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Moderating the Effect of Institutional Quality on the Fiscal Policy and Economic Growth Nexus: What Evidence Exists in Sub-Saharan Africa?

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Abstract

This study investigates the moderating effect of institutional quality on the fiscal policy-economic growth nexus in 38 Sub-Saharan African (SSA) countries between 2006 and 2022. This study complements the existing literature by providing the moderating effect of institutional quality on the nexus, utilizing the principal component analysis (PCA) to generate an institutional quality index that was employed in analyzing the fiscal policy-economic growth model. Utilizing the dynamic panel generalized method of moments (GMM), the study found a linear or direct fiscal policy that has a distinct positive impact on economic growth. The study found that the interaction between institutional quality and fiscal policy exerts a negative and significant effect on economic growth. This finding implies that institutional quality potentially decelerates economic growth in SSA economies. The results also demonstrate a potential feedback effect of economic growth on fiscal policy, thus validating the feedback hypothesis. While these findings were consistent with some existing studies, the study lays claim to novelty by investigating the fiscal policy-growth model and incorporating the moderating effect of institutional quality. Therefore, policies promoting improved institutions and fiscal viability in terms of resource mobilization and government expenditure should be implemented to ensure Sub-Saharan Africa's economic growth.

Keywords Institutions · Non-causality · Policy · Fiscal · Growth

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Introduction

Economic upheavals such as economic/financial crises and health challenges (for instance, the emerging COVID-19 health pandemic) have re-enforced the need to harness fiscal policy instruments in ensuring economic stability, especially since the financial and health crises exposed the inadequacies of solely relying on monetary policies. The debate on fiscal policy effectiveness and its effect on growth has been raging through the years, especially among developing economies. People think of fiscal policy as the way that authorities (governments) change the amount of money they spend to affect economic growth (Agu et al., 2015). This idea is very important in Keynesian theory, which opines that governments can boost growth through sound spending and taxation policies. Optimal fiscal policy is seen as a *sine qua non* in the growth trajectory and addresses critical growth issues such as unemployment, poverty, and investment, among others. According to Keynesian theory, changing (increasing or decreasing) public expenditure and taxation based on predetermined expenditure multipliers affects economic growth. This will thus affect production positively via socioeconomic activities, despite market imperfections.

It is imperative to note that fiscal policy constitutes a prerequisite to achieving macroeconomic stability and growth sustainability through optimal income and revenue generation, poverty alleviation via taxation, and public expenditure (Lopez et al., 2010; Zulfiqar, 2018). With re-occurring financial crises both at national and global levels, the need to adopt a sound fiscal policy framework cannot be overemphasized. In both the Keynesian and endogenous growth models, fiscal policy plays a central role. In addition, for fiscal policies to be more efficient and effective, there is a need for high-quality institutions. These institutions have the capacity to ensure economic growth through the prevention of rent-seeking and free-riding behaviors, investment stimulation, and collaborations, both locally and globally. On the other hand, weak institutions can potentially result in inefficiency, poor governance, and fraudulent practices. These and other negative outcomes can adversely impede investment and economic growth (Acemoglu, 2010; North, 1990). In addition, such weak institutions can cause political instability and security challenges.

Through the years, the SSA region has been experiencing fiscal policy misalignment and poor-quality institutions (Nkalu & Agu, 2023; Gupta et al., 2022). Given these persistent characteristics, SSA's macroeconomic stability can only be investigated through a conscious appraisal of the fiscal policy-institutional quality-economic growth framework. This is interesting since the region is home to the poorest country and the most corrupt economy in the world. In spite of the huge natural and human resources in the region, it still lags behind economically. Several years of foreign aid and assistance have not improved the economic position of the region. According to Nair et al. (2021), 24 economies in the region are classified as low-income given a gross national income (GNI) per capita of $1,025 or less, with this variable being 7 times less than the world average in 2018. The gross domestic product (GDP) of SSA nations has increased by 5% annually on

average over the past 40 years, while real GDP per capita has increased by 2%. The enhancement of institutional quality is possibly associated with these favorable trends. The appalling economic performance of the SSA's member nations has sparked an important debate about the type and quality of the region's institutions as well as the direction of economic growth. Despite having seen steady growth for nearly 40 years, the SSA region lags behind most other developing regions in the world, especially South Asia and Latin America. Interestingly, between 1980 and 2020, GDP per capita grew at an average rate of -0.9. Comparatively, the growth rates in South Asia were 4.5%, East Asia was 4.7%, and Latin America was 0.9% (World Bank, 2022).

Institution-wise, the region has performed dismally, with a huge prevalence of low-quality institutions. Nair et al. (2021) showed that poor institutional quality in the region has resulted in a high rate of corruption and other fraudulent practices, which have dampened economic growth in the region. The poor institutional quality has been argued to be a contributing factor to extra-budgetary expenditure, which is prevalent in the region. SSA countries have usually depended on supplementary budgets to finance their expenditures. Cases of bribery and corruption have been reoccurring in government institutions in SSA. The World Governance Indicators (WGI, 2020) showed that SSA countries have generally failed to attain the parameters of institutional quality such as good governance, accountability, rule of law, citizen participation, and reduction of violence, among others (Ajide & Alimi, 2019).

