

When Does Taxation Constrain Growth? Institutional Quality and the Tax Burden– Growth Relationship in Sub-Saharan Africa

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Abstract

This study investigates whether the growth impact of the tax burden in Sub-Saharan Africa (SSA) is conditional on institutional quality, treating domestic revenue mobilization and governance reform as interdependent rather than separate policy agendas. The study uses a quantitative research design with an annual panel of 44 SSA countries from 1996–2022. Two-way fixed-effects and two-step system GMM estimators are used to examine the moderating role of institutions in the relationship between tax burden and economic growth. In the fixed-effects estimates, the tax burden and institutional quality are each positively and significantly associated with real GDP per capita growth, while their interaction is negative and statistically significant. The implied marginal effect of the tax burden remains positive across the entire observed range of institutional quality but declines as institutions strengthen, indicating diminishing rather than reversing complementarity. The system GMM estimates preserve the signs of the fixed-effects point estimates but are considerably less precise and are not individually statistically significant; they are therefore treated as consistent with, but not independently confirming, the fixed-effects results, and the substantive conclusions of the paper rest on the fixed-effects evidence. Subject to these limitations, the findings are consistent with the view that domestic revenue mobilization and governance reform should be pursued as a sequenced, complementary agenda, in which early-stage revenue mobilization is paired with investment in fiscal and accountability institutions. The study contributes to a small but growing literature on tax–institution interactions in SSA by using a harmonized tax measure, a longer and more recent panel than previous contributions, and by reporting the full marginal-effect function of the tax burden across the institutional distribution.

1. Introduction

The question of why growth rates differ across economies is one of the defining issues of development economics, and it is especially pressing in Sub-Saharan Africa (SSA), where the tax-to-GDP ratio lags well behind global comparators. Two positions dominate current policy discussion. The first is domestic revenue mobilization (DRM), under which raising the tax-to-GDP ratio has become central to the financing-for-development agenda as a route to development spending that does not rely on unsustainable debt. The second is governance reform, supported by a large body of evidence following North (1990) and Acemoglu, Johnson, and Robinson (2001), which holds that the quality of economic and political institutions is a key determinant of long-run prosperity — a finding reinforced by Acemoglu, Naidu, Restrepo, and Robinson (2019).

The scale of the revenue gap is well documented. IMF and World Bank (2015) suggest that many low- and lower-middle-income countries could raise additional revenue of the order of two to four percentage points of GDP without compromising equity or growth. Yet SSA's tax-to-GDP ratio fell over the decade leading up to 2019, and the COVID-19 pandemic widened the shortfall. Africa's average tax-to-GDP ratio recovered to 16.1 percent in 2023 (OECD/AUC/ATAF, 2025), which remains well below the Asia-Pacific (19.6 percent), Latin America and the Caribbean (21.3 percent), and OECD (33.9 percent) averages, while institutional quality across the region remains substantially below the global mean.

Theoretically, the tax–growth relationship is equivocal. Taxation can finance growth-enhancing public goods and build state capacity, but it can also generate resource misallocation and rent-seeking. The balance of these effects plausibly depends on the quality of the institutions through which revenue is raised and spent.

This conditional view is supported by a growing but inconclusive body of recent evidence. Arvin, Pradhan, and Nair (2021) find that tax revenue, government expenditure, institutions, and growth are jointly determined in low- and lower-middle-income countries. Oyinlola, Adedeji, Bolarinwa, and Olabisi (2020) report that aggregate and disaggregated taxes have no significant effect on inclusive growth in SSA, while all dimensions of governance have a positive direct effect – evidence that the developmental return to revenue depends on the governance environment. Ayana, Demissie, and Sore (2023) find that government revenue on its own is negatively associated with growth in SSA while institutional quality is positively associated with it, with the revenue–institutions interaction improving the revenue effect; this implies a positive interaction. Peprah, Ngalawa, and Derera (2023) show that governance shapes both tax collection and the growth effect of tax collection. Efayena and Olele (2024) report a comparable moderating role for institutional quality in the fiscal policy–growth nexus. Arogundade, Ngarachu, and Bandele (2025) estimate a threshold model in which the DRM–growth relationship is non-linear, with revenue increases yielding little growth below a critical mobilization level and substantially more above it.

Three features of this literature motivate the present study. First, much of it proxies fiscal effort with broad revenue aggregates or with composite economic-freedom indices rather than harmonized tax data, so that the object being measured is not consistently the tax burden. Second, several of the SSA-focused contributions rest on comparatively short samples – Ayana et al. (2023) cover 2012–2022 and Efayena and Olele (2024) cover 2006–2022 – which makes it difficult to separate structural relationships from the post-2012 commodity cycle. Third, interpretation is frequently based on the sign of the interaction coefficient alone, without reporting the marginal-effect function across the range of the moderator, even though the sign of an interaction term is uninformative about whether the marginal effect actually changes sign within the observed data.

Conceptually, the analysis draws on the state-capacity framework of Besley and Persson (2011). In low-capacity settings, marginal tax effort is expected to be growth-enhancing because it simultaneously funds public goods and builds fiscal and legal capacity; in higher-capacity settings, the same marginal effort is more likely to crowd out private activity or to finance lower-return public programmes, weakening the link between taxation and growth. This yields a direct empirical question: does higher tax effort translate into higher growth in SSA, and does this payoff rise or fall as institutional quality improves?

