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AN EMPIRICAL EXAMINATION OF SOUTH AFRICA'S PUBLIC DEBT-ECONOMIC GROWTH NEXUS: THE EMERGENCE OF CLASSICAL ECONOMISTS' IDEOLOGY

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Abstract

This study uses the Vector Error Correction (VEC) technique and secondary quarterly time-series data to examine the nexus between public debt and economic growth in South Africa. The findings confirm classical economists' ideology, since this study found a long-term negative relationship between economic growth and both domestic and foreign debt, with economic growth and domestic debt being causally related. Inflation, economic growth, and fiscal deficits also have negative long-term relationships. The Impulse Response Functions (IRFs) show that shocks to inflation and domestic debt have a negative reaction on South Africa's economic growth rate, whereas shocks to gross fixed capital formation have a partially positive reaction. The shocks to South Africa's fiscal deficit and foreign debt have also had a mixed reaction on the country's economic growth rate. Variance decomposition analysis show a significant decline in South Africa's economic growth rate variance, with domestic debt and inflation increasing and the fiscal deficit declining marginally, while foreign debt declined marginally before increasing significantly. This study recommends that South Africa should enhance its fiscal management strategies, including financial repression, debt restructuring, cost cutting, and improved capital spending. Enhancing these strategies could boost the economy's productive capacity.

Keywords: South Africa, Public Debt, Economic Growth, VEC, IRFs, Variance Decomposition

JEL Classifications: H30, H60, O47

1. Introduction

The 2008 global financial crisis led to a surge in sovereign debt in both developing and developed economies due to conventional and unconventional monetary and fiscal policies. This raised concerns about fiscal sustainability and government liabilities' impact on financial markets and the economy. Poor economic performance exacerbates fiscal sustainability issues and increases the risk of harsh fiscal adjustments, making the question of public debt's influence on economic

growth ongoing in academia and policymaking. Public debt is a crucial economic component in both developing and developed countries, serving as a financing tool for public expenditure, enhancing social welfare, promoting capital accumulation, and fostering economic growth (Appiah-Kubi *et al*. 2022). Sani *et al*. (2019) point out how economic theory suggests that a country's public debt can be advantageous for its economic growth. The authors further argue that Sub-Saharan Africa (SSA) has witnessed how public debt has benefited other regions with comparably higher institutional quality; while developing African countries such as Nigeria, Ghana, Mozambique, and South Africa continue to accrue higher levels of public debt sustained with poor economic growth. This research delves into the intricate relationship between public debt shocks and economic growth in South Africa since South Africa is similar to these economies. This exercise is critical in shedding some light on the economic consequences that have emerged due to these shocks.

As the largest and perhaps most developed economy in SSA, South Africa continues to wrestle with the issue of public debt's unpleasant consequences (Mhlaba and Phiri, 2019). Since the democratic transition in 1994, fiscal authorities have been tasked with the dreadful duty of eliminating the nation's socioeconomic issues (Mhlaba and Phiri, 2019). This is evident in the National Treasury (1994) report, where there was already an R29 274 billion budget deficit to be financed, which was relatively low at only 6,6% of GDP, while the primary deficit was deemed unsustainable unless the economy and government revenue grew at a faster rate over time. After 1994, the South African government implemented a few economic and financial reforms that effectively managed South African domestic and foreign debts effectively. Thus, domestic government securities increased significantly to build up both citizens' and foreign investors' confidence in the government (Saungweme and Odhiambo, 2021). For a detailed analysis, Figure 1 presents line graphs of South African public debt and economic growth for the period 1994q1 – 2023q4.

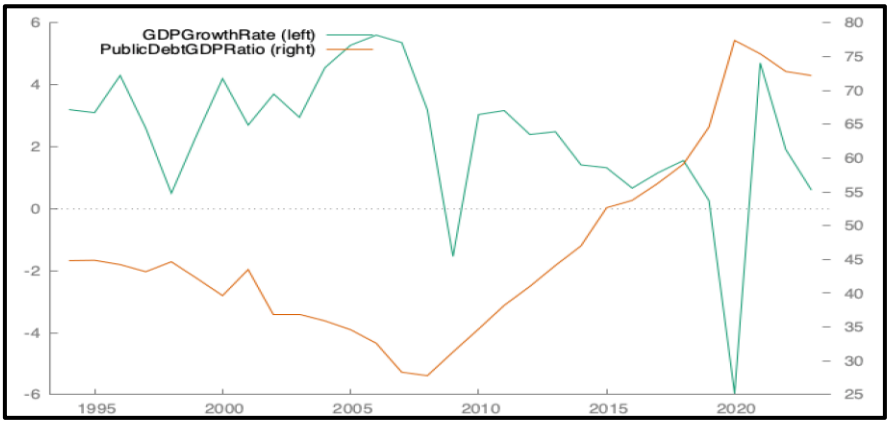

Figure 1. South African public debt and economic growth: 1994Q1 – 2023Q4
Source: Researchers' plot using South African Reserve Bank (SARB) Data and Eviews 13 Software

Figure 1 illustrates three different phases, showing the dynamic movements of the South African public debt and economic growth. The aforementioned three phases are described for the time periods 1994-2008, 2009-2017, and 2018-2023, corresponding to different financial and economic policies and structural transitions. For instance, from 1994 to 2008, public debt showed a downward trend coinciding with significant economic and financial reforms. These reforms were necessary due to the high public debt from extensive domestic and foreign borrowing in the 1980s. The ANC government implemented key programs such as the Reconstruction and Development Programme (RDP) in 1994, the Growth Employment and Redistribution (GEAR) policy in 1996, and the Accelerated and Shared Initiative for South Africa (ASGISA) in 2005 to reduce government debt and promote economic growth, leading to an upward GDP trend from a low of 1,2% in 2001 to a peak of 4,6% in 2006, supported by industrialization and economic diversification (Mhlaba and Phiri, 2019; Saungweme and Odhiambo, 2019).

During 2009-2017, public debt increased significantly due to the 2008 global financial crisis and recession, leading to increased debt levels and a deteriorating macroeconomy, as a -1,6% growth rate was recorded in mid-2009 (Mhlaba and Phiri, 2019). The government abandoned the ASGISA policy in favor of the National Development Plan and New Growth Path in 2013, resulting in increased gross and net debt levels. Although economic growth recovered slightly in 2010, it declined to -0,8% in 2016 (Mhlaba and Phiri, 2019).

From 2018 to 2023, public debt remained high, whereas economic growth remained low. The South African economy slipped into recession in 2018, shrinking by 0,7% due to contractions in transport and trade industries and decreased government activity (Stats SA, 2018). In 2019, the economy contracted again by 1,4%, following a 0,8% contraction in the third quarter, driven by a decline in the performance of seven out of ten industries (Stats SA, 2019). The government spent less than it earned, with interest payments accounting for 9,2% of general government expenditure, which was more than what was spent on the hospital, education, and housing (public investment) (Stats SA, 2019). Public sector spending on infrastructure (capital expenditure) decreased for a third consecutive year, falling from R250 billion in 2018 to R231 billion in 2019, according to Stats SA (2019). This presented a decline of 7,6% in South Africa's economic growth. The 2020 COVID-19 pandemic further impacted the economy, with nine out of ten businesses experiencing reduced turnover (Stats SA, 2020). This period saw a steep GDP slump and significant increase in public debt. While recovering from the pandemic, the economy faced additional challenges from KwaZulu-Natal floods and loadshedding. By 2023, government spending shifted its focus from non-financial and financial assets towards current expenditure and interest payments on debt (Stats SA, 2023).