Governments in the region have embarked on several structural adjustment programs to correct the fiscal issues emanating from fiscal policy misalignment. The effectiveness of such policy options remains debatable. However, the region continues to experience huge government expenditures and an exploding debt overhang (Comelli et al., 2023; Sandow et al., 2022). The region, locally and globally, has continued to experience economic and financial crises that have crippled economic growth in SSA. If left unchecked, the current trajectory will further result in more debt (domestic and external) crises (Nair et al., 2021). The current fiscal position of SSA has placed policymakers and government authorities under extreme pressure, given that macroeconomic volatility and vulnerability have the potential to exacerbate economic crises with adverse ripple effects. Over the last decade, SSA countries' fiscal situations have deteriorated significantly. There were evident indicators of substantial debt in the region at the time, prompting the international community to launch the Heavily Indebted Poor Countries (HIPC) program in the region. The HIPC initiative, in collaboration with the Multilateral Debt Relief Initiative (MDRI), offered significant debt relief to 30 SSA states. While the tax burden was first reduced, the debt load has since grown. The rising COVID-19 epidemic, as well as the impacts of the Russia-Ukraine crisis, have recently heightened SSA's sensitivity to debt. As a result, empirical research on the relationship between fiscal policy, institutional quality, and regional economic growth is required.

There are two strands of empirical literature on the fiscal policy-growth trajectory in SSA. The first covers regional studies (Aremo & Abiodun, 2020; Ayana, 2022; Chabossou, 2017; Nabieu et al., 2021; Ugwuanyi & Ugwunta, 2017), while the second is country-specific (Addai et al., 2022; Agu et al., 2015; Babalola, 2015; Mengistu, 2022; Nuru & Gereziher, 2022; Tendengu et al., 2022). These

empirical studies resulted in contrasting outcomes, ranging from positive and negative to neutral effects. Notwithstanding the outcomes of previous empirical studies, the existing empirical studies did not incorporate the influence of institutional factors in the growth process of Keynesian theory. The theory proposed that increasing government spending, ceteris paribus, accelerates economic growth (Easterly & Rebelo, 1993; Mauro, 1995). The potential of government expenditure to accelerate growth has long been the subject of empirical and theoretical discussion, with some advocating that government intervention in economic activity is crucial for economic growth, while others contend bureaucratic bottlenecks, and inefficiency in government processes will decelerate or stifle growth (Folster & Henrekson, 2001; Chrystal & Price, 1994). Thus, the debate about the fiscal policy-growth trajectory is negative, positive, or indeterminate. The outcome of the relationship cannot be fully captured without incorporating institutional effects in the nexus, since the efficacy of fiscal policies depends largely on the level of institutional quality of the economic unit or region.

The role of institutions in the growth process has also been an issue of great importance in SSA. Although the need to strengthen institutions in the sub-region to stimulate growth has long been expressed, there has been a resurgence of interest in the issue in recent times, especially due to differences in institutions as well as the channel(s) via which institutional activities may influence growth across the sub-region. Several studies have been carried out to validate the axiom that the quality of institutions determines, to a large extent, economic performance in SSA (Abubakar, 2020; Fayissa & Nsiah, 2013; Kumssa & Mbeche, 2004; Wandeda et al., 2021a, b). Different parts of SSA have different levels of how institutions affect economic performance (Epaphra & Kombe, 2017; Wandeda et al., 2021a, b). This is mainly because institutions are weak and ineffective when it comes to fighting corruption, upholding the law, preventing political interference, and managing resources poorly (Kumssa & Mbeche, 2004).

It is imperative to note that the viability and sustainability of fiscal policy depend largely on institutional quality. Substantial evidence abounds that suggests that even growth-enhancing fiscal policies are generally ineffective in the presence of weak institutions (Banerjee & Iyer, 2002; Easterly, 2002). Thus, due to their deleterious effects on fiscal policies, weak institutions generally undermine economic performance. Discussions about whether the amount of government expenditure should be varied given the state of economic progress in SSA have led to the need for a more in-depth investigation to revisit the impacts of government spending and institutions on economic growth. This study aims to demonstrate the critical role institutions play in ensuring cautious government spending and how strong institutions help to accomplish this. It is thus imperative to re-appraise the fiscal policy growth nexus with institutional factors embedded, given that most economies in SSA have been experiencing fiscal deficits alongside decelerating or even negative economic growth rates in recent years, especially in the post-COVID-19 era. According to Efayena et al. (2023), there are several advantages to adapting a panel analysis in evaluating economic phenomena, especially in SSA, among which are the robust application of inferences and policy relevance.

Our contribution to the existing literature is twofold. First, we investigate the dynamic stance of the fiscal policy-growth model, incorporating institutional factors in economies in SSA. In other words, this study contributes to the extant studies by examining empirical evidence of the moderating effect of institutional quality on the fiscal policy-growth nexus in SSA. Second, we examine possible reversal causality in the fiscal policy-growth nexus. Previous studies such as Wandeda et al., (2021a, b), Ayana (2022), Fayissa et al. (2013), among others, were focused on accessing individual variables along with economic growth. This approach has severely limited the scope of the applicability of economic policies drawn from these studies. From an empirical perspective, the results of our study highlight how crucial regulating fiscal policy amidst market imperfections in SSA is to ensuring economic growth and stability. Following this introduction, the paper is structured as follows: Sect. 2 covers the methodology of the study, while Sect. 3 presents the results and discussion of findings drawn from the empirical analysis. The study was concluded in Sect. 4 with policy recommendations.

Literature Review

There is a plethora of empirical studies on the impact of fiscal policy on economic growth in both country-specific and panel studies. For instance, utilizing a panel of 36 economies in SSA between 2011 and 2021 in a GMM framework, Ayana et al. (2023) found that fiscal policy negatively impacts growth. As for Diyoke et al. (2017), the study found a significant long-run nexus between growth and government spending in SSA while utilizing data between 1980 and 2015. The GMM estimates also showed that the variables are negatively related. Thus, the study suggested that fiscal policies in the region should be project-driven and prioritized.