The paper makes three contributions, which we state deliberately narrowly. First, it extends the evidence base to an annual panel covering 1996–2022, a longer and more recent window than the SSA studies closest to it, and one that includes the COVID-19 contraction. Second, it measures the tax burden using

the harmonized ICTD/UNU-WIDER Government Revenue Dataset, which isolates tax revenue from resource rents, social contributions, and other non-tax revenue, rather than relying on broad revenue aggregates or on economic-freedom indices. Third, it reports the full implied marginal-effect function of the tax burden across the institutional distribution, and cross-validates the institutional measure across three independently constructed governance indicators, rather than resting the interpretation on the sign of a single interaction coefficient. The paper does not claim to be the first to model tax revenue and institutional quality jointly in SSA; Oyinlola et al. (2020), Ayana et al. (2023), Bah (2024), and Efayena and Olele (2024) all examine closely related questions, and our contribution is one of measurement, sample coverage, and interpretation rather than of framing.

The remainder of the paper is organized as follows. Section 2 reviews the literature and sets out the conceptual framework. Section 3 describes the data and variables. Section 4 outlines the empirical strategy. Section 5 presents the results. Section 6 reports robustness checks and discusses the findings. Section 7 concludes and draws policy implications.

2. Literature Review and Conceptual Framework

2.1 Institutions and Growth

North (1990) characterized institutions as the rules that shape economic incentives, a view supported empirically by Acemoglu, Johnson, and Robinson (2001, 2002) using settler mortality as an instrument for property-rights enforcement. Rodrik, Subramanian, and Trebbi (2004) show that institutions outweigh geography and trade openness as determinants of income levels, while Acemoglu et al. (2019) find that democratization raises long-run GDP per capita by roughly 20 percent. For Africa specifically, Easterly and Levine (1997) link the continent's slow growth to policy and institutional shortcomings, and Ogbuabor, Orji, Manasseh, and Anthony-Orji (2020) observe that the growth benefits of strong institutions in West Africa increased following the global financial crisis. The present study re-examines this relationship using within-country variation across governance indicators, which avoids the cross-sectional confounding of historical and geographic factors.

A related strand asks whether the institutions–growth relationship is linear. Using panel smooth-transition regression, Ochi, Saidi, and Labidi (2023) find that governance raises growth only beyond an estimated threshold, and Saidi, Labidi, and Ochi (2024) report an analogous threshold for poverty reduction. Because average institutional quality in SSA lies well below these thresholds, the marginal returns to institutional improvement – and to the revenue mobilization it enables – are plausibly largest precisely in the low-capacity settings that dominate this sample. This motivates an interaction-based rather than a purely additive specification.

2.2 Taxation and Growth

Endogenous growth theory (Romer, 1986; Lucas, 1988; Barro, 1990) predicts that distortionary taxation lowers growth when it funds unproductive spending but can raise growth when it funds productive public

investment, producing a hump-shaped tax–growth relationship. Kneller, Bleaney, and Gemmell (1999) confirm this pattern for OECD countries, and Gemmell, Kneller, and Sanz (2011) show that the composition of taxation and spending matters more than their levels. For developing economies, McNabb (2018) shows that the growth effects of tax structure vary with income level, and Baunsgaard and Keen (2010) document the difficulty low-income countries face in replacing lost trade-tax revenue. Because SSA tax ratios remain well below any plausible growth-maximizing rate, the binding constraint is arguably the state’s capacity to collect and productively deploy revenue rather than the distortionary cost of taxation itself. This premise underlies the paper’s focus on institutions rather than on tax levels alone.

Recent SSA-focused studies reinforce this view. Arvin, Pradhan, and Nair (2021) find that tax revenue, expenditure, institutions, and growth are jointly determined in low- and lower-middle-income samples. Oyinlola et al. (2020) find that aggregate and disaggregated taxes do not significantly affect inclusive growth, while governance does. Gwaindepi (2021) shows that the developmental effect of revenue depends on how it is collected. Bah (2024) documents that institutional quality is itself a determinant of tax revenue mobilization in SSA, implying a two-way relationship between collection capacity and governance. Arogundade et al. (2025) estimate a threshold model in which additional revenue has negligible growth effects below a critical mobilization level but substantial effects above it, particularly where institutions are supportive.

2.3 Theoretical Framework

Three complementary traditions motivate the interaction term tested here. First, Besley and Persson (2011) argue that investments in fiscal and legal capacity are complements, with the highest returns arising when both are developed simultaneously. Second, fiscal-contract theory (Levi, 1988; Bates and Lien, 1985; Moore, 2004; Timmons, 2005; Moore, Prichard, and Fjeldstad, 2018) holds that financing government operations from tax revenue rather than from rents or aid increases the accountability of the state to its citizens, a mechanism of particular relevance in SSA. Third, the productive-expenditure tradition in endogenous growth theory (Barro, 1990; Kneller et al., 1999) ties the net growth effect of taxation to how the resulting revenue is spent, a channel that itself depends on institutional quality.

