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Original Paper

Budget Deficit and Economic Growth in Cote d'Ivoire: A Search for Threshold

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Abstract

This study examines the effect of budget deficit on economic growth in Cote d'Ivoire. The study applies threshold regression model to annual data covering the period 1970-2022. The results show that fiscal policy significantly influences economic growth rate. Further, the study establishes that the threshold level of budget deficit conducive for economic growth is 4% of GDP. Beyond this threshold, budget deficit is detrimental to economic growth. As the actual budget deficit is above 4%, the study recommends measures aimed at increasing domestic revenue and enhancing efficiency of public spending to enable the country reap more economic growth associated with fiscal policy. In this regards, efforts should be deployed to reduce tax revenue losses from exemptions and evasion which represent a potential of 4.2% of GDP, i.e. more than FCFA 1800 billion. Under certain assumptions, the "true" budget deficit threshold of Cote d'Ivoire is around 2% of GDP.

Keywords

Budget deficit, economic growth, threshold, Cote d'Ivoire

1. Introduction

Budget deficit can simply be defined as a gap between the flows of government revenues and expenditures in a given calendar year. Accordingly, in the periods when government revenues exceed its expenditures, the budget is in surplus instead of deficit. An increase in budget deficit means that the government needs to increase its demand for "loanable" funds from the private sector domestically and/or internationally. Economists generally agree countries that continuously run budget deficits may suffer slower growth and are more prone to financial and economic instability. In contrast, accurate fiscal management is a foundation for sustainable prosperity and growth. This is in line with the Neo-Classical argument that persistent high budget deficits are detrimental to economic growth (Bernheim, 1989).

Fiscal policy is the use of government spending and revenue to influence a number of aspects of the economy. These include the level of economic activity, the distribution of income among population, and the allocation of resources between different sectors. The budget balance is defined as the difference between government revenue and expenditures in a fiscal year. A budget deficit arises when revenues fall short of government expenditures. In contrast, a budget surplus occurs when revenues exceed government spending. Generally, the country has to borrow money from domestic and foreign sources to finance the deficit. This does not go without consequences. Three schools of thought have been developed to explain the effects of budget deficit on economic growth (Note 1). The Keynesian economic theory argues that budget deficit has, by the working of the multiplier, a stimulating effect on economic growth through an increase in aggregate demand and private investment. This theory advocates the use of deficit to boost a sluggish economy. If the deficit comes from an increased expenditure on public infrastructure and human capital, it improves future economic growth (Aschauer, 1989; Eisner, 1989). On the other hand, the neoclassical paradigm entails that persistent budget deficit is detrimental to economic growth because of crowding out effects on private investment and balance of payment problems (Bernheim, 1989). For instance, if the deficit is financed through domestic borrowings then the amount of loanable funds to private sector decreases, interest rate rises and private investment is hampered, reducing economic growth. In this case, the budget deficit goes against the efficient allocation of resources into the economy. Meanwhile, the Ricardian equivalence theory claims that deficit is neutral to economic growth as private agents internalize government's budget constraint into their own lifetime budget constraints and accordingly adjust their behavior (Barro, 1989; Kormendi, 1983).

On the empirical ground, there is extensive empirical literature on the relationship between budget deficit and economic growth. The evidence from this literature is however mixed and inconclusive across countries. Whereas some studies found deficit to positively influence economic growth (Eze & Ogiji, 2016; Hussain & Haque, 2017; Bhari et al., 2020; Yusuff & Abolaji, 2020), others reported the effect of deficit to be negative (Ezeabasili et al., 2012; Arjomand et al., 2016; Nkrumah et al., 2016; Amgain & Dhakal, 2017; Rana & Wahid, 2017; Onwioduokit & Onye, 2019; Sharma & Mittal, 2019; Awolaja & Esefo, 2020) or insignificant (Edame & Okoi, 2015; Van & Sudhipongpracha, 2015). These studies are premised on the assumption that the relationship between budget deficit and economic growth is linear and symmetric. This means that whether budget deficit is worsening or improving, the reaction of economic growth is the same in absolute value. Such assumption might not be correct in light of evidence of nonlinear macroeconomic effects of fiscal policy.

Recently, a number of empirical studies have addressed the issue of threshold effect of budget deficit on economic growth and estimated optimal budget deficit for different countries. For instance, Adam and Bevan (2005) examined the relationship between fiscal deficits and economic growth for a panel of 45 developing countries. The results of the study provided evidence of a threshold effect at a level of the deficit estimated at 1.5% of GDP. Onwioduokit (2012) found that the threshold level of fiscal

deficit favorable for economic growth in Guinea is 3%. Beyond that limit, economic growth decreases with fiscal deficit. Onwioduokit (2013) conducted a study for Sierra Leone and concluded that the threshold deficit is 7% of GDP, above which the deficit impedes economic growth. Onwioduokit and Bassey (2014) estimated the deficit threshold for the Gambia at 6% of GDP. In a study of 40 developing countries, Slimani (2016) found a negative effect on economic growth when the budget deficit exceeds 4.8% of GDP or fiscal surplus reaches 3.2% of GDP. Iqbal et al. (2017) reported that the threshold level of fiscal deficit in Pakistan is about 5.57% of GDP. Sar and Rath (2017) investigated the case of Odisha in India and found a threshold level of fiscal deficit of 3.5%. When the fiscal deficit exceeds this threshold, it has corrosive effects on economic growth. Aero and Ogundipe (2018) scrutinized the experience of Nigeria and established a threshold fiscal deficit level of 5%. Onwioduokit and Inam (2018) identified the threshold level of budget deficit conducive for growth in Liberia at 6%. Hashemi-Nabi et al. (2021) estimated the threshold level of budget deficit for Malaysia and confirmed the existence of a deficit threshold level of 4% of GDP. In a case study of Nigeria, Umaru et al. (2021) found that budget deficit drives positively economic growth only if the deficit does not exceed the threshold of 2.02% of GDP. Behera and Mallick (2022) investigated the case of selected Indian states and found that a positive impact of fiscal deficit on economic growth is realized when the fiscal deficit does not exceed 2.33% of GDP. Kebalo and Zouri (2022) examined the fiscal deficit threshold that maximizes economic growth for the West African Economic and Monetary Union (WAEMU). The findings identified a threshold level at 11.42% of GDP, which reduced to 3.97% since the debt relief program in 2006. Tran (2022) examined the experience of 48 Asian countries using panel threshold regression. The findings of the study divulged that economic growth is best promoted with budget balance ranging from 22.69% to 25.19% GDP. Overall, the empirical literature regarding African countries shows that the threshold level of fiscal deficit ranges between 1.5 and 7% of GDP, depending upon country specific characteristics. These findings show that excessively large budget deficit would retard economic growth.