Ahuja and Pandit (2020) analyzed the nexus between government spending and growth among 59 emerging economies between 1990 and 2019. Utilizing the fixed effect model, the study found a positive and significant impact of government expenditure on growth among the economies. Undertaking a sector-by-sector approach, Wandeda et al. (2021a) found that education expenditure and health expenditure positively impacted growth in SSA between 2006 and 2018, while employing the GMM approach. The study thus recommends that SSA economies should prioritize spending on health and education above military expenditures.

Gnangoin et al. (2019) analyzed the impact of public expenditure on the growth of ECOWAS economies utilizing GMM techniques. The study concluded that total public expenditure did not positively impact the growth of most ECOWAS economies in both the short run and long run. The study of Paparas et al. (2015) takes a panel approach, utilizing the data of economies in the European Union. The study employed several econometric techniques, such as fixed effects, OLS, random effects, and GMM. The results showed mixed findings, with a strong and negative effect observed in some of the regressions and a non-significant nexus found in others. The results also showed that the nexus was nonlinear in nature. While most panel studies established that fiscal policy positively impacts growth, Meniago and Eita (2022) found a negative nexus between economic growth and fiscal

policy among select CFA countries between 1995 and 2017 using the system GMM technique. In the same way, Ouattara (2017) and Ubi-Abai and Ekere (2018) used a panel of economies in the West African Economic and Monetary Union to find that fiscal policy had a small positive effect on growth, but that the elasticity of public expenditure was negative across member nations.

Country-specific studies also showed some interesting findings. For instance, Agu et al. (2015) focused on several fiscal policy components in Nigeria between 1961 and 2010 using the multiple OLS technique. The study found a positive impact of fiscal policy on growth in Nigeria during the period under examination. The study by Babalola (2015) arrived at a similar conclusion, although it was only significant in the short run. The study utilized data between 1981 and 2013 using error correction and cointegration techniques. Simon (2012) conducted a study using data from Zimbabwe between 1980 and 2010. The error correction model showed a positive effect of fiscal policy on growth in the short run.

For their part, Ejinkonye et al. (2023) investigated the impact of fiscal policy on growth in Nigeria between 2001 and 2021, employing the OLS technique. The estimation resulted in mixed findings, with recurrent expenditure exerting a positive and significant impact on growth while capital expenditure adversely impacts growth in Nigeria. Such heterogenous effects have the potential to influence fiscal policies in Nigeria. Nwankwo et al. (2017) utilized data between 1970 and 2014 in Nigeria. The study found a long-run relationship between the variables. The study by Nwamuo (2020) corroborated this. Utilizing data between 1981 and 2018, the study established a long-run nexus between growth and fiscal policy in Nigeria. Specifically, both domestic and external debts impact growth positively during the period under consideration.

The study of Pamba (2022) utilized autoregression VAR in examining the effectiveness of fiscal policy on growth in South Africa between 1980 and 2020. The study has mixed findings, depending on the fiscal policy proxy. For instance, fixed capital formation and government expenditure have positive impacts on growth, but government deficits have an adverse effect on growth. Nuru and Gereziher (2022) investigated both the long-run and short-run asymmetric effects of fiscal policy on growth in South Africa. Using data ranging from $2004Q_2$ to $2018Q_1$ in a nonlinear autoregressive distributed lag (ARDL) framework, the study found that the nexus was largely negative. Another South African study by Tendengu et al. (2022), which was carried out on a dataset between 1988 and 2018 utilizing the ARDL technique, showed a positive nexus between fiscal policy (proxied by taxation, public sector consumption, and public sector expenditure) and growth. A similar conclusion was reached by a study carried out by Al-kasasbeh et al. (2022) in Jordan.

In the same vein, Daoudi (2023) employed the structural VAR in appraising the fiscal policy-growth nexus in Algeria. The study found that public expenditure has a positive influence on growth in Algeria, but this impact diminishes with time, transitioning to a negative impact in the medium and long run. A positive impact of fiscal policy on growth was also found in the study of Maheswaranathan and Jeewanthi (2021). The study employed the ARDL technique, utilizing Sri Lankan economic data between 1990 and 2019.

In addition, utilizing a nonlinear ARDL, Yusuf and Mohd (2021) investigated the asymmetric effects of fiscal policy on growth in Nigeria. The outcome was an asymmetrical nexus between the variables. Another study conducted in Nigeria by Titiloye and Ishola (2020) also utilized the ARDL model on data between 1989 and 2018. The study found a significant relationship between fiscal policy and growth. Tiony (2023) utilized vector autoregression (VAR) in examining the effect of fiscal policy on growth in Kenya between 1998 and 2023. A positive effect was obtained, and this has several implications for policymaking. Aliyu et al. (2019) reached a similar conclusion. Their study employed data between 1981 and 2016, utilizing a cointegration test and an error correction model. As for Igwe et al. (2015), the vector error correction model (VECM) was employed in assessing the effect of fiscal policy on growth in Nigeria between 1970 and 2012. The study found that fiscal policy stimulates growth in the long run.

Several studies exist on the nexus between institutional quality and growth in SSA economies and others outside SSA. For instance, Gardezi et al. (2022) examined the nexus in Pakistan between 1996 and 2020. The study established that institutional quality positively impacted growth in Pakistan in both the long run and the short run.

A recent study by Hussen (2023) showed that highly quality institutions have the potential to stimulate growth. The study used panel data from 31 SSA economies from 1991 to 2015 in a two-step system GMM framework and found a positive nexus between the variables. Nguyen et al. (2018) carried out another panel study. The study employed the data of 29 emerging economies between 2002 and 2015, utilizing the system GMM. The study found that institutional quality has a positive impact on growth. A similar conclusion was reached in the study of Gibogwe et al. (2022), which investigated the nexus in Tanzania utilizing the ARDL technique using data ranging from 1990 to 2021.

