach revealed a positive effect of public debt on economic growth in the short run and negative relationship in the long run. In the same vein, the study by Lee and Ng (2015) confirmed a negative association between public debt and GDP for Malaysia. With additional variables of budget expenditure, budget deficit and government expenditure as explanatory variables for a time series data between 1991 and 2013, it was further revealed that government consumption and budget deficit are decreasing functions of economic growth. Dogan and Bilgili (2014) used the Markov-switching model in explaining a high indebtedness in relation to growth in Turkey and further alluded to a non-linear debt-growth relationship for the country.

Further studies on Asia, a continent of many emerging economies like South Africa, were carried out by Panizza and Presbitero (2013), Kharusi and Ada (2018), Intartaglia *et al.* (2018). For Oman, a negative and statistically significant relationship between the country's public debt and GDP was shown by Kharusi and Ada (2018). Not only that, the result of the ARDL on data that cover 1990–2015 showed investment (as a proxy for gross fixed capital formation) as not only having positive but a significant impact on economic growth. Contrary result emanated from the study by Akram (2017) on Sri Lanka in that external debt was shown as a boost for economic growth process just as debt servicing exhibited inverse association with economic growth. Intartaglia *et al.* (2018) unbundled the debt-growth hypothesis into public and private for 48 developed and emerging economies using the PVAR method of evaluation. The result confirmed public debt as harmful on economic growth both in developed and emerging economies but in varying degrees. For developing countries, to achieve the much expected accelerated economic growth, policies that are likely to reduce debt burden were among the recommendations of these studies.

Different levels of turning points of debts to GDP were revealed in separate studies on EU countries (Aristovnik *et al.*, 2014; Dincă and Dincă, 2015; Shkolnyk and Koilo, 2018). For instance, Aristovnik *et al.* (2014) divided the member countries of EU into old and new members in a panel estimation on generalized growth model and confirmed the existence of nonlinear statistically significant impact of public debt on economic growth in the 25 sovereign member countries under consideration. The study came up with a turning point of 80–94% of debt to GDP for the old members and 53–54% for the new members of the union. Beyond these points, any additional debt acquisition will be detrimental to these groups of countries. In the same spirit, Dincă and Dincă (2015) explored the nexus between government debt and GDP in ten out of the new members of the same EU using quadratic equation and also came with a nonlinear relationship of debt to GDP turning level revolving around 50%. The empirical evidence by Shkolnyk and Koilo (2018) in Ukraine and some other emerging economies in Europe returned a high level external debt in the face of macroeconomic instability that hinders growth potentials.

There were further mixed reports by some studies on the debt-GDP debate in OECD community as a result of interpolation of emerging and developed economies. Mencinger *et al.* (2015) studied 31 OECD and 5 non-OECD countries in order to examine and determine the turning point of debt to GDP of these countries and confirmed the theoretical assumption that a low debt to GDP will be beneficial than a higher level one. The study divided the countries

into developed and emerging economies in a panel estimation on generalized economic growth model for a period spanning 1980 to 2010 and suggested a turning point of 90–94% for developed economies and 44–45% for emerging economies. In another study, [Bökemeier and Greiner \(2015\)](#) investigated seven developed economies within the OECD and observed that there was no evidence of nonlinearity in the relationship between public debt and economic growth in those countries. Evidently, this review shows that the ideal debt-GDP ratio depends on measurement, time and individual country's peculiarity in terms of developmental levels and approach. As pointed out in these studies, the estimation specifications were not subjected to robustness tests with the attendant implications on the studies.

Studies have also faulted the Reinhart-Rogoff (RR) hypothesis on the nexus between economic growth and debt, premised that there is no rule of the thumb in the 90% prescription by the two scholars ([Herndon *et al.*, 2014](#); [Égert, 2015](#); [Chirwa and Oghiambo, 2017](#); [Rahman *et al.*, 2019](#)). [Herndon *et al.* \(2014\)](#) tested this hypothesis in twenty advanced economies and faulted the data used, coding system and miscalculation in the statistical weighing of the summary. In their review of SCOPUS listed papers, [Rahaman *et al.* \(2019\)](#) did not only show that a mutual agreement on this relationship is not static but also submitted that it could be negative, positive or even a nonlinear one. [Chirwa and Odhiambo \(2017\)](#) showed that the relationship is a nonlinear one at 70% threshold point in a study that employed ARDL approach on EU countries. The summary of opinions of these studies is that the relationship is a function of time and individual country's developmental stage.

In Africa, the few reviewed literatures produced mixed results about the interactions of public debt with economic growth. This is because individual country's peculiarity and measurement of variables differ. For instance, [Owusu-Nantwi and Erickson \(2016\)](#) showed that a bidirectional relationship with positive effect exists for public debt and GDP in Ghana but a weak association for Nigeria as shown in [Ogunmuyiwa \(2011\)](#). [Tchereni *et al.* \(2013\)](#) produced a statistically insignificant negative relationship for Malawi while the result of the study by [Ssempala *et al.* \(2020\)](#) on Uganda produced mixed long run effects and statistically negative impact in the short run. [Saungweme and Odhiambo \(2019a\)](#) employed a dynamic multivariate ARDL bounds test approach on servicing of debt, public debt, GDP for Zambia and came up with a unidirectional causality result that runs public debt through economic growth. No evidence of causality was recorded between debt servicing and GDP in the study which covers 1970–2017. The summary here is that the affected countries should be cautious in their application of externally sourced debt by avoiding frivolities.

The current COVID-19 pandemic has left many countries with no options than to resort to fiscal borrowing as a way out of their economic problems. This has raised concerns about the increasing public debt in South Africa whose leverage is already approaching an alarming level. Studies such as [Saungweme and Odhiambo \(2019b, c\)](#), [Mothibi and Mncayi \(2019\)](#), [Baaziz *et al.* \(2015\)](#), [Ncanywa and Masoga \(2018\)](#) have contributed to the awareness of debt-GDP nexus in South Africa with different degrees in control variables, threshold level, methods of estimation with different policy recommendations. In their suggestion after carrying out an investigation about the dynamic association between accumulated external borrowings and GDP in South Africa, [Baaziz *et al.* \(2015\)](#) recommended 31.3% debt-GDP for the country. The result of the nonlinear smooth transition regression model further suggested that GDP status of South Africa will go a long way in determining the ideal debt-GDP ratio. However, the recent report by [National Treasury \(2020\)](#) shows that the ratio of government borrowings in relation with GDP increased to 59.3% in 2019 as against the earlier record of 31.8% in 1990. The story is not also impressive as contained in the 2020 IMF report that economic activities slowed down to 0.7% in 2019 as against the 4.2% figure in year 2000.

