SUSTAINABILITY OF PUBLIC DEBT AND BUDGET DEFICIT IN SOUTH AFRICA

Ephrem Habtemichael Redda, North-West University

ABSTRACT

It is often argued that policymakers, lenders and borrowers regularly face the challenge of determining the optimal level of indebtedness of a given economy. Determining the sustainability of budget is equally challenging. The purpose of this study is to assess the sustainability of public debt and budget deficit in South Africa. In doing so, it aims to provide a deeper understanding of and insight into the fiscal outlook in the medium- to long run. Descriptive statistics, including the mean and standard deviation, were used to assess the sustainability of public debt and budget deficit in South Africa. In addition, stationarity test, Johansen cointegration, vector error correction model (VECM) and Granger non-causality test are utilised to determine whether the current trajectory of public debt and budget deficit is sustainable. The results of the study reveal that the sustainability of public debt and budget deficit is not guaranteed (not sustainable). These challenges become untenable especially within the context of South Africa's very low level of economic growth projection in the short- to medium term. It is recommended that major fiscal adjustment measures are introduced in the near future in order to avoid major fiscal crises in the future. For example, South Africa may need to relax its business laws, which businesses and investors often criticise for inhibiting South Africa's full potential.

Keywords: Fiscal Sustainability, Public Debt, Budget Deficit, Fiscal Crises, South Africa.

INTRODUCTION

After ending apartheid in 1994, South Africans viewed the newly achieved political freedom to be the foundation for economic prosperity to all people who live in it, both black and white. The last 25 years have seen mixed results. A great deal has been achieved, and yet much still needs to be done. The economic growth has been unstable, and it has not created sufficient opportunities for employment. It is true that the inequalities in public services have been reduced; however, the income inequality among the population has increased, while poverty levels have remained stagnant. The focus of this paper is on the sustainability of public and budget deficits of the country in the face of the triple challenges, i.e. unemployment, poverty and inequality, as identified by the government.

Fiscal policy is deeply intertwined with politics, since it relates to the redistribution of resources across individuals, regions and generations, which is always the core of political conflict in societies (Alesina & Passalacqua, 2016). Public debt and budget deficit are two crucial macroeconomic variables that influence the fiscal policy of a country. It is often argued that policymakers, lenders and borrowers regularly face the challenge of determining the optimal level of indebtedness of a given economy (Naraidoo & Raputsoane, 2015). Determining the sustainability of budget is equally challenging.

For purposes of clarity, this paper takes the definition of the macroeconomic variables as used by the International Monetary Fund (IMF). Generally, government debt/public debt expressed as a percent of gross domestic product (GDP) is used by investors to measure a country's ability to make future payments on its debt, thereby affecting the country's borrowing

costs and government bond yields. The GDP measures of national income and output for a given country's economy are equal to the total expenditures for all final goods and services produced within the country in a stipulated period of time. A closely related concept to public debt is government budget. Government budget is an itemised accounting of the payments received by government (taxes and other fees) and the payments made by government (purchases and transfer payments). A budget deficit occurs when a government spends more money than it takes in; the opposite of a budget deficit is a budget surplus, and when the two are equal, we say the budget is balanced.

According to the Southern African Development Community's (SADC) Protocol on Finance and Investment, public debt should be kept less than 60% of GDP and budget deficit 3% of GDP as anchor, with a range of 1% (Rossouw, 2006; SADC, 2006). Prior to this, the Maastricht treaty had set similar conditions to be fulfilled for entry into the European Monetary System (EMS) and the launching of the euro in 1999 (Mongelli, 2008; Darvas & Szapáry, 2010; Van Der Merwe & Mollentze, 2010).

As indicated earlier, budget deficits occur when a government's expenditures exceed the revenue that it generates (Agarwal, 2014), and it can be measured with or without including the interest payments on the debt as expenditures (Saima & Uddin, 2017). For purposes of this study, interest payments are included as part of government spending. According to Statistics South Africa (2019), South Africa has devoted a larger proportion of its budget to paying interest than other countries such as Russia and China, based on the data it obtained from the International Monetary Fund (IMF). Furthermore, it indicates that South Africa has a higher interest payment burden than some of its neighbours, such as Namibia, Botswana and Lesotho, which all contribute proportionally smaller chunks of their budgets to service debt.