Taken together, these traditions generate a common prediction. Where institutions are weak, tax effort contributes to fiscal capacity and accountability at the same time as it provides revenue for public goods, so its marginal growth contribution is large. Where institutions are already strong, the incremental growth gain from the same tax effort is smaller, because the capacity- and accountability-building channels are largely exhausted and the distortionary margin becomes relatively more important. This implies a positive direct effect for both the tax burden and institutional quality, and a negative interaction between them — that is, diminishing but not reversing complementarity. The competing prediction, consistent with Ayana et al. (2023) and Efayena and Olele (2024), is that stronger institutions raise the growth payoff to revenue raised under weak institutions, yielding a positive interaction. Which of these predictions holds is the empirical question addressed below.

3. Data and Variables

The analysis uses an annual panel of 44 SSA economies from 1996 to 2022, yielding 1,188 potential country-year observations. The sample used to estimate the institutions–growth relationship excludes country-years with missing data on growth, institutions, lagged income, and population growth, leaving 1,056 observations for 44 countries. Adding the tax variable reduces the sample to 769 observations across 42 countries, reflecting the sparser coverage of the tax data. Because harmonized tax data are not available for the full panel beyond 2020, all specifications that include the tax burden are estimated over 1996–2020, while the institutions-only specification uses the full 1996–2022 window. The estimation period for each specification is reported in the tables.

The Maddison Project Database 2023 (Bolt and van Zanden, 2024) provides real GDP per capita and population. The dependent variable is real GDP per capita growth, winsorized at the 1st and 99th percentiles. Lagged log GDP per capita captures persistence and conditional convergence, and population growth enters as a control. The tax burden is total tax revenue as a percentage of GDP, taken from the ICTD/UNU-WIDER Government Revenue Dataset (Prichard, Cobham, and Goodall, 2014; UNU-WIDER, 2025), and winsorized at the same percentiles as the growth variable. This measure is preferred over broader revenue aggregates because it more closely proxies the state’s extractive capacity, which is the theoretical concept of interest here.

The principal indicator of institutional quality is the simple average of the six standardized Worldwide Governance Indicators (WGI; Kaufmann, Kraay, and Mastruzzi, 2011). Robustness checks use the V-Dem rule-of-law index (Coppedge et al., 2024) and the WGI rule-of-law sub-index, which are conceptually and methodologically distinct measures. The interaction term is constructed as the product of the tax ratio and the WGI composite. Because the WGI composite is standardized to a global mean of approximately zero, the coefficient on the tax burden in the interacted specifications is interpretable as the marginal tax–growth association at approximately average global institutional quality. Using several independently constructed indices complements recent studies that rely on a single index — for example, the Heritage economic-freedom index used by Ayana et al. (2023) — by testing whether the institutions–growth relationship survives changes in the governance measure. Specifications with the full control set add Penn World Table variables (Feenstra, Inklaar, and Timmer, 2015): investment, government consumption, trade openness (all as a percentage of GDP), and a human-capital index.

Table I. Descriptive statistics

Variable	N	Mean	Std. dev.	Min	Max
Real GDP per capita growth (%)	1,188	2.17	4.60	-12.25	18.52
Tax revenue (% of GDP)	876	14.02	8.09	3.30	42.50
Institutional quality (WGI composite)	1,056	-0.614	0.605	-2.142	0.908
WGI rule of law	1,056	-0.650	0.640	-2.157	1.087
WGI control of corruption	1,056	-0.584	0.635	-1.828	1.240
V-Dem rule of law index	1,188	0.427	0.250	0.032	0.969
Investment (% of GDP)	1,056	18.90	10.21	2.31	84.03
Government consumption (% of GDP)	1,056	16.50	7.93	0.52	75.02
Net openness (% of GDP)	1,056	39.06	29.20	3.66	195.94
Human-capital index	864	1.742	0.429	1.053	2.939
Population growth (%)	1,188	2.47	1.20	-1.80	20.33
Log GDP per capita (lagged)	1,188	7.779	0.957	5.934	10.770

Annual data, 1996–2022, for 44 SSA countries. The tax ratio and the growth variable are winsorized at the 1st and 99th percentiles. The WGI indicators are expressed in standardized units with a global mean of approximately zero.

Table II. Pairwise correlations of key variables

1. Growth	1	2	3	4	5	6
	1.00					
2. Tax	0.06	1.00				
3. Inst.	0.08	0.49	1.00			
4. Pop. gr.	0.08	-0.38	-0.37	1.00		
5. ln GDP	0.05	0.55	0.52	-0.33	1.00	
6. V-Dem RoL	0.05	0.44	0.85	-0.26	0.34	1.00

Pairwise Pearson correlations on the annual panel. Inst. = WGI composite; Pop. gr. = population growth; ln GDP = lagged log GDP per capita; V-Dem RoL = V-Dem rule-of-law index.

Tables I and II report descriptive statistics and pairwise correlations. Mean tax-to-GDP in the sample (14.0 percent) is below the continental average and is highly dispersed (standard deviation 8.1); the sample mean is not directly comparable to the 16.1 percent headline figure reported by OECD/AUC/ATAF

(2025), which covers a different country set, a different revenue definition, and a later year. Institutional quality averages – 0.61 in standardized units, placing SSA well below the global mean of zero. The raw correlation between growth and institutions (0.08) modestly exceeds that between growth and the tax ratio (0.06). Tax and institutions correlate at 0.49, while the WGI composite correlates at 0.85 with the V-Dem rule-of-law index. The first of these correlations underscores the need to enter tax and institutions jointly rather than treating either as a proxy for the other; the second indicates that the two governance sources capture a common underlying construct while remaining independently constructed, which is what makes the cross-validation in Section 6 informative.