[Mothibi and Mncayi \(2019\)](#) used ARDL model to investigate the drivers of government debts in post-apartheid South Africa and discovered that government debt impact negatively

on economic growth and inflation. The study which identified real GDP, government expenditure and interest rate as the main drivers of government debts further suggested improvement in productive capacity, interest rate control and elimination of unproductive expenses by government as ways of reducing government debts. [Phiri and Mhlaba \(2019\)](#) employed the same ARDL for time series data spanning 2002–2016 in testing for the long and short run harmful effects of debt on GDP for South Africa and reported a negative relationship.

An inverted U-shaped result was obtained in the study by [Phiri \(2016a\)](#) on the nexus between South Africa's expenditures on its military formation and GDP. This is an indication that the relationship is a nonlinear one. The result of the Logistic Smooth Transition Regression model for a period of 1988–2014 further revealed that government spending on military was too high and such money could be diverted to more promising units of the economy. Contrary studies in support of positive relationship between debt and economic growth are [Fosu \(1996\)](#), [Sulaiman and Azzez \(2012\)](#), [Sarkodie et al. \(2020\)](#). Employing external factors-led growth hypothesis for South Africa, [Sarkodie et al. \(2020\)](#) demonstrated that external borrowing has positive impact on GDP which was in line with an earlier study on Nigeria by [Sulaiman and Azzez \(2012\)](#).

Studies have further linked expenditures of government and economic growth to the popular Wagner law that says increasing government spending will result in expansion of economic activities ([Mosikari and Eita, 2017](#); [Phiri, 2017](#); [Iwegbunam and Robinson, 2019](#)). There are also in-between arguments in the Keynesian theoretical opposite direction that say expenditure causes increase in government activities or economic growth ([Phiri, 2016b](#); [Adil et al., 2017](#)). For instance, [Phiri \(2016b\)](#) investigated the nonlinear government expenditure cum growth nexus for South Africa and found that a larger component of the Wagner's hypothesis did not hold for the country. Specifically, the study was partially in line with the Keynesian hypothesis by establishing an uni-directional association that runs from government expenditure to economic activities. In conclusion, the study did not see excessive spending by the government of South Africa as a panacea for any financial or economic crisis.

Between 2015–2016 fiscal year, [Ncanywa and Masoga \(2018\)](#) asserted that public debt-GDP ratio of South Africa doubled to an alarming rate of 44.3%. Employing the ARDL to investigate whether public debt can influence economic growth through investment, they submitted that a negative relationship exists between public debt and economic growth through investment. While borrowing was encouraged in order to increase capital accumulation, the study suggested that this should be kept within the bearable level. In contrast, [Saungweme and Odhiambo \(2019b\)](#) unbundled public debt into domestic and foreign debts in order to separate the aggregated effects as against individual components of public debt on economic growth. They came to the conclusion that aggregate public debt has negative effects on economic growth both in the long run and the short run.

2.2 Corruption and economic growth

Beginning from the work of [Mauro \(1995\)](#) who was among the first scholars to investigate the corruption-growth relationship, opinions have varied thereafter on this subject matter. However, a higher percentage of available findings on the inter-dependence of external debt, corruption and GDP were panel based ([Gillies, 2020](#); [Hassan et al., 2018](#); [Kim et al., 2017](#); [Ivanyna et al., 2016](#)); an indication that country-based studies are still very scarce. [Hassan et al. \(2018\)](#) employed FMOLS and DOLS techniques while examining the effect of corruption and external debt on economic growth in five selected countries of sub-Saharan Africa namely Kenya, Malawi, Nigeria, South Africa and Uganda. Among other things, a bidirectional association between external debt and economic growth was not only observed

in the study but also a negative relationship among these variables. Also, the study established one-way causation running from economic growth through corruption and positive coexistence for corruption and economic growth in these countries. For the simple reason that public debts and economic growth differ from one country to another, the findings of this study cannot be a true reflection of the situation in South Africa. Not only that, the treatment of corruption in a panel study such as this study may underscore the deleterious effect of this social vice at country level.

A similar study by [Kim *et al.* \(2017\)](#) adopted three methods of estimation technique, namely, the Pooled OLS, FE models and Dynamic Panel GMM for 77 countries and affirmed that public debt effect of growth runs through corruption. The study further showed that public debt influence on economic growth runs through corruption with negative effect in corrupt countries and positive effect in less corrupt and transparent countries. This was complimented by [Dzhumashev \(2014\)](#) in which corruption was seen as a decreasing function of economic development. In another study on the BRICS, two different outcomes resulted from the work of [Bitterhout and Simo-Kengne \(2020\)](#) as a result of differences in the methodology employed. While the fixed effect shows negative impact, the result from the GMM showed that corruption exerts positively on GDP for the investigation period, 1996 through 2014. On the contrary, [Huang \(2016\)](#) and [Coupet \(2018\)](#) differ in their findings as positive relationship was found between corruption and economic growth in their studies.

[Ivanyna *et al.* \(2016\)](#) paid particular attention to how the interaction of tax evasion, corruption and public debt can affect the fiscal policy of a country. The study which developed a new quantitative fiscal policy theory also argued that even with zero level of debt in an economy, corruption can lead to great borrowing by government. Corruption was seen as a major determinant of government borrowing whose rise could increase public debt and reduce output and welfare of the people. Also, on a panel of OECD countries that covers 1995–2015, [Monte and Pennacchio \(2020\)](#) investigated the impact of corruption on public debt and it showed public debt as an increasing function of corruption. It was equally noticed that public debt would reduce by 2% when corruption is halved in the short run. Further, the long run detrimental consequences of corruption on external borrowing still manifest in some of these countries that have a high level of corruptive tendency.

Government external debts, corruption and GDP relationship formed the basis of the study by [Saengchai *et al.* \(2019\)](#) for five ASEAN nations using estimation of direction and degree of regression as well as the causal relationship, and cautioned the countries in their quest for more debts. Not only that, the result further confirmed a bi-directional interdependence between foreign debt and economic growth with no association for corruption and economic growth in the selected studied countries. In essence, certain level of corruption is required to achieve growth in the economy especially in bureaucratic engagements. In conformity with the above finding on corruption-GDP relationship, [Huang's \(2016\)](#) result from the use of Bootstrap Panel granger causality approach encourage this association for South Korea and China.

Two conclusions can be drawn from the above review. One, the incorporation of corruption into the debt-GDP hypothesis is far from researchers' attention because its deleterious effect on economic activities cannot be swept under the carpet, and two, country-specific studies about how corruption, external debt and economic growth interact are still scarce in the field of economic research. We therefore hope to fill this gap with South Africa as a study area.