Fiscal sustainability refers to whether the government is capable of maintaining a given spending, taxation and borrowing pattern indefinitely, or whether it will be ultimately constrained to alter those policy settings to satisfy its long-run budget constraint (Abdulnasser, 2002). The essential ingredient of debt sustainability is the solvency or the ability of a country to service its debt in the long run (Naraidoo & Raputsoane, 2015). In other words, the country should not have any problem in meeting its long-term financial obligation to its creditors. Bohn (1998; 2007) argues that sustainability of the government budget requires government policies to be consistent with the present value of the budget constraint such that the present value of government expenditures equals the present value of its revenues. This is to avoid consistent budget shortfalls and debt crises in the future.

Having prudent government spending is absolutely crucial in order to avoid financial crises. It is crucial that debt is managed sustainably, and to do so the government should not run large budget deficits consistently. Having a reasonable budget is not all bad. In fact, a budget deficit is often considered as a tool to stabilise the economy provided that it is handled efficiently, otherwise it may have a dangerous effect of escalation of debt stock (Saima & Uddin, 2017). It is often argued that the economic growth rate (often expressed as GDP) is likely to have a linear negative impact on the public debt-to-GDP ratio; high levels of public debt are also likely to be harmful for growth, but potentially after a certain threshold has been reached.

South Africa is near junk status from all three rating agencies, namely Fitch, Standard & Poor and Moody's (Mutize, 2019). Mutize (2019) further elaborates that the country's long-term foreign-currency government bonds are rated BB+ by Fitch and BB by Standard & Poor. This means that the government bond is categorised as considerably risky, and Moody's rating is Baa3, indicating a moderate credit risk investment grade. What this means is that South Africa has to pay more interest on loans, thereby increasing the debt-to-GDP ratio and widening the budget deficit.

In light of this challenge, the purpose of this paper is to assess the sustainability of public debt and budget deficit in South Africa. In doing so, it aims to provide a deeper understanding and insight into the fiscal outlook in the medium- to long run. Therefore, in part, this paper aims to contribute to the prevailing debate about South Africa's debt sustainability and possible impact on the South African economy as a whole.

RESEARCH METHODOLOGY

Data and Statistics

Secondary data (from 2000 to 2018) for macroeconomic variables such as public debt, budget deficit and GDP growth rates gathered from Statistics South Africa and the Reserve Bank of South Africa and corroborated from IMF were used for analysis. Measures of central tendency (mean), measures of variability (standard deviation) and measures of shape (skewness and kurtosis) were used to conduct the analysis.

Econometric Modelling

Furthermore, econometric analyses, including stationarity test, Johansen cointegration (Johansen, 1992), vector error correction model (VECM) and Granger non-causality test (Granger, 1969) were utilised to determine whether the current trajectory of public debt and budget deficit is sustainable.

Stationarity Test

The examination of stationarity of a series is a crucial step before undertaking any econometric analyses, because its stationarity or otherwise may have a strong influence on its behaviour and properties and may lead to spurious regression (Brooks, 2014). To test the stationarity of the data, the augmented Dickey-Fuller test (Dickey & Fuller, 1979) statistic (ADF) and the Phillips-Perron (PP) unit root tests were applied.

Cointegration Test

Following the unit root tests, the Johansen test of cointegration was used to assess whether the two economic variables, namely public debt and budget deficit are cointegrated. The Johansen cointegration test requires that the variables be non-stationary at level and stationary at first difference and that the variables should be integrated of the same order (Enders & Hurn, 1997; Brooks, 2014). The two test statistics involved are trace statistics and Max-Eigen statistics, and are formulated as follows:

$$\lambda_{trace} = T \sum_{i=r+1}^{n} \ln(1 - \lambda_i) \qquad (1)$$

$$\lambda_{\max(r,r+1)} = -Tln(1 - \lambda r + 1) \qquad (2)$$

Where r is the number of cointegrating vectors under the null hypothesis and λ is the estimated value for the ith ordered eigenvalues of the matrix of canonical correlations (Enders & Hurn, 1997; Brooks, 2014). These two test statistics test the hypothesis that there are at most r cointegrating vectors ($0 \leq r \leq n$) in a series.

λ_{trace} is a joint test where

H0: the number of co-integrating vectors $\leq r$

H1: the number of co-integrating vectors > r

λ_{max} Conducts a separate test on each eigenvalue in sequence as follows:

$$H0: r = 0 \; Versus \; H1: 0 < r \le n$$

$$H0: r = 1 \; Versus \; H1: 1 < r \le n$$

$$H0: r = 2 \; Versus \; H1: 2 < r \le n$$

$$H0: r = n - 1 \; Versus \; H1: r = n$$

The first test involves an H0 of non-co-integrating vectors. If the H0 is not rejected, it would indicate that there are no co-integrating vectors and the cointegration test would be completed. Contrarily, if the H0 for r = 0 is rejected, the H0 for r = 1 will be tested and so on. Therefore, the value of r is increased repeatedly until the H0 is no longer rejected.