Generally, the trends show that South African public debt and economic growth have conflicting patterns, with public debt increasing and economic growth decreasing over the three phases of the study period. This implies that increased public debt does not always result in a better economic growth rate, as the Keynesian macroeconomic ideology claims. South Africa's economic growth has stagnated despite a significantly increasing public debt level. That is, public borrowing has had little positive impact on the South African economy due to internal macroeconomic and socioeconomic challenges, such as high rates of unemployment, poverty, inequality, political instability, and institutional flaws, calling into question the Keynesian ideology established by the majority of the research featured in the South African context. For this reason, the first contribution of this study is to empirically explore the classical economists' ideology of the public debt-economic growth nexus in South Africa.

The research given in the South African context also looked at aggregated public debt to determine if public borrowing boosts or harms the South African economy. Given South Africa's macroeconomic dynamics, this study acknowledges the need of splitting aggregate governmental debt into domestic and foreign debt. This is the second contribution of this study, which could assist policymakers identify the portion of South Africa's public debt that is most detrimental to the country's economic growth.

The rest of the paper is organized as follows: section two discusses the literature review of the study, divided into two main sub-sections: theoretical perspectives and empirical literature. Section three outlines the research methodology. Section four presents the results of this study. Section five presents the conclusions and policy proposals. Section six concludes the paper by discussing the limitations of the study and suggestions for future research.

2. Literature review

2.1. Theoretical perspectives

The Keynesian view argues that at sustainable levels of governmental debt, fiscal policy helps stimulate economic growth (Saungweme and Odhiambo, 2021). If resources in the economy are initially under-employed, a budget deficit will increase national income and need not discourage or crowd out private investment. For instance, if public debt is used to fund infrastructure projects, public health initiatives, critical research, and education, public debt can contribute to long-term productivity and economic growth (Saungweme and Odhiambo, 2021). However, rising government spending can crowd out the available funding for both domestic and foreign

investments and the same investment activities necessary for bridging the saving-investment gap, as stipulated by the Keynesian framework (Masoga, 2017).

Contrary to Keynesian theory, the classical theory postulates that public debt causes stagnant growth (Mbali, 2021). It asserts that there is a strong negative correlation between public debt (via permanent budget deficits) and economic growth since permanent budget deficits undoubtedly discourage private investment. Classicalists contend that a decline in economic output results from debt-financed state expenditure, which is insufficient to counteract the detrimental effects of private investment incentives (Mbali, 2021). Classical economists believe that budget deficits increase bond stock, lower market prices, and encourage high interest rates, making fixed investment financing more expensive, whereas public debt increases labor demand and wages, affecting profitability (Mbali, 2021; Lee and Ng, 2015). Therefore, attempts to boost the economy through public borrowing would be unfruitful.

In support of the classical economists' view, Reinhart *et al*. (2012) established the debt overhang theory, which suggests that unsustainable public debt can hinder economic growth by limiting private investment and impacting government spending. According to Mohanty and Mishra (2016), if a country's ability to repay its debt exceeds its expected foreign debt, the debt overhang hypothesis leads to higher debt payment costs, which may hinder investment. Governments may compromise fiscal consolidation because of pressure from public debt, leading to an increase in the country's budget deficit. In summary, the theory suggests that high debt levels create different incentives for creditors and borrowers, leading to debt reduction benefits for both parties. This theory explains how capital accumulation and productive growth impact the economy, with public debt having a nonlinear effect. Future debt accumulation may exceed a country's repayment capacity, which is discouraged by the increased debt payment costs. According to Krugman (1988), potential investors are more concerned about creditors taxing production to service public debt at the cost of future output investments.

2.2. Empirical literature

Chitera (2020) used the autoregressive distributed lags (ARDL) method to investigate the impact of domestic debt on Malawi's economic growth. In both the long and short terms, the study found that domestic debt and inflation significantly impacted economic growth positively and negatively, respectively. Using the same method, Mokuolu and Adejayan (2024) find that public debt has a long-term statistically significant impact on economic growth in Nigeria.

Misiri *et al*. (2021) obtained comparable findings in a case study of Kosovo using the Vector Error Correction (VEC) method. The authors' findings confirmed the Keynesian perspective, demonstrating that public debt or a running fiscal deficit might stimulate the economy, particularly during the downturn period. Notably, Misiri *et al*. (2021) and Chitera (2020) study employed domestic public debt.

Ogunjimi (2019) finds a negative and statistically significant impact of public debt on economic growth in Nigeria using the VEC technique. Saungweme and Odhiambo (2019) and Phiri (2022) obtained related results for Zambia using ARDL and VEC, respectively. Kurniasih (2021) uses the VEC technique to show that foreign debt has a negative and statistically significant impact on economic growth in Malaysia. The authors' findings support the classical economists' argument that public debt adversely impacts the economy. It should be noted that Kurniasih (2021) study focused on external or foreign debt rather than the total public debt. This may shed light on what is expected from this study in terms of the impact of foreign public debt on the economy.

In South Africa, Hlongwane (2019) assessed the impact of foreign debt on economic growth using the ARDL method. The study concludes that external debt has a negative and statistically significant impact on economic growth. These findings support classical economists' views on the relationship between public debt and economic growth. Mhlaba and Phiri (2019), Saungweme and Odhiambo (2019), and Mbali (2021) find different results using the same method, indicating that public debt has a positive and statistically significant long-term impact on economic growth. Using a different technique (the VEC method), Masoga (2017) finds comparable findings, demonstrating a positive and statistically significant long-term impact of

public debt on economic growth. These findings support the Keynesian ideology that public debt promotes economic growth, especially during the downturn period.

Most of the reviewed studies in the South African context indicate that South African government has traditionally used the Keynesian approach, which entails raising its fiscal deficit, thus raising public borrowing requirements to boost stagnant or slow economic growth. Despite the government's efforts, the South African economy has not grown sufficiently. This calls into doubt the Keynesian ideology and raises the issue of classical economists' ideology, which holds that growing public debt harms the country's economy.

Furthermore, these studies employed aggregated public debt to determine whether public borrowing promotes or harms the South African economy. Drawing on South African macroeconomic dynamics, this study recognizes the necessity of splitting aggregate governmental debt into domestic and foreign debt. By doing so, the study can help policymakers identify the share of South Africa's public debt, which is more destructive to the country's economic growth. To achieve these two important empirical contributions, this study uses of an econometric time-series analysis technique known as Vector Auto Regression (VAR) or Vector Error Correction (VEC), depending on the Johansen and Juselius cointegration test results, and stationarity condition of all the key variables of the study.