3. Data

The nature of this study is time series and sources of data are mainly from the World Development Indicators of the World Bank database. Also, the study covers 1990 to 2019.

There are various ways of measuring economic growth which include real GDP, GDP growth rate, real GNP, per capita GDP, etc. Here, we use real GDP because it captures economic growth with welfare and it is measured at 2010 US\$. External debt is the financial commitment of the country to outside lenders such as obligations to foreign countries, international financial organisations, private or corporate households. Its measurement is stock of external debt as percentage of gross national income (Burger and Calitz, 2020). Debt servicing is the ratio of debt servicing to exports. Abuse of public power for personal gain which is usually employed in the literature is our definition of corruption (Cooray *et al.*, 2017; Özşahin and Üçler, 2017). Corruption is approximated as corruption perception index and was obtained from World Governance Indicators (WGI).

The next variable included is inflation (INF) as shown in the literature that there is always uncertainty in debt servicing and payment as a result of time value of money. Consequently, studies have identified different ways of measuring inflation which include GDP deflator, producer price index and consumer price index. Following Phiri and Mhlaba (2019), we prefer Consumer Price Index (CPI, 2010 = 100) as it is a common means in the literature. Investment or stock of capital (K), measured as gross fixed capital formation as a percentage of GDP, is another variable of interest to this study. It has been extensively employed in various studies and argued that investment enhances growth (Akram, 2017; Pegkas, 2018; Asteriou *et al.*, 2020).

4. Model specification and methodology

The model specification has real GDP (RGDP) as the dependent variable while external debt (EXD), external debt service (EXDS), corruption (CORR), inflation (INFL) and investment (proxy by capital accumulation- K) as the regressors. In keeping with the debt overhang hypothesis and the modified Solow growth model as adopted in Akram and Rath (2018), Hassan *et al.* (2018) and Saengchai *et al.* (2019), the linear hybrid form of our model which incorporates other variables of interest is specified as follows:

$$RGDP = f(\text{exd}, \text{exds}, \text{corr}, \text{inf } l, k) \quad (1)$$

$$\ln RGDP_t = \beta_0 + \beta_1 \ln EXD_t + \beta_2 \ln EXDS_t + \beta_3 \ln CORR_t + \beta_4 \ln INFL_t + \beta_5 \ln K_t + \xi_t \quad (2)$$

where $\ln RGDP$, $\ln EXD$, $\ln EXDS$, $\ln CORR$, $\ln INFL$, $\ln K$ are series logarithmic values, error term is ε_t and the betas represent coefficients to be estimated.

The *a priori* expectation is that $\beta_1, \beta_2, \beta_3, \beta_4$ will be negative while β_5 will be positive.

In agreement with econometric observations that time series data be subjected to unit root tests so as to account for the implications of spurious regression, Augmented Dickey-Fuller (Im *et al.*, 2003) and Phillips-Perron (1988) unit root tests were carried out on the series. Our null hypothesis is that the series are non-stationary (i.e. the series are not devoid of unit roots) as against alternative hypothesis that the series are stationary (i.e. the series are devoid of unit roots). The equation of the ADF unit root test is usually specified as:

$$\text{Trend: } \Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} \alpha \sum i = 1 \Delta Y_{t-1} + \varepsilon_i \quad (3)$$

From eqn. (3), $\Delta Y_t = Y_t - Y_{t-1}$; $\Delta Y_{t-1} = Y_{t-1} - Y_{t-2}$ and so on with included lags number determined by AIC.

Also, P-P unit root is the AR(1) process and is usually expressed as:

$$\Delta Y_{t-1} = \alpha_0 + \gamma y_{t-1} + \xi_t \quad (4)$$

The multivariate log expression of [equation \(2\)](#) is:

$$\begin{aligned} \ln \text{rgdp}_t = & \sum_{i=1}^n \eta_1 \Delta \ln \text{rgdp}_{t-1} + \sum_{i=1}^n \beta_1 \Delta \ln \text{exd}_{t-1} + \sum_{i=1}^n \beta_2 \Delta \ln \text{exds}_{t-1} + \sum_{i=1}^n \beta_3 \Delta \ln \text{corr}_{t-1} \\ & + \sum_{i=1}^n \beta_4 \Delta \ln \text{inf}_{t-1} + \sum_{i=1}^n \beta_5 \Delta \ln k_{t-1} + \xi_t \end{aligned} \quad (5)$$

Our ARDL cointegration starting point is the bound test with null hypothesis (no cointegration) and the alternative hypothesis (cointegration) stated as follows:

$$\begin{aligned} H_0: & \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0 \\ H_1: & \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0 \end{aligned}$$

The decision rule from above hypothesis formulation is that we reject null hypothesis as evidence of cointegration and accept it to signify otherwise.

5. Estimation results

Next is the presentation of the outcomes of descriptive statistics, unit root tests, standard diagnostic tests of autocorrelation, normality, heteroscedasticity and cointegration tests. During the period under review, the economy of South Africa grew at an average rate of 3.06% with a maximum of 4.3% and a minimum of 4.28%. An average debt stock for the country during the investigation period was \$25.51 m peaking at \$53.54 m with a minimum of zero dollars. With a standard deviation of 15.51%, external borrowing varied showing that it depends on availability of resources by lenders and the financial need of the country. Debt service for the country was also at an average of 6.11% with a maximum rate of 2.34% and zero minimum. The variation in growth rate was 9.47% as shown by the standard deviation and it skewed towards the left (−0.92) suggesting that the economy of the country did not record much growth during the period under investigation. The later years of the period under review when economic growth was becoming a big challenge for the country could be another issue. Corruption rate averaged 0.17% while inflation has the highest mean value of 81.59%. The maximum growth rate of inflation was 152.63% and minimum rate of 25.43%. Variation in inflation was 38.38%, an indication that inflation was most varied during the investigation period. This shows that one major challenge that faced South Africa during the period was inflation. Corruption growth rate was at an average of 0.16% with capital accumulation averaging 18%. In addition, accumulated capital recorded a maximum of 23.51% and minimum of 15.15%. In summary, inflation is a major challenge to contend with in South Africa while corruption is gradually having effects on the economic activities (see [Table 1](#)).

From all indications in [Table 2](#), the results of the unit root tests via ADF and PP shows that the stationarity of the variables were achieved at levels $I(0)$ and first differencing $I(1)$.

