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Impact of Output Gap, COVID-19, and Governance Quality on Fiscal Space in Sub-Saharan Africa

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Abstract: This study examined the determinants of fiscal space within the Sub-Saharan Africa (SSA) region, utilising a panel of 33 countries from 2005 to 2021. The paper applied the panel threshold, difference, and system generalised method of moments (GMM) regression techniques. The empirical results found evidence of constrained fiscal space and poor governance in Central, Western, and Eastern Africa. The results further unveiled that an enhancement in governance indicators beyond −0.23 for the governance index, −0.15 for control of corruption, −0.98 for the rule of law, −0.37 for regulatory quality, −0.15 for voice and accountability, +0.36 for political stability, and −0.61 for government effectiveness, respectively, increase fiscal space. Moreover, the study concluded that the output gap, COVID-19, trade openness, and economic growth impact fiscal space availability in Central, Western, Southern, and Eastern Africa. The paper investigated whether the COVID-19 pandemic and governance quality significantly influenced fiscal space within SSA. We strongly recommend enhancement in all facets of governance through comprehensive restructuring of governance policies across all SSA countries. Another key recommendation is fostering trade openness to expand tax revenue generation and broaden the tax base, thereby providing the continent with greater fiscal space and improved resilience to unforeseen shocks.

Keywords: de facto fiscal space; output gap; governance quality; COVID-19 pandemic; panel threshold regression; Hamilton regression filter

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1. Introduction

The concept of fiscal space has increasingly garnered attention in both developing and developed economies. Fiscal space is defined as the ability of a government to allocate additional budgetary resources while maintaining fiscal sustainability. The availability of fiscal space is crucial in emerging economies such as Sub-Saharan Africa (SSA) countries because it enables governments to implement countercyclical fiscal policies and respond effectively to economic shocks (Romer and Romer 2019). Emerging economies often face numerous development challenges, such as infrastructure deficits, social inequality, and vulnerability to external shocks. Therefore, having fiscal space allows these countries to allocate resources to address these issues, promoting economic growth and reducing poverty. Furthermore, fiscal space can enhance the ability of emerging economies to manage debt and reduce their dependence on external financing, which is often associated with higher borrowing costs and increased vulnerability to global financial conditions (World Bank 2021).

Recently, fiscal space's importance has been underscored due to the need for economies to respond to various economic shocks, including the COVID-19 pandemic. The shock prompted several economies to exceed their budgeted expenditures and borrowing limits, particularly in less developed nations Kose et al. (2022). Figure 1 presents the trends for general government debt and total external debt from 2005 to 2020.

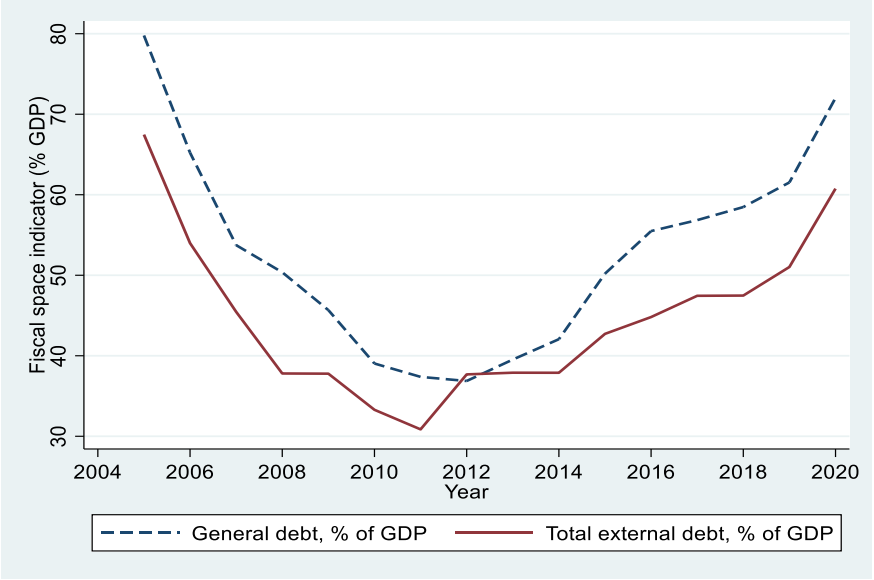

Figure 1. General government debt and total external debt in SSA.

The trends generally indicate improvement in fiscal space indicators, signified by the decrease in the general government debt and total external debt as a percentage of GDP during the periods preceding 2012. A discernible shock associated with the Global Financial Crisis (GFC) was evident in the 2008 trends, during which stagnation in fiscal space was observed. The indicators worsened from 2011 to 2020. A sharp deterioration in the fiscal space was evident in 2020, and this change in trend signifies the fiscal pressure stemming from the need to finance shocks arising from the COVID-19 pandemic. The situation portrayed in the post-2011 trends raises concerns for the continent due to the heavy reliance on debt, which may invite debt distress and potentially restrict the region's ability to generate additional fiscal space. This implies that the future financial sustainability of most economies in SSA is under threat.

In the same vein, the governance of a country significantly influences the operations of fiscal institutions, and there is substantial evidence of the presence of weak governance within the SSA region (Hammadi et al. 2019; Assa 2018; Musavengane et al. 2019). Good governance, characterised by transparent, accountable, and efficient fiscal institutions, can enhance fiscal space by promoting prudent fiscal management, encouraging economic growth, and attracting investment. It ensures that resources are allocated efficiently, public funds are used responsibly, and fiscal policies are implemented effectively (Kraay et al. 2010). This can lead to improved fiscal performance, increased public revenue, and reduced public debt, thereby expanding fiscal space. On the contrary, poor governance can constrain fiscal space by undermining fiscal discipline, discouraging investment, and stifling economic growth. It can lead to fiscal mismanagement, corruption, and wastage of public resources, resulting in fiscal deficits and debt accumulation with no tangible economic growth, thereby shrinking fiscal space. Thus, governance quality plays a crucial role in determining fiscal space.

The output gap, the discrepancy between a nation's actual and potential output, can also markedly influence government tax revenue generation and debt accumulation, thus, its fiscal space. A negative output gap is associated with lower economic output, decreasing tax revenues and increasing government spending on social services, thereby increasing the budget deficit and limiting fiscal space availability. Conversely, a positive output gap implies that the economy is performing well and more tax revenue is generated, resulting in a narrow financing gap and increased fiscal space. Thus, understanding the effect of the output gap in SSA is crucial for maintaining fiscal space and ensuring sustainable public finances.

This study investigates the influence of governance quality, the COVID-19 pandemic, and the output gap on the fiscal space within selected Sub-Saharan African countries. While existing literature has primarily concentrated on the impact of governance and economic growth on fiscal space, there is a paucity of research examining the effects of the COVID-19 pandemic and the output gap within the context of developing economies. Furthermore, there is a lack of scholarly work identifying the appropriate threshold for various governance dimensions that can enhance fiscal space in the SSA region. Therefore, this paper scrutinises the influence of the COVID-19 pandemic, output gap, and governance quality on fiscal space. Thus, the study provides valuable insights that could aid policymakers in formulating effective strategies to enhance the continent's fiscal space.

2. Literature Review

2.1. Theoretical Literature

Two main theories explain the interaction between fiscal space and political economy. These are the institutional quality and political budget cycle hypotheses. The institutional quality theory asserts that the quality of a country's institutions, such as its legal and administrative system, significantly impacts its economic performance and development. This theory suggests that a country with strong, efficient, and effective institutions is more likely to have higher economic growth and development. The quality of these institutions can be measured in various ways, including the level of corruption, the degree of law enforcement, the efficiency of public services, the level of protection for property rights, and the ease of doing business. According to this theory, countries with high-quality institutions attract more investment, promote entrepreneurship, and stimulate innovation, leading to higher economic growth and more fiscal space.