3. Research methodology

3.1. Model specification

The unrivalled debt overhang theory, presented in the 'theoretical perspectives' section, offers a promising framework for econometric modelling. The analysis also follows the theoretical model of Cunningham (1993) and Akram (2016), whose auxiliary structure is as Equation 1 :

$$Y = A * f(K, L, Debt) \quad (1)$$

where Y denotes economic growth, *A* is another fixed variable, *K* is capital stock, *L* is labor force and Debt is total public/government debt.

A priori expectation is that capital stock (K), labor force (L) and debt should be equal to or greater than zero, and the summation of capital, labor, and debt should be equal to or less than one (Cunningham, 1993; Akram, 2016). Building on the theoretical model presented in Equation 1, and the work of Saungweme and Odhiambo (2019), the following is a mathematical representation of the empirical model to be followed in this study as Equation 2.

$$RGDP = f(PD, FD, INF, GFCF) \quad (2)$$

where the response variable, RGDP, is the growth rate. The explanatory variables were public debt (PD), fiscal deficit (FD), inflation (INF), and gross fixed capital formation (GFCF). All explanatory variables, except inflation, are measured as percentages of GDP. The proxy for inflation is the official inflation rate.

Another justification (apart from the theoretical model described in Equation 1) for selecting explanatory variables such as fiscal deficit, inflation, and gross fixed capital formation is the macroeconomic dynamics that exist among these variables (in relation to the public debt-growth nexus). For instance, if government revenue and noninterest expenditure increase concurrently with inflation, the fiscal deficit measurement may be influenced, potentially causing a short-term positive impact and a long-term negative impact on economic growth and debt stock (Nkrumah *et al*. 2016). Furthermore, public debt sustainability depends on higher primary balances and growth, but an increase in public debt can reduce savings, raise interest rates, and lower investment incentives, all of which influence capital formation (investment incentives and activity) and subsequently economic growth (Ayana *et al*. 2023).

Given the second empirical contribution of this study, it is necessary to decompose the total South African governmental debt into two key components: domestic debt and foreign debt. The purpose of decomposing South Africa's total public debt is to determine the portion (either

domestic or foreign) of public debt that has a more detrimental impact on the country's economic growth. The final empirical model to be followed in this study is Equation 3.

$$RGDP = f(DDE, FDE, FD, INF, GFCF) \quad (3)$$

where the response variable, RGDP, is the growth rate. The explanatory variables were domestic debt (DDE), foreign debt (FDE), fiscal deficit (FD), inflation (INF), and gross fixed capital formation (GFCF). All explanatory variables, except inflation, are measured as percentages of GDP. The proxy for inflation is the official inflation rate.

3.2. Data description and sources

This study uses secondary quarterly time-series data from 1994 quarter 1 to 2024 quarter 3. This period is chosen for data credibility and the 30th anniversary of the South African democracy in 2024. The data for the variables are from the South African Reserve Bank (SARB) and World Bank databases.

3.3. Research methods

3.3.1. Vector auto regression/vector error correction

Vector autoregression (VAR) is a statistical method used to analyze the relationship between several influencing variables. This method allows variables to be integrated into different orders, such as *I (0)*, *I (1)*, and *I (2)*, assuming no cointegration (Gujarati and Porter, 2009; Brooks, 2008). Popular in economics and other sciences, VARs are flexible and simple models for multivariate time-series data. These became standard tools in econometrics when classical simultaneous equation models were questioned.

The VAR model is a quantitative forecasting approach that combines multiple autoregressive (AR) models to form a vector between variable effects. It is commonly applied to multivariate time-series data and describes the relationship between observations of a variable and its association with other variables at lagged periods. The mathematical notation for the VAR model is shown as Equation 4.

$$Y_t = \sum_{i=1}^{P} D_i Y_{t-i} + CX_t + \varepsilon_t \quad (4)$$

where t = 1,…,T, Y_t denotes a k vector of endogenous variables, and X_t represents a *d* vector of exogenous variables. D_i and C are matrices of the coefficients to be estimated. ε_t describes a process for estimating coefficients using a Gaussian zero-mean vector white noise process with a time-invariant positive definite variance-covariance matrix $E(\varepsilon_t \varepsilon_t') = \Sigma_\mu$. Hence, $\varepsilon_t \sim NID(0; \Sigma_\mu)$.

On the other hand, Vector Error Correction (VEC) is a multivariate time-series modelling technique that involves a long-term relationship (cointegration) between non-stationary variables (but the stationarity condition is met after 1st difference, *I (1)*). This co-integration provides hope for creating a stationary condition eventually using a combination of linear variables. If co-integration analysis is possible, the Error Correction Model (ECM) can be used. If testing reaches the ECM analysis, the Error Correction Term (ECT) is used to assess the state of disequilibrium correction, ensuring a negative convergent state. The ECM is similar to the usual regression of known terms of independent and bound variables (Brooks, 2008; Asteriou and Hall, 2011).

In this technique, the trace and maximum eigenvalue approaches are used to evaluate for cointegration. These approaches evaluate the hypothesis that only '*r*' vectors are cointegrated. Thus, Equations 5 and 6 present the mathematical representations for the trace and maximum eigenvalues as Equation 5 and Equation 6, respectively.

$$J_{trace} = -T \sum_{i=r+1}^{n} log\,(1 - \mu i) \quad (5)$$

$$J_{\max eigen}= -T \log (1- \mu r + 1) \quad (6)$$

where T is the number of observations, and μ is the i^{th} largest canonical correlation. Thus, the Johansen and Juselius approach of cointegration can be quantified as Equation 7.

$$\Delta Y_t = \varphi\, Y_{t-1} + \sum_{i=1}^{P-1} \theta i\, \Delta_{t-1} + X_{it-1} + \varepsilon_t \quad (7)$$

where:

Y_t : K vector of *I(1)* variables
X_{it-1} : Long-run coefficients' estimates for the explanatory variables
ε_t : Error term following White Noise process
φ : Error correction term
θ : Short-run coefficients' estimates
φ : Speed of adjustment/error correction term

Engle and Granger (1987) suggested that if two series are integrated in the same order of one, the VEC model should be used to study the combined behavior of the dynamic system. The model assumes at least one cointegrating equation or vector between the studied variables. The VEC method is important because it considers both long- and short-term adjustments and provides information about the causative processes influencing the variables. For simplicity, Table 1 gives directives on when to use the VAR or VEC model.

Table 1. Directives for choosing between VAR and VEC Methods

Number of Cointegrating Vectors	Meaning	Stationarity of Variables	Proposed Model	Results
r = 0	No Cointegration	Variables are non-stationary, but there is no evidence of cointegration.	VAR in differences.	VAR results show short run estimates.
0< r <k	Cointegration	Variables are non-stationary, and the number of cointegrating vectors is equal to '*r*'	VEC	VEC results show short & long run equilibrium/cointegrating relationship
r = k	No Cointegration	Variables are stationary, but there is no evidence of cointegration.	VAR in the variables' level form.	The VAR results give long run estimates since the variables are not in differences.