Having been satisfied that the series are devoid of spurious regression, next is the determination of long run relationship or co-integration. Since the series became stationary at their levels and first differencing, ARDL approach of co-integration, as recommended by [Pesaran *et al.* \(2001\)](#) is preferred in this study. It is a method that autoregressively lagged the value of the dependent variable and distributed it in lagged form as part of the regressors. One observation in the literature is that the use of ARDL is increasingly becoming popular because of its overriding advantages which include: (1) that the ARDL is a small sample size friendly in testing the long run relationship between variables as in this present study ([Pegkas, 2018](#)); (2) unlike the usual bivariate and multivariate cointegration methods, the

ARDL places no restriction on the order of integration of each variable in levels whether they are $I(1)$ or $I(0)$ or both (Habanabakize and Meyer, 2018). This does not apply where the order of integration is two or more (Akram, 2017); (3) it gives room for different optimum lags to be used for different variables as against the standard cointegration (Kharusi and Ada, 2018).

Therefore, the first stage in the application of the ARDL is the F -test where the asymptotic F -statistic distribution is non-standard under the null hypothesis of no cointegrating relationship in our examined variables irrespective of order of integration. As shown in Table 3, the estimated F -statistic value is more than both upper and lower bound values at 5%; thereby suggesting the rejection of joint null hypothesis and acceptance of alternative hypothesis that says co-integration exists among the variables. On the lag length for F -test selection, a maximum of 2 was selected as suggested by Pesaran *et al.* (2001) since the study is annual with few observations of 27 and six parameters.

One way of detecting the existence of structural breaks and also ensure stability in time series modelling is through the CUSUM and CUSUM of Square tests as suggested by Brown *et al.* (1975). The single structural break test over time using the recursive residuals is expressed as follows:

Table 1.
Descriptive statistics
(1990–2018)

Variable	Observations	Mean	SD	Min	Max
Real GDP	29	6,591	798	5,517	7,582
External debt	29	24.54	14.84	0	53.33
External debt services	29	6.22	5.02	0	23.38
Corruption perception index	29	0.17	0.25	−0.12	0.73
Consumer price index	29	79.27	36.85	25.43	152.63
Gross fixed capital formation	29	18.31	2.09	15.15	23.51

Table 2.
Unit root test results

Variable	Augmented Dickey-Fuller		Phillips-Perron	
	$I(0)$	$I(1)$	$I(0)$	$I(1)$
LnRGDP	−3.052671**	(0.0426)		−2.954353** (0.0523)
LnEXD	−5.091888***	(0.0005)		−5.636785*** (0.0001)
LnEXDS	5.433410***	(0.0001)		−5.433410*** (0.0001)
LnCORR	−15.72053***	(0.0000)	−4.847647*** (0.0006)	
LnINFL			−6.152651*** (0.0001)	
LnK	−3.507436***	(0.0156)		−3.416494*** (0.0192)

Note(s): ADF and PP stand for the Augmented Dicky Fuller and Phillip-Peron unit root tests. The optimal lag selection is determined via the Akaike lag length selection criteria while the *, ** and *** are null hypothesis rejection at 10, 5 and 1% level of significance in that order

Table 3.
ARDL bound
test results

F -statistic	Significance	$I(0)$	$I(1)$
3.81	10%	2.26	3.35
	5%	2.62	3.79
	2.5%	2.96	4.18
	1%	3.41	4.68

$$\text{CUSUM}_t = \sum_{j=k+1}^t \frac{\bar{w}_j}{\hat{\sigma}_w} \quad (6)$$

$$\hat{\sigma}_w^2 = \frac{1}{n-k} \sum_{t=1}^n (w_t - \bar{w})^2 \quad (7)$$

here, $t = k + 1 \dots T$. CUSUM_t is the recursive residual which is based on plotting against t . In the null hypothesis, β is constant. The CUSUM has zero mean with proportional variance of $t-k-1$. If the null hypothesis is rejected, it indicates that the recursive residual crosses the boundary for some t . In the same vein, the null hypothesis for the CUSUMS q ($\beta = n-k/T-k$) varies from 0 to 1 (0 for $n = k$ and 1 for $n = T$). If the null hypothesis is rejected, it is an indication that the squared recursive residual crosses the boundary.

As shown in Figures 1 and 2, there were no deviations from the 5% significant level for both tests which confirm the stability and reliability of the model. Therefore, we cannot but accept the null hypothesis of model stability and proceed to performing necessary diagnostic tests.

Table 4 presents the three post estimation standard diagnostic tests for the study namely normality, residual autocorrelation and heteroscedasticity tests. The result of the Jarque-Bera statistics test shows that our equation does not violate the normality assumption since the value of the probability which is 0.804835 is higher than 5%. Hence, we cannot but accept the null hypothesis that the error term satisfies the normal distribution property. In order to check whether the successive values of the error terms are temporary independent, the result of the Breusch-Godfrey serial correlation LM shows that the null hypothesis of no autocorrelation cannot be rejected but conclude that the regression is free from possible serial correlation since the value of our probability is more than 5%. In essence, there is no serial correlation in the residuals up to the specified lag order and finally is the test of heteroscedasticity which reveals whether the error term exhibits constant variance or not. It is evident from Table 4 that the result of Breusch-Pagan-Godfrey shows the absence of heteroscedasticity problem in the model, thereby suggesting that the model is homoscedastic.