On the other hand, countries with poor institutional quality may suffer from corruption, inefficiency, and lack of innovation, which can hinder economic growth, resulting in limited fiscal space. The grease-the-wheel and sand-the-wheel theories also support the perspective that corruption promotes and discourages economic growth, respectively (Ibrahim et al. 2015). In this context, the theories indirectly explain the role of corruption in fiscal space creation.

In the same context, the political budget cycle hypothesis suggests that budget deficits arise from political conflicts of interest when incumbent political office bearers are incentivised to run a budget deficit to gain more political support from the citizens (Mawejje and Odhiambo 2020). The increased budget deficit arising from political motives will require more tax years to finance the fiscal deficit, hence limited fiscal space. The incumbent political office bearers could also acquire more public debt, resulting in a high public debt ratio and limited fiscal space. Thus, both the institutional quality and political budget cycle theories explain the role of the political economy on a country's fiscal conditions and, hence, the fiscal space status.

The Keynesians suggested several theories that could indirectly explain a country's fiscal conditions. First, the Keynesians stated that fiscal deficits are necessary for financing variables that ameliorate the country's economic growth conditions. For example, in their view, fiscal deficit stimulates investment and aggregate demand, translating to improved economic growth in the long run (Bernheim 1989). The Keynesians also explained the output gap theory, explaining the role of aggregate demand in influencing economic output. The output gap reflects the performance of an economy by examining how the economy's actual output deviates from the potential output. A positive output gap indicates that the actual output is greater than the potential output, suggesting a well-performing economy, often leading to more fiscal space. A negative output gap, on the other hand, means the actual output is less than the potential output, suggesting an economy is underperforming, often leading to limited fiscal space.

2.2. Brief Overview of the Concept of Fiscal Space

The term fiscal space is defined in various ways, contingent upon the context and the developmental stage of the respective country. Heller (2005) interprets it from the standpoint of sustainability and solvency, suggesting it represents the budgetary capacity that enables a government to allocate resources to specific purposes without jeopardising its financial stability. Conversely, Roy et al. (2007) approach fiscal space from a developmental perspective, viewing it as the funding available to the government as a consequence of concrete policy measures aimed at enhancing resource mobilisation and instituting reforms. These reforms are essential for creating an effective governmental, institutional, and economic environment for implementing these policies toward achieving defined developmental objectives.

Similarly, Ghosh et al. (2013) define fiscal space within the context of developed economies, identifying it as the discrepancy between a country's actual debt and its debt limit. Aizenman and Jinjarak (2010), on the other hand, perceive fiscal space as the tax years required to settle the current public debt or finance the fiscal deficit, while Kose et al. (2017) consider fiscal space as the budgetary resources available to a government to meet its financial commitments. A common thread in these definitions is the emphasis on a government's ability to service its debt obligations, thus linking the concept of fiscal space closely with financial sustainability. There is a need to instil a culture of good governance and promote prudent fiscal management to generate sufficient tax revenue that helps create fiscal space. Literature suggests several avenues that economies could use to create fiscal space depending on a country's development stage. As the literature suggests, these avenues include foreign aid, borrowing, seignorage, economic growth, fiscal decentralisation, reprioritising government expenditure, and access to wealth and stabilisation funds (Heller 2005; Kose et al. 2022).

2.3. Determinants of Fiscal Space

The widely discussed measures of fiscal space are based on Ostry et al. (2010) and Aizenman and Jinjarak's (2010) approaches. A recent study by Aslan (2022) applied the Ostry et al. (2010) debt limit-based and Aizenman and Jinjarak's (2010) de facto fiscal space (DFSP) approaches to examine the fiscal space drivers in 27 Organisation for Economic Co-operation and Development (OECD) countries using time series data from 1999–2020. The study included several macroeconomic, institutional, and political variables, and results indicated that institutional, political, and macroeconomic factors significantly influence fiscal space.

In their study, Zandi et al. (2012) employed the fiscal space measurement approach developed by Ostry et al. (2010) to a sample of 30 developed countries, utilising data from 1985 to 2007. Their study examined the impact of several factors on fiscal space, including the government expenditure gap, age dependency ratio, output gap, real oil prices, and trade openness. These factors were analysed using the panel regression technique. The study results indicated a positive correlation between fiscal space and the output gap, trade openness, oil prices, and fiscal prudence. Conversely, a negative correlation was found between fiscal space, age dependency, and the government expenditure gap.

Furthermore, Gnangnon and Brun (2020) investigated the impact of tax reforms on fiscal space, utilising a sample set of 99 countries, 37 of which were less developed and 62 were developing. They considered trade openness, economic growth, real income per capita, institutional quality, inflation, and age dependency ratio. The data used spanned from 1980 to 2015. By employing the de facto fiscal space approach, they discovered that tax reforms positively influence fiscal space. Furthermore, their findings indicated that factors such as higher economic growth, increased real income per capita, superior institutional quality, reduced inflation rates, and a lower age dependency ratio positively impact fiscal space, as evidenced in their panel regression analysis.

Using data from 17 welfare states for 1986 to 2013, Ko (2020) applied the approach described by Ostry et al. (2010) to examine drivers of fiscal space. The study variables incor-

porated into the analysis were output gap, inflation, unemployment, welfare expenditure, future expenditure, age dependency, capital openness, the share of the service industry, and self-employment. The results indicated that countries in the sample had limited fiscal space due to a lack of adequate governance and a high-interest burden on public debt.

The preceding discussion confirms that fiscal space is not determined by a single factor either in developing or developed nations. Building upon this line of research, the study employs the DFSP approach, as advocated by Aizenman and Jinjarak (2010), to examine the factors influencing fiscal space in Sub-Saharan Africa. The novelty of this paper lies in its analysis of the output gap, using a more recent Hamilton (2018) regression filter, and the impact of the COVID-19 pandemic, using the most recent dataset in the Sub-Saharan Africa context. This approach provides more accurate and timely information to policymakers and governments, particularly regarding the effects of COVID-19, which has significantly impacted the fiscal space of several developing nations.

3. Methodology

3.1. Data and Measurement

The paper analysed a panel of 33 Sub-Saharan African countries, spanning the period from 2005 to 2021. The countries encompassed within this sample include Zambia, Rwanda, Seychelles, Senegal, Namibia, Mozambique, Mauritius, Mali, Malawi, Angola, Uganda, Botswana, Burkina Faso, Burundi, Zimbabwe, South Africa, Madagascar, Liberia, Lesotho, Kenya, Ivory Coast, Guinea-Bissau, Gabon, Ghana, Togo, Tanzania, Cameroon, Cape Verde, Central African Republic, Republic of the Congo, Sudan, Equatorial Guinea, and Ethiopia. The study utilised annual time series data, with the final sample selection being informed by data availability. The data for this research were obtained from various sources, including the World Bank, Worldwide Governance Indicators, Our World Data, and Federal Research Economic Data.

3.1.1. Measuring Fiscal Space

The study utilised the DFSP approach, as Aizenman and Jinjarak (2010) suggested, to assess fiscal space. In their study, Aizenman and Jinjarak (2010) define DFSP as the number of tax years a country needs to finance its fiscal deficit or repay its existing public debt. As such, the DFSP is calculated by dividing the present public debt or fiscal deficit by the de facto tax base. Consequently, the DFSP is depicted as the ratio of the fiscal deficit or current public debt to the de facto tax base, which can be mathematically represented as follows:

$$De\ facto\ fiscal\ space\ (DFSP) = \frac{Fiscal\ deficit\ or\ public\ debt\ (percentage\ of\ GDP)}{De\ facto\ tax\ base\ (percentage\ of\ GDP)} \quad (1)$$

where

$$De\ facto\ tax\ base\ (percentage\ of\ GDP) = Average\ tax\ revenue\ (percentage\ of\ GDP)_{t-4\ to\ t} \quad (2)$$

Instead of fiscal deficit data, the study utilised public debt as a percentage of GDP as the numerator in the DFSP calculation. Drawing from existing literature, the de facto tax base was estimated utilising the tax revenue data (expressed as a percentage of GDP) from the past five years. The data used to compute DFSP were obtained from the World Bank's World Development Indicators website. Since DFSP emphasises the number of tax years required to repay public debt, high values imply limited fiscal space as they translate to more tax years required to repay the current debt.