Vector Error Correction Model

After establishing the long-run relationship between budget deficit and public debt through the Johansen test of cointegration, the vector error correction model (VECM) was estimated to test the adjustment between the two variables towards long-run equilibrium and determine the direction of causality.

The adjustment from short-run to long-run equilibrium was performed using the VECM, which is give in the following regression model:

$$\Delta BD_t = \sum_{i=1}^{p-1} \beta_i BD_{t-i} + \sum_{i=1}^{p-1} \gamma_i PD_{t-i} \qquad (3)$$

$$\Delta PD_t = \sum_{i=1}^{p-1} \beta_i BD_{t-i} + \sum_{i-1}^{p-1} \gamma_i PD_{t-i} \qquad (4)$$

Where Δ is the difference operator, C1 and C2 are the estimated residuals from the cointegrating equations, $\epsilon1$ and $\epsilon2$ are random disturbances and β, γ, δ are parameters (Pesaran et al., 2001).

Granger Causality Test

To further assess the relationship between the two variables, a Granger non-causality test was conducted. A simple definition of Granger causality that involves two variables (time-series variables), X and Y: "X is said to Granger-cause Y if Y can be better predicted using the histories of both X and Y than it can by using the history of Y alone". The absence of the Granger causality test was conducted by estimating the following equation in the VAR model:

$$BD_t = c_0 + c_1 BDt - 1 + \ldots + c_p BD_t - p + d_1 PD_t - 1 + \ldots + d_p PD_t - p + vt \qquad (5)$$

$$PD_t = a_0 + a_1 PD_t - 1 + \ldots + a_p PD_t - p + b_1 BD_t - 1 + \ldots + b_p BD_t - p + ut \qquad (6)$$

Where PD_t and BD_t refer to public debt and budget deficit at time t respectively.

RESULTS AND DISCUSSION

Descriptive Analysis

Table 1 illustrates descriptive statistics of the macroeconomic variables under study, namely gross domestic product, public debt and budget deficit all expressed in terms of

percentages. The estimates of skewness and kurtosis indicate that the observation regarding the variables under study do not depart significantly from normality.

<table>
<tr><td colspan="4">TABLE 1
DESCRIPTIVE STATISTICS</td></tr>
<tr><td></td><td>GDP%</td><td>Debt%</td><td>Budget deficit%</td></tr>
<tr><td>Mean</td><td>2,769652</td><td>39,58521</td><td>-2,454</td></tr>
<tr><td>Standard deviation</td><td>1,843283</td><td>8,726283</td><td>1,927033</td></tr>
<tr><td>Skewness</td><td>-0,42833</td><td>0,310424</td><td>0,434</td></tr>
<tr><td>Kurtosis</td><td>0,22778</td><td>-0,8858</td><td>-1,03197</td></tr>
</table>