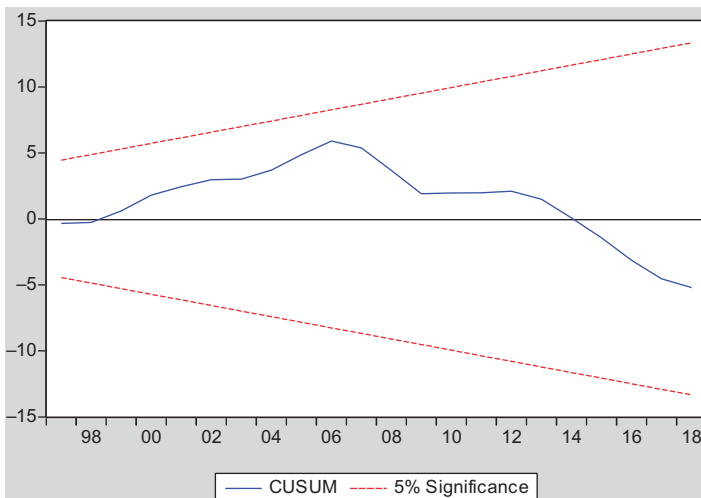


Figure 1.
Plot of CUSUM test for
structural break

Figure 2.
Plot of CUSUM of
Squares test for
structural break

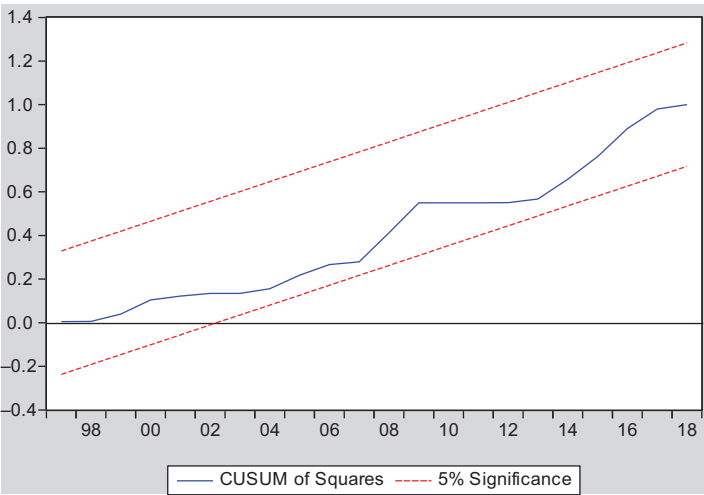


Table 4.
Diagnostic test results

Diagnostic test	Test	<i>p</i> -value	Conclusion
Normality	Jarque-Bera	0.434	Residuals are normal
Serial correlation	Breusch-Godfrey LM	0.198	No serial correlation
Heteroscedasticity	Breusch-Pagan-Godfrey	0.425	No heteroscedasticity

Estimated ARDL model passed the serial correlation and heteroscedasticity standard tests with Breusch-Godfrey LM tests. It can be observed from [Table 5](#) that in the short run, the effect of external debt on growth is not only positive but also statistically significant. Also, in the long run, the effect was negative and not significant statistically. Economically, this can be interpreted to mean that 1% increase in external borrowing will lead to a corresponding 0.27% increase in GDP of South Africa in the short run but become harmful thereafter. This is

Table 5.
ARDL short and long
run estimations

Variable	Coefficient	<i>p</i> -value
<i>Long-run</i>		
External debt	−0.6276665	0.1871
External debt services	−0.2420249	0.1102
Corruption perception index	−0.1348824	0.2688
Consumer price index	−0.2052705	0.0000***
Gross fixed capital formation	0.1263841	0.0001***
<i>Short-run</i>		
ΔExternal debt	0.271907	0.0000***
ΔExternal debt services	−0.609451	0.2065
ΔCorruption perception index	−0.282718	0.0000***
ΔConsumer price index	−0.1295078	0.0000***
ΔGross fixed capital formation	0.304888	0.0000***
C	−0.2316397	0.0030***

Note(s): *p*-values in brackets. [***]/(**)/* indicates significance at 1, 5 and 10% respectively

an indication that external debt boosts economic growth through investment financing at the early stage of development. It is a one-off fiscal sustainability effect that stabilizes the debt-GDP ratio (Burger and Calitz, 2020). Other existing studies in support of this relationship include Sulaiman and Azeez (2012), Nwannebuike *et al.* (2016), Bal and Rath (2018), Sarkodie *et al.* (2020). This is also consistent with the postulation of the Keynesians that at certain level, public debt can impact positively on growth. Corruption and inflation are negatively and statistically significant in their relationship with economic growth while external debt servicing effect on growth is negative although, it is not statistically significant (see Akram, 2017; Kim *et al.*, 2017; Ssempala *et al.*, 2020). For instance, if corruption increases by 1%, the implication on growth will be 0.28% decrease while a 1% increase in the level of inflation will bring down growth by 0.13%. The negative statistical significant influence of corruption on economic growth negates peoples' standard welfare which may be through the GDP and capital formation (Coupet, 2018; Gillies, 2020). This also points to the fact that in the short run, corruption is highly detrimental to the economic expansion of South Africa. As rightly pointed out by Nicolaides (2016), corruption is retarding the efforts of the South African government towards poverty alleviation because of the corruptive ways by which government resources are being expended.

The results for external debt, external debt servicing and corruption are negative and statistically insignificant in the long run. Although these variables affect growth negatively, their effects are neutral agents of economic advancement for South Africa. In specific terms, a 1% increase in any of these variables will result in insignificant negative transformation of the GDP in the long run. The negative but insignificant relationship between external debt and economic growth suggests the possibility of public debt overhang hypothesis for South Africa and is consistent with previous studies by Tchereni *et al.* (2013), Hassan *et al.* (2018), Mothibi and Mncayi (2019), Phiri and Mhlaba (2019). Also, debt servicing which has negative effects but not statistically significant points to the fact that the quantum of debt servicing did affect growth but the effect is not well pronounced (Akram, 2017). However, corruption which is negative and statistically significant in the short run did not exhibit the same effect in the long run. This shows that the negative effect of corruption on economic growth is short-lived such that this effect did not manifest on growth potentials of the country in the long run (Bitterout and Simon-Kengne, 2020; Ivanyna *et al.*, 2016; Monte and Pennacchio, 2020; Saengchai *et al.*, 2019). This is an indication that this cancer of corruption is gradually eroding the moral fiber of the country at the detriment of economic growth. This is unlike what obtains in Nigeria where available studies showed corruption as having permeated the length and breadth of the country (Bamidele *et al.*, 2016; Igiebor, 2019). Differences in terms of economic and political activations could account for this.

On inflation, the result displayed the expected sign and also in line with some existing studies on the relationship between inflation and economic growth in South Africa (Phiri and Mhlaba, 2019; Mothibi and Mncayi, 2019). As can be observed in Table 5, inflation exhibits negative signs on economic growth in both the short run and the long run and it is also statistically significant. In clear terms, a 1% increase in inflation will reduce GDP by 0.21% in the long run. Studies such as Hodge (2006) and Phiri and Mhlaba (2019) lend support to this type of relationship. Not only that, the finding is also in line with theoretical postulation for South Africa.

Finally, the study reveals that capital accumulation is in line with the expected positive sign and is statistically significant both in the short run and in the long run. This is consistent with existing studies (see Kharusi and Ada, 2018; Saungweme and Odhiambo, 2019b; Abdullahi *et al.*, 2019) and economic theory where an increase in capital accumulation is expected to increase economic growth for the country. Therefore, efforts should be geared towards encouraging more investments into the country and transfer of technology with the aim of creating more employment opportunities.