It should be noted that only a few studies exist on the interaction effect of institutional quality and fiscal policy on growth. For instance, Ayana et al. (2023) utilized the two-step system GMM on a dataset of 36 countries in SSA between 2011 and 2021. The study found that, though the effect of fiscal policy on economic growth was negative, the interactive effect of governance indicators and fiscal policy on economic growth was positive. The study of Meniago and Eita (2022) on selected CFA economies between 1995 and 2017 showed mixed findings on the interaction terms, using several governance indicators. Afonso and Jalles (2015) have previously established, using an unbalanced panel of 108 heterogenous economies between 1970 and 2008 in a system GMM framework, that there is a positive growth effect of institutional quality on the fiscal policy-growth nexus. This finding is corroborated by other empirical studies (Arvin et al., 2021; Bassey & Egwu, 2019; Ishaku et al., 2021).

A review of empirical studies shows a paucity of empirical studies on the moderating role of institutional quality on the fiscal policy-growth nexus in SSA. A major shortcoming of previous studies such as Ayana et al. (2023) is that utilizing governance indicators may result in issues of multicollinearity due to the close relationship among the variables. This may severely affect the econometric

outcome of the estimation. This was possibly the case in Meniago and Eita (2022), with the interaction variables having mixed findings.

Material and Methodology

Theoretical Framework

In investigating the effect of institutions and fiscal policy on growth, we adopted the Barro (1990) endogenous growth model as synthesized in several developed models (see d'Agostino et al., 2016; Mittnik & Neumann, 2003; Deverajan et al., 1996). The model allows for a non-monotonic economic growth-government expenditure nexus. The model begins with a constant elasticity of substitution (CES) functional representation given as follows:

$$q = \left[\alpha k^{-\vartheta} + \beta G^{-\vartheta}\right]^{-\frac{1}{\vartheta}}; \vartheta \geq 1, \alpha + \beta = 1 \tag{1}$$

where q is output, k is private capital stock, and G is government spending. The assumption that government spending, G, is a non-perfect substitute for private input is feasible, given that the following conditions must be satisfied:

$$\dot{k} = (1 - \zeta)\left[\alpha k^{-\vartheta} + \beta G^{-\vartheta}\right]^{-\frac{1}{\vartheta}} - c \tag{2}$$

The variable $\dot{k}$ denotes private input growth across time; the income tax rate is given as ζ; and c is households' consumption level. Thus, a rational individual maximizes a lifetime utility, U, by picking a consumption level given as c_t. Given a discount rate δ, and an assumed isoelastic utility, the utility function is thus given:

$$u\left(c_t\right) = \frac{c^{1-\eta} - 1}{(1 - \eta)} \tag{3}$$

Note that η denotes the intertemporal elasticity of substitution of consumption. A rational individual will strive to maximize the utility function given below:

$$U = \int_0^{\infty} u\left(c_t\right) e^{-\delta t}.dt \tag{4}$$

Given the above expression, the size of government or the share of public expenditure is given as follows:

$$\zeta = \frac{G}{q} \tag{5}$$

To examine the effect of government spending on economic growth, we assume output to be given as follows:

$$\varphi = \frac{\dot{c}}{c} = \frac{1}{\eta}\left[(1-\zeta)q\prime\right] - \delta \tag{6}$$

From the above expression, φ denotes the private capital marginal product. Following d'Agostino et al. (2016), Eq. (3) can be incorporated into Eq. (4), and the resultant expression can be maximized subject to Eq. (2). The resulting expression is given as follows:

$$\varphi = \frac{\dot{c}}{c} = \frac{1}{\eta}\left[(1-\zeta)\alpha^{-\frac{1}{\vartheta}}\right]\left[\frac{\left(1-\zeta\beta^{-\frac{1}{\vartheta}}\right)^{(1+\vartheta)} + \beta^{-\frac{1+\vartheta}{\vartheta\zeta}+\vartheta}}{\left(1-\zeta\beta^{-\frac{1}{\vartheta}}\right)^{(1+\vartheta)}}\right] - \delta \tag{7}$$

The above expression is the standard endogenous growth model. It should be noted that β represents the government spending parameter. Let the steady state consumption growth rate, π, be given as follows:

$$\pi = \frac{\alpha(1-\zeta)\left\{\frac{\alpha\zeta^{\vartheta}}{\left[\zeta^{\vartheta}-\beta\mu^{-\vartheta}-\varphi(1-\mu)^{-\vartheta}\right]}\right\}^{-\frac{1+\vartheta}{\vartheta}} - \delta}{\eta} \tag{8}$$

where μ denotes the share of government spending on consumption. Thus, the relationship between government spending and growth rate is given as follows:

$$\frac{\partial\pi}{\partial\mu} = \frac{\alpha(1-\zeta)(1+\vartheta)[\alpha\zeta^{\vartheta}]^{-\frac{1+\vartheta}{\vartheta}}\left[\beta\mu^{-(1+\vartheta)} - \varphi(1-\mu)^{-(1+\vartheta)}\right]}{\eta\left[\zeta^{\vartheta} - \beta\mu^{-\vartheta} - \varphi(1-\mu)^{-\vartheta}\right]^{-\frac{1}{\vartheta}}} \tag{9}$$

If government spending is productive, Eq. (9) is positive. Thus, output, Q, is a function of government spending (G) and capital stock (K). This can be expressed in a Cobb–Douglas production function as follows:

$$Q_{it} = K_{it}^{\gamma}G_{it}^{\tau}(A_{it}L_{it})^{1-\gamma-\tau};0<\gamma<1;0<\tau<1;0<\gamma+\tau<1 \tag{10}$$

One of the important variables in the above expression is the technological level (A). A basic assumption about this variable is that it grows at a constant rate ρ (Afonso & Jalles, 2015). The technological function can be expressed as follows:

$$A_{it} = A_{i0}e^{\rho_i t + I_{it}\delta_i} \tag{11}$$

The above shows that the level of technology is dependent on the institutional quality (I) of the economy. Explicitly, an effective and efficient institutional system is a sine qua non for economic growth (North, 1990). To ensure growth, institution quality should be tenuously pursued both at the national and regional levels.