3.1.2. Measuring Governance Quality

The study employed six governance indicators sourced from the Worldwide Governance Indicators website. As per Kaufmann et al. (2010), these indicators include control of corruption, the rule of law, regulatory quality, voice and accountability, political stability and absence of violence or terrorism, and government effectiveness. Each indicator is scored on a scale of −2.5 to +2.5, with countries scoring +2.5 demonstrating good gov-

ernance and those scoring −2.5 indicating weak governance. However, due to the high correlation among these indicators, including them all in a single regression model is inappropriate as this could lead to biased estimations. Consequently, this necessitated the creation of a governance index using the principal component analysis (PCA) method. Good governance is anticipated to foster fiscal space, while poor governance deteriorates it. Therefore, the study posits the following hypothesis:

H1. *There is a negative association between governance indicators and DFSP.*

3.1.3. Measuring Output Gap (OGAP)

The output gap has implications for the government's economic financing capacity. The output gap is the difference between real/actual and potential GDP. The study generated output gap data by decomposing GDP time series data using the Hamilton regression filter (HRF). The motivation for using the HRF is based on critiques raised by Hamilton regarding the use of the Hodrick–Prescott filter (HPF). The critiques include the potential to introduce spurious dynamic relations resulting from using HPF (Hamilton 2018). Assuming a series $\{y_t\}_{t=1}^{tmax}$, which is GDP in our case, the HRF specifies the trend value y_t^* in the period t as a forecast made h periods earlier based on a few observations up to y_{t-h}. A regression forecast with p number of lags is assumed where the cycle $\{y_t\}_{t=h+p}^{tmax}$ is then defined as the prediction error. The $p+1$ regression coefficients, which are the same for all periods t, are obtained from an antecedent OLS estimation over the entire sample. In the case of yearly data, Hamilton recommended that the values h and p be fixed at h = 5 and p = 1. Running it once and for all over the entire sample, the estimation reads:

$$y_t = \hat{\beta}_0 + \sum_{k=1}^{p} \hat{\beta}_K y_{t-h-k+1} + \mu_t, \qquad t = h+p, \ldots, t^{max} \tag{3}$$

and with the resulting estimates $\hat{\beta}_0, \hat{\beta}_1, \ldots, \hat{\beta}_p$, the HRF trend y_t^* and the cyclical component c_t in period t are given by:

$$y_t^* = \hat{\beta}_0 + \sum_{k=1}^{p} \hat{\beta}_K y_{t-h-k+1} + \mu_t, \quad t = h+p, \ldots, T \tag{4}$$

$$c_t = y_t - y_t^* = \hat{\mu}_t \tag{5}$$

The study utilised GDP data at the 2015 US constant price to generate the output gap variable obtained from the World Bank's World Development Indicators (WDI) website. A positive output gap, indicative of an economic boom, corresponds to an increase in tax revenue. This reduces the tax years needed to repay the current public debt, effectively decreasing the DFSP and increasing the fiscal space. On the contrary, a negative output gap, characteristic of a recession or economic contraction, is correlated with a decrease in tax revenue. This increases the number of tax years required to repay the current public debt or finance the fiscal deficit, resulting in fiscal space shrinkage. From these observations, the study proposes the following hypothesis:

H2. *A negative relationship exists between the output gap and DFSP.*

3.1.4. Measuring COVID-19 Dummy (COVID)

The study examined the impact of pandemics on fiscal space, utilising a dummy variable for COVID-19. This variable was assigned a value of 1 for the COVID-19 period and 0 otherwise. The COVID-19 pandemic decreased tax revenue due to a decline in business profits and individual income. This decrease in tax revenue increased DFSP values, as more tax years were needed to service current debt levels. Based on these observations, the study proposed the following hypothesis:

H3. *The association between the COVID-19 dummy variable and DFSP, is positive.*

3.1.5. Other Control Variables

The study incorporated numerous control variables into the analysis, presented in Table 1 below.

Table 1. Other control variables.

Variable	Measurement	Expected Relationship	Supporting Literature	Source
Economic growth rate (GDPR)	GDP growth (annual percentage)	−	Botev et al. (2016)	The World Bank (World Development Indicators)
Population growth (POPG)	Population growth (annual percentage)	+/−	Endris Mekonnen and Amede (2022)	
Global risk (GRSK)	Global risk (CBOE Volatility Index: VIX, Annual)	−	Aslan (2022)	FRED St. Louis Fed Database
Trade openness (TOP)	Trade openness (sum of goods and services imports and exports as a percentage of the GDP)	+/−	Yohou (2023)	Our World Data

3.2. Model Specification

To understand the interplay between governance, COVID-19, and the output gap, this study initially examined the influence of each of these factors independently. The investigation commenced with identifying the role of governance quality and its relevant thresholds, utilising the panel threshold regression model proposed by Seo et al. (2019) within a parsimonious framework. The specific parsimonious regression model for establishing the governance quality threshold and direction of influence based on Seo et al. (2019) framework becomes:

$$DFSP_{it} = \delta(\theta_{it} - \gamma)\mathbb{I}\{\theta_{it} \geq \gamma\} + \alpha_i + \varepsilon_{it} \quad (6)$$

where

$DSFP_{it}$ = dependent variable, namely de facto fiscal space for country i in period t;

γ = the unknown threshold value;

i = a cross-sectional index;

t = the time period;

$\varepsilon_{i,t}$ = an independent and identically distributed (iid) error term, and the threshold parameter (γ) will be endogenously determined (estimated) by the model;

θ_{it} = the threshold variable denoted by the governance indicators, that is, regulatory quality (RQE), political stability and absence of violence/terrorism (PVE), control of corruption (CCE), voice and accountability (VAE), rule of law (RLE), government effectiveness (GEE), and governance index (PC1).

Equation (7) generates information regarding the direction of influence and threshold levels. A robustness checking mechanism is ensured by introducing control variables using the dynamic regression model (difference GMM) expressed below:

$$y_{it} = \alpha_0 + \beta_1 y_{it-1} + \beta_2 X'_{it} + \beta_3 \delta_{it} + \varepsilon_{it} \quad (7)$$

where

y_{it} = DFSP;

y_{it-1} = lagged DFSP;

X'_{it} = control variables, namely, economic growth (GDPR), trade openness (TOP), and population growth (POGR);

δ_{it} = governance indicators, that is, control of corruption (CCE), political stability and absence of violence/terrorism (PVE), voice and accountability (VAE), rule of law (RLE), regulatory quality (RQE); government effectiveness (GEE), and governance index (PC1).

Following this, the study eliminated the role of governance quality and added COVID-19 and output gap variables separately, such that Equation (7) becomes:

$$y_{it} = \alpha_0 + \beta_1 y_{it-1} + \beta_2 X'_{it} + \beta_3 COVID_{it} + \varepsilon_{it} \quad (8)$$

and

$$y_{it} = \alpha_0 + \beta_1 y_{it-1} + \beta_2 X'_{it} + \beta_3 OGAP_{it} + \varepsilon_{it} \quad (9)$$

where

$COVID_{it}$ = COVID-19 dummy variable, which equals 1 for the COVID-19 era, and 0 for otherwise;

$OGAP_{it}$ = output gap estimated using Hamilton regression filter.