To provide perspective on the South African economy, a brief discussion of its GDP is firstly provided. South Africa is a member of the BRICS (Brazil, Russia, India, China & South Africa), and it is considered an emerging economy with a medium income (Besada et al., 2013). In 2018, South Africa's GDP was worth 366.30 billion US dollars. This represents 0.59 percent of the world economy. An all-time high of 416.42 USD billion was recorded in 2011. However, South Africa has been experiencing an economic slowdown and in some cases contraction over the past few years.
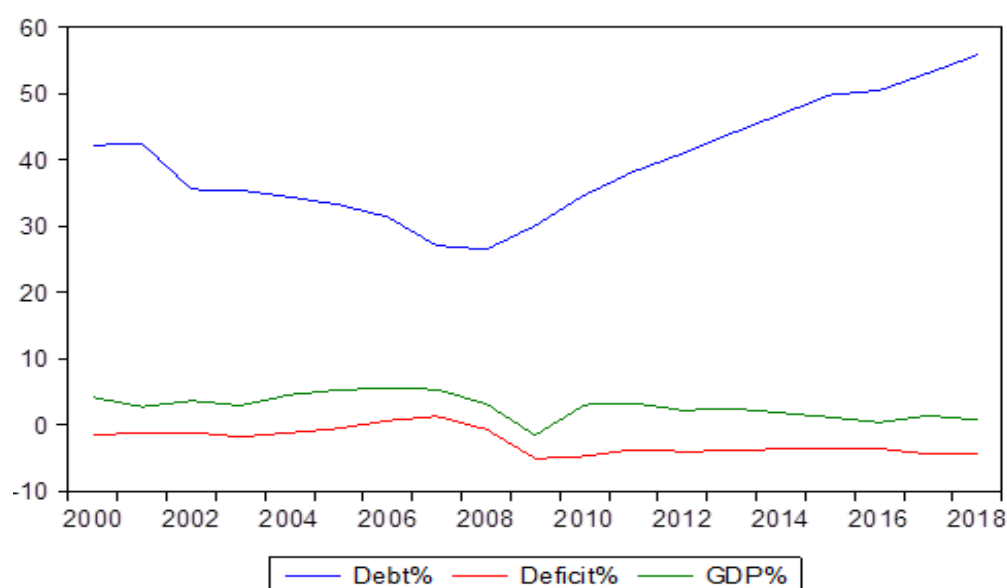
As illustrated in Figure 1, South Africa's public debt has been on the increase since 2009. It appears that the 2007/2008 financial crises have had a major impact on the South African economy (Baxter, 2008). Baxter (2008) is of the view that South Africa, as a small open economy, which is dependent on foreign trade and attracting foreign savings to prop up its domestic investment, is not immune to the impact of the global financial crisis-induced economic slowdown.
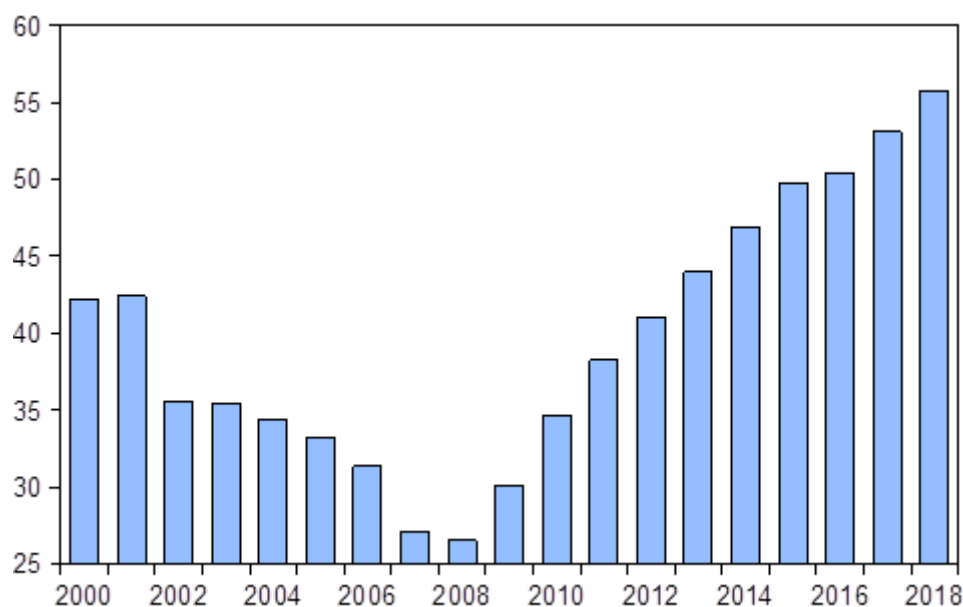
FIGURE 1
PUBLIC DEBT

As can be seen from Figure 1, South Africa recorded a government debt equivalent to 55.80 percent of the country's GDP in 2018. Government debt-to-GDP ratio in South Africa averaged 39.58 percent from 2000 until 2018, reaching an all-time high of 55.80 percent in 2018 and a record low of 26.51 percent in 2008. It has not reached the 60 percent threshold as yet.

The situation with respect to budget deficit is not different from that of public debt as the two variables are closely intertwined. South Africa recorded a budget deficit equivalent to 4.40 percent of the country's GDP in 2018. As illustrated in Figure 2 and Table 1, government budget in South Africa averaged -2,454 percent of GDP from 2000 until 2018, reaching an all-time high of 1.32 percent of GDP in 2007 (budget surplus) and a record low of -4.40 percent of GDP in 2017 and 2018.

FIGURE 2
PUBLIC DEBT, BUDGET DEFICIT, GDP

When one looks at the public debt and budget deficit in light of South Africa's low economic growth (GDP) as illustrated in Figure 2, it is not hard to see that South Africa has a tough road ahead. The declining economy (low levels of GDP) is not in a position to generate sufficient tax revenue to narrow the budget deficit and reduce the country's debt. In other words, South Africa's debt levels and budget deficits do not appear to be sustainable if the current trajectory persists.

