INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol: 13 **No:** 2 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 388-409) **Doi:** 10.34109/ijefs.20212018
Received: 24.10.2021 | **Accepted:** 31.12.2021 | **Published Online:** 23.01.2022

-RESEARCH ARTICLE-

FISCAL DEFICIT-ECONOMIC GROWTH NEXUS IN SOUTH AFRICA: A THRESHOLD ANALYSIS

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─Abstract─

The rising government spending over time has exacerbated the fiscal deficit. The federal budget deficit as a proportion of GDP has been rising for a decade with little indication of respite. The South African government has boosted spending, especially amid the 2008/2009 global financial crisis and the 2019 pandemic. While a budget deficit can benefit some economies, it can also harm others. This study used quarterly data from 1996Q3 through 2021Q2 to explore whether a budget deficit benefits or harms South Africa's economic performance. Another goal was to determine the point at which fiscal deficits start to impact economic growth negatively. The relationship between the budget deficit and economic growth was confirmed using the autoregressive distributed lag (ARDL), and threshold autoregressive (TAR) approach was used to obtain the threshold value. The findings suggest that the neoclassical paradigm holds in South Africa, with higher budget deficits affecting economic development. A -3.6 percent threshold was also found, close to the "healthy" deficit level of 3%. A budget deficit beyond this threshold number has a severely detrimental impact on economic growth in South Africa.

Keywords: ARDL, economic growth, fiscal deficit, South Africa, TAR, threshold value.

JEL Classification: C01, C32, E62, F62 H62

1. INTRODUCTION

While fiscal deficits have been the topic of substantial research for the better part of the last eight decades, they remain complex. A persistent and ever-increasing government deficit and debt are serious concerns in several African and emerging countries and serve

Citation (APA): Leshoro, T. L. A. (2021). Fiscal Deficit-Economic Growth Nexus in South Africa: A Threshold Analysis. *International Journal of Economics and Finance Studies, 13* (2), 388-409. doi:10.34111/ijefs.20212018

as the focal point for macroeconomic adjustment (Adejoh, Ekeyi and Mary, 2019; Molefe & Maredza, 2017). There are three distinct schools of thought regarding the relationship between fiscal deficits and economic growth: Keynesian, neoclassical, and Ricardian. Keynesians felt that fiscal deficits do not always harm economic growth but promote it instead (Keynes, 1936). The converse is true for adherents of the neoclassical school of thought. According to the neoclassical school of thought, former South African Finance Minister Tito Mboweni reiterated that South Africa "may fall into a debt trap," with catastrophic consequences for the economy, if the government does not move promptly to decrease budget deficits. There is, however, a third group that believes fiscal deficits have a long-run neutral effect on economic growth and is based on the Ricardian paradigm (Bernheim, 1989).

It is critical to define a government budget (or fiscal) deficit and contextualise the phrase. Simply described, a government budget deficit is a government's financial plan or policy specifying how revenues will be collected and spent. When government spending exceeds tax revenue in a given time, budget deficits occur; when government spending is less than tax revenue, budget surpluses occur. In other words, when the government borrows more money to support its expenditure, the budget deficit is negative; when revenue exceeds spending, the budget deficit is positive. Fiscal balance is achieved when money generated equals expenses. Meanwhile, in many nations, the response of economic growth to changes in government budget deficits is a constant source of policy debate. This is critical, as the Organization for Economic Co-operation and Development (OECD) asked that the finance ministers of several nations, including South Africa, adopt actions to stimulate government spending without jeopardising economic development.

Fiscal deficits can be expressed as a percentage of GDP, or the total rand spent more than income. South Africa's budget deficits have been in the red for several years, and the 2008/09 financial crisis, as well as the ongoing Covid-19 pandemic, have resulted in increased government spending and, consequently, borrowing, as a result of expanded social programmes. While there had a budget surplus of 0.9 percent of GDP at the start of the global financial crisis, this quickly deteriorated into a negative budget deficit, which grew to more than 10% of GDP in 2021. Meanwhile, South Africa was ranked second in the world in 2012 for budget transparency and ranks highly in this category (Treasury, 2009; Brand South Africa, 2013).

As a result of the South African government's emphasis on the budget deficit and its relationship to economic growth, this study seeks to contribute to the literature through the following objectives. This study will ascertain which of the three schools of thought is most applicable to South Africa. Second, the study will consider the global financial crisis and the recent global epidemic. Finally, the study will analyse how economic growth responds to rising government budget deficits by setting a cutoff point for

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expanded fiscal deficits. As discussed in the methods section below, this does not indicate that the U-shaped or inverted U-shaped relationship is non-linear.

The budget deficit and economic growth in South Africa are depicted in Figure 1. Low fiscal deficits as a proportion of GDP are associated with high economic growth and vice versa, implying a strong negative association. For example, when fiscal deficits decreased from -7.1 percent of GDP in 1993 to -2.1 percent in 2000, GDP expanded from 1.2 percent to 4.2 percent during the same period. It is critical to highlight. However, that budget deficits may have been a response to changes in economic growth or, conversely, may have precipitated the shift in economic growth. Thus, this study will analyse the influence of budget deficits on economic growth and the extent to which they are advantageous or destructive to South Africa's economic growth.

<Insert figure 1 about here>

According to Nyathi and Chivasa (2021), a country's actual budget deficit should be no more than 3% of its gross domestic product (GDP). Thus, a country with a sound fiscal position will strive for a budget deficit of 3%, preferable. However, many industrialised countries have budget deficits of over 3%, which negatively affect their economic performance, as deficits are mostly utilised to finance capital spending. Table 1 compares South Africa's budget deficits and economic performance to its major trading partners and selected African countries.

Table 1: Fiscal Deficit and Economic Performance Of Selected Countries

Country	Budget deficit (%GDP)	GDP growth (%)
Major trading partners		
China	-6.34[+]	2.3%
Germany	-4.20%	-4.6%
United States of America	-5.69%[+]	-3.4%
India	-12.26%	-8.0%
United Kingdom	-13.43%	-9.8%
Saudi Arabia	-4.45%[+]	-4.1%
Selected African countries		
South Africa	-12.25%	-7.0%
Nigeria	-4.76%[+]	2.2%[+]
Ghana	-6.97%	6.5%[+]
Egypt	-7.90%	3.6%
Kenya	-7.73%[+]	5.4%[+]

[+] Report for 2019, others are reported for 2020, except ' 'Ghana's budget deficit reported for 2018.