To confirm the results obtained by estimating using models (6)–(9), the paper incorporated all the variables into one model such that:

$$y_{it} = \alpha_0 + \beta_1 y_{it-1} + \beta_2 X'_{it} + \beta_3 \delta_{it} + \beta_4 COVID_{it} + \beta_5 OGAP_{it} + \varepsilon_{it} \quad (10)$$

The dynamic Equations (7)–(10) were estimated using difference generalised method of moments (GMM) techniques. However, there are instances when the value of the lagged dependent variable becomes a weaker instrument in the model, which results in biased estimates (Blundell and Bond 1998). A system GMM is applied in such instances as it uses the first difference and level equations (Sabir and Qamar 2019). To ensure the results are robust and efficient, a system GMM technique was performed to verify the results produced by estimating the model (10). Pre- and post-estimation tests performed are the multicollinearity, unit root, autocorrelation, and instrument over-identification tests.

4. Empirical Results and Analysis

4.1. Descriptive Analysis

Figure 2 shows fiscal space in the SSA regions. The graphical representations suggest that Southern Africa has lower DFSP values than other SSA regions. This finding means that the Southern African region has more fiscal space, implying that the region has the potential to engross unforeseen shocks than other regions. Southern Africa has more fiscal space due to robust economic growth, prudent fiscal management, and significant natural resources. The region has seen steady economic growth over the past decade, driven by strong commodity prices, particularly for minerals like diamonds, gold, and platinum, which are abundant in the region. Furthermore, many countries in Southern Africa have adopted prudent fiscal management practices, including sound budgeting processes and effective tax collection systems. This could have helped ensure that public funds are used efficiently and effectively, increasing fiscal space.

The findings shown in Figure 2 also suggest that Central and Eastern African countries have limited fiscal space. Central and Eastern African countries have limited fiscal space primarily due to high levels of public debt, low domestic revenue mobilisation, and heavy dependence on external aid. These countries often struggle with weak economic structures, political instability, corruption, and poor governance, which hinder their ability to generate sufficient revenue. Additionally, they often face high levels of poverty and inequality, further straining their fiscal resources. Moreover, these countries are highly vulnerable to external shocks such as commodity price fluctuations, climate change impacts, and global economic downturns, which can further exacerbate their fiscal constraints. Thus, these complex and interrelated challenges limit the fiscal space in Central and Eastern African countries. Figure 3 shows governance quality by region in the Sub-Saharan Africa continent.

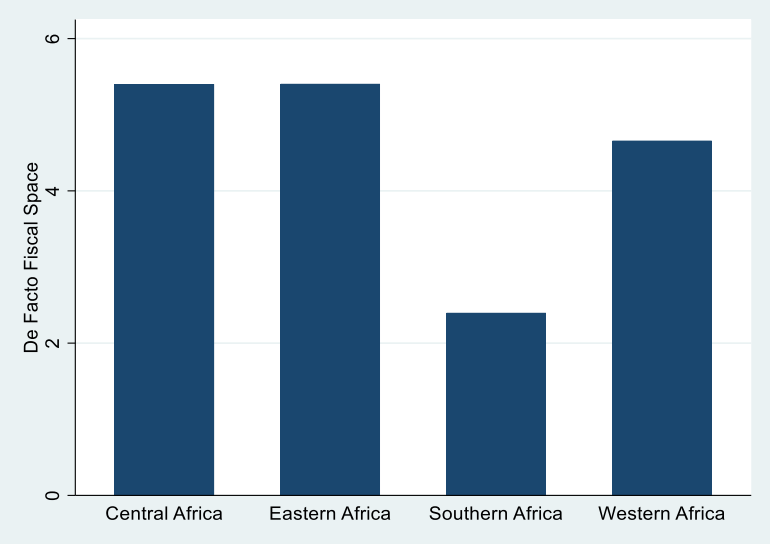

Figure 2. De facto fiscal space (DFSP) by region.

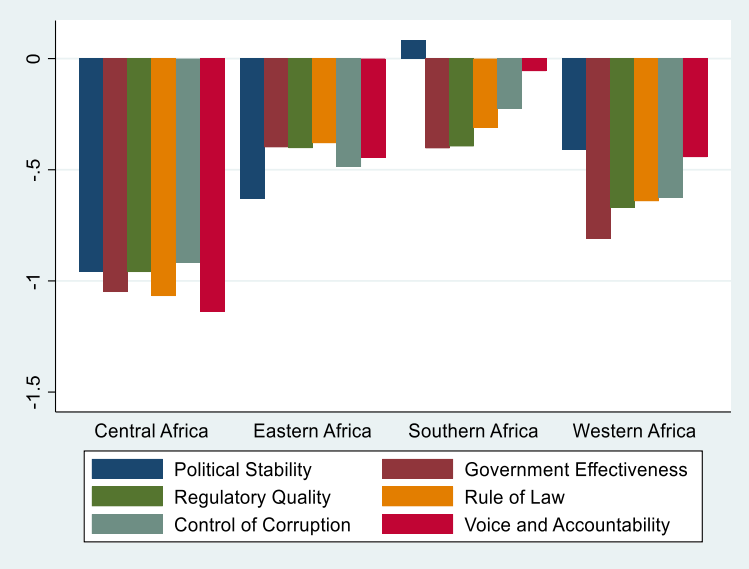

Figure 3. Governance quality by region.

As delineated in Figure 3, it is noticeable that Central Africa presents lower scores in terms of governance quality in comparison to Southern Africa, which exhibits the highest scores. This disparity can be attributed to the prevalent political instability, corruption, and weak rule of law in Central African countries, such as the Democratic Republic of Congo and the Central African Republic. For example, the fragile states index (FSI), published by the Fund for Peace, ranks several Central African countries among the most fragile states globally due to uneven development, economic decline, and inadequate public services. In the 2021 FSI, the Democratic Republic of Congo, the Central African Republic, and Chad were ranked sixth, seventh, and eighth, respectively (Fund for Peace 2021).

4.2. Correlation Analysis

The issue of multicollinearity can significantly undermine the reliability of regression results, given its profound impact on *p*-values and standard errors. To mitigate this issue, the variance inflation factor (VIF) criterion was employed to ascertain the degree of correlation among the variables. The results of the multicollinearity test are shown in Table 2.

Table 2. Correlation analysis.

Variable	VIF
GDPR	1.6300
OGAP	1.4200
COVID	1.2000
TOP	1.2600
GRSK	1.0500
POGR	1.3200
PC1	1.2800
Mean VIF	1.3100

The test outcomes suggest that the variance inflation factor (VIF) value is less than 5. Consequently, it can be deduced that these variables do not demonstrate a multicollinearity problem.

4.3. Unit Root Results

Unit root tests are employed to ascertain the stationarity of time series data. A stationary time series is one whose properties do not depend on the time the series is observed. If the data are not stationary, it can lead to spurious regression results, meaning the results may indicate a relationship between variables when there is not one. Stationarity was tested for in the study variables using Pesaran's CIPS unit root test, as shown in Table 3.

Table 3. Unit root.

			Critical Value		
Variable	**CIPS Statistic**	**Order of Integration**	**10%**	**5%**	**1%**
DFSP	−2.552	(0)	−2.03	−2.11	−2.25
GDPR	−2.844	(0)	−2.03	−2.11	−2.25
GRSK	2.61	(0)	−2.03	−2.11	−2.25
OGAP	−2.364	(0)	−2.03	−2.11	−2.26
COVID	2.61	(0)	−2.03	−2.11	−2.25
TOP	−3.5	(I)	−2.03	−2.11	−2.25
POGR	−2.433	(I)	−2.03	−2.11	−2.25
PC1	−3.583	(I)	−2.03	−2.11	−2.25

Using a lag length of 1, the findings indicate that DFSP, GDPR, GRSK, OGAP, and COVID are stationary at level. Conversely, TOP, POGR, and PC1 became stationary after first differencing.