6. Conclusion

In this study, the effects of external debt on economic growth in South Africa was examined; using the ARDL approach on different variables of interest. The study moved further by investigating the impact of corruption on the debt-GDP hypothesis. To start with, the study revealed that external debt exerts positively on economic growth in the short run while its negative impact in the long run was statistically insignificant. This shows that external debt brings succor to the economy by contributing positively to the nation's GDP. Policy makers are therefore enjoined to efficiently and effectively utilize and prioritize available financial resources. Further, it was also shown that corruption as a variable affects economic growth negatively in the short run while the long run negative effect was insignificant. With these outcomes in mind, our findings may slightly differ from existing literature on South Africa because of some acknowledged limitations. First is the usage of peoples' perceptions of corruption indices which is a subject of time-gap between actual and perceptive corruption while the second limitation is the time frame of the study which may not be sufficient to establish the true situation of the long run relationship between corruption, external debt and economic growth.

Regardless of these caveats, two foremost major policy implications can be inferred from the study: continuous reliance on external debt to augment short falls in government revenue must be discouraged. Considering the rate at which South Africa has been borrowing especially during this period of covid-19 pandemic, the country could witness further deteriorating growth figures. As a way out, tax evaders and avoiders should be targeted with the hope of increasing government revenue instead of continuous borrowing. The second point is the negative effects of corruption and external debt servicing on economic growth. One fact about South Africa is that corruption is fast gaining ground in the land as revealed in the rating by Transparency International from 54th position in 2010 to 70th position in 2019. In order to avoid the palpable deleterious effects of this social monster on the overall productivity of the economy, institutions such as the National Prosecution Authority, Public Service Anti-Corruption Strategy and Special Investigation Unit need to be strengthened further in their investigation and prosecution of corrupt officers. Not only that, since the incident of corruption is common in the public sector and among the politicians, existing sanctions on stolen funds and corruption-related offences need to be reviewed with stiffer penalties. Honest behaviours among civil servants should be more encouraged and rewarded while the activities of whistle-blowers should also be more pronounced with better compensation. Arising from the findings of this study, it is recognized that the relevance of "crowding-out effects" in relation to debt servicing was not explored since the general consensus in the literature is that debt servicing reduces expenditures on development. Thus, the ARDL technique may be extended in investigating the effects of government spending in the areas of defence, development, debt servicing, education, health and social security on economic growth.

References

- Abdullahi, S., Rusmawati, S., Normaz, W.I. and Nur, S.M. (2019), "Public debt, institutional quality and economic growth in sub-Saharan Africa", *Institutions and Economies*, Vol. 11 No. 3, pp. 39-64.
- Adil, M., Ganaie, A. and Kamaiah, B. (2017), "Wagner's Hypothesis: an empirical verification", *IIM Kozhikode Society and Management Review*, Vol. 6 No. 1, pp. 1-12.
- African Development Bank (2019), "Southern African economic outlook 2019. Macroeconomic performance and prospects", available at: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/2019AEO/REO_2019_-_Southern_africa.pdf.
- Akram, N. (2017), "Role of public debt in economic growth of Sri Lanka: an ARDL approach", *Pakistan Journal of Applied Economics*, Vol. 27 No. 2, pp. 189-212.

-
- Akram, V. and Rath, B.N. (2018), "Fiscal sustainability in India: evidence from Markov switching and threshold regression models", *Studies in Economics and Finance*, Vol. 38 No. 2, pp. 227-245.
- Amann, J. and Middleditch, P. (2017), "Growth in a time of austerity: evidence from the UK", *Scottish Journal of Political Economy*, Vol. 64 No. 4, pp. 349-375.
- Aristovnik, A., Mencinger, J. and Verbic, M. (2014), "The impact of growing public debt on economic growth in the European Union", *Amfiteatru Economic Journal*, Vol. 16 No. 35, pp. 403-414.
- Asteriou, D., Pilbeam, K. and Pratiwi, C.E. (2020), "Public debt and economic growth: panel data evidence for Asian countries", *Journal of Economics and Finance*, Vol. 45, pp. 270-287.
- Baaziz, Y., Guesmi, K., Heller, D. and Lahiani, A. (2015), "Does public debt matter for economic growth? Evidence from South Africa", *The Journal of Applied Business Research*, Vol. 31 No. 6, pp. 2187-2196.
- Baharumshah, A.Z., Jibrilla, A.A., Sirag, A., Ali, H.S. and Muhammad, I.M. (2016), "Public revenue-expenditure nexus in South Africa: are there asymmetries?", *South African Journal of Economics*, Vol. 84 No. 4, pp. 520-537.
- Bal, D.P. and Rath, B.N. (2018), "Do macroeconomics channels matter for examining relationship between public debt and economic growth in India?", *Journal of Quantitative Economics*, Vol. 16, pp. 121-142.
- Bamidele, O., Olaniyan, A.O. and Ayodele, B. (2016), "Culture, corruption, and anticorruption struggles in Nigeria", *Journal of Developing Societies*, Vol. 32 No. 2, pp. 103-129.
- Bardhan, P. (2018), "Reflections on corruption in the context of political and economic liberalization", in Basu, K. and Cordella, T. (Eds), *Institutions, Governance and the Control of Corruption. International Economic Association Series*, Palgrave Macmillan, Cham.
- Bitterhout, S. and Simo-Kengne, B.D. (2020), "The effect of corruption on economic growth in the BRICS countries, a panel data analysis", EDWRG Working Paper Number 03-2020.
- Bökemeier, B. and Greiner, A. (2015), "On the relation between public debt and economic growth: an empirical investigation", *Economics and Business Letters*, Vol. 4 No. 4, pp. 137-150.
- Brown, R.L., Durbin, J. and Evans, J.M. (1975). "Techniques for testing the constancy of regression relationships over time", *Journal of the Royal Statistical Society, Series B*, No. 37, pp. 149-192.
- Burger, P. and Calitz, E. (2020), "Covid-19, economic growth and South African fiscal policy", Stellenbosch Economic Working Papers No. WP15/2020.
- Chirwa, T.G. and Odhiambo, N.M. (2017), "Public debt and economic growth nexus in the Euro area: a dynamic panel ARDL approach", UNISA Economic Research Working Paper Series No. 19.
- Cooray, A., Dzhumashev, R. and Schneider, F. (2017), "How does corruption affect public debt? An empirical analysis", *World Development*, Vol. 90, pp. 115-127.
- Coupet, E. (2018), "Corruption, investment and economic growth: theory and international evidence", *Journal of Business and Economics Research*, Vol. 1 No. 1, pp. 93-107.
- Dincă, G. and Dincă, M.S. (2015), "Public debt and economic growth in the EU post-communist countries", *Romanian Journal of Economic Forecasting*, Vol. 18 No. 2, pp. 119-132.
- Doğan, İ. and Bilgili, F. (2014), "The non-linear impact of high and growing government external debt on economic growth: a Markov regime-switching approach", *Economic Modelling*, Vol. 39, pp. 213-220, doi: [10.1016/j.econmod.2014.02.032](https://doi.org/10.1016/j.econmod.2014.02.032).
- Dzhumashev, R. (2014), "Corruption and growth: the role of governance, public spending, and economic development", *Economic Modelling*, Vol. 37, pp. 202-215, doi: [10.1016/j.econmod.2013.11.007](https://doi.org/10.1016/j.econmod.2013.11.007).
- Égert, B. (2015), "Public debt, economic growth and nonlinear effects: myth or reality?", *Journal of Macroeconomics*, Vol. 43, pp. 226-238, doi: [10.1016/j.jmacro.2014.11.006](https://doi.org/10.1016/j.jmacro.2014.11.006).
- Fosu, A.K. (1996), "The impact of external debt on economic growth in sub-Saharan Africa", *Journal of Economic Development*, Vol. 21 No. 1, pp. 93-118.