4. Empirical Strategy

Equation (1) is the baseline conditional convergence growth model for country i in year t :

$$g_{it} = \beta_1 \ln y_{it-1} + \beta_2 TAX_{it} + \beta_3 INST_{it} + \beta_4 (TAX \times INST)_{it} + X'_{it}\gamma + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where g_{it} is real GDP per capita growth and $\ln y_{it-1}$ is lagged log GDP per capita. A negative β_1 indicates conditional convergence. TAX denotes the tax burden, $INST$ denotes institutional quality, X is a vector of controls, and μ_i and λ_t are country and year fixed effects. Because $INST$ is standardized to an approximately zero global mean, β_2 is interpretable as the tax–growth association at approximately average global institutional quality, and the marginal effect of the tax burden at any institutional level is $\beta_2 + \beta_4 \times INST$.

4.1 Fixed-Effects Estimation

Equation (1) is estimated with two-way fixed effects — country and year dummies — with standard errors clustered by country. Country effects absorb time-invariant historical and geographic heterogeneity, and year effects absorb common global shocks such as commodity cycles, the global financial crisis, and the 2020 pandemic. Estimates are reported both on annual data and on nine non-overlapping three-year averages, which reduce business-cycle noise. The within estimator assumes strict exogeneity of the regressors and does not correct for the dynamic bias that arises from persistence in growth; this is the motivation for the dynamic specification that follows.

4.2 System GMM

To address reverse causality and dynamic panel bias, a dynamic specification adds lagged growth and is estimated using the two-step system GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). The tax burden, institutional quality, their interaction, and lagged income are treated as endogenous and instrumented with lags two through four. Population growth is treated as a standard instrument. Following Roodman (2009), the instrument matrix is collapsed to limit instrument proliferation, and Windmeijer (2005)-corrected standard errors are reported. Instrument validity is assessed using the Arellano–Bond tests for first- and second-order serial correlation and the Hansen J test of overidentifying restrictions. This approach follows recent SSA studies (Ayana et al., 2023; Bah,

2024; Arogundade et al., 2025) but differs in combining the dynamic estimator with transparent two-way fixed-effects and three-year-average estimates and, following Ochi et al. (2023) and Arogundade et al. (2025), in reporting the full marginal effect of the tax burden across the institutional distribution rather than the sign of the interaction coefficient alone.

It is important to be explicit at the outset about the trade-off this design involves. Collapsing the instrument matrix and restricting the lag range are necessary to keep the instrument count well below the number of countries and to preserve the credibility of the Hansen test, but both choices reduce the information available to identify the coefficients and therefore lower precision. In a panel with a moderate time dimension and highly persistent institutional series, the lagged-level instruments available for institutional quality are weak, and this is reflected in the standard errors reported in Section 5.2. We therefore treat the system GMM estimates as a specification check on the fixed-effects results rather than as the primary evidence, and we interpret them accordingly.

5. Results

5.1 Fixed-Effects Estimates

Table III presents the two-way fixed-effects estimates. Entered on its own, institutional quality is positive and significant at the 5 percent level (M1): a one-unit increase in the WGI composite is associated with roughly three additional percentage points of annual per capita growth. The tax burden entered on its own is positive and significant at the 1 percent level (M2). When both variables are included (M3), each remains positive and significant at the 1 percent level, indicating that they capture distinct sources of variation rather than one proxying for the other. Initial income is negative and significant throughout, confirming conditional convergence.

Model M4 adds the tax–institutions interaction, which is negative and significant (-0.133 , $p < 0.05$), while institutional quality remains positive and highly significant (5.145 , $p < 0.01$). The implied marginal effect of the tax burden is $0.152 - 0.133 \times INST$, which would change sign only at an institutional score of approximately 1.14 — above the sample maximum of 0.91 . The marginal tax–growth association therefore remains positive throughout the observed range but declines as institutions strengthen. This refines, rather than contradicts, Ayana et al. (2023) and Efayena and Olele (2024), who report that revenue is growth-enhancing mainly under strong institutions. Using a harmonized tax measure and a longer panel, we find instead that the growth payoff to the tax burden is largest where institutions are weakest, which is consistent with a state-capacity mechanism; on this reading the negative interaction reflects diminishing complementarity rather than a harmful effect of taxation at higher institutional quality.