4.4. Principal Component Analysis

The study created a governance index using principal component analysis (PCA) and a set of variables, including control of corruption, the rule of law, regulatory quality, voice and accountability, political stability and absence of violence or terrorism, and government effectiveness. PCA was chosen as the appropriate method for this study as it reduces dataset dimensionality while preserving essential relationships and structures. This simplifies and compresses the dataset (Abdi and Williams 2010). Table 2 presents various tests conducted during the PCA. Horn's parallel analysis suggests that we retain one component in the analysis. This suggestion is based on the fact that one adjusted component is greater than 1, as shown in Table 4.

Table 4. Principal component analysis.

Horn's Parallel Analysis for Principal Components			
Component or Factor	Adjusted Eigenvalue	Unadjusted Eigenvalue	Estimated Bias
1	4.8041102	4.9506418	0.14653158
Bartlett test of sphericity			
Chi-square	4147.407		
Degrees of freedom	15		
p-value	0.0000		
Kaiser–Meyer–Olkin Measure of Sampling Adequacy			
KMO	0.8977		

Moreover, we conducted tests to determine if the variables used in constructing the governance index are intercorrelated, utilising the Bartlett test of sphericity. Given that the *p*-value in Table 4 is less than 0.05, we dismissed the null hypothesis that the variables are uncorrelated. Consequently, we concluded that they are intercorrelated, suggesting correlations within the data, making it suitable for PCA.

Additionally, we implemented the Kaiser–Meyer–Olkin measure of sampling adequacy to verify if the application of the PCA was justified, and the results appear in Table 4. As the coefficient exceeds the 0.5 threshold, the results endorsed using PCA in constructing the inclusive growth index (Kaiser 1974). The PCA output in Table 5 suggests that the first, second, third, fourth, fifth, and sixth components account for 82.51%, 7.25%, 4.77%, 3.07%, 1.3%, and 1.1% of the standardised variations, respectively.

Table 5. Principal component analysis output.

Eigenvalues: (N = 561; Trace = 6; Number of Components = 1)					**Eigenvectors (Loadings)**		
Component	**Eigenvalue**	**Difference**	**Proportion**	**Cumulative**	**Variable**	**Comp1**	**Unexplained**
Comp1	4.95064	4.51572	0.8251	0.8251	PVE	0.3574	0.3675
Comp2	0.434918	0.148625	0.0725	0.8976	GEE	0.424	0.1101
Comp3	0.286294	0.102263	0.0477	0.9453	RQE	0.4171	0.1387
Comp4	0.18403	0.106082	0.0307	0.976	RLE	0.4362	0.05804
Comp5	0.077949	0.011781	0.013	0.989	CCE	0.4155	0.1453
Comp6	0.066167		0.011	1	VAE	0.3945	0.2297

4.5. Regression Results

4.5.1. Governance Quality Threshold Level and Effect on DFSP in a Parsimonious Model

To elucidate, it is crucial to underscore that the DFSP indicator measures the average number of tax years needed to counterbalance public debt or finance the fiscal deficit. Lower values of this indicator denote greater fiscal space. Consequently, when examining the influence of the explanatory variables on the DFSP, the negative/positive sign of the coefficients is interpreted as having an increasing/decreasing effect on the fiscal space, respectively. Table 6 presents results related to identifying the threshold effect of governance indicators within a parsimonious regression framework.

Table 6. Governance quality threshold level and effect on DFSP.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
KINK_SLOPE	4.61 ***	11.6 ***	12.2 ***	35.7 ***	26.3 ***	21.1 ***	19.8 ***
	(0.592)	(1.777)	(0.968)	(2.435)	(1.209)	(1.708)	(1.970)
THRESHOLD	−0.23 ***	0.36 ***	−0.61 ***	−0.37 ***	−0.98 ***	−0.15 ***	−0.15 ***
	(0.034)	(0.069)	(0.009)	(0.016)	(0.009)	(0.028)	(0.008)
PC1_B	−2.53 ***						
	(0.570)						
PVE_B		−3.58 ***					
		(0.251)					
GEE_B			−11.3 ***				
			(0.642)				
RQE_B				−29.6 ***			
				(1.666)			
RLE_B					−21.5 ***		
					(1.144)		
CCE_B						−2.77 ***	
						(0.267)	
VAE_B							−3.09 ***
							(0.440)
N	33	33	33	33	33	33	33
Bootstrap linearity test (*p*-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Source: authors' calculations. Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; standard errors in parentheses.

The findings suggest a bootstrap *p*-value of less than 5% significance level; thus, the paper rejected the null hypothesis of linearity and concluded that there is evidence for non-linearity in the data. It is important to remember that the score for all governance indicators ranges from −2.5 (weak governance) to +2.5 (good governance). The parsimonious model results shown in Table 6 indicate that the threshold governance level for governance index, control of corruption, rule of law, regulatory quality, voice and accountability, political stability and absence of violence or terrorism, and government effectiveness are −0.23, −0.15, −0.98, −0.37, −0.15, +0.36, and −0.61. The same results also suggest that the coefficient for all governance indicators is negatively and significantly associated with DFSP, implying that improvement in any of these variables results in higher fiscal space. Most of the indicators, save for political stability, have negative threshold values, and the probable cause of this is the notion that, on average, the continent has bad governance, as supported by Figure 2, where all indicators are in the negative range for all regions. However, the thresholds are close to zero. Hence, the finding is less worrisome. These findings imply the need to improve governance quality in all SSA countries, especially in the Central, Eastern, and Western African countries that reported worse governance in Figure 2.

The parsimonious regression results estimated using the Seo et al. (2019) panel threshold regression model requires some verification through robustness checking, which the paper achieved by incorporating control variables in the difference GMM regression model. The objective was to validate the robustness of the findings presented in Table 6, particularly regarding the effect of each governance indicator on DFSP. Detailed regression outcomes are disclosed in Table A1 in Appendix A. The regression models in Table A1 satisfied the Arellano–Bond and Sargan tests, suggesting the absence of the autocorrelation problem and the instruments' validity.

The elaborate regression results in Table A1 corroborate the findings suggested in Model 6, apart from Model 11, which elucidates the effect of the rule of law on DFSP. Therefore, the difference GMM results imply that enhancements in political stability, control of corruption, government effectiveness, governance index, regulatory quality, and voice and accountability decreased the number of tax years needed to settle the public debt, thereby improving fiscal space. These findings suggest that good governance, typified by

transparency, accountability, political stability, and efficiency, can augment fiscal space by fostering prudent fiscal management, stimulating economic growth, and attracting investment. It ensures the efficient allocation of resources, responsible use of public funds, and effective implementation of fiscal policies. This can result in improved fiscal performance, increased public revenue, and decreased public debt, thereby expanding fiscal space. Thus, the study confirms the importance of good governance, as explained by the institutional quality hypothesis. Consequently, these findings align with the study hypothesis. Similarly, Ko (2020) showed that improvement in governance quality enhances fiscal space.

4.5.2. COVID-19 Pandemic and Output Gap Effect on DFSP

Upon scrutinising the role of governance, the study subsequently analysed the impact of the output gap and COVID-19 independently, without the interference of governance indicators. The findings of this analysis are displayed in Table 7 This stage is crucial, particularly considering that the African continent, characterised by its volatile economic performance, was profoundly affected by the COVID-19 pandemic.

Table 7. COVID-19 pandemic and output gap effect on DFSP.

