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The Relevance of an Optimal Policy Mix in the CEMAC zone

Jean C. Kouam
Nkafu Policy Institute, Opposite College Jesus-Marie,
Simbock, Yaoundé – Cameroon
E-mails: jkouam@foretiafoundation.org, jcedrickouam@yahoo.fr

Simplice A. Asongu
School of Economics, University of Johannesburg, South Africa
E-mails: asongusimplice@yahoo.com, asongus@afridev.org

Research Department

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Jean C. Kouam & Simplice A. Asongu

Abstract

The study analyses the nature of the nexus between budget deficit and economic growth given inflation trends. It focuses on data from the six CEMAC countries for the period 2000 to 2021. The employs unit root tests and the generalized method of moments (GMM) for the empirical evidence. The following results are established: (i) the level of inflation above and below which the nexus between budget deficit and economic growth changes sign is about 1.8%. (ii) Below this threshold, each 1% decrease in budget deficit induces an increase in economic growth of about 0.30%; but above the threshold, economic growth decreases by 1 % when budget deficit increases by 0.08%. In view of the war in Ukraine and the global economic situation, which require countries to take adequate measures to strengthen the resilience of their economies, including through high-impact economic activities, any national policy aimed at reducing the budget deficit should be preceded by the reduction of inflation to below 1.8%. Otherwise, any measures put in place by the monetary authorities to stabilize prices would not have the expected effect on economic growth and would hence, be counterproductive. In terms of theoretical underpinnings, at the inflation threshold, the findings are consistent with the "Ricardian equivalence" theorem on the absence of any tangible incidence of budget deficits on economic prosperity while above (below) the inflation threshold, the findings are in line with neoclassical economists (Keynesian perspective) on a negative (positive) linkage between budget deficits and economic growth. This study complements the extant studies by providing thresholds at which budget deficit affects economic growth.

1. Introduction

The present exposition is motivated by two fundamental points in the extant policy and scholarly literature on the subject, notably: (i) conflicting strands in the literature on the importance of budget deficits in economic prosperity and (ii) gaps in the extant economic growth literature. These fundamental elements are substantiated in the same chronological order as highlighted.

First, consistent with the extant literature on the subject (Van & Sudhipongpracha, 2015), the incidence of government deficits is a relevant economic concern that is confronting policy makers in both developed and developing countries (Vuyyuri & Seshaiah, 2014). According to the narrative, about ten decades ago, governments were associated with substantial deficits, especially in times of economic depressions or wars. However, over past few decades, governments have incurred substantial deficits to finance programs of social welfare and healthcare instead (Tanzi & Schuknecht, 1997). In the attendant macroeconomic literature, a bulk of empirical and theoretical studies has focused on the nexus between macroeconomic variables (i.e. employment and economic prosperity) and budget deficits. Still, perspectives are conflicting on studies focusing on the importance of budget deficits in the expansion of economies (Elmendorf & Mankiw, 1999). From a neoclassical angle, while in the short term, current consumption is increased by budget deficits, corresponding private investment is reduced in the long term. However, according to Keynesian economists, a "crowding-in" impact is apparent in which a nation's production at the domestic level increases owing of government deficit spending which in turn, provides incentives for more business investments. Conversely, contrary to the Keynesian and neoclassical perspectives, the theory of Ricardian equivalence posits that macroeconomic conditions are not affected by government deficits.

Second, the contemporary extant CEMAC-centric literature on economic growth in the literature has largely focused on *inter alia*: the nexus between external debt and economic growth (Nouamo et al., 2020); an assessment of fundamental drivers of economic performance in the region (Sundjo et al., 2018); the incidence of common currency on economic prosperity (Kangami & Akinkugbe, 2019); the relevance of institutional quality in economic prosperity (Seppo, 2020); the combined incidence of private and public investments in economic growth (Noula et al., 2020); the nexus between foreign investment and economic growth (Sindze et al.,

2021); the connection between financial inclusion and economic growth (Kamga et al., 2022); short and long term money policy dynamics in relation of economic growth and price volatility (Olamide et al., 2021) and the importance of trade openness in economic prosperity (Kuikeu, 2022).