Table III. Tax, institutions, and growth: annual two-way fixed effects

Tax revenue (% of GDP)	M1	M2	M3	M4
		0.229*** (0.062)	0.241*** (0.078)	0.152** (0.063)
Institutional quality (WGI)	3.087** (1.343)		3.567*** (0.972)	5.145*** (1.236)
Tax × Institutions				−0.133** (0.059)
Initial log GDP p.c. (lag)	−7.393*** (1.194)	−5.782*** (0.881)	−7.777*** (1.484)	−7.477*** (1.348)
Population growth (%)	0.377 (0.500)	−0.134 (0.440)	0.057 (0.450)	0.050 (0.439)
Observations	1,056	876	769	769
Countries	44	42	42	42
Period	1996–2022	1996–2020	1996–2020	1996–2020
Within R ²	0.112	0.106	0.153	0.160
Country and year FE	Yes	Yes	Yes	Yes

*Standard errors clustered by country in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Specifications including the tax burden are estimated over 1996–2020 because harmonized tax data are unavailable for the full panel thereafter.*

Table IV reports three-year-average estimates, which reduce business-cycle noise and raise the within- R^2 to between 0.17 and 0.28. Institutional quality remains positive and significant under the WGI composite (FE1, FE2, FE3). The WGI rule-of-law sub-index is significant at the 1 percent level (FE4), as is the V-Dem rule-of-law index (FE5: 7.155, $p < 0.01$). This indicates that the institutions–growth association is not an artefact of any single governance measure. The tax coefficient (approximately 0.31, $p < 0.01$) and the interaction (FE3: −0.132, $p < 0.05$) are stable relative to the annual results.

Table IV. Three-year averages and alternative institutional measures (two-way fixed effects)

Tax revenue (% of GDP)	FE1	FE2	FE3	FE4	FE5
		0.313*** (0.081)	0.204** (0.090)	0.308*** (0.076)	0.314*** (0.081)
Institutions (WGI composite)	2.928* (1.743)	3.926*** (1.085)	5.458*** (1.389)		
WGI rule of law				2.640*** (0.931)	
V-Dem rule of law					7.155*** (2.577)
Tax × Institutions			-0.132** (0.065)		
Initial log GDP p.c.	-5.976*** (1.236)	-6.225*** (0.857)	-5.956*** (0.824)	-5.768*** (0.970)	-5.237*** (0.849)
Population growth (%)	0.365 (0.551)	0.124 (0.451)	0.107 (0.436)	0.095 (0.489)	-0.032 (0.494)
Observations	396	319	319	319	319
Countries	44	42	42	42	42
Within R ²	0.169	0.273	0.282	0.222	0.234

*Non-overlapping three-year averages, nine periods spanning 1996–2022. Country-clustered standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Columns have been renumbered consecutively FE1–FE5; the original submission labelled these columns FE1 and FE3–FE6.*

5.2 Dynamic System-GMM Estimates

Table V reports the two-step system GMM estimates. Lagged growth is positive and significant at the 1 percent level, confirming meaningful persistence in per capita growth and thereby justifying the dynamic specification. The specification tests are satisfied: the Hansen J test does not reject the overidentifying restrictions ($p = 0.20$ and 0.15), the Arellano–Bond test rejects the null of no first-order serial correlation ($p = 0.000$ in both columns), the test for second-order serial correlation does not reject ($p = 0.41$ and 0.57), and the instrument count (18 and 22) remains below the number of countries (44).

However, none of the tax, institutional quality, or interaction coefficients is individually statistically significant at conventional levels. The signs are broadly consistent with the fixed-effects results - institutional quality is positive in both columns, and the interaction is negative (-0.285). Still, the standard errors are between three and five times larger than the corresponding fixed-effects standard errors, and the tax coefficient changes sign between the two GMM columns (0.200 in GMM 1, -0.027 in GMM 2). The 95 percent confidence intervals implied by these estimates comfortably contain both the fixed-effects point estimates and zero.

We interpret this divergence as a difference in precision rather than as conflicting evidence about the sign of the relationship, and we are careful not to overstate the case. Three design features account for the loss of precision. First, the estimation sample falls from 769 to 610 observations because lagging and differencing consume the early years of a panel that is already unbalanced in the tax dimension. Second, institutional quality is highly persistent within countries, so lagged levels are weak instruments for current differences; this is a well-known limitation of applying system GMM to slow-moving institutional variables. Third, collapsing the instrument matrix and restricting the lag range — both necessary to preserve the credibility of the Hansen test given only 44 countries — further reduce identifying information. The consequence is a set of estimates that cannot distinguish the fixed-effects results from zero, which is a statement about the power of the dynamic estimator in this sample rather than evidence against the fixed-effects findings. Accordingly, we treat the fixed-effects estimates as the preferred evidence and the system GMM estimates as consistent with, but not independently confirming, those results.

Table V. Dynamic growth equation: two-step system GMM, annual data, 1996–2020

Lagged growth	GMM (1)	GMM (2)
	0.214*** (0.080)	0.266*** (0.085)
Tax revenue (% of GDP)	0.200 (0.211)	−0.027 (0.276)
Institutional quality (WGI)	1.827 (3.522)	4.465 (5.050)
Tax × Institutions		−0.285 (0.261)
Initial log GDP p.c. (lag)	0.067 (1.651)	1.184 (1.420)
Population growth (%)	1.427 (0.958)	1.238 (1.138)
Observations	610	610
Countries	44	44
Instruments	18	22
Hansen J (p-value)	15.77 (0.200)	20.70 (0.150)
AR(1) p-value	0.000	0.000
AR(2) p-value	0.410	0.574

*Two-step system GMM with Windmeijer-corrected standard errors in parentheses and collapsed instruments. Year dummies included. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.*