Econometrics Analysis

To understand the nature of the relationship between public debt and budget deficit better, and to determine whether the current trajectory of public debt and budget deficit is sustainable, certain econometrics techniques such as stationarity test and Johansen cointegration tests were utilised. The analysis was conducted using Econometric Views (EViews), a statistical software produced by Quantitative Micro Software.

Unit Root Test Results

Table 2 reports the results of the unit root tests applied in this study. The maximum lag length automatically selected by Akaike information criterion (AIC) and Schwarz information criterion (SIC) produced the same result in the ADF unit root test. In the case of the PP unit root test, the estimation method, i.e. Bartlett kernel, and the Newey-West bandwidth were automatically selected.

TABLE 2
RESULTS OF UNIT ROOT TEST

Variables	ADF (level)		ADF (1st diff)		PP (level)		PP (1st diff)	
	t-statistic	Critical values	t-statistic	Critical values	t-statistic	Critical values	t-statistic	Critical values
PD	0.5533	-1.9628	-2.0329	-1.9628	0.7425	-1.9614	-2.0329	-1.9628
BD	-0.1266	-1.9644	-3.7250	-1.9644	-0.4621	-1.9614	-2.9839	-1.9628

As reflected in Table 2, the results of the unit root test show that at level both variables, namely public debt and budget deficit have unit root, meaning they are non-stationary. The variables under study become stationary after the first difference. This implies that the variables are integrated of the same order, I (1), which suggests that there is a probability of cointegration between the two variables. The next step was then to test this probability using a cointegration test, namely the Johansen's cointegration test.

Johansen's Cointegration Test Results

To assess the long-term association of the two variables, Johansen's cointegration test using trace statistic and maximum eigenvalues were computed. Table 3 represents the results of Johansen's cointegration test. The critical values are taken from MacKinon et al. (1999).

As can be seen in Table 3, in trace statistics as well as max-eigen statistics, the none cointegration hypothesis is rejected because the probability is significant at the 0.05 significance level in favour of the alternative of at least one cointegrating equation. Both trace statistic and max-eigen statistic confirm that there is one cointegrating equation; indicating long-run association between public debt and budget deficit. The presence of cointegrating vector(s) may suggest the existence of similar and fundamental macroeconomic forces that drive these two variables.

TABLE 3
RESULTS OF JOHANSEN'S COINTEGRATION TEST

Unrestricted cointegration rank test (trace statistics)				
Hypothesised no. of CE(s)	Eigenvalue	Trace statistic	0.05 critical value	Prob.**
r = 0*	0.65224	17.97197	15.49471	0.02074
r < 1	0.00092	0.015725	3.84146	0.90005

Note: Trace test indicates 1 cointegrating eqn(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level; **MacKinnon et al., 1999 *p*-values

Unrestricted cointegration rank test (maximum eigenvalue)				
Hypothesised no. of CE(s)	Eigenvalue	Trace statistic	0.05 critical value	Prob.**
r = 0*	0.65224	17.95625	14.26460	0.01246
r < 1	0.00092	0.015725	3.841465	0.90005

Note: Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level; **MacKinnon et al., 1999 *p*-values

Vector Error Correction Model (VECM) Results

After confirming the existence of a long-run association between budget deficit and public debt through Johansen test cointegration, it was found to be appropriate to apply the VECM to evaluate the short-run properties of the nature of the relationship between the two variables under study.

In the first instance, budget deficit was entered as a dependent variable and public debt as independent variable. The VAR system produced a negative coefficient (-1.793586) and was significant at the 5 percent level of significance (t-statistics: -2.30838), suggesting a long-run causality running from budget deficit to public debt. In the second instance, the situation was reversed; public debt was entered as a dependent variable, while budget deficit was set as independent variable. The VAR system also produced a negative coefficient (-0.040156), but it was not significant (t-statistics: -1.12079) at the 5 percent level of significance. This can be interpreted as the absence of a long-run causality running from public debt to budget deficit. Saima and Uddin (2017), in a study of the relationship between budget deficit and public debt, found contradicting evidence, where the VECM suggested a unidirectional causality running from public debt to budget deficit.