These controversial views and findings have made less attractive the use of deficits in stimulating economic growth. Today, the prevailing view is that “too large” deficits are associated with lower economic growth, inflation, debt accumulation and depletion of financial reserves resulting in disequilibrium in the balance of payments. The budget deficit is believed to be harmful to economic growth while accurate fiscal management paves the way for economic prosperity. Furthermore, high persistent deficits may give signals to citizens and investors that the government does not perform well in managing public revenues and this could affect reelection prospects (Brender & Drazen, 2008). This pessimistic belief moves against the use of deficit to achieve sustainable economic growth. In line with this belief, the WAEMU member countries have adopted fiscal rules under which the budget deficit may not exceed 3% of GDP. This threshold can be seen as the deficit that stabilizes the debt-to-GDP ratio at 60% (Note 2). The main aim of this rule was to trim budget deficits to ensure high economic growth at the national and regional levels. It is assumed that beyond this threshold, the deficit turns to

slow down economic growth. However, evidence from the past two decades indicate the non-compliance of majority of the members including Cote d'Ivoire to this criterion, raising concern about its relevance for all member countries. Is the 3% deficit threshold still appropriate today in light of rising challenges related to security, health and education in West African states?

Cote d'Ivoire consistently recorded fiscal deficits over the past two decades. Government expenditure has been an important instrument for economic growth and poverty reduction. The overall budget deficit has widened from 1.62% of GDP in 2013 to 5.6% in 2020 reaching 6.9% in 2022. It is projected to 5.2% in 2023. Consequently, the debt profile is currently on the rise to finance the deficits. The government is working on bringing the deficit to the 3% ceiling by 2025. Although it is imperative for the country to reduce the size of the deficit, it is important for fiscal authorities to know the level of the deficit that can be maintained without jeopardizing economic growth. Therefore, this paper seeks to examine the link between economic growth and the budget deficit for Cote d'Ivoire with the aim of estimating the threshold level of the deficit which is conducive to economic growth. More specifically, the study addresses the following research questions. Does the budget deficit influence economic growth in Cote d'Ivoire? Is there a threshold level of deficit beyond which economic growth could be retarded? To the best of our knowledge there is no known study conducted to find out the threshold effect of fiscal deficit on economic growth in Cote d'Ivoire. This study aims to bridge the empirical gap in the case of this country which has been facing persistent budget deficits over the past decade.

The remainder of the paper is organized as follows. Section 2 presents a glimpse of the Ivorian economy in terms of budget deficit and economic growth over the recent decade. Section 3 presents the model specification and outlines the estimation strategy. Section 4 discusses the empirical findings from the study. Section 5 concludes the study with a summary of findings and some policy recommendations.

2. Trends in Budget Deficits and Economic Growth in Cote d'Ivoire

Government spending is a key instrument of the Ivorian fiscal policy given its role in financing public investment and social services. Table 1 shows that total government expenditure increased from 15.8% of GDP in 2013 to 16.5% in 2015. This increase was is in line with the implementation of the National Development Plan (2012-2015) which aimed to deal with the rampant challenges of poverty reduction, unemployment and economic growth facing the country in the aftermath of the 2011 crisis. The execution of this ambitious Plan combined with large-scaled structural reforms has helped record an average economic growth rate of 9.3% during the period 2012-2015. On December 2015, the government adopted a new National Development Plan (PND) for the period 2016-2020, which seeks to achieve the emergence of the country by the year 2020. This was to be achieved through infrastructure development and social service delivery for citizens. Accordingly, public spending rose from 16.5% in 2015 to 20% in 2020 and the economic growth rate averaged 5.9% over the period. The current National Development Plan for the period 2021-2025 envisions to build a unified country. The

framework of this Plan targets a public investment rate amounting around 6.6% of GDP and the economy is projected to grow at 7.6% over the period 2021-2025. Government expenditure has increased from 20% in 2020 to 22.13% in 2022, driven by security spending, capital infrastructure development towards the hosting of African Cup (CAN 2023), and corona virus related extra spending. Current expenditure represented 12% of GDP and more than 60% of total expenditure while investment expenditure averaged 6% of GDP and 27% of total government expenditure. There is a need to increase public investment spending in order to create more economic growth.

Table 1. Fiscal and Economic Indicators, as Percentage of GDP

Year	Budget balance	Expenditure			Revenue			Growth rate
		Total	Current	Other	Total	Tax	Nontax	
2013	-1.62	15.86	10.48	5.38	14.24	11.28	2.95	9.27
2014	-1.56	15.20	10.20	5.00	13.64	10.66	2.98	8.79
2015	-2.04	16.50	10.79	5.70	14.46	10.91	3.55	8.84
2016	-2.92	17.48	11.32	6.16	14.56	11.69	2.87	7.18
2017	-3.27	18.11	11.86	6.25	14.83	12.01	2.83	7.35
2018	-2.91	17.56	11.46	6.10	14.66	11.94	2.71	6.89
2019	-2.24	16.94	11.18	5.76	14.70	11.98	2.72	6.23
2020	-5.42	20.01	12.90	7.11	14.59	12.02	2.57	1.95
2021	-4.93	20.35	12.92	7.42	15.42	12.80	2.62	7.40
2022	-6.82	22.13	12.72	9.41	15.30	12.86	2.44	6.80

Source: MEF/MBPE

As can be observed from Table 1, Cote d'Ivoire is going through a period of continuous budget deficit. This happens because government expenditure rises faster than total revenue. The overall budget deficit has increased from 1.62% of GDP in 2013 to 2.24% in 2019 and reached 5.6% of GDP in 2020, driven by the corona virus pandemic. The deficit fall at 4.93% of GDP in 2021, linked to an improved mobilization of revenues. However, the adverse consequences of the Russia-Ukraine conflict swelled the deficit to 6.9% in 2022. It is worth noting that Cote d'Ivoire depends heavily on tax revenue to generate the much needed funds for development. Tax revenue accounts, on average, for two-third of total expenditure. In spite of several fiscal reforms and improvement in the business environment since 2012, tax revenue still remains below the target of 20% of the WAEMU Convergence Pact. The overall tax-to-GDP ratio lies around 13%, lagging behind Burkina Faso, Mali, and Senegal. The poor tax performance is mainly ascribed to narrow tax base, inelastic and complex tax system, heavy reliance on commodity prices, large tax exemptions, and tax evasion. All these factors impede tax revenue growth and create budget deficits. Tax expenditures from official exemptions amount to 1.2% of GDP and

9.5% of total tax revenue. With regard to tax evasion, it represents 3% of GDP and 23% of total tax revenue that is more than FCFA 1200 billion per year. In other words, tax revenue could be increased by close to 33% or 4.2% of GDP. This would have represented more than FCFA 1800 billion in 2022. This revenue would have been sufficient to bring the deficit down the 3% threshold. The government's goal is to increase the tax ratio by 0.5 point per year so as to align the budget deficit to 3% of GDP by 2025. However, the aggravation of the Russia-Ukraine conflict, a new pandemic, rising security concerns and a decline in commodity prices could compromise this goal. Reducing the deficit to 3% would require strong measures to restrain the growth of government spending while enhancing its efficiency.