The present article seeks to complement the extant literature by assessing the nexus between budget deficit and economic growth, contingent on inflation in the Economic and Monetary Community of Central Africa (CEMAC) made-up of six states: Gabon, Cameroon, Central African Republic (CAR), Chad, Republic of Congo and Equatorial Guinea. The positioning also departs from the extant non-contemporary literature which has focused on *inter alia*, how government deficit tackles the incidence of government expenditure on decisions related to private investments (Yellen, 1989; Barro, 1990); monetary and financial views on the incidence of budget deficits on economic prosperity with emphasis on exchange rate (Hakkio, 1996; Stoker, 1999), inflation (Smyth & Hsing, 1995) and fiscal management (Antwi *et al*., 2013).

In terms of theoretical underpinnings, three main views are apparent in the extant literature (Van & Sudhipongpracha, 2015), notably: the Keynesian, Noeclassical and the Ricardian equivalence theorem. These theoretical premises are expanded in what follows in the same chronology. (i) According to the Keynesian view, there are "crowding-in" or expansionary incidences of budget deficits in the economy owing to improvements in private investment and domestic production (Modigliani, 1995) or the positive relevance of deficits on economic growth (Coggington, 1976). In essence, government budget deficit improves aggregate demand which ultimately increases private investment and savings (Eisner, 1989). The attendant crowding-in incidences are apparent when budgets deficits engender public infrastructure (Carlsson et al., 2013), not least, because education and social welfare programs improve technological and human capital and by extension, mitigate social conflicts (Kelly, 1997).

(ii) The neoclassical economists dispute that "crowding-in" incidences are only apparent in the short term, not least, because tax burdens are shifted to the future by the government when budget deficits are taken into account (Bernheim, 1989). Hence, as a consequence, savings are likely to decline even though current private consumption has to increase. Within this remit, interest rates are anticipated to increase in order for the equilibrium in the capital market to be restored. Higher rates would engender less private investments (Plosser, 1982). As Buiter (1977)

maintains, according to neoclassical economists, negative ramifications such as budget deficits "financial crowding-out" are apparent which reduces the ability of the government to influence economic development by means of fiscal policies. Beyond, the consideration of financial consequences, government deficits can also be the origin of "resource crowding-out", especially when government deficit spending is related to relevant economic resources that are essential for private domestic investment to thrive.

(iii) Whereas Neoclassical and Keynesian economists provide views that are contradictory on the nexus between budget deficits and economic growth, a "Ricardian equivalence" theorem is proposed by Barro who has posited that the nexus is neutral (Barro, 1989). When budget deficits increase in the contemporary era, it is relevant to compensate these with potential increases in tax, hence consumption of private nature and interest rate are unaffected according to Cunningham and Vilasuso (1994). For instance, the findings of Barro (1990) show that spending programs of the government have no direct incidence on productivity at the economic level. Instead, the type of government program and service is what affects the attendant deficit-growth linkage. According to Barro (1991), public infrastructure spending can engender more positive economic outcomes relative to agricultural subsidies and programs of welfare. Bose et al. (2007) maintain that long term economic impacts can be apparent when budget deficits are traceable to the education sector.

The rest of the study is structured in the following manner. The data and methodology are covered in Section 2. The empirical results are disclosed in Section 3 while Section 4 concludes with policy implications and future research directions.

2. Data and methodology

In this study, the outcome variable is the economic growth rate as measured by the growth rate of real GDP ($GDP\ growth$) and the exogenous variable of interest is the budget deficit ($bdef$).The transition variable here is inflation ($infl$). The choice of the dependent, exogenous and transition indicators is informed by contemporary inflation and economic growth literature (Sundjo et al., 2018 ; Kangami & Akinkugbe, 2019; Nouamo et al., 2020 ; Seppo, 2020 ; Noula et al., 2020 ; Sindze et al., 2021).

The control variables selected are:

- Per capita output that is defined by the lagged value of real GDP growth rate $(y(-1))$. This lagged variable in the real GDP growth rate controls for conditional convergence consistent with neoclassical growth theory (Mondjeli & Tsopmo, 2017).