Granger Non-Causality Test Results

To confirm the findings of the VECM model, the Granger non-causality test was conducted to determine the causality between the two variables under study, namely budget deficit and public debt. Since the Granger non-causality test is sensitive to lag selection, an optimal lag length was selected in the VAR system. The criteria used for lag selection, namely Logl statistic, LR test statistic, FPE, AIC, SIC and HQIC, indicated lag three (3) to be an optimal lag for this test. Table 4 reports the results of Granger non-causality test.

TABLE 4 RESULTS OF GRANGER NON-CAUSALITY TEST		
Null hypothesis	**F-statistic**	**Prob.**
Budget deficit does not Granger cause public debt	5.06526	0.0254
Public debt does not Granger cause budget deficit	0.09433	0.9107

As reflected in Table 4, the null hypothesis of non-causality is rejected in favour of the existence of causality running from budget deficit to public debt. However, the null hypothesis of non-causality running from public debt to budget deficit could not be rejected. This suggests that there exists unidirectional Granger causality running from budget deficit to public debt

confirming the result of the VECM. In simple terms, the results show that budget deficit does in deed cause debt, i.e. budget deficit does contribute to public debt, but public debt is not necessarily a result of deficit.

Over the past few years, the tax revenue has continued to fall while government expenditure has continued to rocket, thereby widening the budget deficit. Ackerman (2019) argues that the widening budget deficit is due to tax revenue shortfalls, lower economic growth and the Eskom (the country's electricity utility) bailout. An increasing government wage bill (not necessarily an increased employment) has also contributed to this deficit. In light of this situation, the National Treasury in its recent medium-term budget policy statement (MTBPS) has adjusted South Africa's economic growth expectations for 2019 downwards to 0.5% from an initial forecast of 1.5%. Additionally, weak demand, shrinking corporate and personal tax collection and weak economic growth mean that the country's budget deficit is expected to increase to approximately 6.5% in 2019 and 2020, and similarly the debt-to-GDP ratio is expected to rise to 71.3% by 2022/23.

Mboweni (2019), the country's finance minister, in his MTBPS, acknowledged that the revenue shortfalls and rising spending pressures are threatening the government's ability to maintain existing levels of service provision and infrastructure investment. This is really worrying because lack of investment in infrastructure will mean no new job creation, which South Africa desperately needs given its staggering high levels of unemployment rate, which sits at approximately 29%. Furthermore, the minister indicated that the consolidated budget deficit will average 6.2% of the GDP over the next three years. Similarly, the debt-to-GDP ratio is estimated to reach 71.3% by 2022/23. This is worrying as both indicators will exceed the 3% and 60% threshold, respectively.

CONCLUSIONAND RECOMMENDATIONS

Based on the empirical evidence produced in this study, it is evident that public debt and budget deficit in light of South Africa's low economic growth appear to be unsustainable. Many African and other emerging countries are also in a similar situation. This is because the declining economy (low levels of GDP) is not in a position to generate sufficient tax revenue to narrow the budget deficit and reduce the country's debt. In other words, South Africa's debt levels and budget deficits are not sustainable if the current trajectory persists. The econometrics analysis (specifically stationary test and Johansen test of cointegration) provided evidence that the two variables, namely budget deficit and public debt are cointegrated, and have a long-run association, as the driving force behind these two variables could be similar. Furthermore, the VECM and the Granger non-causality test have suggested that there is a unidirectional causality running from budget deficit to public debt.

As many economists agree, the rising debt levels are attributed to the massive bailouts of state-owned enterprises such as Eskom. The erosion of the public finance at the back of Eskom's financial woes, and other state-owned companies is worrying, and needs urgent attention. Proposed solutions and reforms should underscore that such state-owned companies should be self-sustaining and contribute positively to South Africa's economic growth. More studies and intervention is need to determine which public enterprises are sustainable.

In my view, South Africa's main problem is its low level of economic growth over the past few years; South Africa has not been able to register sufficient economic growth that can create employment to reduce its staggering unemployment rate, and the growth projections are not promising. As a medium-income country with high levels of unemployment, inequality and poverty, South Africa needs to find ways to grow its economy so that it creates employment aimed at reducing the levels of poverty and this will definitely increase its tax base. An

increased tax base will mean the collection of more tax revenue to pay off government debt and narrow the budget deficit of the country. I am of the view that this is the best way to ensure the sustainability of public debt and budget deficit in South Africa. To grow its economy, South Africa may need to implement some bold interventions, however unpopular they are. For example, South Africa may need to relax its business laws, which businesses and investors often criticise for inhibiting South Africa's full potential.

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