5.3 Marginal effects of taxation across the institutional range

The interaction coefficient in M4 is not itself the object of interest; the policy-relevant quantity is the marginal effect of the tax burden on growth at a given level of institutional quality, $\partial g/\partial \text{TAX} = \beta_2 + \beta_4 \times \text{INST}$. We compute this effect and its delta-method standard error across the institutional range from the estimated coefficient vector and the country-clustered variance–covariance matrix, with $\text{Var}(\partial g/\partial \text{TAX}) = \text{Var}(\beta_2) + \text{INST}^2 \cdot \text{Var}(\beta_4) + 2 \cdot \text{INST} \cdot \text{Cov}(\beta_2, \beta_4)$. Table VI reports the effect at representative points of the institutional distribution. The marginal association of taxation with growth is positive and statistically significant across essentially the entire Sub-Saharan African institutional range. Under the core-control model (M4) it falls from about + 0.44 percentage points of growth per point of tax-to-GDP at the weakest institutional level (INST = – 2.14; 95% CI 0.21 to 0.66) to about + 0.22 at the sample mean (95% CI 0.11 to 0.34), remaining significant at the 75th percentile, and becomes statistically indistinguishable from zero only near the very top of the observed range (INST = 0.91; effect 0.03, 95% CI – 0.16 to 0.23). A Johnson–Neyman calculation places the threshold of significance at $\text{INST} \approx 0.15$: the tax–growth effect is positive and significant at the 5% level for all countries below that value, which is 85.6% of the estimation sample. The full-control model (M4f) yields the same picture with a threshold near $\text{INST} \approx 0.64$, and the three-year specification (FE4) is likewise significant from the floor of the distribution through the mean. The confidence band therefore delivers the conditional claim directly: higher tax effort is reliably growth-associated where institutions are weak, and the association attenuates—losing significance rather than turning significantly negative—only among the region's strongest institutional performers.

Table VI. Marginal effect of the tax burden on growth across institutional quality

Institutional quality	Marg. effect	Std. error	95% CI (low)	95% CI (high)
<i>Panel A. Core controls (M4), annual, 1996–2020</i>				
Weakest in sample (INST = – 2.14)	0.436***	0.115	0.211	0.661
25th percentile (INST = – 0.96)	0.279***	0.064	0.153	0.405
Mean (INST = – 0.54)	0.223***	0.057	0.111	0.335
75th percentile (INST = – 0.23)	0.183***	0.059	0.069	0.298
Strongest in sample (INST = 0.91)	0.032	0.099	–0.162	0.226
<i>Panel B. Full controls (M4f), annual</i>				
Weakest in sample (INST = – 2.14)	0.414***	0.105	0.209	0.620
Mean (INST = – 0.52)	0.173***	0.051	0.073	0.274
Strongest in sample (INST = 0.91)	–0.039	0.116	–0.266	0.187

*Marginal effect $\partial g/\partial TAX = \beta_2 + \beta_4 \times INST$ from the interaction models in Tables 3 (M4) and 6 (M4f), evaluated at points of the WGI-composite distribution. Delta-method standard errors from the country-clustered covariance matrix; 95% confidence interval = effect $\pm 1.96 \times SE$. Johnson–Neyman significance threshold $INST \approx 0.15$ (M4) and ≈ 0.64 (M4f). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.*

6. Robustness and Discussion

6.1 Robustness Checks

The fixed-effects findings are robust along several dimensions. First, the positive institutional quality–growth association holds across three independently constructed governance measures: the WGI composite, the WGI rule-of-law sub-index, and the V-Dem rule-of-law index (Table IV). Second, the association is stable at both annual and three-year frequencies. Third, growth and the tax ratio are winsorized at the 1st and 99th percentiles, and year fixed effects absorb the 2020 pandemic shock, so the results are not driven by the crisis years. Fourth, the system GMM specification tests do not reject instrument validity, although, as discussed in Section 5.2, the GMM coefficients are too imprecise to corroborate the fixed-effects estimates.

Table VII adds the Penn World Table conditioning variables — investment, government consumption, trade openness, and human capital — which are available through 2019 for 34 countries. The main results are qualitatively unchanged. The tax burden and institutional quality both remain positive and significant in M3f. In the interacted specification M4f, institutional quality and the interaction remain significant while the tax coefficient (0.096) is no longer individually significant, which is expected given the reduced sample and the correlation between the tax term and its interaction. The interaction remains negative and significant at the 5 percent level. Government consumption is negative and significant, trade openness is positive and significant, and investment and human capital are insignificant.