- Private investment (Inv), which is proxied by the share of private-sector gross fixed capital formation (% of GDP), that captures how economic activity is influenced by the private sector. Private investment is generally expected to positively influence economic growth. Several authors such as Nubukpo (2007) show that public investment is the most effective way to generate the level of growth needed to mitigate the negative effects of public spending. Kremer et al (2013) and Vinayagathasan (2013) also show that public investment positively stimulates economic growth.

- Budget deficit ($bdep$). This is the main channel of the study, in accordance with the motivation of the study in the introduction as well as the corresponding theoretical underpinnings. In essence, the nexus between budget deficit and economic growth has been established in several studies (Devarajan et *al.*, 1996; Gupta et al., 2005) or especially when the threshold of public spending is taken into account (Mondjeli, 2015).

- Petrol (*oil*). All CEMAC countries except the Central African Republic are net oil exporters, (i.e., 5 countries out of 6). These are: Cameroon, Congo Republic, Gabon, Equatorial Guinea and Chad. Antonin et al. (2015) show that lower oil prices are a positive shock for global growth, but not for the environment.

- The inflated rate ($infl$) which is the moderating variable is captured by the consumer price index (CPI) growth rate. Consistent with extant literature, the CPI , compared to the GDP deflator is a better proxy in developing countries, not least, because a large proportion of spending is in terms of consumer spending (Mondjeli & Tsopmo, 2017).

- The population growth rate (pop). There is no established nexus between population growth and economic growth, owing to the fact that the nexus remains subject to debate in the extant literature. The orthodox and heterodox theories are the two theses to encompass the

corresponding debate (Ekodo, 2018). According to the orthodox theory, population growth positively affects economic prosperity (Chan et *al.,* 2005; Dao, 2012; Thuku et *al.,* 2013), whereas proponents of the heterodox position argue that economic growth is negatively affected by population growth (Sija, 2013).

- Public debt ($debt$): Debt is essential for development, but unsustainable levels undermine growth and penalize the poor. If well managed, transparent and used in the context of a credible growth policy, debt can be a lever. Several authors such as Mauviel (2015), Blanchard and Leigh (2013), have analyzed the link between debt and economic growth.

This paper aims to show that the impact of budgets deficits on the economic growth in CEMAC countries is function of the level of inflation. We used a GMM model to determine the optimal budget deficit. The data used are annual, taken from the World Bank's World Development Indicators (2021), and cover the period from 2000 to 2021. The sample considered includes six CEMAC countries, namely: Cameroon, the Central African Republic, Chard, the Congo Republic, Equatorial Guinea and Gabon. The definitions of variables, corresponding sources and expected signs are disclosed in Appendix 1 while Appendix 2 presents the corresponding descriptive statistics.

We estimate a growth equation that is expressed as follows:

$$GDPgrowth_{it} = \alpha_i + \lambda_t + \beta_0 X_{it} + \beta_1 bdef_{it} + \beta_2 infl_{it} + \beta_3(bdef_{it} * infl_{it}) + \varepsilon_{it} (1)$$

To estimate equation (1), the dynamic panel generalized method of moments (GMM) is employed which has the advantage of accounting for some dimensions of endogeneity between variables (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell et al., 2000).

The instrumentation method chosen is as follows: (a) for the control variables, lagged values of one period are used while the endogenous variable is lagged by two periods (Stock, 2001).

3. Empirical results

The empirical results are presented in this section in Table 1 which is divided into five main columns. The fist column provides information on the variables as well as the information criteria for the validity of models while the last-four columns disclose findings entailing various specifications in order to increase the robustness of the estimations. Consistent with elements of the motivation in the introduction, the study is consistent with contemporary interactive regressions literature in the computation inflation thresholds at which the effect of budget deficit on economic growth changes (Asongu, 2020a, 2020b; Tchamyou, 2019; Nchofoung *et al.*, 2021). However, before we get into the details of the computations, it is worthwhile to first of all articulate that the information criteria that are used to assess the validity of the attendant results are consistent with standard information criteria in the attendant literature[1].