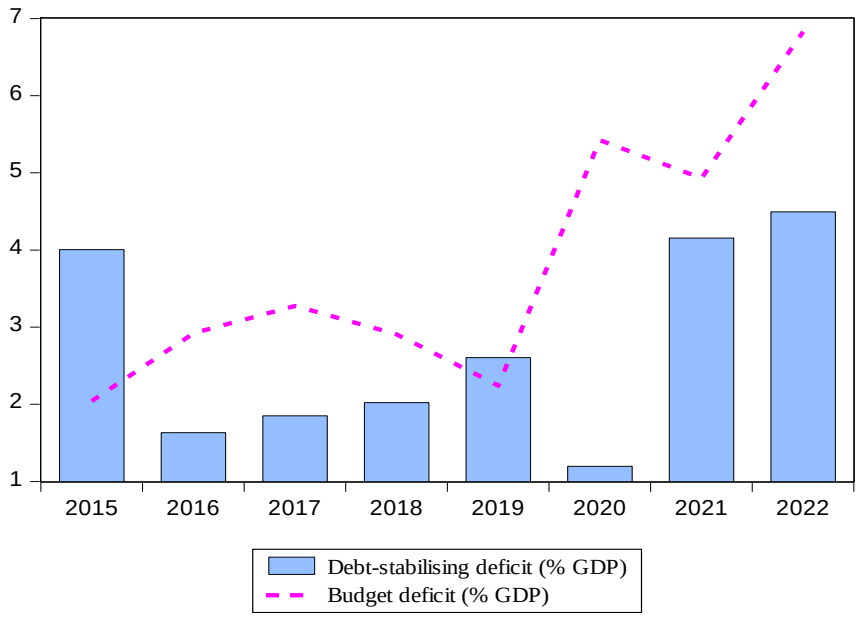

Figure 1. Debt-stabilizing Budget Deficit (% GDP) 2015-2022

Higher deficits are likely to result in rising debt profile, although the effect may also depend on how the deficits are used. Under certain assumptions, a stable debt-to-GDP ratio is compatible with running deficits. If the deficits are such that they do not cause the debt to grow faster than GDP, then the debt-to-GDP ratio will not increase. We estimate the deficit that would stabilize the debt ratio in the absence of shocks using the standard relationship linking the debt-to-GDP ratio and nominal GDP growth rate (Note 3). Figure 1 plots the debt-stabilizing deficit over the period 2015-2022. As can be seen, the deficit recorded by Cote d'Ivoire has been higher than the debt-stabilizing deficit during the period, except for 2015 and 2019. Owing to these differences between the observed deficit and the debt-stabilizing one, but also to other factors of change in indebtedness, the debt ratio has increased sharply from 2015 to 2022.

3. Econometric Methodology

3.1 Model Specification

The objective of this work is to scrutinize the effect of the budget balance on economic growth in Cote d'Ivoire. Following the growth specification in the literature, the empirical model to be estimated is specified by:

$$\Delta Y_t = \alpha + \theta SB_t + \gamma X_t + \mu_t \quad (1)$$

where ΔY_t is the growth rate of real GDP, SB_t stands for budget balance as a share of GDP, X_t is a set of control variables and μ_t is an error term that captures the impact of other variables that are not included in the model. This term is assumed to be independently and identical normally distributed with zero mean and constant variance.

Eq.(1) assumes that the growth effect of budget deficit is the same regardless of the level of deficit. This model would be misleading if the relationship between the budget deficit and economic growth does not follow a linear pattern. To investigate the existence of threshold effect, Eq. (1) is to be modified in a way that allows differences in the response of economic growth to changes in budget balance. To this purpose, we rely on the threshold regression model introduced by Tong and Lim (1980) and extended by Hansen (1996). The main idea of this model is to describe a given nonlinear process by piecewise linear specifications separated according to the magnitude of a so-called "threshold variable". They allow the sample data to endogenously uncover both the form of non-linearity and the threshold. The threshold growth equation in this study is specified as follows:

$$\Delta Y_t = \alpha + \theta_1 SB_t + \theta_2 \left(SB_t - k^*\right) \times I_t \left(SB_t \geq k^*\right) + \gamma X_t + \mu_t \quad (2)$$

where $I_t (SB_t \geq k^*)$ is a dummy variable with a value of 1 if $SB_t \geq k^*$ and 0 otherwise; k^* is the threshold level of budget balance that splits the sample into two regimes. The subtraction of k^* from SB_t makes the threshold relationship between growth and budget balance continuous and derivable at the threshold level k^*.

The main feature of Eq.(2) is that it allows the effect of budget balance on economic growth to change with the size of budget balance. The effect of budget balance on economic growth is given by θ_1 when budget balance is less than or equal to k^*, and by $\theta_1 + \theta_2$ when budget balance exceeds this threshold. The budget deficit stimulates the aggregate demand of goods and services thereby leading to stimulate economic growth rate. However, when deficit exceeds a threshold level, it becomes detrimental to economic growth. Therefore, we expect a negative relationship between budget balance and output growth when budget balance is above the threshold ($\theta_1+\theta_2<0$) and a positive effect when budget balance is below the threshold level ($\theta_1>0$). Evidence of a threshold effect would be associated with a significant value of θ_2.

3.2 Estimation and Threshold Testing

Two issues need to be addressed when estimating a threshold model. The first issue is related to the joint estimation of the threshold value k^* and the slope coefficients $\beta=(\alpha, \theta_1, \theta_2, \gamma)$. The second issue is how to test the existence of the threshold. Following Chan (1993) and Hansen (1996), we estimate the threshold model by OLS method and compute the residual sum of squares (RSS) for different thresholds of deficit ranging from -1% to -8%. The optimal threshold level is then obtained by selecting the value that minimizes the sequence of residual sum of squares, that is:

$$k^* = \arg\min_k S_1(k) \tag{3}$$

where $S_1(k)$ is the least-squares residual sum squared with the threshold level fixed at *k*.

Once k^* is obtained, it is important to determine whether the threshold regression model is statistically significant relative to the linear model. To test for the existence of a threshold relationship between budget deficit and economic growth (H_0: $\theta_2=0$), we use the F-statistic defined as follows:

$$F_1^* = n\frac{S_0 - S_1(k^*)}{S_1(k^*)} \tag{4}$$

where S_0 and S_1 are the residual sum of squares for models without and with threshold effects, respectively, and n is the number of observations.