Table VII. Robustness: annual fixed effects with full control set

Tax revenue (% of GDP)	M3f	M4f
	0.194*** (0.067)	0.096 (0.068)
Institutional quality (WGI)	4.152*** (1.440)	5.916*** (1.696)
Tax × Institutions		−0.149** (0.064)
Initial log GDP p.c. (lag)	−9.259*** (1.619)	−8.966*** (1.548)
Investment (% GDP)	−0.012 (0.035)	−0.021 (0.036)
Govt. consumption (% GDP)	−0.162** (0.072)	−0.158** (0.074)
Net openness (% GDP)	0.034** (0.014)	0.034** (0.015)
Human capital	−0.180 (1.841)	−0.034 (1.746)
Population growth (%)	0.087 (0.469)	0.080 (0.457)
Observations	607	607
Countries	34	34
Within R ²	0.172	0.179
Country and year FE	Yes	Yes

*Two-way fixed effects; country-clustered standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Penn World Table controls are available through 2019 for 34 countries.*

6.2 Discussion

These results align with an independent body of evidence documenting non-linear or threshold effects in the governance–growth and revenue–growth relationships (Ochi et al., 2023; Saidi et al., 2024; Arogundade et al., 2025). The pattern reported here is consistent with SSA occupying the steep, high-return segment of these non-linear relationships, where marginal gains in revenue mobilization are associated with the largest growth dividends. The negative coefficient on government consumption reinforces the view that the composition and quality of public spending, rather than its level, drive the growth payoff. Because the sample is dominated by low- and moderate-institutional-quality countries, the results should not be extrapolated to higher-income settings in which tax ratios lie closer to the growth-maximizing rate.

Taken together, and subject to the qualifications set out below, the fixed-effects evidence is consistent with a state-capacity interpretation: growth is positively associated with institutional quality, and the tax burden is positively associated with growth most strongly where institutions are weak, in line with the argument that tax collection simultaneously builds fiscal and legal state capacity (Besley and Persson, 2011; Moore, Prichard, and Fjeldstad, 2018).

6.3 Limitations

Several limitations should be borne in mind when interpreting these results. First, and most importantly, the identification is not causal. The two-way fixed-effects estimator removes time-invariant country heterogeneity and common shocks but does not address reverse causality, and the system GMM estimates that would address it are too imprecise in this sample to support a causal reading. The relationships reported here are conditional associations, and we describe them as such throughout.

Second, the tax sample is unbalanced and ends in 2020, so the interacted specifications do not cover the post-pandemic revenue recovery documented by OECD/AUC/ATAF (2025). Third, the WGI composite aggregates six perception-based indicators whose comparability across countries and over time has been questioned; the use of the V-Dem rule-of-law index as an alternative mitigates but does not eliminate this concern. Fourth, the analysis uses the aggregate tax ratio and therefore cannot speak to the composition of taxation, which the OECD-focused literature identifies as more consequential than the level (Gemmell et al., 2011; McNabb, 2018). Fifth, the marginal effects reported in Table VI are point estimates derived from the estimated coefficients and should be read alongside the standard errors of the underlying parameters. Finally, the sample is restricted to SSA, so the external validity of the findings to other regions is untested.

7. Conclusions and Policy Implications

This paper examines the joint relationship between the tax burden, institutional quality, and economic growth using a panel of 44 SSA countries over 1996–2022, combining the Maddison Project Database, the ICTD/UNU-WIDER Government Revenue Dataset, and two independent governance sources (WGI and V-Dem). In the fixed-effects estimates, institutional quality is positively associated with per capita growth across all three governance measures and across annual and three-year frequencies. The tax burden is also positively associated with growth, and this association is moderated by institutions: the growth payoff from taxation is largest where institutions are weakest and declines — without turning negative within the observed range in the baseline specification — as institutions strengthen. Conditional convergence holds throughout. The system GMM estimates share the signs of these results but are not statistically significant, and we therefore present the fixed-effects findings as the paper’s substantive evidence rather than claiming consistency across estimators.

The policy implication, offered with the qualification that these are conditional associations rather than causal estimates, is that domestic revenue mobilization and governance reform are better understood as complements than as substitutes. Africa’s tax-to-GDP ratio rose for a third consecutive year to approximately 16 percent in the most recent data (OECD/AUC/ATAF, 2025). Our estimates suggest that the growth dividend from further revenue mobilization may be largest precisely in lower-capacity settings, where the mobilization agenda is most urgent. That dividend, however, depends on the institutional machinery governing how revenue is raised and spent: strengthening the rule of law, curbing corruption, and improving government effectiveness appear not merely complementary to revenue mobilization but important to sustaining its growth payoff.

The evidence points toward a sequenced reform agenda. Early mobilization efforts are plausibly best directed at building the basic architecture of the fiscal state — professional revenue administration, transparency in public financial management, and audit and oversight institutions — since stronger institutions in turn raise collection capacity (Bah, 2024). Without parallel accountability reforms, additional revenue risks dissipating without generating a growth dividend (Peprah, Ngalawa, and Derera, 2023). A practical framework would link specific revenue targets to governance milestones, treat formalization of the informal sector as both a fiscal and an institution-building objective, and sequence the deepening of collection capacity alongside the strengthening of accountability mechanisms.

Two directions for future research follow directly from the limitations set out in Section 6.3. First, a larger cross-section or a longer time dimension would improve the power of dynamic-panel estimators and allow the causal question to be addressed more convincingly than is possible here. Second, disaggregating the tax ratio into its components would allow the composition question that dominates the OECD literature to be brought to bear on the SSA case.

Declarations

Ethics Approval and Consent to Participate

Not applicable. This study is based exclusively on the secondary analysis of publicly available, aggregated, country-level macroeconomic and governance data. It does not involve human participants, human tissue, or animals, and therefore did not require ethical approval from an institutional review board or research ethics committee.

Consent for Publication

Not applicable. The manuscript contains no individual's data in any form.