Source: Country economy

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To summarise, big government budget deficits may signify poor economic performance, as several countries in Table 1 demonstrate. While South Africa's fiscal deficits are larger than many of its trading partners, except India and the United Kingdom, its economic growth is also lower. Similarly, South Africa has the greatest budget deficits and the worst economic performance compared to other African countries.

2. REVIEW OF LITERATURE ON GOVERNMENT BUDGET DEFICIT-GROWTH NEXUS

Keynesian, neoclassical, and Ricardian philosophies are the three most prevalent schools of thinking about the relationship between budget deficits and economic growth. Keynes (1936) stated that higher fiscal deficits stimulate economic growth. He advocated for the government to pursue an expansionary fiscal policy during economic downturns to promote aggregate demand and economic growth. Keynes (1936) thought that the primary drivers of any economy are households, businesses, and government, influencing the economy through their spending. Keynes (1936) elaborated further, stating that an increase in fiscal deficits, whether through higher government spending or a reduction in taxation during a recession, will increase consumer disposable income, stimulating the economy. Keynesianism's demand-side model identifies four aggregate demand components: total household consumption, total investment, total government spending, and net exports.

Neoclassicals, on the other hand, assumed the polar opposite of Keynes's theory, believing that budget deficits are destructive to the economy. They felt that larger budget deficits financed by domestic borrowing would result in higher interest rates, discouraging investment and expenditure, and slowing economic growth. The third viewpoint is the Ricardian one, which maintains no relationship between these two variables in either the short or long run (Barro, 1989). Ricardo contended that fiscal deficits did not affect economic growth (Eigbiremolen, Ezema and Orji 2015). The Ricardian paradigm held that future tax rises would cover present government spending, implying that economic development would be unaffected.

Numerous studies have since been conducted to examine the relationship between government budget deficits and economic growth in various countries. While many have concluded that Keynes' theory is acceptable, others have concluded that the neoclassical school of thought is also acceptable (Nkrumah, Orkoh, & Owusu, 2016; Molefe & Maredza, 2017; Adejoh, Ekeyi and Mary, 2019; Nyathi and Chivasa, 2021) and, yet, others found no relationship, thereby following the Ricardian theory (Ebimobowei, 2010; Abata, Kehinde and Bolarinwa, 2012; Bhoir and Dayre, 2015).

Abata, Kehinde, & Bolarinwa (2012) evaluated the impact of government budget deficits on Nigeria's economic performance, among other variables. Using the

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unrestricted ordinary least squares approach and annual data from 1970 to 2013, the study computed multiple regression. The study discovered that budget deficits boosted economic performance, albeit small. Following the fiscal policy used to influence the economy via the government budget, an expansionary fiscal policy causes budget deficits to grow, and a contractionary fiscal policy causes deficits to shrink. Enache (2009) conducted a study to examine the relationship between fiscal policy and economic growth in Romania. The study examined data from 1992 to 2013 and discovered that fiscal policy had a beneficial effect on economic growth.

Similarly, Khosravi and Karimi (2010) examined the impact of fiscal and monetary policies on the Iranian economy's performance. The authors used data from 1960 to 2006 and the autoregressive distributed lag (ARDL) approach to analyse them. The findings indicated that fiscal policy had a sizable positive effect on economic growth. Eminer (2015) examined the relationship between fiscal deficits and economic growth in North Cyprus using the autoregressive distributed lag (ARDL) technique using annual time series data from 1983 to 2010. The study discovered that government deficits boosted economic development as measured by various government spending components.

Similarly, and Odhiambo et al. (2013) study on the effect of budget deficits on economic growth in Kenya discovered a positive correlation between the amount to which budget deficits affect economic growth and the magnitude of the correlation. They applied the error correction model (ECM) approach to annual time series data from 1970 to 2007. Budget deficits, the study discovered, are positively correlated with economic growth. Finally, Nayab (2015) estimated the link between Pakistan's fiscal deficits and economic growth. The study employed the vector autoregressive (VAR) and vector error correction model (VECM) methodologies to analyse annual time series data from 1976 to 2007. The results indicated that eliminating Pakistan's fiscal deficits will reduce economic growth, implying that higher fiscal deficits are growth-boosting.

On the other side, the following research established the neoclassical theory's existence. Nkrumah et al. (2016) investigated the association between Ghana's fiscal deficits and economic development. They discovered that in the long run, using quarterly data from 2000 to 2015 and the autoregressive distributed lag (ARDL) technique, there is a strong negative association between these factors. Additionally, they discovered that during the study period, low economic growth occurred due to a large budget deficit. Molefe and Maredza (2017) examined the relationship between South Africa's budget deficit and economic growth using the vector error correction model (VECM) using annual data from 1985 to 2015. Gross fixed capital formation, unemployment, real interest rates, and labour force participation were employed as control variables. The findings indicated that budget deficits had a harmful influence on economic growth, indicating that excessive budget deficits are detrimental to the South African economy's growth.

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Hassan and Akhter (2014) previously examined the association between budget deficits and economic development in Bangladesh using annual data from 1976 to 2012 and the vector error correction model (VECM) approach. Budget shortfalls, the study discovered, have a detrimental effect on economic growth. Similarly, Adejoh (2019) examined the influence of Nigeria's fiscal imbalance on economic development. They analysed annual data from 1981 to 2018 using the autoregressive distributed lag (ARDL) technique. Their analysis discovered that a budget deficit negatively influences economic growth in both the long and short run, while the effect was highly statistically significant in the short run.

Meanwhile, Bhoir and Dayre (2015) discovered the Ricardian paradigm to be applicable when examining the influence of budget deficits on India's economic growth. They used time-series data spanning 1991 to 2014 using the ordinary least squares (OLS) approach. Budget deficits have no discernible effect on economic growth, the study concluded. Ebimobowei (2010) previously demonstrated that government indebtedness, government recurrent, and capital budgets, among other variables, are unimportant in determining economic growth in Nigeria. Their investigation used time series data spanning the years 1991 to 2005. Other studies have examined the influence of fiscal and monetary policies on economic growth, for example, in Nigeria (Abata et al., 2012; Adefeso & Mobolaji, 2010), and discovered that while monetary policy has a greater effect on economic growth, fiscal policy has little effect.