- Gillies, A. (2020), "Corruption trends during Africa's oil boom, 2005 to 2014", *The Extractive Industries and Society*, Vol. 7 No. 4, pp. 1171-1181, doi: [10.1016/j.exis.2020.06.006](https://doi.org/10.1016/j.exis.2020.06.006).
- Habanabakize, T. and Meyer, D.F. (2018), "An analysis of the relationship between foreign direct investment, political risk and economic growth in South Africa", *Business and Economic Horizons*, Vol. 14 No. 4, pp. 777-788, doi: [10.15208/beh.2018.54](https://doi.org/10.15208/beh.2018.54).
- Hassan, S., Shittu, W.O. and 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*, Vol. 9 No. 3, pp. 319-334, doi: [10.1108/AJEMS-07-2017-0171](https://doi.org/10.1108/AJEMS-07-2017-0171).
- Herndon, T., Ash, M. and Pollin, R. (2014), "Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff", *Cambridge Journal of Economics*, Vol. 38 No. 2, pp. 257-279, doi: [10.1016/j.jdeveco.2016.09.001](https://doi.org/10.1016/j.jdeveco.2016.09.001).
- Hodge, D. (2006), "Inflation and growth in South Africa", *Cambridge Journal of Economics*, Vol. 30 No. 2, pp. 163-180, doi: [10.1093/cje/bei051](https://doi.org/10.1093/cje/bei051).
- Huang, C.J. (2016), "Is corruption bad for economic growth? Evidence from Asia-Pacific countries", *The North American Journal of Economics and Finance*, Vol. 35, pp. 247-256, doi: [10.1016/j.jinteco.2005.09.001](https://doi.org/10.1016/j.jinteco.2005.09.001).
- Igiebor, G.O. (2019), "Political corruption in Nigeria: implications for economic development in the fourth Republic", *Journal of Developing Societies*, Vol. 35 No. 4, pp. 493-513, doi: [10.1177/0169796x19890745](https://doi.org/10.1177/0169796x19890745).
- Im, K., Pesaran, M. and Shin, Y. (2003), "Testing for unit roots in heterogeneous panels", *Journal of Econometrics*, Vol. 115 No. 1, pp. 53-74.
- Intartaglia, M., Antoniadis, A. and Bhattacharyya, S. (2018), "Unbundled debt and economic growth in developed and developing economies: an empirical analysis", *World Economy*, Vol. 41 No. 12, pp. 3345-3358, doi: [10.1111/twec.12626](https://doi.org/10.1111/twec.12626).
- Ivanyna, M., Moumouras, A. and Rangazas, P. (2016), "The culture of corruption, tax evasion and economic growth", *Economic Inquiry*, Vol. 54 No. 1, pp. 520-542.
- Iwegbunam, I.A. and Robinson, Z. (2019), "Revisiting Wagner's law in the South African economy", *Oeconomica, Acta Universitatis Danubius*, Vol. 15 No. 2, pp. 39-54.
- Kharusi, S. and Ada, S. (2018), "External debt and economic growth: the case of emerging economy", *Journal of Economic Integration*, Vol. 33 No. 1, pp. 1141-1157, doi: [10.11130/jei.2018.33.1.1141](https://doi.org/10.11130/jei.2018.33.1.1141).
- Kim, E., Ha, Y. and Kim, S. (2017), "Public debt, corruption and sustainable economic growth", *Sustainability MDPI*, Vol. 9 No. 433, pp. 1-30.
- Lee, S. and Ng, Y. (2015), "Public debt and economic growth in Malaysia", *Asian Economic and Financial Review*, Vol. 5 No. 1, pp. 119-126, doi: [10.18488/journal.aefr/2015.5.1/102.1.119.126](https://doi.org/10.18488/journal.aefr/2015.5.1/102.1.119.126).
- Liaquat, Z. (2019), "Does government debt crowd out capital formation? A dynamic approach using panel VAR", *Economics Letters*, Vol. 178, pp. 86-90, doi: [10.1016/j.econlet.2019.03.002](https://doi.org/10.1016/j.econlet.2019.03.002).
- Mauro, P. (1995), "Corruption and growth", *The Quarterly Journal of Economics*, Vol. 110 No. 3, pp. 681-712.
- Mencinger, J., Aristovnik, A. and Verbic, M. (2015), "Revisiting the role of public debt in economic growth: the case of OECD countries", *Inzinerine Ekonomika-Engineering Economics*, Vol. 26 No. 1, pp. 61-66.
- Mosikari, T.J. and Eita, J.H. (2017), "Empirical test of the Ricardian equivalence in the Kingdom of Lesotho", *Cogent Economics and Finance*, Vol. 5 No. 1, p. 1351674, doi: [10.1080/23322039.2017.1351674](https://doi.org/10.1080/23322039.2017.1351674).
- Mothibi, I. and Mncayi, P. (2019), "Investigating the key drivers of government debt in South Africa: a post-apartheid analysis", *International Journal of eBusiness and eGovernment Studies*, Vol. 11, p. 1, doi: [10.34111/ijebeg.20191112](https://doi.org/10.34111/ijebeg.20191112).
- Monte, A. and Pennacchio, L. (2020), "Corruption, government expenditure and public debt in OECD countries", *Comparative Economic Studies*, Vol. 62, pp. 739-771.