Note: *r* and *k* denote the number of cointegrating vectors and VAR/VEC system variables, respectively.

Source: Adopted from Brooks (2008)

3.3.2. Impulse Response Functions (IRFs)

The VAR and VEC models use impulse responses to explain how the dependent variable responds to shocks to each explanatory or independent variable, thus affecting the VAR or VEC system over time. A system with g variables can produce an aggregate of g^2 impulse responses achieved by encoding the model as a Vector Moving Average (VMA). The shock should subside over time because of stability (Brooks, 2008).

3.3.3. Variance decompositions

Variance decomposition is a method for studying VAR and VEC models components, describing the predicted variation of response variables in response to shocks compared to explanatory variables. Variance decomposition determines the extent to which the s-step forward forecast error variation is explained by shocks from each explanatory variable, for *s = 1, 2, ... n*. Shocks from the dependent variable often explain most of the estimated error variance (Brooks, 2008).

3.3.4. Granger causality analysis

The Granger causality test, developed by Granger (1981), suggests that time-series past features/values of one variable can provide crucial information for predicting another variable's current level (Stern, 2011). This test is used to determine if shocks in the dependent variable cause shocks in the independent variables or vice versa, demonstrating the direction of cointegration (Mbali, 2021).

3.3.5. VAR/VEC model stability and residuals diagnostics

The stability of the VAR and VEC models is assessed using the inverse root of the AR characteristic polynomial test, ensuring that all the estimated AR characteristic polynomials are within the unit circle (Asteriou and Hall, 2011).

For the residual's diagnostics, the classical linear regression assumptions such as residuals normality, homoscedasticity, and residuals uncorrelation are to be used as the benchmark to diagnose the VAR or VEC model to be estimated (Wooldridge, 2009; Stock and Watson, 2012).

This study also used the Two Stage Least Squares (TSLS) method to analyze the correlation between explanatory variables and the error term (endogeneity). This method is like the Ordinary Least Squares (OLS), with the exception that the lagged explanatory variables must be considered as instrumental variables (Bahador *et al*. 2024). The instrumental variables should not be weak; hence the Cragg-Donald F test should be used to determine whether they are weak (Bastardoz *et al*. 2023). If the Cragg-Donald F statistic is significantly more than 10, it may be concluded that the instrumental variables are not weak (valid), allowing for endogeneity testing (Bastardoz *et al*. 2023). The Hansen-J test is to be used to assess endogeneity in this study.

4. Results

The results start by analyzing the distribution of the data for the study variables using the descriptive statistics. Table 2 provides the descriptive statistics for the study variables.

Table 2. Descriptive statistics

	RGDP	DDE	FD	FDE	GFCF	INF
Mean	1,0514	2,8641	1,8504	3,3416	2,8481	1,7053
Median	1,2528	2,9988	2,0177	3,2979	2,8332	1,7103
Maximum	3,0155	3,7325	2,6081	3,9840	3,1180	1,8361
Minimum	-2,8449	-1,5668	0,7554	2,7307	2,6462	1,5447
S. Deviation	0,8450	0,8524	0,4425	0,3992	0,1080	0,0813
Skewness	-1,8523	-3,0467	-0,6575	0,1265	0,3170	-0,1722
Kurtosis	7,8408	14,2384	2,2950	1,5077	2,3483	1,9060
Jarque-Bera	181,1396	796,7215	10,8541	11.1684	4,0305	6,4133
Probability	0,0000	0,0000	0.0044	0,0038	0,1333	0,0405
Sum	123,0086	335,0984	216,4996	390,9682	333,2237	199,5174
Sum Sq. Dev.	82,8262	84,2911	22,7131	18,4872	1,3537	0,7661
Observation	117	117	117	117	117	117

Source: Researchers' computations using EViews 13 Software.

Table 2 shows that the critical descriptive statistics of the variables under study are often close to the mean, indicating the least amount of significant variability. For instance, the standard deviations for fiscal deficit, inflation, and economic growth rate are 0,44, 0,08, and 0,84, indicating that the data points are close to the average (but significantly less so). On the other hand, domestic debt; foreign debt; and gross fixed capital formation have significantly lower standard deviation values of 0,85, 0,40, and 0,11, respectively. This suggests that the data points for domestic debt, foreign debt, and gross fixed capital formation are dispersed since their standard

deviations are less than their corresponding means. In summary, the study has a reasonable magnitude in terms of variations in the key variables data.

The methodology presented in the preceding section emphasized the need for testing variables for stationarity (to determine the variables' order of integration). This task is especially important because it directs the study to the correct method (VAR or VEC) that needs to be used. This study used Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root/stationarity tests (Dickey and Fuller,1979; Phillips and Perron, 1988).Table 3 presents the results of the ADF and PP unit root tests for the study variables.

Table 3. ADF and PP unit root tests results

		ADF		PP		Order of
Variables	**Specification**	**Level**	**1st Diff.**	**Level**	**1st Diff.**	**Integration**
RGDP	Intercept	0,4348	0,0001***	0,0000***	N/A	*I (1)* (due to ADF results)
	Intercept & Trend	0,4934	0,0012***	0,0000***	N/A	*I (1)* (due to ADF results)
DDE	Intercept	0,9199	0,0772*	0,8673	0,0027***	*I (1)*
	Intercept & Trend	0,2203	0,0163**	0,2779	0,0099***	*I (1)*
FDE	Intercept	0,8165	0,0048***	0,8679	0,0098***	*I (1)*
	Intercept & Trend	0,4821	0,0252**	0,5595	0,0479**	*I (1)*
FD	Intercept	0,3225	0,0152**	0,3410	0,0039***	*I (1)*
	Intercept & Trend	0,1438	0,0000***	0,5541	0,0279**	*I (1)*
GFCF	Intercept	0,1797	0,0089***	0,4744	0,0072***	*I (1)*
	Intercept & Trend	0,4502	0,0444**	0,8144	0,0368**	*I (1)*
INF	Intercept	0,8611	0,0205**	0,5847	0,0187**	*I (1)*
	Intercept & Trend	0,1386	0,0405**	0,1640	0,0782*	*I (1)*

Notes: The figures in the table are the corresponding probability values of the ADF and PP unit root tests statistics.
*; **& *** indicate statistical significance at 10%, 5% and 1%, respectively.
Source: Researchers' computed figures using EViews 13 Software.

The variables under study are integrated in the order of one, which means that they reflect stationarity attributes following the first differentiation according to the results shown in Table 3. Given that every variable is *I (1)*, the next step is to use the Johansen and Juselius approach to test for the presence of cointegration. In this approach, the study variables are considered endogenous, and the appropriate lag length must be determined using information criteria such as the Akaike Information Criterion (AIC), Schwarz Bayesian Information Criterion (SBIC), Hannan Quinn (HQ), and Final Prediction Error (FPE) criterion. Thus, Table 4 provides the lags order determined by the information criteria.