	(15)	**(16)**
L.DFSP	0.6749 ***	0.8163 ***
	(0.0039)	(0.0075)
GDPR	−22.725 ***	−19.645 ***
	(0.8354)	(0.7585)
TOP	1.0172 ***	0.9754 ***
	(0.1312)	(0.1216)
GRSK	−0.007088 ***	−0.005149 *
	(0.0023)	(0.0029)
POGR	54.885 ***	86.283 ***
	(5.0452)	(9.8193)
OGAP	−5.4921 ***	
	(0.5205)	
COVID		0.2051 **
		(0.1013)
C	2.3084 ***	1.5387 ***
	(0.0734)	(0.0842)
N	462	528
AR(1)	0.0105	0.0101
AR(2)	0.9989	0.6953
Sargan (p-value)	0.8088	0.9077

Source: authors' calculations. Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; standard errors in parentheses.

The empirical evidence presented in Model 15 indicates a negative correlation between the output gap and the DFSP. These findings suggest that when the output gap is positive, exceeding potential GDP during an economic boom, tax revenues increase. This reduces the number of tax years required to repay the current public debt, thereby decreasing the DFSP and indicating an improvement in fiscal space. These findings concur with Ghosh et al. (2013) and Zandi et al. (2012), who reported that the output gap positively correlates with fiscal space.

As for the impact of the COVID-19 pandemic on DFSP, the paper documents a significant positive relationship at the 5% level in Model 16. The findings suggest that the COVID-19 pandemic caused a decrease in tax revenue, primarily due to a decline in business profits and individual income. This reduction in tax revenue led to an increase in the DFSP values, as more tax years were required to service the current debt levels. Consequently, the COVID-19 pandemic exacerbated the fiscal space problems in the SSA region. Aslan (2022) reported similar findings that the COVID-19 pandemic adversely affected fiscal space creation in the OECD.

The regressions from Models 1–16 primarily focused on individually analysing the effects of governance quality, output gap, and COVID-19. To gain a more comprehensive understanding of the effects of these variables, the paper incorporated all the variables into a single model using the same difference generalised method of moments (GMM) technique, with the results reported in Table 8.

4.5.3. Subsample Analysis of the Effects of Governance Quality, Output Gap, and COVID-19 on DFSP

Following the examination of the effects of governance quality, COVID-19, and the output gap on DFSP in Models 1–16, the paper further investigates these relationships at a regional level. This is an essential step in ensuring the robustness of the study's findings. The regression results presented in Table 8 delineate the effect of governance quality on DFSP in each of the four regions in SSA.

Table 8. Subsample regressions on the effect of governance quality on DFSP.

	(17)	(18)	(19)	(20)
	Central Africa	**Eastern Africa**	**Southern Africa**	**Western Africa**
L.DFSP	0.3438 **	0.6294 ***	0.2688 ***	0.7932 ***
	(0.1371)	(0.0622)	(0.0599)	(0.0190)
GDPR	−13.953 **	−14.543 ***	−4.2382 ***	−14.680 ***
	(7.0579)	(4.8090)	(1.2872)	(5.5445)
TOP	2.1577 *	1.4262 *	1.1326 **	1.4264 **
	(1.3957)	(0.8954)	(0.5443)	(0.6277)
GRSK	−0.03144	0.005661	0.0005439	−0.03801 **
	(0.0640)	(0.0212)	(0.0080)	(0.0180)
POGR	280.04 *	−4.5131	−188.94 ***	592.19 ***
	(146.9299)	(20.7251)	(66.8400)	(63.2679)
PC1	−4.0261 **	−1.5292 ***	−0.9332 ***	−1.1228 *
	(1.7664)	(0.5635)	(0.2178)	(0.6085)
C	−2.1432	3.0793 ***	2.8978 ***	1.8598 ***
	(3.2341)	(0.6812)	(0.3716)	(0.3731)
N	80	128	128	192
AR(1)	0.0280	0.0000	0.0097	0.0009
AR(2)	0.1190	0.9543	0.1382	0.0589
Sargan (*p* value)	0.2409	1.0000	1.0000	0.8472

Source: authors' calculations. Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; standard errors in parentheses.

The regression outcomes presented in Table 8 indicate a significant and negative relationship between the governance index and DFSP within Models 17–20. The impact of governance quality on DFSP is significant at 5%, 1%, 1%, and 10% in Central, Eastern, Southern, and Western Africa, respectively. These results corroborate the theory that enhancements in governance quality reduces the number of tax years needed to settle public debt, thereby expanding the fiscal space of all nations within these regions. Bah et al. (2021) explore the impact of governance quality on Sub-Saharan African economies, particularly through its potential influence on tax generation via exports. Their findings, corroborated by this paper, underscore the necessity of prioritising governance quality to ensure the prosperity of SSA economies. Similarly, Bekana (2023) emphasises the pivotal role of governance quality in an economy, noting its significant influence on financial development. The author suggests that this factor has the potential to expand tax generation and enhance fiscal space, a conclusion that aligns with the findings of the current study.

In line with the insights from Model 15 in Table 7, the subsample regression results suggest a negative correlation between output gap and DFSP across all regions, as evidenced in Models 21–24 (Table 9). The empirical results reveal that a positive output gap, indicative of an economic boom, generates increased tax revenue, thereby reducing the number of tax years needed to clear outstanding public debt. This, in turn, enhances the fiscal space of countries in Central, Southern, Western, and Eastern Africa.

Table 9. Subsample regressions on the effect of output gap on DFSP.

	(21)	(22)	(23)	(24)
	Central Africa	**Eastern Africa**	**Southern Africa**	**Western Africa**
L.DFSP	0.3505 **	0.4934 ***	0.7050 ***	0.6019 ***
	(0.1697)	(0.0954)	(0.1054)	(0.0240)
GDPR	−8.3279	−31.593 ***	−7.8353 ***	−22.643 ***
	(6.6828)	(11.4298)	(2.5681)	(4.0053)
TOP	7.6620 *	1.2641 **	3.9928 **	1.0104 *
	(4.0389)	(0.5458)	(1.7867)	(0.6153)
GRSK	−0.004334	−0.03484	0.01566	−0.006978
	(0.0351)	(0.0297)	(0.0166)	(0.0101)
POGR	90.534	3.7389	−163.50	−5.9585
	(71.5448)	(23.6805)	(144.8065)	(49.9476)
OGAP	−11.237 *	−26.112 ***	−4.1744 *	−7.0105 **
	(6.5689)	(10.0954)	(2.3985)	(3.1474)
C	3.6077 ***	4.7927 ***	0.7587 *	2.4072 ***
	(0.9348)	(1.1303)	(0.4228)	(0.2201)
N	70	112	112	168
AR(1)	0.016	0.0001	0.0002	0.0004
AR(2)	0.4594	0.6167	0.9919	0.7544
Sargan (*p* value)	0.9978	0.8893	0.8705	1.0000

Source: authors' calculations. Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; standard errors in parentheses.

The impact of the output gap is statistically significant at levels of 10%, 1%, 10%, and 5% in Central, Eastern, Southern, and Western Africa, respectively. These results imply the need for African countries to promote efficiency in production and or resources utilisation to ensure that economies generate more tax revenue by operating beyond potential GDP. The effect of the COVID-19 pandemic across these four regions was also analysed, with the results presented in Table 10 under Models 25–28.

Table 10. Subsample regressions on the effect of COVID-19 on DFSP.