- National Treasury (2020), "National budget speech, South Africa: Pretoria", available at: <http://www.treasury.gov.za/documents/national%20budget/2020/default.aspx>.
- Ncanywa, T. and Masoga, M.M. (2018), "Can public debt stimulate public investment and economic growth in South Africa?", *Cogent Economics and Finance*, Vol. 6, p. 1516483, doi: [10.1080/23322039.2018.1516483](https://doi.org/10.1080/23322039.2018.1516483).
- Nicolaides, A. (2016), "Poverty alleviation and curbing corruption in the South African public service", *International Journal of Development and Sustainability*, Vol. 5 No. 8, pp. 334-348.
- Nwannebukie, U.S., Ike, U.J. and Onuka, O.I. (2016), "External debt and economic growth: the Nigeria experience", *European Journal of Accounting Auditing and Finance Research*, Vol. 4 No. 2, pp. 33-48.
- Ogunmuyiwa, M.S. (2011), "Does external debt promote economic growth?", *Journal of Economic Theory*, Vol. 3, pp. 29-35.
- Omoshoro-Jones, O.S. (2020), "Investigating the government revenue–expenditure nexus: empirical evidence for the Free State Province in a multivariate model", MPRA Paper No. 101349.
- Owusu-Nantwi, V. and Erickson, C. (2016), "Public debt and economic growth in Ghana", *African Development Review*, Vol. 28 No. 1, pp. 116-126.
- Özşahin and Üçler (2017), "The consequences of corruption on inflation in developing countries: evidence from panel cointegration and causality tests", *Economies*, Vol. 5 No. 4, pp. 1-15.
- Panizza, U. and Presbitero, A.F. (2013), "Public debt and economic growth in advanced economies: a survey", *Swiss Journal of Economics and Statistics*, Vol. 149 No. 2, pp. 175-204.
- Pegkas, P. (2018), "The effect of government debt and other determinants on economic growth: the Greek experience", *Economies*, Vol. 6 No. 10, doi: [10.3390/economies6010010](https://doi.org/10.3390/economies6010010).
- Pesaran, M.H., Shin, Y. and Smith, R.J. (2001), "Bounds testing approaches to the analysis of level relationships", *Journal of Applied Economics*, Vol. 16 No. 3, pp. 289-326, doi: [10.1002/jae.616](https://doi.org/10.1002/jae.616).
- Phillips, P.C.B. and Perron, P. (1988), "Testing for a unit root in time series regression", *Biometrika*, Vol. 75 No. 2, pp. 335-346.
- Phiri, A. (2016a), "Does military spending nonlinearly affect economic growth in South Africa?", MPRA Paper No. 69730.
- Phiri, A. (2016b), "Nonlinearities in Wagner's law: further evidence from South Africa", MPRA Paper No. 71702.
- Phiri, A. (2017), "Asymmetries in the revenue–expenditure nexus: new evidence from South Africa", *Empirical Economics*, Vol. 56, pp. 1515-1547, doi: [10.1007/s00181-017-1397-0](https://doi.org/10.1007/s00181-017-1397-0).
- Phiri, A. and Mhlaba, N. (2019), "Is public debt harmful towards economic growth? New evidence from South Africa", *Cogent Economics and Finance*, Vol. 7 No. 1, pp. 1-15.
- Rafindadi, A.A. and Aliyu, A.A. (2017), "Growing the growth of the Ghanaian economy: is the function of the country's financial development of any significance?", *Asian Economic and Financial Review*, Vol. 7 No. 2, pp. 206-221.
- Rafindadi, A.A. and Yusof, Z. (2015), "Do the dynamics of financial development spur economic growth in Nigeria's contemporary growth struggle? A fact beyond the figures", *Quality and Quantity International Journal of Methodology*, Vol. 49, pp. 365-384.
- Rahman, N.H., Ismail, S. and Ridzuan, A.R. (2019), "How does public debt affect economic growth? A systematic review", *Cogent Business and Management*, Vol. 6 No. 1, p. 1701339, doi: [10.1080/23311975.2019.1701339](https://doi.org/10.1080/23311975.2019.1701339).
- Reinhart, C. and Rogoff, K. (2010), "Growth in a time of debt", *American Economic Review*, Vol. 100 No. 2, pp. 573-578.
- Romer, D. (2006), *Advanced Macroeconomics*, 3rd ed., McGraw-Hill/Irwin, New York.
- Saengchai, S., Boonrattanakittibhumi, C. and Urairak, B. (2019), "Insights into the external debt, corruption and economic growth nexus: a case study", *Journal of Security and Sustainability Issues*, Vol. 9 No. 2, pp. 533-546.

- Sarkodie, S.A., Joshua, U. and Adedoyin, F.F. (2020), "Examining the external-factors-led growth hypothesis for the South African economy", *Heliyon*, Vol. 6, e04009, doi: [10.1016/j.heliyon.2020.e04009](https://doi.org/10.1016/j.heliyon.2020.e04009).
- Saungweme, T. and Odhiambo, N.M. (2019a), "Government debt, government debt service and economic growth nexus in Zambia: a multivariate analysis", *Cogent Economics and Finance*, Vol. 7 No. 1, 1622998, pp. 1-17.
- Saungweme, T. and Odhiambo, N.M. (2019b), "Relative impact of domestic and foreign public debt on economic growth in South Africa", UNISA Economic Research Working, Paper Series No. 21.
- Saungweme, T. and Odhiambo, N.M. (2019c), "Causality between public debt, public debt service and economic growth: evidence from South Africa", UNISA Economic Research Working Paper Series No. 31.
- Shkolnyk, I. and Koilo, V. (2018), "The relationship between external debt and economic growth: empirical evidence from Ukraine and other emerging economies", *Investment Management and Financial Innovations*, Vol. 15 No. 1, pp. 387-400.
- Ssempala, R., Ssebulime, K. and Twinoburyo, E. (2020), "Uganda's experience with debt and economic growth: an empirical analysis of the effect of public debt on economic growth- 1980-2016", *Journal of Economic Structures*, Vol. 9 No. 47, pp. 1-18.
- Sulaiman, L.A. and Azeez, B.A. (2012), "Effect of external debt on economic growth of Nigeria", *Journal Economic Sustainable Development*, Vol. 3 No. 8, pp. 71-79.
- Tchereni, B., Tshediso, J.S. and Roosevelt, N. (2013), "The impact of foreign debt on economic growth in Malawi", *African Development Review*, Vol. 25 No. 1, pp. 85-90.
- Transparency International (2019), "Corruption perceptions index", available at: <https://www.transparency.org/cpi2018> (accessed 20 April 2020).
- Van Cauwenbergh, L. and Laleman, J.P. (2018), "Rapid public debt build-up in sub-Saharan Africa", available at: <https://www.credendo.com/country-news/rapid-public-debt-build-sub-saharan-africa>.

Further reading

- International Monetary Fund (2020a), *World Economic Outlook Database*, International Monetary Fund, Washington: DC.
- International Monetary Fund (2020b), "Serving member countries financing and debt relief", available at: <https://www.imf.org/en/Topics/imf-and-covid19/COVID-Lending-Tracker>.

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