There are relatively few studies on the relationship between budget deficits and economic growth in South Africa, which remains a challenge. While research examined the relationship between aggregated or disaggregated fiscal policy and economic development in general, rather than the budget deficit in particular (Chirwa, 2016; Kofi Ocran, 2011; Leshoro, 2020), others examined the causes of the South African budget deficit (Murwirapachena, Maredza, & Choga, 2013; Tevdovski, Jolakoski, & Stojkoski, 2021). Molocwa, Khamfula, and Cheteni (2018) examined the relationship between budget deficits and economic growth in BRICS countries, including South Africa, and discovered that these variables are positively related, contradicting the findings of Molefe and Maredza (2017). They used different techniques and explanatory variables and concluded that budget deficits harm economic growth in BRICS countries.

As a result, no study to our knowledge has examined the schools of thought applicable to the South African economy using the autoregressive distributed lag technique, nor has any study examined the effect of government budget deficits on economic growth in South Africa. Thus, this study contributes to the body of knowledge.

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3. DATA AND METHODOLOGY

3.1 Data Source And Model Specification

The study determined which of the three schools of thought applies to the South African economy and then determined the number of fiscal deficits that damage economic growth while also analysing if the economy may attain "healthy" fiscal deficits. Quarterly data from 1996Q3 to 2021Q2 were utilised to confirm the link using the autoregressive distributed lag (ARDL) technique. It is not sufficient to see how variables relate to one another; it is also necessary to determine the point at which fiscal deficits become damaging to economic growth, which was accomplished using the threshold autoregressive (TAR) technique. In this case, non-linearity does not imply a change in the relationship from positive to negative or vice versa, resulting in an inverted U-shaped or U-shaped relationship, respectively; rather, the results simply indicate the magnitude of the effect of fiscal deficits on economic growth if they exceed the threshold level. Thus, the non-linear relationship will identify the point at which fiscal deficits have a material adverse effect on economic growth.

The variables considered are real gross domestic product (GDP), which serves as the dependent variable, fiscal deficits, and control variables. These explanatory variables encompassed both the demand equation's aggregate demand and supply sides. The variables were chosen in light of the theoretical underpinnings on the relationship between fiscal deficit and economic growth, growth theories, and previous empirical studies. Thus, the control variables include total household consumption, gross fixed capital formation as a proportion of GDP, net exports, the inflation rate, labour productivity, and the real effective exchange rate. The South African Reserve Bank's (SARB) database was used to obtain these characteristics. Additionally, two dummy variables were introduced to account for the worldwide financial crisis of 2008/2009 and the subsequent global pandemic of 2019.

The aggregate demand model predicts that household consumption, gross fixed capital formation, and net exports will contribute to economic development. To ascertain whether the three schools of thinking apply to the South African economy, the government deficit variable is predicted to have a positive, negative, or no significant association with economic growth. Inflation is projected to positively or negatively link with economic growth, but labour force participation is expected to affect economic growth positively. However, studies in South Africa have demonstrated that the country experiences jobless growth, the economic expansion that is not accompanied by an increase in employment (Kumo, 2012; Leshoro, 2013), the current analysis confirmed theoretical predictions. Economic growth is projected to be negatively impacted by the dummy factors.

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Therefore, the model to be estimated is:

$$RGDP = f(\text{HHCON, GFCF } BD, \text{ NEXP, } INF, LAB, EXR, DUM\_FC, DUM\_COVID19) \quad \ldots \quad (1)$$

Where:

RGDP: real gross domestic product (in millions)

HHCON: total final household consumption expenditure (in millions)

GFCF: gross fixed capital formation (%GDP)

BD: government budget (fiscal) deficit (%GDP)

NEXP: net exports

INF: inflation rate

LAB: labour force (2010 index)

EXR: real effective exchange rate

$$Dum\_FC = \begin{cases} 1 & for\ 2008\ to\ 2009\ financial\ crisis \\ 0 & otherwise \end{cases} \qquad Dum\_Covid19 = \begin{cases} 1 & for\ 2019\ onwards \\ 0 & otherwise \end{cases}$$

Since real GDP and household consumption are measured in millions of rand, they are expressed in logarithm form. The model therefore is as shown below:

$$\log RGDP_t = \beta_0 + \beta_1 \log HHCON_t + \beta_2 GFCF_t + \beta_3 BD_t + \beta_4 NEXP_t + \beta_5 INF_t + \beta_6 LAB_t + \beta_7 EXR_t +$$

$$\beta_8 Dum\_FC + \beta_9 Dum\_COVID19 + \varepsilon_t \quad \ldots\ldots\ldots\ldots (2)$$

The variables are as earlier defined. β_0 is the intercept; β_1 to β_9 are the coefficients, t is the period, and ε_t is the error term.

3.2 Estimation Techniques

To avoid erroneous results and to select the appropriate technique, the nature of the variables was investigated using stationarity tests and the order of integration. Economic time series are frequently representative of non-stationary processes (Hjalmarsson, 2007; Johansen & Juselius, 1990). However, descriptive analysis and correlation analysis of the variables was performed first. All variables were checked for stationarity using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, followed by the cointegration test, which was devised by Pesaran et al. (2001).

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3.2.1 Autoregressive Distributed Lag (ARDL) Technique

Pesaran, Shin, and Smith (2001) used the OLS method of a conditional unconstrained error correction model (UECM) to estimate the coefficients and effects of the fiscal deficit's long and short-run dynamics on economic development. The ARDL-UECM results will suggest if the Keynes, neoclassical, or Ricardian paradigms apply to the South African economy, respectively, by examining whether the government budget deficit is favourably, adversely, or not associated with economic growth.

ARDL Bounds test has several advantages over cointegration, including that the variables do not have to be integrated in the same sequence Pesaran et al. (2001). The technique can be used with variables that are either a mixture of I(0) and I(1) or are entirely I(1), but they should not be I. (2). Additionally, the dependent variable must be I. (1). This technique is also useful when the independent variables are endogenous, as in Odhiambo (2015) autoregressive models.