	(25)	(26)	(27)	(28)
	Central Africa	**Eastern Africa**	**Southern Africa**	**Western Africa**
L.DFSP	0.5771 ***	0.5815 ***	0.3846 ***	0.7844 ***
	(0.0673)	(0.0813)	(0.0604)	(0.0133)
GDPR	−15.755 ***	−20.441 ***	−5.8364 ***	−13.220 ***
	(3.5892)	(7.9124)	(1.9378)	(4.3053)
TOP	4.2727 **	4.9645 **	1.02659 *	0.97943 **
	(1.9577)	(2.2229)	(0.5896)	(0.4895)
GRSK	−0.004086	−0.02759	−0.008346	−0.02743 **
	(0.0268)	(0.0309)	(0.0087)	(0.0111)
POGR	116.52 *	11.673	−177.74 ***	330.31 ***
	(62.0150)	(24.5181)	(66.2695)	(41.4212)
COVID	1.4964 *	5.2925 ***	0.8954 ***	0.8382 **
	(0.7820)	(1.2835)	(0.2846)	(0.4065)
C	2.6179 ***	3.4094 ***	1.7929 ***	1.7779 ***
	(0.6506)	(0.9676)	(0.2683)	(0.2455)
N	80	128	128	192
AR(1)	0.0032	0.0000	0.0065	0.0248
AR(2)	0.6460	0.5286	0.0770	0.1766
Sargan (*p*-value)	0.5482	1.0000	1.0000	1.0000

Source: authors' calculations. Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; standard errors in parentheses.

Analogous to the findings presented in Model 16, the outcomes of subsample regression analysis suggest that the COVID-19 pandemic has significantly reduced fiscal space across all four African regions. This is substantiated by the positive and significant effect of the variable on DFSP, as indicated in Models 25–28. Given the impacts typically associated

with crises of this magnitude, these results underscore the necessity for governments in Central, Eastern, Western, and Southern Africa to ensure that adequate budgetary provisions are in place to absorb unexpected shocks, such as those associated with the COVID-19 pandemic. According to the regression results from Models 17–28, these economies could potentially bolster their fiscal space by implementing policies that foster economic growth. The results regarding the impact of COVID-19 on fiscal space closely align with those presented by Aslam et al. (2022). These researchers observed that the COVID-19 pandemic significantly destabilised economies within the SSA region. This instability was primarily due to a halt in economic activities and the introduction of tax forbearance measures within the SSA region.

4.5.4. Governance, COVID-19 Pandemic, and Output Gap Effect on DFSP

The outcomes presented in Table 11 indicate that the influence of COVID-19 on DFSP is positive in SSA, corroborating the findings reported in Model 16 (Table 7). Additionally, the results affirm that all governance indicators and indices, except the rule of law, negatively correlate with DFSP. Finally, the data in Table 11 suggest that the relationship between the output gap and DFSP is negative across all models, specifically from Model 29 to Model 35.

Table 11. Governance, COVID-19 pandemic, and output gap effect on DFSP.

	(29)	**(30)**	**(31)**	**(32)**	**(33)**	**(34)**	**(35)**
L.DFSP	0.6401 ***	0.5972 ***	0.6655 ***	0.6846 ***	0.6756 ***	0.6747 ***	0.6820 ***
	(0.0066)	(0.0057)	(0.0066)	(0.0076)	(0.0047)	(0.0064)	(0.0067)
GDPR	−16.242 ***	−11.431 ***	−19.836 ***	−16.095 ***	−12.238 ***	−17.049 ***	−19.179 ***
	(1.8424)	(0.9706)	(1.2379)	(0.9765)	(2.0349)	(1.7070)	(1.5912)
TOP	0.9447 ***	0.9339 *	1.1614 ***	1.3539 ***	0.2607	1.2729 ***	1.0799 ***
	(0.1829)	(0.4777)	(0.3903)	(0.1912)	(0.5584)	(0.2341)	(0.1706)
GRSK	−0.001761	−0.005516 **	−0.006702 **	−0.01809 ***	−0.01401 ***	−0.007595 ***	−0.009488 **
	(0.0034)	(0.0023)	(0.0029)	(0.0036)	(0.0023)	(0.0025)	(0.0037)
POGR	62.500 ***	55.646 ***	53.776 ***	43.352 ***	35.370 ***	35.134 ***	42.216 ***
	(6.4218)	(4.5406)	(9.3011)	(5.5150)	(6.4703)	(10.4261)	(4.3730)
COVID	0.4724 ***	0.6556 ***	0.5176 ***	0.7360 ***	0.6628 ***	0.6333 ***	0.5181 ***
	(0.0597)	(0.0762)	(0.0680)	(0.0839)	(0.1125)	(0.1050)	(0.1008)
OGAP	−4.5792 ***	−3.8479 ***	−7.6709 ***	−3.2062 ***	−3.3130 ***	−4.4504 ***	−4.9825 ***
	(0.9680)	(0.4930)	(0.9807)	(0.6633)	(1.2099)	(0.9637)	(0.6544)
PC1	−1.0551 ***						
	(0.1674)						
PVE		−2.3473 ***					
		(0.3330)					
GEE			−1.9692 ***				
			(0.2087)				
RLE				2.9629 ***			
				(0.3981)			
RQE					−1.6140 ***		
					(0.2524)		
CCE						−2.5302 ***	
						(0.4433)	
VAE							−0.1046
							(0.2367)
C	2.3779 ***	1.0771 ***	0.9823 ***	3.7923 ***	1.0581 ***	0.5644 **	2.0587 ***
	(0.1405)	(0.1753)	(0.1830)	(0.3142)	(0.1677)	(0.2527)	(0.1827)
N	462	462	462	462	462	462	462
AR(1)	0.0209	0.0308	0.0144	0.0171	0.0312	0.0170	0.0137
AR(2)	0.7904	0.7548	0.7193	0.9058	0.9262	0.8426	0.9951
Sargan (p value)	0.7393	0.7393	0.7393	0.7393	0.9999	0.9816	0.7393

Source: authors' calculations. Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; standard errors in parentheses.

4.6. Robustness Checking

To verify the robustness of the results derived from Models 1–35, the system generalised method of moments (GMM) regression technique was employed. This step is crucial due to the potential unreliability of estimates produced by the difference GMM, particularly when the lagged dependent variable is a weaker instrument in the model (Blundell and Bond 1998). The paper presents the system GMM results in Table 12. The results reveal a significant inverse relationship between gross domestic product (GDP) growth (GDPR) and DFSP in Models 36–42. This implies that increased economic growth improves fiscal space by reducing the DFSP indicator. As suggested in academic literature, economic growth promotes the expansion of public revenues by broadening the tax base, reducing the number of tax years required to repay public debt. This correlation between GDP growth and fiscal space is consistent with the findings of previous research conducted by Botev et al. (2016).

Table 12. Governance, COVID-19 pandemic, and output gap effect on DFSP.