Since the threshold k^* is not identified under the null hypothesis, the asymptotic distribution of F_1^* is non-standard and conventional inference cannot be applied. Hansen (2000) proposed a bootstrap-based method to simulate the asymptotic distribution and provide *p-value* of the test statistic. Using this method, the values of the regressors are fixed, and a new dependent variable $\tilde{u}_t$ is generated from $N(0,1)$. For each bootstrap iteration, we set $\tilde{y}_t = \tilde{u}_t$ and we regress $\tilde{y}_t$ on all regressors under null and alternative hypotheses to obtain the restricted and unrestricted sum of squared errors $\tilde{S}_0$ and $\tilde{S}_1(k)$. From these statistics we computed $\tilde{F}_1(k) = n\left(\frac{\tilde{S}_n - \tilde{S}_1(k)}{\tilde{S}_1(k)}\right)$ and $\tilde{F}_1^* = \underset{\gamma\in\Gamma}{Sup}\,\tilde{F}_1(k)$. The distribution of $\tilde{F}_1^*$ provides the bootstrap distribution of F_1^*, so the bootstrap *p-value* is the frequency of simulated $\tilde{F}_1^*$ that exceed F_1^*.

3.3 Data Description

The study uses annual data covering the period from 1970 to 2022. The variables used in the empirical

analysis are the following. The dependent variable is economic growth measured as the annual growth rate of real GDP. The independent variable of interest is the overall budget balance (including grants) as a share of GDP. Based on the empirical literature (e.g., Barro, 1991; Mankiw et al., 1992; Sala-I-Martin, 1997), we also include as control variables, the ratio of gross fixed capital formation to GDP as a proxy for growth in physical capital stock, the growth rate of population as a proxy for labour force growth, the ratio of government expenditure to GDP, and inflation rate (INF) computed as the change rate of the GDP deflator. Our goal in this study is not to find out the determinants of economic growth in Cote d'Ivoire, but to check if there is a threshold relationship between budget balance and economic growth rate and derive the threshold level of deficit for this country. Table 2 gives the description and sources of the variables of the study.

Table 2. Description of the Variables

Variable	Measurement	Source
ΔY	Growth rate of real GDP	BCEAO/MEF
INV	Gross fixed capital formation as a ratio of GDP	WDI
POP	Growth rate of population	WDI
SB	Overall budget balance (in including grants) as a share of GDP	BCEAO/MBPE/MEF
GE	Total government expenditure as a share of GDP	BCEAO/MBPE
INF	Change rate of the GDP deflator	WDI

Note. BCEAO—Banque Centrale des Etats de l'Afrique de l'Ouest (Central Bank of West African States). MEF—Ministry of Economics and Finance. WDI—World Development Indicators of the World Bank, available at http://datacatalog.worldbank.org/ [Last accessed on 2023 may 16]. MBPE—Ministry of Budget and State Portfolio.

Table 3 presents descriptive statistics of the variables. The mean of real GDP growth rate is 3.5% with a minimum of -10.9% and a maximum of 12.9%, which were observed in 1976 and 1980. Gross fixed capital formation averages 17.955% of GDP and ranges between 8.5% and 29.6%, respectively observed in 1990 and 1978. Population grows at a rate of 3.3% and oscillates between 2.1% and 4.7%. Over the entire period, the budget balance averages -4.5% of GDP and fluctuates between -16.6% in 1989 and 2.8% in 1985. Government expenditure as a share of GDP shows an average of 26.1% with minimum and maximum values of 11.5% and 80.4%, respectively. Inflation rate averages 6.3% and reaches its maximum at 56.2% and its minimum at -4.5%, coming respectively from 1996 and 1990. The Jarque-Bera statistic suggests that economic growth and investment rate are normally distributed while the other variables depart significantly from the normal distribution.

Table 3. Descriptive Statistics of Variables

Variables	ΔY	INV	POP	SB	GE	INF
Mean	3.515	17.955	3.330	-4.511	26.109	6.303
Median	3.251	18.205	3.277	-2.438	20.545	2.976
Maximum	12.916	29.661	4.789	2.870	80.402	56.283
Minimum	-10.957	8.502	2.107	-16.655	11.523	-4.523
Std. Dev.	4.567	5.238	0.925	5.056	15.131	11.523
Jarque-Bera	1.816	1.324	5.336	9.912	33.104	187.267
Prob.	0.403	0.515	0.069	0.007	0.000	0.000
n	53	53	53	53	53	53

Note. ΔY=Growth rate of real GDP; INV=Gross fixed capital formation as a ratio of GDP; POP=Population growth rate; SB=Budget balance as a ratio of GDP; GE=Government expenditure as a share of GDP; INF= Growth rate of GDP deflator.

The correlation matrix between the variables is displayed in Table 4. This table shows that investment rate (INV) and budget balance (SB) are positively and significantly related to economic growth. The outcomes also reveal a positive correlation among government expenditure, investment, and population growth. However, there is no evidence of a strong relationship between the explanatory variables as all the correlation coefficients are less than 0.80. To further check the issue of multicollinearity, we conduct the variance inflation factor (VIF) analysis. The magnitudes of VIF and tolerance confirm that the explanatory variables are free from multicollinearity and as such we can proceed with the dataset for further investigation.

Table 4. Correlation Matrix and Collinearity Test Results

	Correlation coefficients						Collinearity results	
Variables	ΔY	INV	POP	SB	GE	INF	VIF	Tolerance
ΔY	1.000	0.442*	0.062	0.241**	0.056	-0.009	-	-
INV		1.000	0.184	-0.063	0.370*	0.136	1.276	0.784
POP			1.000	-0.441*	0.785*	0.301*	2.939	0.340
SB				1.000	-0.601*	0.082	1.740	0.574
GE					1.000	0.183	4.050	0.247
INF						1.000	1.182	0.845

Note. ΔY=Growth rate of real GDP; INV=Gross fixed capital formation as a ratio of GDP; POP=Population growth rate; SB=Budget balance as a ratio of GDP; GE=Government expenditure as a share of GDP; INF= Growth rate of GDP deflator. The general rule is VIF<5 and Tol>0.2. The asterisks * and ** indicate significance at the 5% and 10% levels, respectively.

As a first step in exploring the relationship between budget deficit and economic growth, Figure 2 depicts the trends of budget balance and real GDP growth rate over the past five decades. The figure confirms that Cote d'Ivoire has been facing persistent fiscal deficits over time. Over the period 1970-2022, Cote d'Ivoire's fiscal policy recorded 49 years of deficits and four years of surpluses. This clearly shows that government revenues are structurally insufficient to match its spending needs. Figure 1 shows no clear pattern on the relationship between budget deficit and economic growth rate. However, the link between the two variables can be observed within a certain period. For instance, the budget deficit widened over the periods 1978-1983 and 1987-1994, averaging respectively 14.07% and 10.08% of GDP. During these periods, the economic growth rate of the country averaged 0.36% and 0.53%, respectively. From 1995, the budget deficit started to narrow and averaged 1.49% over the period 1995-2019. At the same time, the country recorded an average economic growth rate of 3.84%. The economic performance was plagued by the political crisis during the period 1999-2011. With the end of the crisis in 2011, the country grew on average by 7.35% and recorded an average budget deficit of 3.32% during the period from 2012 to 2022.