Thus, from equation 2, the conditional ARDL model for the fiscal deficit-economic growth nexus is as follows:

$$\Delta \log RGDP_t = \beta_0 + \sum_{i=1}^{n} \alpha_0 \Delta \log RGDP_{t-i} + \sum_{i=0}^{n} \alpha_1 \Delta \log HHCON_{t-i} + \sum_{i=0}^{n} \alpha_2 \Delta GFCF_{t-i} + \sum_{i=0}^{n} \alpha_3 \Delta BD_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_4 \Delta NEXP_{t-i} + \sum_{i=0}^{n} \alpha_5 \Delta INF_{t-i} + \sum_{i=0}^{n} \alpha_6 \Delta LAB_{t-i} + \sum_{i=0}^{n} \alpha_7 \Delta EXR_{t-i} + \sum_{i=0}^{n} \alpha_8 \Delta Dum\_FC_{t-i} + \sum_{i=0}^{n} \alpha_9 Dum\_Covid19_{t-i}$$
$$\lambda_0 \log RGDP_{t-1} + \lambda_1 \log HHCON_{t-1} + \lambda_2 GFCF_{t-1} + \lambda_3 BD_{t-1} + \lambda_4 NEXP_{t-1} + \lambda_5 INF_{t-1} + \lambda_6 LAB_{t-1} +$$
$$\lambda_7 EXR_{t-1} + \lambda_8 Dum\_FC_{t-1} + \lambda_9 Dum\_Covid19_{t-1} + \varepsilon_t \quad \text{.....(3)}$$

Where, Δ indicates the first difference,

the short-run and long-run coefficients are $\alpha_0, \ldots, \alpha_9$ and $\lambda_0, \ldots, \lambda_9$, respectively,

ε_t is the error term.

Cointegration among the variables is tested using the F-test, through the following null and alternative hypotheses:

H_0: $\lambda_0 = \lambda_1 = \ldots = \lambda_7 = 0$ (there is no cointegration)

H_1: $\lambda_0 \neq \lambda_1 \neq \ldots \neq \lambda_7 \neq 0$ (there is cointegration) …(4)

If the estimated F-statistic exceeds the upper bound, the null hypothesis of "no cointegration" is rejected — this indicates the presence of cointegration. If the F-statistic is less than or equal to the lower bound, the null hypothesis cannot be rejected, indicating any cointegration. However, when the estimated F-statistic sits between the upper and lower bounds at a given level of significance, the conclusion on cointegration is equivocal.

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If cointegration exists, equation 3 will be estimated using the usual OLS method to determine the long-run and short-run coefficients and the speed with which government budget deficits return to long-run equilibrium. By re-parameterizing equation 3, the short run and long run unconstrained error correction model (UECM) of the dynamic linear ARDL regression model is represented as follows:

$$\Delta \log RGDP_t = \beta_0 + \sum_{i=1}^{n} \alpha_0 \Delta \log RGDP_{t-i} + \sum_{i=0}^{n} \alpha_1 \Delta \log HHCON_{t-i} + \sum_{i=0}^{n} \alpha_2 \Delta GFCF_{t-i} + \sum_{i=0}^{n} \alpha_3 \Delta BD_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_4 \Delta NEXP + \sum_{i=0}^{n} \alpha_5 \Delta INF_{t-i} + \sum_{i=0}^{n} \alpha_6 \Delta LAB_{t-i} + \sum_{i=0}^{n} \alpha_7 \Delta EXR_{t-i} + \sum_{i=0}^{n} \alpha_8 \Delta Dum\_FC_{t-i} + \sum_{i=0}^{n} \alpha_9 \Delta Dum\_Covid19_{t-i}$$
$$\lambda_0 \log RGDP_{t-1} + \lambda_1 \log HHCON_{t-1} + \lambda_2 GFCF_{t-1} + \lambda_3 BD_{t-1} + \lambda_4 NEXP_{t-1} + \lambda_5 INF_{t-1} + \lambda_6 LAB_{t-1} +$$
$$\lambda_7 EXR_{t-1} + \lambda_8 Dum\_FC_{t-1} + \lambda_9 Dum\_Covid19_{t-1} + \gamma ECT_{t-1} + \varepsilon_t \quad \ldots(5)$$

The error correction term's (ECT) coefficient represents the short-run pace of adjustment back to long-run equilibrium, illustrating how economic development eventually returns to its long-run equilibrium path after deviating from it. The ECT's one-period lag indicates the proportion of time required to transition from a previous period shock to the current period equilibrium. The ECT coefficient should be less than one, negative, and statistically significant for the economy to rebalance. Equation 5 contains the long-run and short-run coefficients from the ARDL-UECM model, which we use to determine the relationship between government deficits and economic growth in South Africa.

3.2.2 Threshold Autoregressive (TAR) Technique

After examining the relationship between government budget deficits and economic growth, the study's second purpose is to determine the appropriate government budget deficits. Thus, the analysis lends itself nicely to the use of the threshold regression technique. Tong & Lim (1980) presented the threshold autoregressive (TAR) model as a simple type of non-linear regression that exhibits piecewise linear specifications as well as regime flipping as a result of an observed variable passing an unknown threshold (Bai & Perron, 1998). Estimating the threshold is a linear regression model using regime dummies.

This model makes use of model selection, which automatically selects the optimal explanatory variable threshold value that minimises the residual sum-of-squares (RSS) and/or has the highest adjusted R-squared among all available threshold values (Bai & Perron, 1998). This model does not require the inclusion of the dependent variable's lagged value, as the self-exciting TAR (SETAR) technique does, but rather the lag of the explanatory variable (TAR), as is usual in threshold regression models. Not only are threshold models advantageous for generating threshold values, but they also facilitate asymmetric analysis and provide realistic estimates of the dynamic structure of

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economic time series by accurately capturing asymmetries, jump phenomena, and limit cycles in the series (Li, 2006; Tsay, 1989). Once again, this strategy circumvents the possibility of endogeneity.