To put the computation of thresholds into more perspective, it is important to illustrate with an example for readability and flow. In the second column of Table 1, the inflation threshold at which the effect of inflation changes in sign is 1.39% (0.214591/0.076872). In the computation, 0.214591 is the unconditional effect of budget deficit on economic growth while 0.076872 is the conditional or interactive effect on budget deficit on economic growth. Accordingly, the interactive effect is the incidence from the interaction between inflation and budget deficit. The underlying computation is consistent with the attendant literature on interactive regressions (Nchofoung & Asongu, 2022a, 2022b; Nchofoung *et al.*, 2022).

In the light of insights into the information criteria and computation of thresholds, the following findings are apparent: (i) the level of inflation above and below which the nexus between budget deficit and economic growth changes sign is about 1.8%. (ii) Below this threshold, each 1% decrease in budget deficit induces an increase in economic growth of about 0.30%; but above the threshold, economic growth would decrease by 1 % when budget deficit increases by 0.08%.

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[1] "*First, the null hypothesis of the second-order Arellano and Bond autocorrelation test (AR (2)) in difference for the absence of autocorrelation in the residuals should not be rejected. Second the Hansen over-identification restrictions (OIR) tests should not be significant because their null hypotheses are the positions that instruments are valid or not correlated with the error terms. In essence, while the Sargan OIR test is not robust but not weakened by instruments, the Hansen OIR is robust but weakened by instruments. In order to restrict identification or limit the proliferation of instruments, we have ensured that instruments are lower than the number of cross-sections in most specifications. Third, a Fisher test for the joint validity of estimated coefficients is also provided*" (Asongu & De Moor, 2017, p.200).

Table 1: Estimation of the GMM Model

Variables	Dependent variable: Economic growth ($GDP\ growth$)			
	(1)	**(2)**	**(3)**	**(4)**
$bdep$	**0.214591**** **(0.093067)**	**0.163409*** **(0.08666)**	0.183254 (0.115478)	**0.30123**** **(0.14353)**
$infl$	−0.580854*** (0.157507)	−0.620699*** (0.177551)	−0.54553*** (0.12769)	−0.80507*** (0.236672)
$bdef*infl$	**−0.076872**** **(0.033814)**	**−0.082817**** **(0.031055)**	−0.022396 (0.027085)	**−0.0816**** **(0.03751)**
oil	0.121629*** (0.034782)	0.065583*** (0.017508)	0.093528*** (0.02439)	0.110104** (0.018754)
pop	− −	− −	−12.70397*** (2.381695)	−9.167945** (2.22606)
inv	− −	− −	0.153231** (0.059906)	− −
$Debt$	− −	−0.066307** (0.022966)	− −	− −
$TIAO$	0.585018 (0.553642)	0.005907 (0.311335)	1.406223** (0.51157)	− −
AR(1)	0.423727*** (0.180502)	0.43625* (0.1719)	0.478774** (0.14838)	0.58162*** (0.18084)
AR(2)	0.309185 (0.177766)	0.268452 (0.217221)	0.155485 (0.122576)	-0.041329 (0.099637)
PDL(1)	−0.145283 (0.196132)	0.144727 (0.213817)	-0.136469 (0.128863)	0.229783* (0.130117)
PDL(2)	0.200350 (0.423727)	−0.334314 (0.217221)	0.159885 (0.430754)	-0.028581 (0.316987)
Fisher Test	7.389562*** (0.14913)	6.274448** (0.156798)	15.21605*** (0.10752)	6.30235** (0.2041)
R	0.39	0.51	0.55	0.46
Threshold (infl)	1.39	0.98	1.1	**1.8**
J - statistic	7.195693	7.670685	7.670685	5.582606
Prob (J – statistic)	0.616753	0.466281	0.466281	0.589240
Number of instruments	2	2	2	2
Number of countries	6	6	6	6
Number of observations	30	30	30	30

Note(s): The values in parentheses are the standard errors calculated for each variable. *Significant at 10%.**Significant at 5%. ***Significant at 1%. Source(s): Authors. PDL: Polynomial Distributive Lag, AR: Auto Regressive, inv: private investment, bdep: Budget deficit, oil: petrol, infl: inflated rate, pop: population growth rate, debt: public debt.