Empirical Model

Drawing from the theoretical framework presented above, we are extending the endogenous growth model to examine the scenario in SSA. Thus, the model mathematical function is specified as follows:

$$GDPPC_{it} = \delta_1 + \delta_2 FP_{it} + \delta_3 TR_{it} + \delta_4 GD_{it} + \delta_5 FDI_{it} + \delta_6 OPN_{it} + \delta_7 IV_{it} + \varphi_i + u_{it} \tag{12}$$

The dependent variable, GDPPC, is the logarithm of *GDP per capita*. FP denotes fiscal policy, which is captured by the ratio of overall fiscal balance to GDP; TR denotes tax revenue as a per cent of GDP; FDI denotes foreign direct investment net inflows as a per cent of GDP; GD denotes central government debt as a per cent of GDP; OPN denotes openness, derived from the sum of imports and exports as a percentage of GDP; and IV denotes institutional variable. In the model, unobservable country-specific effects are captured by φ, while δ_1–δ_7 are variable parameters.

Following Madni and Chaudhary (2017), as well as Butkiewicz and Yanikkaya (2011), we employed the principal component analysis (PCA) technique to create an institutional quality measure, *IV*. PCA is a statistical method that converts a set of data with potential variable correlation into an array of uncorrelated linear variables via an orthogonal transformation. We utilized the different institutional variables in the PCA following Hussen (2023). The variables adapted are governance effectiveness (GE), rule of law (RL), regulatory quality (RQ), political stability and absence of violence/terrorism (PSAV), voice and accountability (VA), and control of corruption (CC). The time and country variables are denoted by subscripts *t* and *i*, respectively, and the error term, which is assumed to be identically and independently distributed, is given by *u*.

We further incorporated the variable that shows the interaction of institution quality and fiscal policy into Eq. (12). The resulting expression is given as follows:

$$\begin{aligned} GDPPC_{it} = {} & \delta_1 + \delta_2 FP_{it} + \delta_3 TR_{it} \\ & + \delta_4 GD_{it} + \delta_5 FDI_{it} + \delta_6 OPN_{it} \\ & + \delta_7 IV_{it} + \delta_8 (FP_{it} * IV_{it}) + \varphi_i + u_{it} \end{aligned} \tag{13}$$

As can be observed, Eq. (13) provides a distinct effect of the interaction between fiscal policy and institutional quality on growth. It should be noted that the marginal effect of fiscal policy on growth can be captured by taking partial derivatives of Eq. (13) with respect to fiscal policy. This can be expressed as follows:

$$\frac{\partial GDPPC_{it}}{\partial FP_{it}} = \delta_2 + \delta_8 \tag{14}$$

The effect of institutional quality on the fiscal policy-economic growth nexus is conditional on δ_2 and δ_8. There exist four distinct outcomes:

- If both δ_2 and δ_8 exceed zero, it implies that fiscal policy positively impacts growth, and this relationship is complemented and enhanced by institutional quality.

- If $\delta_2 > 0$ and $\delta_8 < 0$, it is indicative that fiscal policy positively stimulates economic growth, but institutional quality has a dampening effect on the nexus.
- If $\delta_2 < 0$ and $\delta_8 > 0$, it is indicative that fiscal policy negatively impacts economic growth, but institutional quality has a dampening effect on the nexus.
- If $\delta_2 < 0$ and $\delta_8 < 0$, it is indicative that fiscal policy negatively impacts economic growth, but institutional quality has an aggravating effect on the nexus.

In estimating Eq. (13), we employed the panel dynamic generalized method of moments (PGMM) approach following Beck et al. (2000). This technique was chosen given its ability to address the issue of endogeneity using instrumental variables. Our dataset was appropriate since the cross-sectional units (countries) exceeded the time period (Roodman, 2009). We employed the two-step GMM proposed by Arellano and Bond (1991) to provide consistent and unbiased estimates that are also asymptotically more efficient and reliable than estimates of the one-step GMM. We also employed the Sargen tests of over-identifying restrictions to test the validity of the instruments employed in the model.

Pre-estimation Tests

Before estimating the econometric models, several tests were carried out.

Panel Cointegration Tests

The investigation employed panel cointegration tests proposed by Kao (1999) and Pedroni (1999, 2004). The tests are intended to validate the existence or otherwise of a long-run nexus among the variables. The test in this study is specifically used to demonstrate if such a relationship persists or exists between fiscal policy and economic growth. Specifically, the Pedroni regression is given as follows:

$$q_{i,t} = \theta_i + \rho_i t + \alpha_{1i} x_{1i,t} + \alpha_{2i} x_{2i,t} + \cdots + \alpha_{Vi} x_{Vi,t} + e_{i,t} (15)$$

$$for\, t = 1, \ldots, T; i = 1, \ldots, N; v = 1, \ldots, V$$

In Eq. (15), T stands for the number of observations, N for the number of panel members (individual countries), and V for regression variables. Four panel cointegration statistics and three group-mean panel cointegration statistics. The Kao (1999) cointegration test is a single regressor residual-based and parametric test with five tests. In addition to the above, we also carried out the cross-sectional dependence (CD), homogeneity, and panel unit root (PUR) tests.

Data

The study utilized data from 38 SSA countries from 2006 to 2022. Data accessibility and availability were key factors in the choice of these economies. We adopted a balanced panel. This approach enhances the applicability of the findings derived

(see Efayena et al., 2022). The data were sourced from the World Governance Indicators (WGI) and the World Development Indicators (WDI) databases.