Table 4. The results for the information criteria

Lag	FPE	AIC	SC	HQ
0	6138,945	25,7500	25,8945	25,8084
1	2,96e-07	1,9926	3,0063	2,4040
2	5,67e-09*	-1,9670*	-0,0844*	-1,2030*
3	8,58e-09	-1,5655	1,1889	-0,4490
4	7,18e-09	-1,7680	1,8504	-0,3009

Notes: The computed figures in the table are the values for information criteria.
* indicates the lag order selected by the information criterion
Source: Researchers' computed figures using EViews 13 Software.

All information criteria chose lag order 2, meaning that lag order 2 was the most optimal lag order for the variables under study. As a result, the cointegration test was performed at a lag-order interval of 1:2. Table 5 shows the results of the trace and eigenvalues tests used to determine the number of cointegrating vectors or equations.

The results in Table 5 indicate that there is only one cointegrating equation, allowing the study to estimate the VEC model rather than the VAR model (see Table 1, Row 2). This is because the null hypothesis of '*no cointegration*' is rejected at 'none,' implying that there is at most one

cointegrating vector. Consequently, the study includes the estimated ECT for each equation since the VAR and VEC techniques encode the variables endogenously. For cointegration purposes, the ECT for the cointegrating equation or vector should be negative and statistically significant (Engle and Granger, 1987; Gujarati and Porter, 2009). Table 6 shows the ECT estimations for each equation using the VEC modelling approach (within a 1:2 lag-order interval).

Table 5. The results for the trace and maximum eigen value tests

Unrestricted cointegration rank test							
Hypothesis		**Trace**			**Maximum Eigenvalue**		
Hypothesized # of CE(s)	Eigenvalue	Trace Stat.	0.05 Critical Value.	Prob. Value	Max. eigen Stat.	0.05 Critical Value.	Prob. Value
None*	0,4262	125,5639	95,7537	0,0001	63,3726	40,0776	0,0000
≤ 1	0,1755	62,1913	69,8189	0,1743	21,9949	33,8769	0,6080
≤ 2	0,1351	40,1965	47,8561	0,2156	16,5462	27,5843	0,6190
≤ 3	0,1033	23,6503	29,7971	0,2156	12,4256	21,1316	0,5062
≤ 4	0,0912	11,2247	15,4947	0,1981	10,9024	14,2646	0,1592
≤ 5	0,0028	0,3223	3,8415	0,5702	0,3223	3,8415	0,5702

Notes: The computed figures in the table are the trace and maximum eigenvalue statistics. * indicates the rejection of the null hypothesis at the 0.05 level. ≤ operator denotes '*at most.'*

Source: Researchers' computed figures using EViews 13 Software.

Table 6. The estimates of the ECTs

	D(RGDP)	**D(DDE)**	**D(FDE)**	**D(FD)**	**D(GFCF)**	**D(INF)**
Error Correction Term (ECT)	-0,8439 (0,14770) [-5,7137] ***	-0,0198 (0,0353) [-0,5627]	0,0158 (0,0051) [3,1100] ***	0,0302 (0,0122) [2,4667] **	0,0049 (0,0022) [2,2544] **	8,29e-05 (0,0001) [0,6643]

Notes: Standard errors are in () and *t*-statistics are in []. *; **& *** show statistical significance at 10%, 5% and 1%, respectively.

Source: Researchers' computed figures using EViews 13 Software**.**

The results in Table 6 indicate that only the study's principal empirical model showed evidence of cointegration. This is because the speed of adjustment/ECT is negative (-0,8439) and very statistically significant, with the t-statistic of 5,7137 being greater than 2 (0,05 significance level). Figure 2 shows a residuals plot of the cointegrating equation.

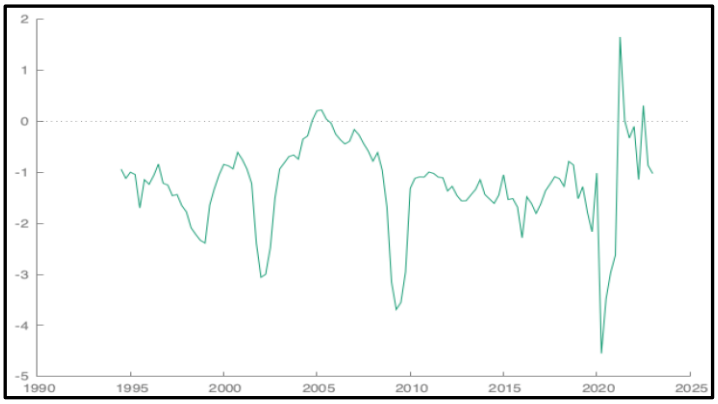

Figure 2. Residuals plot for the cointegrating equation

Source: Researchers' plot using EViews 13 Software

The residuals from the cointegrating equation should follow a white noise process, which means that they should have a constant mean and variance (Granger, 1981). Granger (1981)

further emphasizes that level stationary residuals may be observed graphically if the residuals series exhibits constant movement against time. The plotted residuals series, shown in Figure 2, is stationary at level because it exhibits stationarity characteristics. This finding confirms the cointegration between the independent and dependent variables in this study. The estimates for the long- and short-term coefficients are presented in Table 7.

Table 7. Long and Short run coefficients

Long Run Coefficients				
Dependent Variable: RGDP				
Ind. variables	**Coefficient**	**Std. error**	**T statistic**	**P-value**
DDE	0, 0,6416	0,1191	5,3858	0,0000***
FD	0, 0,0876	0,2227	3,9085	0,0001***
FDE	0, 5226	0,1322	3,9527	0,0000***
GFCF	0,1615	0,0411	3,9305	0,0001***
INF	0,7073	3,3021	2,1419	0,0395**
Prob (F statistic) = 0,0000 ***		R-Squared = 0,7621		
Short Run Coefficients				
Dependent Variable: D(RGDP)				
Ind. variables	**Coefficient**	**Std. error**	**T statistic**	**P-value**
CointEq1/ECT	-0,8439	0,1477	-5,7137	0,0000***
D (RGDP (-1))	0,2685	0,1374	1,9541	0,0512*
D (RGDP (-2))	0,2586	0,1104	2,3414	0,0195**
D (DDE (-1))	-0,3107	0,3621	-0,8580	0,3912
D (DDE (-2))	0,0132	0,3775	0,0349	0,9722
D (FD (-1))	-0,9502	0,3065	3,0999	0,0000***
D (FD (-2))	0,9462	1,2586	0,7518	0,4525
D (FDE (-1))	-0,2451	3,4992	-0,0700	0,9442
D (FDE (-2))	-0,5874	0,2787	2,5776	0,0039***
D (GFCF (-1))	0,5235	0,0774	6,7639	0,0000***
D (GFCF (-2))	0,6115	0,1114	5,4893	0,0000***
D (INF (-1))	-0,8438	0,1396	-6,0441	0,0000***
D (INF (-2))	-0,5075	0,1342	-3,7823	0,0000***
Constant	0,5046	0,1774	2,8440	0,0046***

Note: *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively

Source: Researchers' computed figures using EViews 13 Software.