The following is the regression model for the government budget deficit-growth threshold:

$$-\log RGDP_t = \phi_0 + \sum_{i=0}^{1} \phi_{1ti} D_t (BD_{t-i} - BD_{t-i}^{\#}) + \sum \phi_{2t} Z_t + \mu_t$$

$$D_t = \begin{cases} 1 & if\ BD_t < BD_t^{\#} \\ 0 & if\ BD_t \geq BD_t^{\#} \end{cases} \qquad \ldots \text{(Keynes)}$$

(Africa, 2013)

Where *logRGDP* is the dependent variable, Z is the set of control variables and $BD^{\#}$ the threshold variable used in splitting the sample into regimes, μ_t is the IID error with mean zero and variance σ^2.

Equation 6 is an autoregressive model, whereby economic growth is expressed in terms of the lag of the budget deficits, constrained upon the dummy being 1 when the threshold variable is less than the chosen threshold value, $BD^{\#}$. In this case, the threshold variable is BD's variable of interest. Similarly, the dummy is 0 when the chosen threshold value is less than or equal to the threshold variable.

4. ANALYSIS OF EMPIRICAL RESULTS

Tables 2 and 3 offer a descriptive analysis of the data and a correlation analysis of the variables. Except for the budget (fiscal) deficits (BD) variable, which has a negative mean rate, all variables have a positive mean rate. Similarly, only three variables in Table 3, budget deficits, net exports, and inflation, negatively connect with economic growth, with only budget deficits and net exports statistically significant.

Except for the real effective exchange rate, which is not statistically significant, all other factors are statistically strongly positively connected with economic development (table 3). While the preliminary descriptive analysis and correlation matrix support the neoclassical argument for a negative relationship between budget deficit and economic growth, they are only preliminary findings and do not provide sufficient information about the relationship between the variables; thus, additional analysis using the ARDL is provided.

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Table 2: Descriptive Statistics

	RGDP_MIL	HHCON_MIL	GFCF	BD	NEXP	LAB	EXR	INF
Mean	3717615.	2324599.	16.59700	-3.017000	11.90300	95.97000	0.032892	5.686000
Median	3871464.	2424736.	16.35000	-2.800000	8.850000	98.50000	0.474448	5.450000
Maximum	4601805.	3020314.	23.30000	3.700000	33.40000	122.0000	13.46807	16.90000
Minimum	2585910.	1516081.	12.90000	-17.20000	-8.000000	65.80000	-15.17049	-2.300000
Std. Dev.	688182.5	500540.9	2.024918	3.237784	11.35726	15.21749	5.096023	3.354840
Observations	100	100	100	100	100	100	100	100

Table 3: Correlation Probability

variable	LogRGDP	LogHHCON	GFCF	BD	NEXP	LAB	EXR	INF
LogRGDP	1.000000							

LogHHCON	0.999	1.000						
t-stat	191.672	-----						
Prob-value	0.0000	-----						
GFCF	0.380	0.368	1.000					
t-stat	4.072	3.915	-----					
Prob-value	0.0001	0.0002	-----					
BD	-0.301	-0.308	0.131	1.000				
t-stat	-3.127	-3.209	1.309	-----				
Prob-value	0.0023	0.002	0.194	-----				
NEXP	-0.899	-0.904	-0.476	0.371	1.000			
t-stat	-20.302	-20.882	-5.355	3.959	-----			
Prob-value	0.0000	0.000	0.000	0.0001	-----			
LAB	0.977	0.979	0.275	-0.272	-0.834	1.000		
t-stat	44.857	47.055	2.836	-2.799	-14.960	-----		
Prob-value	0.0000	0.000	0.006	0.006	0.000	-----		
EXR	0.0293	0.019	-0.086	-0.082	0.077	0.043	1.000	
t-stat	0.289985	0.192	-0.852	-0.813	0.769	0.423	-----	
Prob-value	0.7724	0.848	0.397	0.418	0.444	0.673	-----	
INF	-0.133	-0.133	0.253	0.193	0.145	-0.111	-0.103	1.000
t-stat	-1.331	-1.327	2.590	1.946	1.456	-1.104	-1.023	-----
Prob-value	0.186	0.188	0.011	0.055	0.149	0.272	0.309	-----

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Analysis by author

Table 4: Stationarity Result

Variables	**LEVELS**		**First difference**		**Decision**
	ADF	**PP**	**ADF**	**PP**	
$logGDP_t$	-1.554	-1.702	-13.859***	-14.647***	I(1)
$logHHCON_t$	-1.272	-2.175	-14.143***	-15.781***	I(1)
$GFCF_t$	-1.041	-0.828	-7.710***	-7.704***	I(1)
BD_t	-2.138	-6.954***	-5.583***	—	I(0)
$NEXP_t$	-1.159	-3.229	-11.08***	-19.043***	I(1)
LAB_t	-5.192***	-5.145***	—	—	I(0)
EXR_t	-9.261***	-9.263***	—	—	I(0)
INF_t	-5.569***	-5.569***	—	—	I(0)

[#]test equation of intercept and trend

Test critical values: PP [1% -3.498; 5% -2.891; 10% -2.583]; DF-GLS [1% -3.77; 5% -3.19; 10% -2.89]; ZA [1% -5.57; 5% -5.08; 10% -4.82]. Test equation for exchange rate and inflation are at 'Intercept'; others are tested at 'Trend and Intercept'

***1%

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Although a pre-test for stationarity is not necessary for the ARDL Bounds test, we must ensure that the variables are not I(2), and thus the ARDL technique is applicable. The stationarity results for the ADF and PP are shown in Table 4, where the variables exhibited a mixture of I(0) and I(1) variables. While some variables remained stationary at their initial values, others became stationary following the first difference.

Given that the variables exhibit a mixture of I(0) and I(1) values, the ARDL Bounds test for cointegration is the most appropriate method for determining if the variables move together in the long run. Before performing a cointegration test, it is critical to identify the correct lag length. The Akaike information criterion (AIC) determined an ideal lag duration of 8, which is plausible because the study uses quarterly data. The ARDL Bounds test indicates that all variables exhibit a long-run relationship, as illustrated in Table 5.