Results and Discussion

Preliminary Results

Correlation Test

We began this section with the correlation test. The pairwise correlation results presented in Table 1 showed that collinearity does not constitute a major issue among the variables employed in the study. The variables have a relatively low correlation as observed in the resulting coefficients.

Homogeneity and Cross-Sectional Dependence Tests

In ensuring heterogeneity of the slope coefficients, we adopted the Pesaran and Yamagata (2008) as well as the Blomquist and Westerlund (2013) techniques. We also examined the cross-sectional dependency of the variables employed (Pesaran, 2004). The outcomes of these tests (see Table 2) have several implications.

At a 1% and 5% level of significance, the data in the Cross-sectional dependence test demonstrated cross-sectional dependence between the variables. The null hypothesis of homogeneous slope coefficients is rejected given the statistics in the Homogeneity test. Instead, it is impossible to rule out the alternative hypothesis, which posits heterogeneous slope coefficients.

Panel Unit Root (PUR) Tests

To profile the stationarity properties of the dataset utilized in this research, we employed several *PUR* tests including ADF-Fisher, Im, Pesaran and Shin (IPS), and

Table 1 Pairwise correlation

Variable	FDI	FP	GD	GDPPC	IV	OPN	TR
FDI	1.0000						
FP	-0.2793	1.0000					
GD	0.2209	-0.3517	1.0000				
GDPPC	0.4137	-0.1736	-0.4892	1.0000			
IV	-0.1102	-0.2368	0.3824	-0.2987	1.0000		
OPN	0.1753	0.2217	0.1835	0.1517	-0.3716	1.0000	
TR	0.1561	-0.1639	0.3116	0.1851	0.2071	0.1782	1.0000

Authors' computation

Table 2 Homogeneity and cross-sectional dependency test

Cross-sectional dependence test H_0: *No cross-section dependence*							
Test	FDI	FP	GD	GDPPC	IV	OPN	TR
Breusch-Pagan LM	115.21 (0.00)	101.48 (0.01)	127.43 (0.00)	117.13 (0.00)	151.34 (0.00)	127.01 (0.00)	103.11 (0.00)
Pesaran Scaled LM	21.61 (0.01)	47.11 (0.02)	114.17 (0.01)	58.28 (0.00)	84.51 (0.01)	96.28 (0.00)	44.32 (0.00)
Bias-corrected scaled LM	18.75 (0.00)	14.69 (0.00)	106.17 (0.00)	51.87 (0.04)	61.73 (0.00)	59.64 (0.00)	22.07 (0.00)
Pesaran CD	13.24 (0.01)	7.36 (0.00)	41.86 (0.02)	8.78 (0.00)	13.57 (0.00)	36.51 (0.02)	16.57 (0.00)
Homogeneity test							
Statistics	Blomquist and Westerlund (2013)				Pesaran and Yamagata (2008)		
Delta	8.24 (0.00)				15.71 (0.00)		
Delta_adj	6.19 (0.01)				18.07 (0.00)		

Authors' compilation

p value in parenthesis

Levin, Lin, and Chu (LLC) tests (Im et al., 2003; Levin et al., 2002; Maddala & Wu, 1999). The resulting estimates are presented in Table 3.

According to the estimates in Table 3, the employed variables are integrated in mixed order [at levels, *I(0)* and first differences, *I(1)*]. That is, the variables are integrated in the order of zero (0) and one (1). The variables are stationary at levels except *FP* (fiscal policy), which attained stationarity at the first difference. The application of a panel ARDL is therefore appropriate.

Panel Cointegration Tests (PCTs)

Having established that the variables are a mix of *I(0)* vis-à-vis *I(1)*, we examined the long-run relation among the variables utilizing the Kao (1999) and Pedroni (1999) panel cointegration tests. Table 4 gives the results obtained.

Based on the statistical significance levels of the test statistics, the estimated panel cointegration results indicate the presence of a cointegration relationship among the variables. This is indicative of a long-run nexus between economic growth and the covariates.

GMM Results

The results of the two-step GMM model are presented in Table 5. From the results, the Sargen test shows that the instruments adopted are uncorrelated with the error term. Thus, the null hypothesis was accepted. This implies that the instrumental variables utilized in the study are valid and reliable. The model does not suffer from serial correlation, given the AR(2) value.

Table 3 PUR tests' results

		Level		First difference		
Tests	Variables	C	C + T	C	C + T	Decision
	FDI	-14.27***	-12.01***	-	-	Stationary
	FP	6.11	4.39	-18.53***	-13.71***	″
LLC	GD	-3.92***	-2.79***	-	-	″
	GDPPC	-13.29***	-9.77***	-	-	″
	IV	-5.11***	-2.69***	-	-	″
	OPN	-11.74***	-8.09***	-	-	“
	TR	-3.88***	-2.75***	-	-	“
	FDI	-10.61***	-9.23***	-	-	″
	FP	8.46	5.94	-34.64***	-31.27***	″
IPS	GD	-10.93***	-7.48***	-	-	″
	GDPPC	-5.66***	-3.81***	-	-	″
	IV	-2.85**	-1.95**	-	-	″
	OPN	-3.87***	-2.18**	-	-	“
	TR	-10.57***	-7.05***			“
	FDI	130.95***	232.52***	-	-	″
	FP	15.08	24.11	210.14***	225.15***	″
ADF-Fisher	GD	88.13***	81.52***	-	-	″
Chi-square	GDPPC	119.33***	122.73***	-	-	″
	IV	200.05***	219.27***	-	-	″
	OPN	88.24***	62.18***	-	-	“
	TR	211.05***	209.43***	-	-	“