In the normalized cointegrating equation, the signs of the long-run coefficients for the estimated VEC model must be reversed (Gujarati and Porter, 2009). Thus, the normalized cointegrating equation can be expressed as:

$$RGDP_t - 0{,}6416DDE_t - 0{,}0876FD_t - 0{,}5226FDE_t + 0{,}1615GFCF_t - 0{,}7073INF_t = 0$$

Domestic public debt, fiscal deficit, and external (foreign) debt have a negative and statistically significant long-term impact on economic growth. Thus, a 1% rise in South Africa's domestic debt, fiscal deficit, and foreign debt resulted in a 0,6416%; 0.0876% and 0.5226% decreases in economic growth, respectively. In the short run, domestic debt has both negative and positive effects on economic growth. However, these effects were not statistically significant. Furthermore, the short run adverse impacts of fiscal deficit and foreign debt (two-lagged period) on the economic growth rate are statistically significant. Thus, a 1% rise in the fiscal deficit (one-lagged period) and foreign debt (two-lagged period) results in a 0,9502% and 0,5874% decrease in economic growth, respectively.

The established dynamics are supported by the South African Reserve Bank (2022) report, which indicates that an increased fiscal deficit, as revenue decreased and government spending increased, resulted in low growth, increasing fiscal sustainability risk, and raising both domestic and external borrowing requirements. Phiri (2022) and Saungweme and Odhiambo (2019) found comparable long-term results in the Zambia and South Africa, respectively. That is,

these studies validate the classical economists' view that governmental borrowing has a detrimental effect on the economy. However, the studies of Ogunjimi (2019), Chitera (2020), and Misiri *et al*. (2021) provided different long- and short-term results, indicating that domestic public debt has a long- and short-term positive impact on economic growth in Nigeria, Malawi, and Kosovo, respectively. As a result, the Keynesian theory about the impact of public borrowing on economic growth is supported.

In terms of the research that confirm the findings concerning the impact of fiscal deficit and foreign debt on economic growth, Nkrumah *et al*. (2016) found comparable long- and short-term results on the impact of fiscal deficit on economic growth in Nigeria. Thus, reinforcing the classical economists' notion that running a fiscal deficit does not always promote the economy, but rather harms it (by deterring government intervention). In terms of the long- and short-term effects of foreign debt on economic growth, Kurniasih (2021) achieved unfavorable findings in Malaysia, which supported the classical economists' approach.

Gross fixed capital formation has a positive and statistically significant impact on the economic growth rate in both the long and short term. Thus, a 1% rise in South African gross fixed capital formation (investment activity) resulted in a long-term increase in economic growth of 0,1615%. In the short term, a 1% increase in gross fixed capital formation results in a 0,5235% (one-lagged period) and 0,6115% (two-lagged period) increases, respectively. The established inadequate investment activity (in relation to economic growth) is corroborated by National Treasury (2024), indicating that investment activity in South Africa has seldom exceeded 20% of GDP since 1994. National Treasury (2024) also reports that investment rates have been declining since 2013. Ali (2017) and Maune and Matanda (2022) found comparable long- and short-term results in Pakistan and Zimbabwe, respectively. These findings confirm the Keynesian perspective that an increase in capital formation (investment activity) leads to economic growth.

Inflation has a negative and statistically significant impact on the economic growth rate in both the long and short term. Thus, a 1% increase in the South African inflation rate results in a 0,7073% decrease in the long-term economic growth. In terms of short-term economic growth, a 1% increase in inflation rate results in 0,8438% (one-lagged period) and 0,5075% (two-lag period) decreases, respectively. The established relationship corroborates the South African Reserve Bank (2022) report, which indicates that increasing inflation, from 4.5% in 2021 to 6.0% in 2022, is one of the factors that slowed economic growth.

Talatu and Binta (2023) and Mandeya and Ho (2021) found identical results in Sierra Leone and South Africa, respectively. These findings contradict the Keynesian notion that responsibly managed inflation is necessary for economic growth, while supporting the classical economists' view that higher inflation (owing to excessive money supply circulation) can lead to stagnant or slow economic growth.

For the validity of the estimated error correction model, ECT was -0,843910, which was statistically significant. This means that 84,39% of the model disequilibrium will be rectified in the next quarter. The coefficient of determination (R*Squared) is 0,7621, indicating that variations in South African domestic debt, foreign debt, fiscal deficit, gross fixed capital formation (investment activity), and inflation account for 76,21% of the total variation in the South African economic growth rate. Finally, the overall model is statistically significant because the probability value for the F-statistic is zero.

According to Granger (1981), it is critical to determine the direction of cointegration after its establishment. Table 8 presents the results of the Granger causality test used in this study. Table 8 shows that gross fixed capital formation, foreign debt, and domestic debt granger-cause economic growth rate, and vice versa (bi-directional). Lastly, the fiscal deficit and inflation Granger-cause economic growth rate. These results basically imply that cointegration flows from domestic debt, fiscal deficit, foreign debt, gross fixed capital formation, and inflation to economic growth, as well as from economic growth to domestic debt, foreign debt, and gross fixed capital formation (bidirectional). In terms of policy implications, these results simply mean that past values of South African domestic debt, foreign debt, fiscal deficit, gross fixed capital formation, and inflation may be used to predict the present economic growth rate. Similarly, past values of South Africa's economic growth rate can help predict the present value of domestic debt, foreign debt, and gross fixed capital formation.

Table 8. Granger causality test results

Null Hypothesis	N	F-Statistic	P(F-Statistic)
DDE ↛ RGDP	115	12,6705	0,0000***
RGDP ↛ DDE	115	8,11611	0,0000***
FD ↛ RGDP	115	12,2161	0,0000***
RGDP ↛ FD	115	0,67048	0,5135
FDE ↛ RGDP	115	3,16103	0,0463**
RGDP ↛ FDE	115	3,58516	0,0310**
GFCF ↛ RGDP	115	4,97865	0,0089***
RGDP ↛ GFCF	115	4,81791	0,0099***
INF ↛ RGDP	115	3,3907	0,0299**
RGDP ↛ INF	115	0,4253	0,4986

Note: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively. ↛ operator represents the test hypothesis of "*no Granger-causality*."

Source: Researchers' computed figures using EViews 13 Software

The estimated VEC model regarded the study variables as endogenous variables. However, the estimated VEC model failed to describe the resilience characteristics of the system. This study uses impulse response functions (IRFs) and variance decompositions to analyze the dynamic interactions between response variable and explanatory variables. First, the study evaluates IRFs' responses to shocks in domestic debt, foreign debt, fiscal deficit, gross fixed capital formation, and inflation over a 30-quarter period. Figure 3 displays the IRFs for the South African economic growth rate due to shocks in domestic debt, foreign debt, fiscal deficit, gross fixed capital formation and inflation.