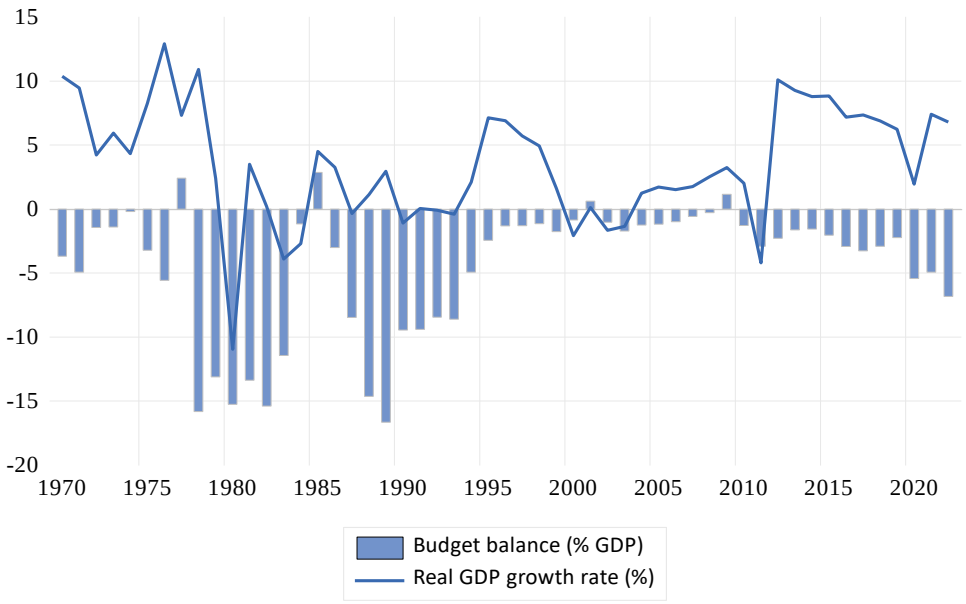

Figure 2. Trends of Budget Balance and Real GDP Growth Rate over Time (1970-2022)

We observe that real GDP growth is positively correlated with deficit when deficit is moderate and this relationship becomes negative at higher deficit. This suggests that there may exists a non-linear relationship between deficit and economic growth in Cote d'Ivoire. In the next section, we discuss the threshold level of deficit that can be targeted by fiscal authorities to promote economic growth.

4. Results and Discussion

Prior to applying the estimation procedure described above, we examine the stationary status of the variables under study. For this purpose, we perform unit root tests using both the PP test of Phillips and Perron (1988) and the KPSS test developed by Kwiatkowski et al. (1992). These tests are applied to the level variables as well as to their first differences. The results reported in Table 5 are broadly consistent with the hypothesis that the variables under investigation are stationary at the level.

Table 5. Results of Unit Root Tests

	Level		First difference	
Series	PP	KPSS	PP	KPSS
ΔY	-4.247*	0.176	-10.441*	0.096
INV	-1.639	0.178	-5.835*	0.152
POP	-1.667	0.159	-3.514*	0.163
SB	-2.971*	0.100	-8.667*	0.125
GE	-1.382	0.115	-5.257*	0.090
INF	-6.213*	0.047	-14.132*	0.118

Note. ΔY=Growth rate of real GDP; INV=Gross fixed capital formation as a ratio of GDP; POP=Population growth rate; SB=Budget balance as a ratio of GDP; GE=Government expenditure as a share of GDP; INF= Growth rate of GDP deflator. * denotes the rejection of the null hypothesis at the 5% level.

We begin the econometric analysis by estimating the linear, quadratic and interaction models. The results are summarized in Table 6. First, the importance of investment is emphasized by the positive and statistically significant effect that it exerts on economic growth. A one-percentage point increase in investment rate is associated with a 0.4 percentage point increase in real GDP growth rate. This result is consistent with the theoretical arguments and empirical findings. Second, the effect of population growth is positive but not statistically significant in all models. This may be attributed to the high unemployment level among the active population. Third, the estimated models show that government expenditure and budget balance are neural to economic growth. The quadratic and interaction models do not fit adequately the nexus between economic growth and budget balance in the case of Cote d'Ivoire.

Table 6. Linear, Quadratic and Interaction Effects of Budget Balance on Economic Growth

	Linear model		Quadratic model		Interaction model	
Variables	Coef.	*t*-stat.	Coef.	*t*-stat.	Coef.	*t*-stat.
INV	0.387*	4.118	0.375*	3.893	0.385*	3.890
POP	1.123	1.596	1.052	1.277	1.249	1.525
GE	-0.016	-0.297	0.006	0.094	-0.018	-0.286
INF	0.003	0.073	0.003	0.083	0.003	0.075
SB	0.143	1.273	-0.024	-0.086	0.158	0.637
SB^2	-	-	-0.014	-0.663	-	-
SB*GE	-	-	-	-	-0.001	-0.067
C	-6.560*	-2.734	-6.463*	-2.671	-6.518*	-2.597
R^2		0.642	0.646		0.643	
n		53	53		53	
Residual diagnostics						
Breusch-Godfrey test		5.890*	4.566*		6.987*	
Prob.		0.015	0.032		0.008	
White test		9.707	9.672		10.237	
Prob.		0.286	0.377		0.331	
Jarque-Bera test		0.301	0.485		0.319	
Prob.		0.859	0.784		0.852	

Note. The dependent variable is the growth rate of real GDP; INV=Gross fixed capital formation as a ratio of GDP; POP=Population growth rate; SB=Budget balance as a ratio of GDP; GE=Government expenditure as a share of GDP; INF= Growth rate of GDP deflator. Models include DUM80, DUM11 and DUM12_17 as dummy variables. * (**) indicates significance at the 5% (10%) level.

To test for the existence of a threshold relationship between budget balance and economic growth, we estimate the threshold model and compute the residual sum of squares for different values of expected threshold of deficit from -1% to -8%. The estimation results are reported in Table 7. The results disclose a positive effect of budget balance on output growth for deficit higher than the threshold value ranging from 1% to 8%. The residual sum of squares records its lowest value at the threshold point of -4%. Thus, the threshold level for budget deficit in Cote d'Ivoire is estimated at 4%.