Authors' compilation

*** and ** significant at 1% and 5%, respectively; *C* constant, *C* + *T* constant and trend

The estimates are also highly robust with a significant F-statistic value. The GMM estimates presented in Table 5 show that the lagged GDPPC has a positive and significant impact on its current value. The variable is statistically significant

Table 4 PCTs results

Pedroni (1999) *test*	*Coefficient*	Kao (1999) *test*	*Coefficient*
Panel v-statistic	5.18***	DF	-1.62*
Panel ρ-statistic	-12.71**	DF^{ρ}	-4.81***
Panel non-parametric (PP) t-statistic	-4.98	DF^{t}	-5.74***
Panel parametric (ADF) t-statistic	-109.48***	$DF^{\rho *}$	-3.66***
Group ρ-statistic	-16.11***	ADF^{t*}	-1.83**
Group non-parametric t-statistic	-5.09***		
Group parametric t-statistic	-3.75***		

Authors' compilation

***, **, and * are significant at 1%, 5%, and 10%, respectively; *C* constant, *C* + *T* constant and trend

Table 5 Panel GMM results

Dependent variable: GDPPC		
Variable	**Coefficient**	**Prob value**
GDPPC(-1)	0.6183***	0.0000
FP	0.0516***	0.0000
IV	0.2033**	0.0135
OPN	0.0181	0.1831
FDI	0.6227*	0.0562
GD	-0.1586**	0.0428
TR	0.3011	0.2168
(FP*IV)	-0.5275**	0.0310
F-stat [Wald test]	294.7251***	0.0000
Sargan test		0.4391
Serial correlation test [AR(2)]		0.6718

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***, **, and * are significant at 1%, 5%, and 10%, respectively

at the 1 percent level. This variable indicates that previous growth levels have a significant influence on the current GDP per capita in SSA. This invalidates the utilization of static models such as random effects, ordinary least squares, and fixed effects. It shows the appropriateness of adopting a dynamic panel model. The estimates also show that fiscal policy exerts a significant and positive impact on growth in SSA at the 1 percent significance level. This conformed to previous studies (Agu et al., 2015; Akinlo, 2016; Efayena & Buzugbe, 2021; Fayissa & Nsiah, 2013; Ogbuabor et al., 2020; Osabiyi et al., 2019), but contrasts with the studies of Siddiqui and Ahmed (2013), Hashim Osman et al. (2011), and Slesman et al. (2015). This finding underscores the need to propagate viable fiscal policies in the region to stimulate and enhance growth.

Table 5 also shows that institutional quality positively influences economic growth in SSA. The coefficient value of 0.2033 is significant statistically at the 5 percent significance level. This finding corroborates those of Ayana et al. (2023), Olaniyi and Oladeji (2021), Gnangoin et al. (2019), and Ndiaye (2018). The trade openness (OPN), which controls for external competitiveness, is positive but statistically insignificant. A possible reason for the observed insignificance of this variable could be attributed to the non-competitive prices of SSA's production sector in the international market. Owing to economic crises such as inflation and energy challenges ravaging the sub-region, the export level has been severely affected. Other control variables also presented some interesting facts. For instance, FDI positively impacts economic growth. Government debt (GD) negatively impacts economic growth. The tax revenue (TR) variable implies that tax revenue in the sub-region has not significantly impacted economic growth. This might be a result of poor accountability and transparency in the collection and distribution of tax money.

An important variable in the model is the variable that captures the interaction between fiscal policy and institutional quality (FP*IV) on economic growth in SSA.

From Table 5, the variable is negative (-0.5275) and statistically significant at the 5 percent level of significance. These findings contrast those of Ayana et al. (2023) that interacted fiscal policy with several governance indicators and found that the interaction positively impacted growth. The finding implies that institutional quality does not significantly stimulate fiscal policy to enhance growth positively in SSA. Instead, institutional quality decelerates the growth effect(s) of fiscal policy in the region. It should be noted that while fiscal policy directly stimulates growth, the reverse is the case when it interacts with institutional quality. This interactive variable (FP*IV) also shows that fiscal policy and institutional variables are both substitutes rather than complements in the economic growth process in SSA. *Ceteris paribus*, institutional quality is expected to complement fiscal policy to enhance growth. In other words, it is obvious that institutional quality and fiscal policy are substitutes rather than complements, and their interaction impedes growth in SSA. While fiscal policy has a favorable impact on growth, institutional quality dampens the positive effect.

Several reasons can be responsible for the adverse effect. In SSA, as in other regions, the influence of institutional quality on fiscal policy might exhibit variability contingent upon particular circumstances and historical determinants. The prevalence of corruption inside institutions is prevalent in most SSA countries. Corruption catalyzes the diversion of resources from their intended productive uses, impeding investment and eroding public trust in governmental institutions. This has the potential to impede economic growth due to its adverse effects on the efficiency of resource allocation and its deterrent impact on both domestic and international investment.

Additionally, SSA countries frequently experience political instability, which is characterized by a pattern of frequent governmental changes and sporadic conflicts. The presence of political instability can engender an atmosphere characterized by unpredictability, which can have adverse effects on the process of economic progress. Investors frequently exhibit reluctance when making commitments to long-term investments situated in regions characterized by instability. The situation is further worsened by the presence of inefficient and burdensome bureaucratic procedures, which have the potential to discourage entrepreneurial activities and impede the progress of economic development. The process of initiating and managing a firm sometimes entails the intricate and time-intensive undertaking of navigating several procedures, thereby deterring potential investments from both local and international sources.

Causality Test

The fiscal policy-economic growth nexus in SSA is hardly a one-way directional case. There is a high possibility of a feedback hypothesis. In other words, the possibility of a reverse influence of economic growth on fiscal policy is feasible. The Granger non-causality test was utilized to ascertain the possibility of a reverse effect (Juodis et al., 2021). Table 6 presents the results obtained from the test.