	(36)	(37)	(38)	(39)	(40)	(41)	(42)
L.DFSP	0.5963 ***	0.6496 ***	0.6057 ***	0.6038 ***	0.6874 ***	0.6069 ***	0.6224 ***
	(0.0038)	(0.0023)	(0.0021)	(0.0029)	(0.0018)	(0.0028)	(0.0029)
GDPR	−12.895 ***	−13.717 ***	−13.595 ***	−12.582 ***	−13.834 ***	−9.6795 ***	−9.1871 ***
	(0.9453)	(0.8050)	(0.8158)	(0.5341)	(0.5997)	(0.7397)	(1.0857)
TOP	0.8941 ***	0.7684 ***	1.0485 ***	0.6926 ***	1.0783 ***	0.6540 ***	0.5294 ***
	(0.1624)	(0.1103)	(0.2266)	(0.1400)	(0.1666)	(0.1545)	(0.2007)
GRSK	−0.01264 ***	−0.01803 ***	−0.01119 ***	−0.006040 ***	−0.02138 ***	0.001578	0.001373
	(0.0016)	(0.0012)	(0.0014)	(0.0014)	(0.0017)	(0.0023)	(0.0010)
POGR	10.702 *	16.823 ***	10.433	14.193 ***	14.779	5.2072	17.264
	(6.4807)	(5.7158)	(8.5629)	(4.9419)	(9.8767)	(8.1622)	(11.1476)
COVID	1.3923 ***	1.2265 ***	1.3370 ***	1.1000 ***	1.3002 ***	1.4089 ***	1.4406 ***
	(0.0837)	(0.0994)	(0.0711)	(0.1078)	(0.0837)	(0.0674)	(0.1034)
OGAP	−2.2761 ***	−3.4599 ***	−2.8520 ***	−2.5717 ***	−3.1315 ***	−1.6888 ***	−2.8157 ***
	(0.7825)	(0.4710)	(0.3594)	(0.1931)	(0.2182)	(0.4025)	(0.7790)
PC1	−0.8663 ***						
	(0.0444)						
PVE		−0.8070 ***					
		(0.0528)					
GEE			−2.3408 ***				
			(0.2348)				
RQE				−2.6295 ***			
				(0.1112)			
RLE					0.7394 ***		
					(0.0966)		
CCE						−3.1943 ***	
						(0.2006)	
VAE							−3.1761 ***
							(0.0862)
C	2.2359 ***	1.8719 ***	0.7907 ***	0.5820 ***	2.5271 ***	0.1064	0.3128 ***
	(0.0939)	(0.0554)	(0.2803)	(0.0786)	(0.1257)	(0.2927)	(0.1203)
N	462	462	462	462	462	462	462
AR(1)	0.0162	0.0188	0.0173	0.0218	0.0172	0.0180	0.0243
AR(2)	0.4673	0.6129	0.3097	0.9587	0.6961	0.9017	0.8117
Sargan (p value)	1.0000	0.2999	0.9998	0.3542	0.1933	0.2535	0.2452

Source: authors' calculations. Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; standard errors in parentheses.

The findings from Models 8–42 suggest a positive correlation between trade openness and DFSP. This suggests that trade openness expands the tax base, leading to increased tax revenues, decreased tax years needed to repay public debt, and a subsequent decline in DFSP. Therefore, the study concludes that trade openness enhances fiscal space in SSA. This

conclusion aligns with the findings from Yohou (2023). This study also considers the effect of the global environment by including a global risk variable (GRSK). The outcomes from Models 36–40 indicate a significant negative correlation between global risk and DFSP in SSA. This negative correlation is likely due to the reluctance of creditors to lend to countries when global risk escalates, leading to a decrease in a country's debt accumulation and, consequently, fewer years needed to settle the outstanding public debt. Hence, the study confidently concludes that an increase in global risk improves fiscal space in SSA.

The study also investigates the influence of population growth on DFSP. Most of the findings, specifically Models 8–16 and 29–39, suggest a positive relationship between population growth and DFSP, except for Models 40–42, where the variable is insignificant. These results document that improvement in the population of the SSA continent is associated with higher DFSP, which translates to deteriorating fiscal space. The probable explanation for this finding is the potential impact of the high unemployment rates characterising the continent, as noted in previous research (Endris Mekonnen and Amede 2022). Owing to high unemployment, population growth does not necessarily lead to an increased tax base, hence the positive effect on DFSP. Additionally, if the population grows faster than the GDP, the GDP per capita income falls. These findings are consistent with those concluded by Yohou (2023).

The findings in Table 12 concerning the impact of governance indicators, output gap, and the COVID-19 pandemic are like those in Table 11, confirming the robustness of the results. The findings reveal that the output gap and governance indicators negatively correlate with DFSP. This implies that as the quality of governance improves and economies operate beyond their full potential output, DFSP tends to decrease, leading to an improvement in fiscal space in SSA. Similarly, the COVID-19 pandemic appears to increase DFSP, consistent with the results reported in Table 11. Overall, the study concludes that the results are robust.

5. Conclusions and Policy Recommendations

This study examined the determinants of fiscal space in the SSA region using a recent dataset from 2005–2021. The data were analysed through panel threshold, difference, and system generalised method of moments (GMM) regression techniques. This paper offers insights into the governance indicators that should be targeted in the region and how the COVID-19 pandemic and other similar crises impact fiscal space in SSA. Through descriptive analysis, the study found substantial evidence of limited fiscal space and poor governance in Central, Western, and Eastern Africa. However, on average, Southern Africa has better governance and fiscal space than all the other African regions. The regression analysis indicates a negative correlation between the output gap, economic growth, and governance indicators with DFSP in subsample and general regressions.

Conversely, COVID-19 and trade openness have been found to influence DFSP in all regressions positively. The results depict the continents' inability to recover and regain momentum after being severely affected by the unexpected shocks of the COVID-19 pandemic. Consequently, this study advocates for improvements in all aspects of governance in all SSA countries. Another outcome from the study findings is the need to improve trade openness to broaden tax revenue generation and base. This would give the continent more fiscal space and better absorb the effects of unexpected shocks. The paper concludes that there is a need for a comprehensive restructuring of governance policies, maintaining a broader tax base through improvements in economic output and trade openness. The study encourages future researchers to consider the potential effects of other pandemics in certain parts of the continent to allow for accurate forecasting of other unknown effects that may have similar impacts in the region.

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Appendix A

Table A1. Governance quality effect on DFSP.

	(8)	(9)	(10)	(11)	(12)	(13)	(14)
L.DFSP	0.8164 ***	0.8013 ***	0.8184 ***	0.8215 ***	0.8147 ***	0.8205 ***	0.8259 ***
	(0.0062)	(0.0091)	(0.0068)	(0.0047)	(0.0056)	(0.0080)	(0.0076)
GDPR	−19.971 ***	−14.204 ***	−21.918 ***	−18.688 ***	−20.990 ***	−20.930 ***	−19.799 ***
	(1.3969)	(0.9462)	(0.8591)	(0.9969)	(1.1895)	(0.6494)	(1.1976)
TOP	0.8916 ***	0.6927 ***	0.8120 ***	1.2294 ***	0.8816 ***	0.8245 ***	1.0570 ***
	(0.0720)	(0.1738)	(0.1572)	(0.0795)	(0.1157)	(0.1524)	(0.1119)
GRSK	−0.002134	0.001944	−0.002100	−0.007289 ***	−0.005217 **	0.001328	−0.001013
	(0.0024)	(0.0028)	(0.0028)	(0.0018)	(0.0022)	(0.0027)	(0.0038)
POGR	77.228 ***	87.129 ***	85.994 ***	60.798 ***	79.974 ***	85.076 ***	74.866 ***
	(8.4137)	(13.0141)	(7.0775)	(9.2616)	(8.7676)	(13.2355)	(9.6359)
PC1	−0.7646 ***						
	(0.1214)						
PVE		−2.0138 ***					
		(0.2808)					
GEE			−1.1110 ***				
			(0.3476)				
RLE				1.5894 ***			
				(0.2481)			
RQE					−2.1493 ***		
					(0.5130)		
CCE						−3.3284 ***	
						(0.5616)	
VAE							−2.3255 ***
							(0.4420)
C	1.5839 ***	0.3121 *	0.8802 ***	2.3728 ***	0.4242	−0.3319	0.3433 **
	(0.1090)	(0.1778)	(0.2561)	(0.2094)	(0.3039)	(0.3099)	(0.1720)
N	528	528	528	528	528	528	528
AR(1)	0.0153	0.0268	0.0093	0.0145	0.0113	0.0083	0.0181
AR(2)	0.5444	0.9999	0.4395	0.6577	0.7282	0.7975	0.5119
Sargan (p-value)	0.9077	0.9077	0.9077	0.8648	0.9077	0.9077	0.9077

Source: authors' calculations. Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; standard errors in parentheses.

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