Before concluding, it is important to reconcile the study with the theoretical postulations provided in the introduction. Accordingly, in terms of theoretical underpinnings, at the inflation threshold, the findings are consistent with the "Ricardian equivalence" theorem on the absence of any tangible incidence of budget deficits on economic prosperity while above (below) the inflation threshold, the findings are in line with neoclassical economists (Keynesian perspective) on a negative (positive) linkage between budget deficits and economic growth..

4. Concluding implications and future research directions

The present study has contributed to the extant literature by assessing the nexus between budget deficit and economic prosperity in the light of inflation trends in six CEMAC nations for the period 2000 to 2021. The study has employed the generalized method of moments (GMM) as empirical strategy and the following findings have been established: (i) the level of inflation above and below which the nexus between budget deficit and economic growth changes sign is about 1.8%. (ii) Below this threshold, each 1% decrease in budget deficit induces an increase in economic growth of about 0.30%; but above the threshold, economic growth decreases by 1 % when budget deficit increases by 0.08%.

In terms of practical implications, in the light of the global economic situation and war in Ukraine which necessitates that countries should take prompt and relevant policies in view of consolidating their economic resilience, it is worthwhile for budget deficits to be preceded by the reduction of inflation to below 1.8%. Otherwise, any measures put in place by the monetary authorities to stabilize prices would not have the expected effect on economic growth and would therefore be counterproductive. The originality and value of the study builds on the premise that the study contributes to the extant literature by providing inflation policy thresholds that are relevant in understanding the nexus between budget deficits and economic prosperity in the CEMAC countries.

This study evidently leaves space for future research, especially as it pertains to assessing nexuses established in the study within the remit of other regional blocks, especially in the light of the ongoing Russian-Ukrainian war. Moreover, engaging country-specific studies is also

worthwhile for more country-specific policy implications, especially for countries not using the same currency like it is presently the case of countries in the CEMAC region.

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Appendices

Appendix 1: Description of Variables

Variable	Description	Source	Expected sign (s)
$GDPgrowth$	Real GDP growth rate	WDI	
$infl$	Inflation	WDI	+/-
$debt$	Public debt	IMF	-
Inv	Ratio of private sector gross fixed capital formation to GDP	WDI	+
oil	petrol	OCDE	+
$bdef$	Ratio of public expenditure to GDP	WDI	+/-
pop	Population growth rate	WDI	+/-
$M2$	Money Supply	IMF	+/-

Appendix 2: Descriptive statistics

	GDP growth	Infl	Inv	pop	M2	bdef	debt	Ouv
Mean	2.553281	2.803558	18.25285	2.880243	19.03411	-0.862564	42.52473	15.98205
Median	3.016705	2.281473	18.22844	2.801727	17.76611	-2.615929	40.36861	13.79628
Maximum	33.62937	18.08784	19.75405	4.654917	36.35704	23.21475	122.5911	70.32123
Minimum	-36.39198	-8.069719	17.77586	0.259648	5.920290	-18.39408	0.488086	-20.3341
Std. Dev.	7.469505	3.771828	0.173064	0.938818	6.636002	8.090709	26.85979	20.95081
Skewness	-0.23908	1.073014	6.538453	-0.529358	0.196840	0.689716	0.811355	0.309017
Kurtosis	12.39411	6.336404	55.87083	3.624929	2.669695	3.722391	3.365468	2.168312
Jarque-Bera	398.1511	70.81662	13348.48	6.801364	1.188387	10.91106	12.45039	4.831516
Probability	0.000000	0.000000	0.000000	0.033351	0.552008	0.004273	0.001979	0.089300
Sum	275.7543	302.7843	1971.308	311.0663	2055.684	-93.15693	4592.671	1726.062
Sum Sq. Dev.	5969.906	1522.256	3.204782	94.30765	4711.908	7004.175	77194.98	46966.22
Observations	108	108	108	108	108	108	108	108