Table 6 Results of Granger non-causality test

Panel A	*Panel B*	
H_0: GDPPC does not Granger-cause FP	H_0: FP does not Granger-cause GDPPC	
H_1: GDPPC does Granger-cause FP for at least one-panel var	H_1: FP does Granger-cause GDPPC for at least one-panel var	
Results for the Half-Panel Jackknife estimator		
Cross-sectional heteroscedasticity-robust variance estimation		
Statistics	L1	L1
Coefficient	0.0328	0.1215
SE	0.0078	0.0371
z	4.16	3.28
P > z	0.000	0.000
BIC	-721.89811	-143.03611
HPJ Wald test	2.1935674	82.543138
p-value_HPJ	0.0229	0.0000

Authors' compilation

L1 number of lags, standard error is given as SE

In Panel A, *FP* assumes the dependent variable, while *GDPPC* takes the role of the independent variable, whereas in Panel B, there is a reversal in the role of the variables. From the results, the null hypotheses that GDPPC does not Granger-cause FP and that FP does not Granger-cause GDPPC were rejected at the 1 and 5 percent significance levels. By implication, there is a causality running from GDPPC to FP and from FP to GDPPC in at least one of the sampled SSA countries. This finding implies that fiscal policy determines future economic growth, *ceteris paribus*, as well as validates a potential feedback mechanism between economic growth and fiscal policy in SSA.

Conclusion

Fiscal policy undeniably has the potential to drive economic growth when effectively and efficiently implemented. The efficacy of fiscal policies is, however, better felt when implemented in a favorable economic climate with top-notch institutions or high-quality institutions. This study analyzes the moderating effect of institutional quality on the fiscal policy-economic growth framework in 38 SSA economies from 2006 to 2022. In spite of the importance of institutional factors, there is a paucity of existing studies on the moderating effect of institutional quality on the fiscal policy-economic growth in the region. To avoid endogeneity issues inherent in previous studies, this study utilized the dynamic GMM technique. The study further investigates the possibility of a reverse effect of economic growth on fiscal policy utilizing the Granger non-causality test.

After analyzing the dataset employing a two-step dynamic panel GMM, we found that fiscal policy has a clear and strong positive effect on growth in SSA. Specifically, the study shows that institutional quality positively influences economic growth in SSA with a coefficient of 0.2033, which is statistically significant. Although this conclusion was in tandem with previous studies (see Ayana et al., 2023; Olaniyi & Oladeji, 2021; Gnangoin et al., 2019; Ndiaye, 2018), these studies focus on an investigation of individual governance variables. This approach has the possibility of suffering from multicollinearity issues since the variables are collinear, thus making the estimates obtained highly biased and unreliable. However, in this study, the institutional quality was generated utilizing the PCA technique. The added value of this approach contributes to the reliability of the study's estimates. In addition, the interactive variable between fiscal policy and institutional quality negatively impacts economic growth in SSA. To the best of our knowledge, the only study that has investigated the moderating effect of institutional quality on the fiscal policy and growth nexus in SSA was that of Ayana et al. (2023). The nature of the nexus found in this study is in variance with those of Ayana et al. (2023). In other words, institutional quality is found to dampen the positive effect of fiscal policy on growth. This suggests that during the growth process, fiscal policy and institutional quality operate as substitutes rather than complements. This suggests that there are inherent vulnerabilities and defects in the institutional framework of SSA economies that facilitate opportunistic behavior and sharp practices. This dampens the region's fiscal policy's growth effects. This finding has more added value than previous studies since the institutional quality comprises all existing governance indicators, thus making the estimates derived therein more policy-relevant. In addition, the possibility of potential feedback, which implied a bi-directional causal relationship between both variables, was validated in the study. In other words, the results of the study support the validity of the feedback hypothesis.

These results have significant policy implications. SSA countries ought to conduct a comprehensive evaluation of the current institutional framework that regulates the functioning of individual and regional governments. This assessment should aim to identify any defects or deficiencies that undermine the capacity of fiscal policy to enhance growth. Drawing from the above, there is thus an urgent need for SSA countries to design viable fiscal policies that will stimulate and harness economic growth amidst dwindling business cycles. This can be achieved if conscientious efforts are made to distinguish between productive and unproductive expenditures and design fiscal policies that will encourage expenditure on productive sectors. There is also a need to diversify the SSA region to improve foreign investment in its productive sectors, especially those related to natural resources in which the region has a comparative advantage. Additionally, individual governments in the sub-region should improve their institutional structure as it relates to control of corruption, quality of governance, and regulatory quality to help spur economic growth and optimally maximize the economic potential of the sub-region.

In spite of its policy relevance, the study has several limitations. For instance, due to sufficient proxies among SSA countries, the study did not incorporate financial development. This variable can potentially influence the extent of the impact of the institutional variable on the fiscal policy and economic growth nexus. In addition,

the influence of tax reforms and sustainable tax compliance were not captured in the estimated model. The inclusion of additional instruments would have enhanced the scope of the policy relevance of the study. Due to these limitations, future studies should conscientiously include tax factors and financial development in estimating the fiscal policy and economic growth nexus. There is also a need to carry out a sector-by-sector analysis of the moderating effect of institutional quality on the fiscal policy and growth nexus, especially considering the large informal sector in SSA. Future studies can also consider transmission channels through which institutional quality moderates.

Author Contribution All authors contributed to the conceptualization and design of the study. The initial draft was written by O.O.E., and both authors carefully read through all versions of the manuscript, offering constructive comments. E.H.O. carried out the analysis and discussion of the results. All authors read and approved the final manuscript.

Availability of Data and Materials Data can be obtained from the authors at reasonable request.

Declarations

Ethics Approval and Consent to Participate Not applicable.

Consent for Publication Not applicable.

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