Table 5: ARDL Bounds Test to Cointegration Result

Test statistic	Value	k
F-statistic	4.905***	7
Critical value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	2.22	3.17
5%	2.5	3.5
2.5%	2.76	3.81
1%	3.07	4.23

Null hypothesis: No long run relationships exist

*** 1%; k is the number of explanatory variables

Because the F-statistic value of 4.905 is greater than the I(0) and I(1) bounds at all significance levels, the null hypothesis that there is no long-run relationship in equation 4 may be rejected. As a result, we conclude that all variables are cointegrated. With cointegration present, the investigation proceeds to estimate the autoregressive distributed lag-based unconstrained error correction model (ARDL-UECM), with short-run and long-run findings provided in Table 6. ARDL is the best ARDL model for the economic growth equation (2, 3, 0, 2, 1, 3, 1, 0). The findings indicate that the interest variable, budget deficits, is negatively associated to economic growth, both in the long run and in the short run at the current level. Although the coefficient is small, it is extremely statistically significant. Increasing the government's fiscal deficit will harm economic growth in the long run.

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Table 6: ARDL-UECM Results: Dependent Variable - LogRGDP

Long run coefficients			
Variable	Coefficient	Std error	t-Statistic
logHHCON	0.539***	0.164439	3.274690
GFCF	-0.004	0.003382	-1.181717
BD	-0.004**	0.001887	-2.008454
NEXP	-0.00034	0.000924	-0.374796
LAB	0.0086***	0.002848	3.020373
EXR	0.0018***	0.000680	2.621798
INF	0.0004	0.000728	0.520890
DUM_COVID19	-0.023**	0.011257	-2.049182
DUM_FC	0.049***	0.018033	2.705187
ECT_{t-1}	-0.194***	0.025725	-7.548852
@TREND	-0.0021**	0.001056	-2.026463
Short run coefficients			
Variable	Coefficient	Std error	t-Statistic
$\Delta logRGDP_{t-1}$	0.174**	0.079154	2.200538
$\Delta logHHCON_{t}$	0.578***	0.026369	21.926511
$\Delta logHHCON_{t-1}$	-0.090	0.054289	-1.651537
$\Delta logHHCON_{t-2}$	0.066**	0.026744	2.482173
$\Delta GFCF_{t}$	-0.001	0.000671	-1.948698
ΔBD_{t}	-0.0005***	0.000108	-4.241404
ΔBD_{t-1}	0.0003***	0.000112	2.542801
$\Delta NEXP_{t}$	0.0003***	0.000097	2.854324
ΔLAB_{t}	0.002***	0.000209	8.800153
ΔLAB_{t-1}	-0.0007***	0.000212	-3.529258
ΔLAB_{t-2}	-0.0007***	0.000178	-4.036650
ΔEXR_{t}	0.00013**	0.000050	2.633197
ΔINF_{t}	0.00002	0.000104	0.190613
$\Delta Dum\_Covid19_{t}$	-0.003	0.003164	-0.899459
ΔDum_FC_{t}	0.008***	0.002320	3.442246
C	1.276***	0.169016	7.547379

ECT(-1) is the error correction term; ** 5%; ***1%

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Thus, the findings indicate that the nexus between the South African government's budget deficit and economic growth does indeed follow the neoclassical paradigm. The outcome of the negative association between budget deficits and economic growth corroborates both the trend depicted in Figure 1 and the preliminary descriptive studies, thereby supporting neoclassical theory. This suggests that larger government budget deficits sustained by domestic borrowing result in higher interest rates, discouraging investment and expenditure, slowing economic growth.

This finding corroborates the findings of Molefe & Maredza (2017) and Nyathi & Chivasa (2021), who discovered an inverse relationship between budget deficits and economic growth. These findings, however, contradict those of Molocwa et al. (2018), who found a positive link between government budget deficits and economic growth in BRICS countries. This could explain why Molocwa et al. (2018) explored this link using panel analysis, whereas the current work used time series analysis to focus on the South African economy specifically.

While the error correction term should be the primary focus of attention and thus interpreted in the short run regression findings, the outcomes of the other control variables will be addressed briefly. These control variables illustrate the expected relationships in the short and long run, respectively. In both the short and long run, total household consumption spending has the expected positive economic and statistical significance. Investment as a percentage of GDP has a marginally negative effect on economic growth. The explanation for this could be that the negative impact of overall investment spending is greater than the negative impact of private and government investment spending. In the short run, net exports have a positive and highly statistically significant link with economic growth; however, this relationship has shifted to a negative and statistically insignificant relationship in the long run.

Although labour is adversely and positively connected to economic growth in the short term, the long-run relationship is extremely statistically significant. This conclusion thus supports the notion of jobless growth in the short run, as previously discovered (Kumo, 2012; Leshoro, 2013). Exchange rates and inflation also demonstrate the anticipated positive association between economic growth and unemployment, both in the short and long run, although inflation is not statistically significant. Thus, the error correction term of -0.19, which represents the short-run adjustment, not only meets the requirement that the coefficient is less than 1, but is also negative and highly statistically significant. This demonstrates that the model is returned to long-run equilibrium at a rate of 19% following a short-run disequilibrium. Thus, if economic growth and explanatory factors vary from their long-term equilibrium in the current quarter, approximately 19% of the disequilibrium will be addressed in the subsequent quarter.

Additionally, the dummy variables are of particular significance because they caught the effect of the global financial crisis and the global epidemic. Not only are they statistically

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significant, indicating they are considerably different from zero, but they also convey economic significance. The global pandemic demonstrates both short- and long-run adverse effects on economic growth. Although this is not statistically significant in the short run, it becomes statistically significant in the long run, as projected, showing a negative impact on the economic growth of approximately 0.02 percent. On the other hand, the dummy variable capturing the effect of the financial crisis demonstrates a positive and statistically significant link with economic growth in both the short and long run. These dummies were not included in previous experiments.

The threshold regression result in Table 7 supports using a single threshold, as it provides results for the impacts of government budget deficit on economic growth when the former is either below or over the chosen threshold. This study bolsters the argument that budget deficits have a detrimental influence on economic growth while also defining the threshold at which they are helpful to the economy.