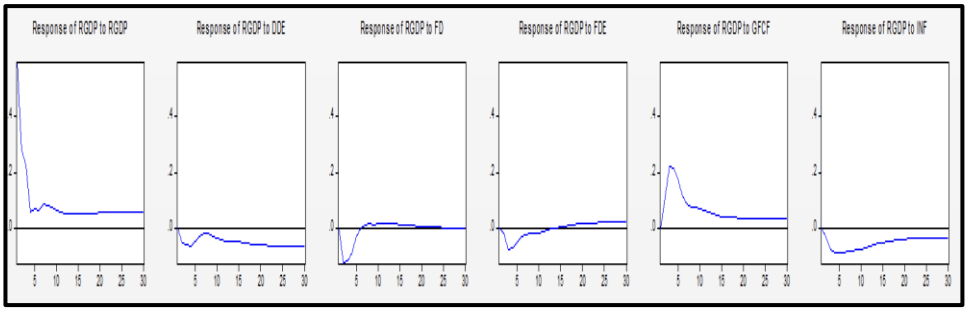

Figure 3. Impulse response functions for the South African economic growth rate

Source: Researchers' plots using EViews 13 Software

The graphs in Figure 3 indicate that South Africa's economic growth rate responds to impulses from domestic debt, fiscal deficit, foreign debt, gross fixed capital formation, and inflation. Domestic debt and inflation shocks have a negative impact on South Africa's economic growth rate, but gross fixed capital formation shocks have a positive impact, although they decline from the 5th to the 30th quarter. Furthermore, the South African economic growth rate has had mixed reactions to a country's fiscal deficit and foreign debt shocks. However, the negative response was more severe than the positive response.

Concisely, shocks to inflation and domestic debt have a negative reaction on South Africa's economic growth rate, whereas shocks to gross fixed capital formation (investment activity) have a partially positive reaction. The shocks to South Africa's fiscal deficit and foreign debt have also had a mixed reaction on the country's economic growth rate.

In terms of policy considerations, rising inflation and domestic debt, as well as inadequate investment activity (as the shocks from gross fixed capital formation are closer to zero), are the primary causes of South Africa's sluggish or declining economic growth rate. Furthermore, mixed shocks from the fiscal deficit and foreign debt explain volatility in South Africa's economic growth rate, with negative shocks being greater than positive ones.

Table 9. Variance decomposition for the South African economic growth rate

Period	S.E.	RGDP	DDE	FD	FDE	GFCF	INF
1	0.5879	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.6727	93.3658	0.6218	3.0603	0.0783	2.5803	0.2937
3	0.7616	81.6053	1.0486	4.6285	0.9959	10.5802	1.1415
4	0.8077	73.1319	1.5563	5.1765	1.5720	16.4598	2.1036
5	0.8362	68.8918	1.7456	4.9435	1.8151	19.5707	3.0332
6	0.8518	66.9177	1.7964	4.7643	1.8544	20.7742	3.8931
7	0.8651	65.8364	1.7786	4.6477	1.8522	21.2061	4.6790
8	0.8765	64.9948	1.7734	4.5587	1.8493	21.4323	5.3916
9	0.8869	64.2029	1.8176	4.4812	1.8513	21.6366	6.0103
10	0.8959	63.4303	1.9434	4.4211	1.8461	21.8331	6.5261
11	0.9037	62.7421	2.1307	4.3791	1.8285	21.9758	6.9437
12	0.9105	62.1697	2.3399	4.3511	1.8045	22.0508	7.2840
13	0.9165	61.7070	2.5454	4.3291	1.7810	22.0711	7.5665
14	0.9220	61.3193	2.7507	4.3067	1.7610	22.0584	7.8040
15	0.9273	60.9718	2.9724	4.2811	1.7450	22.0273	8.0024
16	0.9325	60.6398	3.2260	4.2520	1.7337	21.9839	8.1647
17	0.9376	60.3138	3.5151	4.2198	1.7282	21.9289	8.2942
18	0.9427	59.9949	3.8320	4.1853	1.7298	21.8620	8.3960
19	0.9479	59.6879	4.1638	4.1488	1.7385	21.7848	8.4762
20	0.9530	59.3949	4.5008	4.1107	1.7535	21.6999	8.5402
21	0.9581	59.1139	4.8394	4.0712	1.7731	21.6103	8.5920
22	0.9633	58.8409	5.1790	4.0308	1.7961	21.5182	8.6341
23	0.9685	58.5723	5.5237	3.9898	1.8215	21.4247	8.6680
24	0.9737	58.3068	5.8703	3.9484	1.8490	21.3303	8.6952
25	0.9790	58.0450	6.2173	3.9070	1.8781	21.2357	8.7170
26	0.9843	57.7881	6.5617	3.8657	1.9085	21.1412	8.7348
27	0.9896	57.5371	6.9013	3.8249	1.9395	21.0475	8.7498
28	0.9950	57.2920	7.2349	3.7845	1.9706	20.9553	8.7627
29	1.0003	57.0525	7.5622	3.7446	2.0015	20.8649	8.7743
30	1.0056	56.8178	7.8835	3.7054	2.0318	20.7765	8.7850

Source: Researchers' computed figures using EViews 13 Software.

Similarly, Table 9 demonstrates the variance decomposition of South Africa's economic growth rate over a 30-quarter period due to shocks from domestic debt, foreign debt, fiscal deficit, gross fixed capital formation, and inflation.

In the tenth quarter, the forecasting error variance indicated that South Africa's economic growth rate had the greatest short-term effect on itself, accounting for approximately 63,42% of the variance. Domestic debt is responsible for approximately 1,94%, fiscal deficit for approximately 4,42%, foreign debt for approximately 1,84%, gross fixed capital formation for approximately 21,83%, and inflation for approximately 6,53%.

The forecasting error variance for the 20th quarter from the 11th quarter indicates that South Africa's economic growth rate continues to have the greatest short-run effect on itself, accounting for approximately 59,39% of the variation. Domestic debt accounted for approximately 4,50%, fiscal deficit for 4,11%, foreign debt for 1,75%, gross fixed capital formation for 21,70%, and inflation for 8,54%.

The forecasting error variance for the 30th quarter, which follows from the 21st quarter, demonstrates that South Africa's economic growth rate continues to have the greatest short-run effect on itself, accounting for approximately 56,82% of the variation. Domestic debt accounted for approximately 7,88%, fiscal deficit for 3,70%, foreign debt for 2,03%, gross fixed capital formation for 20,78%, and inflation for 8,78%

In summary, the variance decomposition for South Africa's economic growth rate declined dramatically, but that for domestic debt and inflation increased significantly throughout the study period. Furthermore, the analysis showed that the variance decomposition due to fiscal deficit and gross fixed capital formation declined slightly. Finally, the variance decomposition due to foreign debt slightly decreased between the 10th and 20th quarters and then bounced back (increased) between the 20th and 30th quarters.

In terms of policy concerns, the South African fiscal deficit and gross fixed capital formation explain a decline in the economic growth rate, whereas the South African domestic debt and inflation explain an increase. This means that stagnating economic growth in South Africa is

accompanied with growing domestic debt and increasing inflation, declining investment activity and fiscal deficit, and modestly volatile foreign debt.

Brooks (2008) asserted that traditional linear regression assumptions are crucial for relying on the estimated VEC model, and the Jarque-Bera test was used to verify the normal residuals distribution. Table 10 presents the results of the Jarque-Bera test.