Table 7. Effects of Fiscal Deficit on Economic Growth across Potential Thresholds

Threshold (k^*)	Effect of budget balance below the threshold (θ_1)	Effect of budget balance above the threshold ($\theta_1 + \theta_2$)	SSR
-1%	0.286 (1.824)	-0.451 (-0.675)	443.789
-2%	0.445 (2.845)	-0.874 (-1.909)	401.095
-3%	0.522 (3.443)	-0.761 (-2.391)	369.003
-4%	**0.576 (3.697)**	**-0.578 (-2.338)**	**357.532**
-5%	0.595 (3.677)	-0.387 (-1.921)	360.219
-6%	0.604 (3.547)	-0.261 (-1.466)	368.573
-7%	0.600 (3.347)	-0.154 (-0.959)	379.665
-8%	0.584 (3.123)	-0.068 (-0.462)	390.963

We further proceed with the threshold regression model. Table 8 displays the regression estimates and testing results. The F-statistic is strongly significant suggesting that the null hypothesis of no threshold effect can be rejected. Thus the data strongly support the existence of threshold effect of budget balance on economic growth for the threshold level of budget balance of –4% of GDP. The estimated model passes the diagnostic tests. The results show some interesting information. First, the role of investment is reemphasized by its positive and significant relationship with economic growth. Keeping other things constant, a one percentage point increase in investment to GDP leads to a 0.3 percentage point increase in real GDP growth rate. Second, an increase in government expenditure as share of GDP has a positive and significant effect on economic growth. Keeping the budget balance constant, a one percentage point increase in both government spending and revenue results in about a 0.1 percentage point increase in economic growth rate.

Table 8. Threshold Effects of Fiscal Balance on Economic Growth

	Deficit = -4%			Deficit =-3%		
Variables	Coef.	*t*-stat.	Prob.	Coef.	*t*-stat.	Prob.
INV	0.282*	3.902	0.000	0.257*	3.559	0.000
POP	0.227	0.447	0.657	0.020	0.040	0.967
GE	0.085**	1.869	0.068	0.098*	2.094	0.042
INF	0.007	0.186	0.852	0.012	0.306	0.760
SB_{Inf}	0.577*	3.697	0.000	0.522*	3.443	0.001
SB_{Sup}	-0.578*	-2.338	0.024	-0.761*	-2.391	0.021
R^2		0.670			0.659	
SSR		357.532			369.003	
n		53			53	
Threshold testing						
Threshold		-4%			-3%	
F value (H_0: θ_2=0)		14.198*			11.859*	
p_value		0.004			0.001	
Residual diagnostics						
Breusch-Godfrey test		2.039			2.317	
Prob.		0.153			0.127	
White test		8.343			7.689	
Prob.		0.499			0.565	
Jarque-Bera test		1.217			1.297	
Prob.		0.544			0.522	

Note. The dependent variable is the growth rate of real GDP; INV=Gross fixed capital formation as a ratio of GDP; POP=Population growth rate; GE=Government expenditure as a share of GDP; INF= Growth rate of GDP deflator. SB_{inf} (SB_{Sup}) indicates budget balance below (above) the threshold deficit. Models include DUM80, DUM11 and DUM12_17 as dummy variables. *p-value* for threshold testing is computed from 10000 bootstrap replications. * (**) indicates significance at the 5% (10%) level.

Third, the most important result in this analysis is the effect of budget balance on economic growth. The results disclose that when budget balance is below the threshold level of -4% (*i.e.* budget deficit exceeds 4%), economic growth decreases with expanding budget deficit. However, when budget balance exceeds the –4% threshold level (i.e., budget deficit is below 4%), widening budget deficit increases economic growth. In other words, the effect of budget deficit on economic growth is positive when deficit is below the 4% threshold level. This positive association is such that a one percentage point increase in the budget deficit, driven by government spending, will bring about a 0.663

percentage point increase in economic growth rate. While beyond the 4% threshold level, a one percentage point increase in the budget deficit will bring about a 0.492 percentage point decrease in economic growth rate. Thus, the deficit and economic growth relationship follows an inverted V-shaped curve. The policy implication of this finding is that increasing deficit beyond 4% is detrimental to growth. The range of 0-4% provides the room for a menu of policy choices on deficit levels that would be consistent with high economic growth in Cote d'Ivoire.

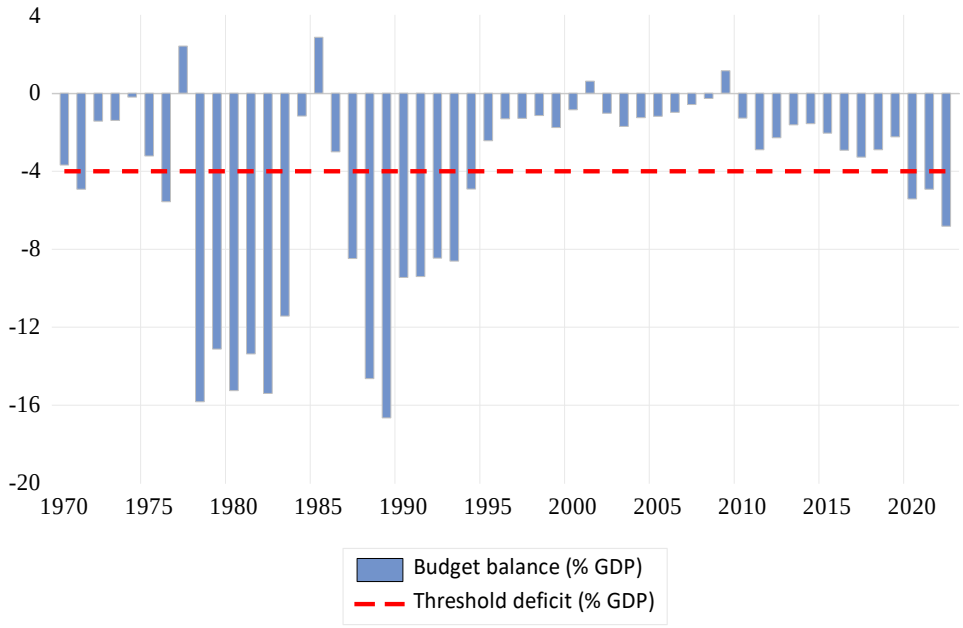

Figure 3. Cote D'Ivoire's Budget Deficit vs. the Threshold Level

As we can see from Figure 3, the budget deficit in Cote d'Ivoire has not generally exceeded the threshold level over time. During the study period (1970-2022), there were 19 periods where the deficit is higher than the 4% threshold level, i.e., 1971, 1976, 1978-1983, 1987-1994 and 2020-2022. For these years, economic growth rate averaged 2.36% while for periods where deficit is lower than 4%, economic growth rate averaged 4.16%. The deficits recorded from 2020 to 2022 and that projected for 2023 exceed the 4% threshold. This clearly shows that Cote d'Ivoire is on the downward sloping portion of the deficit-growth nexus. Keeping the deficit close to 4% of GDP could potentially yield an economic growth rate between 7 and 10%. The economic outcomes of such a policy could be amplified if policies are adopted to enhance efficiency in the allocation of public spending. Considering a potential nominal growth rate of 8% (10%), a 4% deficit would stabilize debt at 54% (44%) of GDP. It is possible to curb the deficit by implementing measures that will reduce tax revenue losses from tax exemptions and evasion, which represent about 4.2% of GDP. Efforts could be deployed to collect 50% of this potential over two or three years. This will help shrink the deficit threshold to about 2% of GDP provided the growth of government spending as a share of GDP is contained. A 2% deficit threshold would stabilize debt at around 30% of GDP if a nominal growth rate of 8% is assumed.