Table 7: Result of Threshold Regression Model – Dependent Variable: logRGDP

Variable	Coefficient	Std error	t-Statistic
BD < -3.6000001 -- 34 obs			
BD	-0.0006*	0.000364	-1.599334
BD_{t-1}	0.0006	0.000403	1.473117
-3.6000001 <= BD -- 65 obs			
BD	-0.0012**	0.000557	-2.156144
BD_{t-1}	-0.0006***	0.000358	-1.749902
Non-threshold variables			
logHHC_CON	0.872***	0.029723	29.34730
GFCF	-0.0008	0.000777	-1.050151
NEXP	0.0004*	0.000234	1.676222
LAB	4.12E-05	0.000355	0.115936
REER	0.0002	0.000159	1.350441
INF	-0.0004	0.000262	-1.473935
DUM_COVID19	-0.021***	0.004576	-4.651871
DUM_FC	0.019***	0.004245	4.449914
C	2.349***	0.404459	5.809073
Adjusted R-squared	0.998409		
F-statistic	5126.757		
Prob(F-statistic)	0.000000		

Threshold variable: government budget deficit. Threshold value: -3.6 percent.

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This is the study's novel contribution, as earlier research did not take the threshold level of government budget deficit into account. The chosen threshold value of 3.6 percent is automatically picked because it has the highest adjusted R-squared and/or the lowest residual sum of squares of all potential regressions. This result is comparable to Nyathi and Chivasa's estimated "healthy".

The results indicate that when fiscal deficits are less than 3.6 percent of GDP, economic growth will be negatively affected, but at a low significance level and with a little effect. When fiscal deficits exceed the specified threshold value, economic growth will drop by the same magnitude but at a highly statistically significant level one period later. Meanwhile, the current fiscal deficits will result in a greater drop in economic growth than when fiscal deficits are below the threshold. Thus, there is a strong negative link between fiscal deficits and economic performance before the threshold value, but this relationship becomes extremely statistically significant when the threshold value is exceeded.

Not only does the conclusion demonstrate that government budget deficits harm economic growth, but it also confirms that an increase in budget deficits above the threshold will result in a greater loss in economic growth. The result is consistent with the economic theory that growing budget deficits are bad for the economy, a neoclassical belief.

5. CONCLUSION AND RECOMMENDATIONS

The difference between government spending and revenue, referred to as the budget deficit, is a critical and one of the primary economic indicators of every country. As such, policymakers should be concerned about its scale and financing. The South African government's persistent expansion in fiscal deficits and the impact on the economy is critical. Thus, this study sought to determine which of the three schools of thinking, Keynesian, neoclassical, or Ricardian, best explains the relationship between the government budget deficit and economic development in South Africa. The study went further, determining the point at which budget deficits begin to have a major effect on South Africa's economic growth; this point is referred to as the threshold.

The study used quarterly time series data from 1996Q3 to 2021Q2, achieving the first aim using the autoregressive distributed lag (ARDL) technique and obtaining the fiscal deficit threshold value using the threshold autoregressive (TAR) technique. The study discovered that fiscal deficits had a highly statistically significant negative effect on economic performance, corroborated by several studies that revealed an inverse association between these variables. Thus, the analysis determined that South Africa adheres to the neoclassical school of thought, which holds that financing the government's budget deficit through domestic borrowing results in higher interest rates. This will deter investment and consumption, resulting in a slowdown in economic growth.

Additionally, the TAR study indicated that the point at which budget deficits as a percentage of GDP begin to have a significant negative effect on economic growth is -3.6 percent. This is close to the "healthy" deficit value. While fiscal deficits continue to negatively affect economic growth in South Africa, when they fall below a certain threshold, they have a negligible significant negative influence with a low coefficient. However, the impact becomes more pronouncedly negative and larger once it crosses the threshold.

The study's conclusions provide critical policy suggestions. Given the evident harmful effect of growing budget deficits on economic growth, the government should consider keeping the budget deficit below the threshold to experience increased and better growth. This is consistent with "sound" fiscal deficits. This also demonstrates the importance of formers Finance Minister Tito Mboweni's address, which urged the South African government to act swiftly to cut the budget deficit to prevent falling into a debt trap, which would have a harmful effect economy. Additionally, the government should maintain fiscal discipline by funding its expenditures only from its income, thereby curbing wasteful spending and corruption. Thus, government international and domestic financing of spending should be avoided, as this will raise interest rates and discourage investment, resulting in lower economic performance over time.

Further research should involve a more in-depth examination of the reasons of government budget deficits, which should include the likely effects of corruption, wasteful expenditures, and unaccounted for spending.

REFERENCES

Abata, M. A., Kehinde, J. S., & Bolarinwa, S. A. (2012). Fiscal/monetary policy and economic growth in Nigeria: A theoretical exploration. *International Journal of Academic Research in Economics and Management Sciences, 1*(5), 75.

Adefeso, H., & Mobolaji, H. (2010). The fiscal-monetary policy and economic growth in Nigeria: Further empirical evidence. *Pakistan Journal of Social Sciences, 7*(2), 137-142. Retrieved from https://www.researchgate.net/profile/Hakeem-Mobolaji/publication/250303892_The_Fiscal-Monetary_Policy_and_Economic_Growth_in_Nigeria_Further_Empirical_Evidence/links/02e7e53bd620f526fe000000/The-Fiscal-Monetary-Policy-and-Economic-Growth-in-Nigeria-Further-Empirical-Evidence.pdf

Adejoh, M., S. Ekeyi, and S. Mary. (2019). Fiscal Deficit and Economic Growth in Nigeria. *Lafia Journal of Economics and Management Sciences 4*(1), 81-81.

Africa, B. S. (2013). SA 2nd in world for budget transparency. Accessed 29 September 2021. Retrieved from https://www.brandsouthafrica.com/people-culture/democracy/budget-290113

Bai, J., & Perron, P. (1998). Estimating and testing linear models with multiple structural changes. *Econometrica, 66*(1), 47-78. doi:https://doi.org/10.2307/2998540

Barro, R. J. (1989). The Ricardian approach to budget deficits. *Journal of Economic perspectives, 3*(2), 37-54. doi:https://doi.org/10.1257/jep.3.2.37

Bernheim, B. D. (1989). A Neoclassical Perspective on Budget Deficits. *Journal of Economic perspectives, 3*(2), 55-72. doi:https://doi.org/10.1257/jep.3.2.55

Bhoir, R. B., & Dayre, S. R. (2015). Does India's economic growth independent of fiscal deficit? *The Business & Management Review, 5*(4), 189. Retrieved from https://cberuk.com/cdn/conference_proceedings/2015iciee_india31.pdf

Chirwa, T. G. (2016). What drives long-run economic growth? Empirical evidence from South Africa. *69*(4), 425–452. Retrieved from http://hdl.handle.net/10500/19975

Ebimobowei, A. (2010). The relationship between fiscal policy and economic growth in Nigeria (1991-2005). *International Journal of Economic Development Research and Investment, 1*(2), 37-46.