Table 10. Jarque-Bera test results

Component	Jarque-Bera Stat.	df	P(JB Stat.)
1	0,498765	3	0,7689
2	0,564354	3	0,7984
3	0,675478	3	0,8976
4	0,879081	3	0,5678
5	0,509890	3	0,7898
6	0,565472	3	0,8976
Total/Joint	3,693040	18	0,7867

Source: Researchers' computed figures using EViews 13 Software.

The results in Table 10 demonstrate that the estimated residuals are normally distributed with a joint probability value of 0,7867, which is greater than the 0,05 level of significance. Similarly, Table 11 shows the results of the Breusch-Godfrey serial correlation LM test.

Table 11. VEC Residuals Correlation LM Test Results

Lags	LM Statistic	P(LM Stat.)
1	27,25787	0,8526
2	36,67770	0,4373

Source: Researchers' computed figures using EViews 13 Software.

The results in Table 11 show that the estimated residuals are not serially correlated. This is because the probability value for the LM statistic at all lags was greater than the 0,05 level of significance. Table 12 shows the results of the White's test for heteroscedasticity.

Table 12. VEC Residuals Heteroskedasticity Test Results: White's test

Chi-squared Statistic	Df	P(Chi-squared Stat.)
299,838	294	0,3940

Source: Researchers' computed figures using EViews 13 Software.

Table 12 shows that the estimated residuals are not heteroscedastic because the probability value for the chi-squared statistic is greater than the 0,05 level of significance. To evaluate for endogeneity, this study starts first by testing if the instrumental variables (lagged explanatory variables) are valid (not weak). Hence, Table 13 presents the results for the Cragg-Donald F test via the Two Stage Least Squares (TSLS) approach.

Table 13. Cragg-Donald F test results

Weak Instrument Diagnostics	
Cragg-Donald F Statistic	92,47389
Moment Selection Criteria	
SIC based	12,83139
HQIC-based	20,90743
Relevant MSC	15,17074

Source: Researchers' computed figures using EViews 13 Software.

The results in Table 13 demonstrate that the study's instrumental variables are valid (not weak) because the Cragg-Donald F statistic is significantly greater than 10, leading to Hansen-J test for endogeneity. Table 14 presents the results for difference in Hansen-J test.

Table 14. Difference in Hansen-J test results

Statistic	Value	Degree of freedom	Probability Value
Difference in Hansen-J Statistic	5,5069	5	0,3572

Source: Researchers' computed figures using EViews 13 Software.

Table 14 shows that the two-lagged period explanatory variables, as determined by the information criteria in the VEC system, are not correlated to the error term (exogeneous). This is because the probability value for the difference in Hansen-J statistic is greater than the 0,05 level of significance. Figure 4 shows the assessment of the stability of the VEC model coefficients using the inverse roots of the AR polynomials.

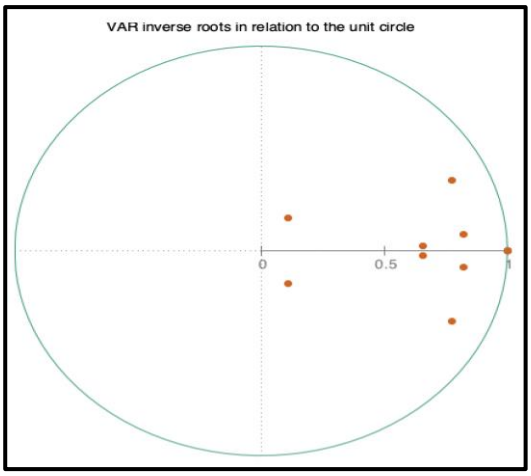

Figure 4. Inverse roots of AR characteristics polynomial
Source: Researchers' plot using EViews 13 Software.

Figure 4 demonstrates that the AR polynomials have roots with a smaller modulus because they lie within the unit circle, indicating the stability of the estimated VEC model.

5. Conclusions and policy proposals

South Africa's domestic and foreign debt, fiscal deficit, and inflation have detrimental impacts on its economic growth. Notably, borrowing domestically has a greater detrimental impact on economic growth than external borrowing. Furthermore, South Africa's gross fixed capital formation has a positive impact on economic growth, but only to an unreasonable extent since the impulse from gross fixed capital formation to economic growth rate generally declining towards zero. South Africa's fiscal deficit and foreign debt have had mixed impacts on its economic growth, with the negative impact being more severe.

In terms of variation analysis, there is a significant decline in the variation of the economic growth rate, whereas that of domestic debt and inflation increases. There is also a slight decline in the variation in the fiscal deficit and gross fixed capital formation. In terms of causality, past shocks to South Africa's domestic and foreign debt, fiscal deficit, gross fixed capital formation, and inflation predict present shocks to economic growth. Similarly, past shocks to South African economic growth predict presents shocks to domestic and foreign debt as well as gross fixed capital formation.

The significant policy implication is that stagnating economic growth in South Africa is accompanied with growing domestic debt and raising inflation, declining investment activity and fiscal deficit, and modestly volatile foreign debt. As a result, this study proposes measures for

South Africa's economic management, including financial repression, debt restructuring, cost cutting, and improved capital spending. Financial repression involves government channels through policies like directed lending, interest rate caps, and regulation of cross-border capital movements (Reinhart *et al*. 2011). In support of this measure, especially paying attention to its caution (potential increased inflation), the South African Reserve Bank could increase the inflation target interval to directly impact debt reduction by boosting the rate at which debt gradually declines.

Debt restructuring is the process of redesigning and reorganizing debt in a manageable manner for effective government administration (Financial and Fiscal Commission, 2016). South Africa's government can negotiate with debt creditors on how the debt will be restructured and sign legally binding agreements (to ensure confident repayment commitment and accountability). This approach may reduce the government's debt burden and make fiscal consolidation more manageable.

Cost-cutting refers to an organization’s actions to reduce expenses and increase revenues, often implemented during significant debt phase or a recession/depression phase in the economy (Asaolu and Nassar, 2007). South Africa's government may reduce administrative costs by decreasing unimportant spending, changing public sector spending patterns, reorganizing processes such as human resources, procurement, and finance, and cutting expenses such as consultants and travel.

Lastly, the South African government ought to consider increasing capital spending as another strategy for increasing the country's productive capacity, as this study found that South Africa's investment activity is insufficient. This might boost domestic productive capacity and infrastructure, resulting in enhanced exports and less costly foreign debt payments.

6. Limitations and direction for future research

This study only examined South Africa. Therefore, the results might not be applicable to other economies, but they could serve as a benchmark, particularly for other industrialized African economies/countries with institutional and economic characteristics comparable to South Africa. The fiscal deficit and foreign debt caused mixed reactions to South Africa's economic growth according to the estimated VEC model. Therefore, there may be a non-linear or asymmetric relationship between the economic growth of South Africa and its fiscal deficit and foreign debt. Thus, future studies may use nonlinear techniques guided by Laffer curve theory to examine the relationship between foreign/external debt and economic growth, considering that indebtedness is the product of accrued previous fiscal deficits.

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