5. Conclusion

The central focus of this paper was to examine the effect of budget deficit on economic growth in Cote d'Ivoire. The study also sought to find out the threshold level of budget deficit that is favorable for growth. The study estimated linear and threshold regression models using annual data covering the period from 1970 to 2022. The linear model was not capable to explain the relationship between deficit and economic growth. However, the results from threshold regression model revealed a number of findings. First, the role of investment was emphasized by its positive effect on economic growth. Second, the effect of government expenditure on growth was found to be positive as predicted by the Keynesian theory. Third, the relationship between deficit and growth follows an inverted V-curve. The deficit threshold level was found to be 4% of GDP. The estimation results show that a deficit level below 4% stimulates economic growth, while a deficit higher than 4% is harmful to growth. Keeping the deficit to 4% of GDP will result in a real economic growth rate of 7-10%.

The findings of this study lend credence to the idea that fiscal policy has an important role in promoting economic growth, but beyond a certain threshold budget deficit is corrosive for economic growth. These findings suggest that there is room for fiscal policy to promote growth, provided the deficit is kept below the 4% threshold and resources are channeled into productive investments that raise the country's economic growth potential. Cote d'Ivoire is experiencing deficits beyond the estimated threshold level. The study demonstrates the urgency for fiscal restraint to bring about higher economic growth. The government should also deploy efforts to improve the collection of domestic revenue as it will enable the country to create the fiscal space necessary to finance its growing social, development and security spending. In this regards, government should endeavor to implement measures aimed at reducing substantially tax revenue losses from tax exemptions and evasion, which represent a potential of 4.2% of GDP. Collecting 50% of this potential will bring the threshold deficit down to 2% of GDP. Considering a potential nominal growth rate of 8%, a 2% deficit would stabilize debt at around 30% of GDP.

Cote d'Ivoire as a member country of WAEMU cannot follow its own budget deficit ceiling. The revision of the deficit threshold should be conducted at the regional level. This will require a more comprehensive analysis to assess all the macroeconomic implications of a shift to a 4% deficit ceiling. These may include impacts on imports, international reserves, competitiveness of national economies, debt sustainability, and inflation rates as well as the possible crowding-out effects on private sector. Further research could be conducted to find out how the threshold level of the budget deficit varies with changes in deficit financing strategy. These issues are left to be dug in future research.

References

Adam, C. S., & Bevan, D. L. (2005). Fiscal Deficits and Growth in Developing Countries. *Journal of Public Economics*, *89*(4), 571-597. https://doi.org/10.1016/j.jpubeco.2004.02.006.

Aero, O., & Ogundipe, A. A. (2018). Fiscal Deficit and Economic Growth in Nigeria: Ascertaining a Feasible Threshold. *International Journal of Economics and Financial Issues*, *8*(3), 296-306.

Amgain, J., & Dhakal, N. K. (2017). Public Revenue, Fiscal Deficit and Economic Growth: Evidence from Asian Countries. *Journal of Economics and Political Economy*, *4*(4), 329-342. https://doi.org/10.1453/ JEPE.V4I4.1482

Arjomand, M., Emami, K., & Salimi, F. (2016). Growth and Productivity; the role of Budget Deficit in the MENA Selected Countries. *Procedia Economics and Finance*, *36*(16), 345-352. https://doi.org/10.1016/ S2212-5671(16)30046-6

Aschauer, D. A. (1989). Is Public Expenditure Productive? *Journal of Monetary Economics*, *23*(2), 177-200. https://doi.org/10.1016/0304-3932(89)90047-0

Awolaja, G. O., & Esefo, I. O. (2020). Budget Deficit and Economic Growth in Sub-Saharan Africa: A PMG Approach. *Asian Journal of Economics, Business and Accounting*, *13*(3), 1-10. https://doi.org/10.9734/ajeba/2019/v13i330174

Barro, R. (1991). Economic Growth in a Cross-Section of Countries. *Quarterly Journal of Economics*, *106*(2), 407-433. https://doi.org/10.2307/2937943

Barro, R. J. (1989). The Ricardian Approach to Budget Deficits. *Journal of Economic Perspectives*, *3*(2), 37-54. https://doi.org/10.1257/jep.3.2.37.

Behera, B. K. & Mallick, H. (2022). Does Fiscal Deficit Matter for Economic Growth Performance of Indian States? *Indian Public Policy Review*, *3*(6), 16-44. https://doi.org/10.55763/ippr.2022.03.06.002

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

Bhari, A. A. A., Lau, W.-Y., Aslam, M., & Yip, T.-M. (2020). The Nexus between Fiscal Deficit and Economic Growth in Malaysia. *Journal of Southeast Asian Studies*, *25*(1), 79-94. https://doi.org/10.22452/jati.vol25no1.5

Brender, A., & Drazen, A. (2008). How do Budget Deficits and Economic Growth affect Reelection Prospects? Evidence from a Large Panel of Countries. *American Economic Review*, *98*(5), 2203-2221. https://doi.org/10.1257/aer.98.5.2203

Briotti, M. G. (2005). *Economic Reactions to Public Finance Consolidation: A Survey of the Literature*. European Central Bank, Occasional Paper Series, No. 38, October. https://doi.org/10.2139/ssrn.807411

Buiter, W. H. (2006). The 'Sense and Nonsense of Maastricht' revisited: What have we learnt about Stabilization in the EMU? *Journal of Common Market Studies*, *44*(4), 687-710. https://doi.org/10.1111/j.1468-5965.2006.00658.x

Chan, K. S. (1993). Consistency and Limiting Distribution of the Least Squares Estimator of a Threshold Autoregressive Model. *The Annals of Statistics*, *21*(1), 520-533. https://doi.org/10.1214/aos/1176349040

Edame, G. E., & Okoi, O. B. (2015). Fiscal Deficits and Economic Growth in Nigeria: A Chow Test Approach. *International Journal of Economics and Financial Issues*, *5*(3), 748-752.

Eisner, R. (1989). Budget Deficits: Rhetoric and Reality. *Journal of Economic Perspectives*, *3*(2), 73-93. https://doi.org/10.1257/jep.3.2.73

Eze, O. R., & Ogiji, F. O. (2016). Impact of Deficit Financing on Economic Stability in Nigeria: Analysis of Economic Growth. *Journal of Applied Finance and Banking*, *6*(1), 1-7.

Ezeabasili, V. N., Tsegba, I. N., & Ezi-Herbert, W. (2012). Economic Growth and Fiscal Deficits: Empirical Evidence from Nigeria. *Economics and Finance Review*, *2*(6), 85-96.