Eigbiremolen, G. O., N.J. Ezema and A. Orji. 2015. "Dynamics of budget deficit and Macroeconomic Fundamentals: Further Evidence from Nigeria." *International Journal of Academic Research in Business and Social Sciences* 5(5): 31-41.

Eminer, F. (2015). *The impact of budget deficit on economic growth in North Cyprus.* Paper presented at the The 2015 WEI International Academic Conference Proceedings. Vienna, Australia.

Enache, C. (2009). Fiscal policy and economic growth in Romania. *Annales Universitatis Apulensis: Series Oeconomica, 11*(1), 502. Retrieved from http://www.oeconomica.uab.ro/upload/lucrari/1120091/50.pdf

Hassan, H., & Akhter, A. (2014). Budget deficit and economic growth of Bangladesh: A VAR-VECM approach. *Janata Bank Journal of Money, Finance and Development, 1*(2). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2661754

Hjalmarsson, E., and P. Osterholm. (2007). Testing for Cointegration using the Johansen Methodology when Variables are Near-integrate. doi:https://doi.org/10.5089/9781451867053.001

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with appucations to the demand for money. *Oxford Bulletin of Economics and statistics, 52*(2), 169-210. doi:https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x

Keynes, J. M. (1936). The general theory of interest, employment and money. In: london: MacMillan.

Khosravi, A., & Karimi, M. S. (2010). To investigation the relationship between monetary, fiscal policy and economic growth in Iran: Autoregressive distributed lag approach to cointegration. *American Journal of Applied Sciences, 7*(3), 415. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.822.6991&rep=rep1&type=pdf

Kofi Ocran, M. (2011). Fiscal policy and economic growth in South Africa. *Journal of Economic Studies, 38*(5), 604-618. doi:https://doi.org/10.1108/0144358111116184110.1108/01443581111161841

Kumo, W. L. (2012). Infrastructure investment and economic growth in South Africa: A granger causality analysis. *African development bank group working paper series, 160*. Retrieved from https://www.afdb.org/sites/default/files/documents/publications/working_paper_160_-_infrastructure_investment_and_economic_growth_in_south_africa_a_granger_causality_analysis.pdf

Leshoro, T. L. A. (2013). Does economic growth lead employment in South Africa? *Journal of Economics and Behavioral Studies*, 5(6), 336-345.

Leshoro, T. L. A. (2020). Impacts of productive and recurrent public expenditure on economic growth in South Africa: An analysis using the autoregressive distributed lag–error correction model. *Journal of Economic and Financial Sciences, 13*(1), 12. Retrieved from https://jefjournal.org.za/index.php/jef/article/view/563/1046

Li, J. (2006). Threshold Autoregressive Modeling of Bond Series-Japanese Case. *Journal Investment Management and Financial Innovations, 3*(4), 120-132. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3903667

Molefe, K., & Maredza, A. (2017). Budget deficits and economic growth: A Vector Error Correction modelling of South Africa. *Journal of Economics and Behavioral Studies, 9*(2), 215-223. doi:https://doi.org/10.22610/jebs.v9i2.1662

Molocwa, G. A., Khamfula, Y., & Cheteni, P. (2018). Budget deficits, investment and economic growth: a panel cointegration approach. *Investment Management and Financial Innovations, 15*(3), 182-189. Retrieved from https://www.ceeol.com/search/article-detail?id=741800

Murwirapachena, G., Maredza, A., & Choga, I. (2013). The Economic Determinants of Budget Deficits in South Africa. *Mediterranean Journal of Social Sciences, 4*(13), 561. doi:http://dx.doi.org/10.5901/mjss.2013.v4n13p561

Nayab, H. (2015). The relationship between budget deficit and economic growth of Pakistan. *Journal of Economics and Sustainable Development, 6*(11), 85-90. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.921.9289&rep=rep1&type=pdf

Nkrumah, K. O., Orkoh, E., & Owusu, A. M. (2016). Exploring the budget deficit-economic growth nexus: new evidence from Ghana. *Journal for the Advancement of Developing Economies 5*(1), 1-18. Retrieved from https://digitalcommons.unl.edu/jade/3/

Nyathi, G. B., & Chivasa, S. (2021). An investigation into the effect of budget deficit on the economic performance of Zimbabwe. *Development Southern Africa, 38*(4), 580-590. doi:https://doi.org/10.1080/0376835X.2020.1845123

Odhiambo, N. M. (2015). Government Expenditure and Economic Growth in South Africa: an Empirical Investigation. *Atlantic Economic Journal, 43*(3), 393-406. doi:https://doi.org/10.1007/s11293-015-9466-2

Odhiambo, S. O., Momanyi, G., Othuon, L., & Aila, F. (2013). The relationship between fiscal deficits and economic growth in Kenya: An empirical investigation. *Greener Journal of Social Sciences, 3*(6), 306-323.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289-326. doi:https://doi.org/10.1002/jae.616

Temitope, L. A. (2013). Does Economic Growth Lead Employment in South Africa? *Journal of Economics and Behavioral Studies, 5*(6). doi:https://doi.org/10.22610/jebs.v5i6.409

Tevdovski, D., Jolakoski, P., & Stojkoski, V. (2021). Determinants of budget deficits: Focus on the effects from the COVID-19 crisis. *arXiv preprint arXiv:2105.14959*. Retrieved from https://arxiv.org/abs/2105.14959

Tong, H., & Lim, K. S. (1980). Threshold Autoregression, Limit Cycles and Cyclical Data. In *Exploration of a Nonlinear World* (pp. 245–292.).

Tsay, R. S. (1989). Testing and Modeling Threshold Autoregressive Processes. *Journal of the American Statistical Association, 84*(405), 231-240. doi:https://doi.org/10.1080/01621459.1989.10478760