Hansen, B. E. (1996). Inference when a Nuisance Parameter is not identified under the Null Hypothesis. *Econometrica*, *64*(2), 413-430. https://doi.org/10.2307/2171789

Hansen, B. E. (2000). Sample Splitting and Threshold Estimation. *Econometrica*, *68*(3), 575-603. https://doi.org/10.1111/1468-0262.00124

Hashemi-Nabi, M., Zakaria, Z., & Jamil, R. (2021). Budget Deficits and Economic Growth in Malaysia: What is the Threshold Level? *Indian Journal of Economics and Business*, *20*(3), 17-31.

Hemming, R., Kell, M., & Mahfouz, S. (2002). The Effectiveness of Fiscal Policy in Stimulating Economic Activity - A Review of the Literature. *IMF Working Paper WP/02/208*.

Hussain, M. E., & Haque, M. (2017). Fiscal Deficit and Its Impact on Economic Growth: Evidence from Bangladesh. *Economies*, *5*(4), 37. https://doi.org/10.3390/economies5040037

Iqbal, N., Din, M., & Ghani, E. (2017). The Fiscal Deficit and Economic Growth in Pakistan: New Evidence. *The Lahore Journal of Economics*, *22*, 53-72. https://doi.org/10.35536/lje.2017.v22.isp.a3

Kebalo, L., & Zouri, S. (2022). Monetary Agreements Reform and Issue of the Key Fiscal Convergence Criterion in the West African Economic and Monetary Union (WAEMU). *Journal of Economic Integration*, *37*(1), 30-53. https://doi.org/10.11130/jei.2022.37.1.30

Kormendi, R. C. (1983). Government Debt, Government Spending, and Private Sector Behaviour. *American Economic Review*, *73*(5), 994-1010.

Kwiatkowski, D., Phillips, P. C. B., Schmidt, P., & Shin, Y. (1992). Testing the Null Hypothesis of Stationarity against the Alternative of a Unit Root. *Journal of Econometrics*, *54*(1-3), 159-178. https://doi.org/10.1016/0304-4076(92)90104-Y

Mankiw, N., Romer D., & Weil, D. (1992). A Contribution to Empirics of Economic Growth. *Quarterly Journal of Economics*, *107*, 407-437. https://doi.org/10.2307/2118477.

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), 4-18. https://doi.org/10.13014/K2NZ85

Onwioduokit, E. A. (2012). An Empirical Estimate of the Optimal Level of Fiscal Deficit in Guinea. *Economic and Financial Review*, *50*(2), 37-79.

Onwioduokit, E. A. (2013). Threshold Analysis of Budget Deficit and Economic Growth in Sierra Leone. *West African Financial and Economic Review*, *10*(1), 93-121.

Onwioduokit, E. A., & Bassey, G. E. (2014). Fiscal Deficit and Economic Growth in the Gambia: A Search for Threshold. *Developing Country Studies*, *4*(19), 162-181.

Onwioduokit, E. A., & Inam, U. S. (2018). An Empirical Estimation of the Optimum Level of Budget Deficit in Liberia. *The International Journal of Business & Management*, *6*(5), 151-162.

Onwioduokit, E. A., & Onye, K. (2019). Fiscal Deficit and Economic Growth in the West African Monetary Zone: An Empirical Re-examination. *West African Financial and Economic Review*, *19*(1), 1-34.

Phillips, P. C. B., & Perron, P. (1988). Testing for a Unit Root in a Time Series Regression. *Biometrika*, *75*(2), 335-346. https://doi.org/10.2307/2336182

Rana, E. A., & Wahid, A. N. M. (2017). Fiscal Deficit and Economic Growth in Bangladesh: A Time-Series Analysis. *The American Economist*, *62*(1), 31-42. https://doi.org/10.1177/0569434516672778

Sala-I-Martin, X. (1997). I just ran two million regressions. *American Economic Review*, *87*, 178-193. https://doi.org/10.3386/w6252

Saleh, A. S., & Harvie, C. (2005). The Budget Deficit and Economic Performance: A Survey. *Singapore Economic Review*, *50*(2), 211-243. https://doi.org/10.1142/S0217590805001986

Sar, A. K., & Rath, S. P. (2017). The Dynamics of Fiscal Deficit and Economic Growth: A Threshold Analysis for the State of Odisha in India. *International Journal of Economic Research*, *14*(14), 383-389.

Sharma, V., & Mittal, A. (2019). Fiscal Deficit, Capital Formation, and Economic Growth in India: A Nonlinear ARDL Model. *Decision*, *46*, 353-363. https://doi.org/10.1007/s40622-019-00223-8

Slimani, S. (2016). Threshold Effects of Fiscal Policy on Economic Activity in Developing Countries. *International Journal of Business and Social Research*, *6*(3), 20-37. https://doi.org/10.18533/ijbsr.v6i3.933

Tong, H., & Lim, K. S. (1980). Threshold Autoregression, Limit Cycles and Data. *Journal of the Royal Statistical Society, Serie B*, *42*, 245-292. https://doi.org/10.1111/j.2517-6161.1980.tb01126.x

Tran, O. K. T. (2022). Does there exist an Optimal Budget Balance to improve Economic Growth? Empirical Evidence from Asian Countries. *Cogent Economics & Finance*, *10*, 2114174. https://doi.org/10.1080/23322039.2022.2114174

Umaru, A. D., Aliero, H. M., & Abubakar, M. (2021). Budget Deficit and Economic Growth in Nigeria. *CBN Economic and Financial Review*, *59*(2), 23-41.

Van, V. B., & Sudhipongpracha, T. (2015). Exploring Government Budget Deficit and Economic Growth: Evidence from Vietnam's Economic Miracle. *Asian Affairs: An American Review*, *42*(3),

127-148. https://doi.org/10.1080/00927678.2015.1048629

Yusuff, S. A., & Abolaji, A. (2020). The Impact of Budget Deficit on Economic Growth in an Emerging Market: An Application of the ARDL Technique. *Asian Development Policy Review, 8*(4), 351-361. https://doi.org/10.18488/journal.107.2020.84.351.361

Notes

Note 1. A survey of these paradigms is provided in Bernheim (1989), Hemming et al. (2002), Briotti (2005), and Saleh and Harvie (2005).

Note 2. Assuming a potential real economic growth rate of 3% and an inflation rate of 2%, the deficit that stabilizes debt ratio at 60% of GDP would be 3% ((3% + 2%)*60%). This threshold was copied from the Maastricht Treaty fiscal rules for membership in the European Monetary Union. Its justification for African economies remains debatable. For some economists, the Maastricht deficit and debt criteria were "arbitrary and neither necessary nor sufficient for national fiscal-financial sustainability". See Buiter (2006). The 'Sense and Nonsense of Maastricht' revisited: What have we learnt about stabilization in the EMU? *Journal of Common Market Studies, 44*(4), 687-710.

Note 3. We assume that debt grows by the deficit, ignoring stock-flow adjustments which may influence the evolution of debt, beyond automatic drivers such as economic growth rate, inflation rate, interest rate, and the exchange rate.