Informed Consent

Not applicable. No human participants were involved in this study, and no individual-level data were collected or analyzed.

Competing Interests

The authors declare that they have no competing interests, financial or non-financial, that could have appeared to influence the work reported in this paper.

Use of Artificial Intelligence Tools

The authors used an AI-assisted language tool (ChatGPT) solely to improve the grammar, clarity, and readability of portions of the manuscript. The tool was not used to generate the study design, to collect

or analyse data, to interpret findings, or to formulate the scientific conclusions. All intellectual content, data analysis, interpretation, and final decisions regarding the manuscript remain the sole responsibility of the authors, who reviewed and edited the resulting text and take full responsibility for the content of the publication.

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Author Contribution

Abubakar Mohammed Toufiq contributed to data collection and preparation. Abdulai Iddrisu, the corresponding author, led the conceptualization, empirical analysis, interpretation of results, and drafting of the manuscript. Yakubu Ibrahim Nandom contributed to the data analysis, interpretation of findings, and selected sections of the manuscript. Abdulai Iddrisu prepared the tables and figures, while Yakubu Ibrahim Nandom reviewed and undertook detailed revisions to the final manuscript.

Data Availability

Publicly available in a repository: The Panel dataset that support this study are deposited into the Figshare database and are available at the following DOI: <https://doi.org/10.6084/m9.figshare.33478816>

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Figures

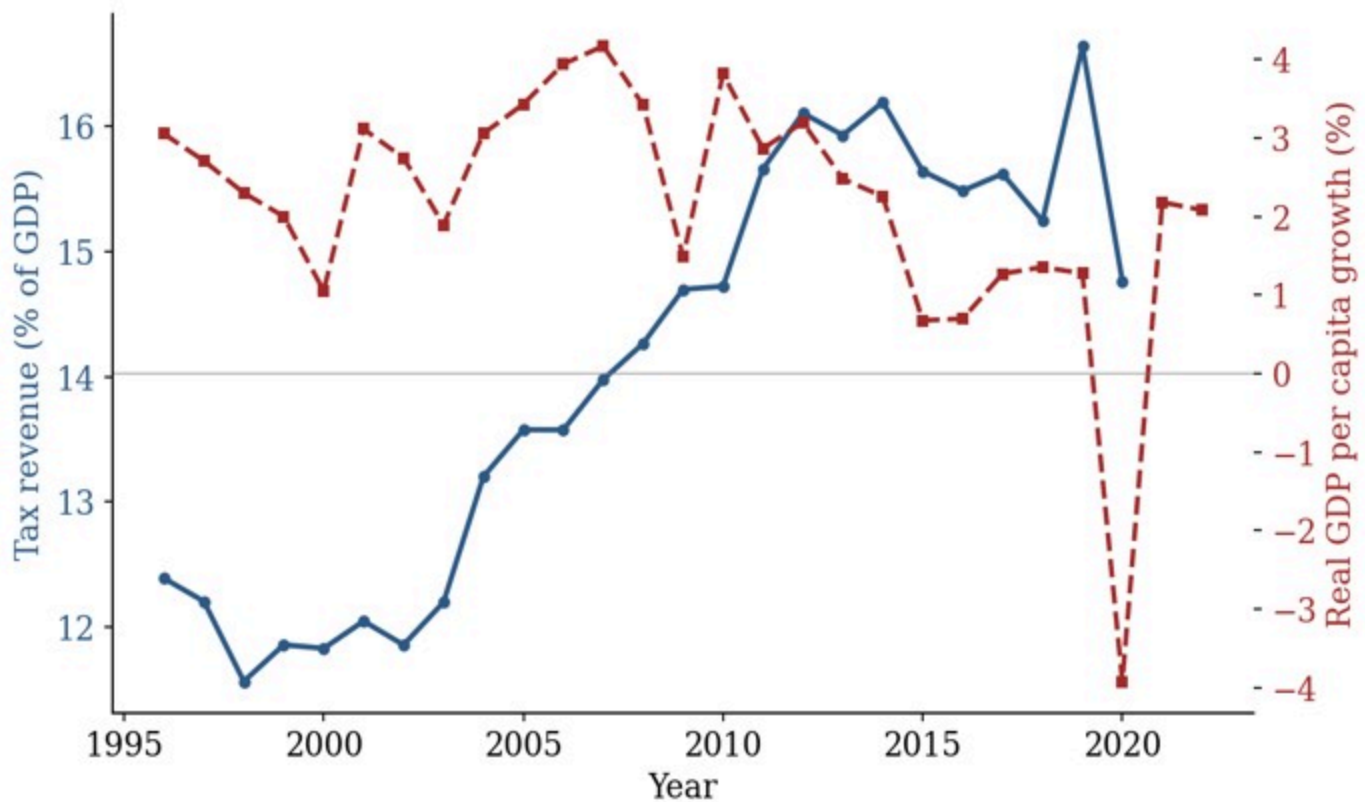


Figure 1

Tax burden and per capita growth from 1996 to 2022. The 2020 trough reflects the COVID-19 contraction.

Source: The authors' construction is based on the data in the Government Revenue Dataset (Prichard, Cobham, & Goodall, 2014) and [World Bank World Development Indicators, 2024 / Penn World Table 10.01].

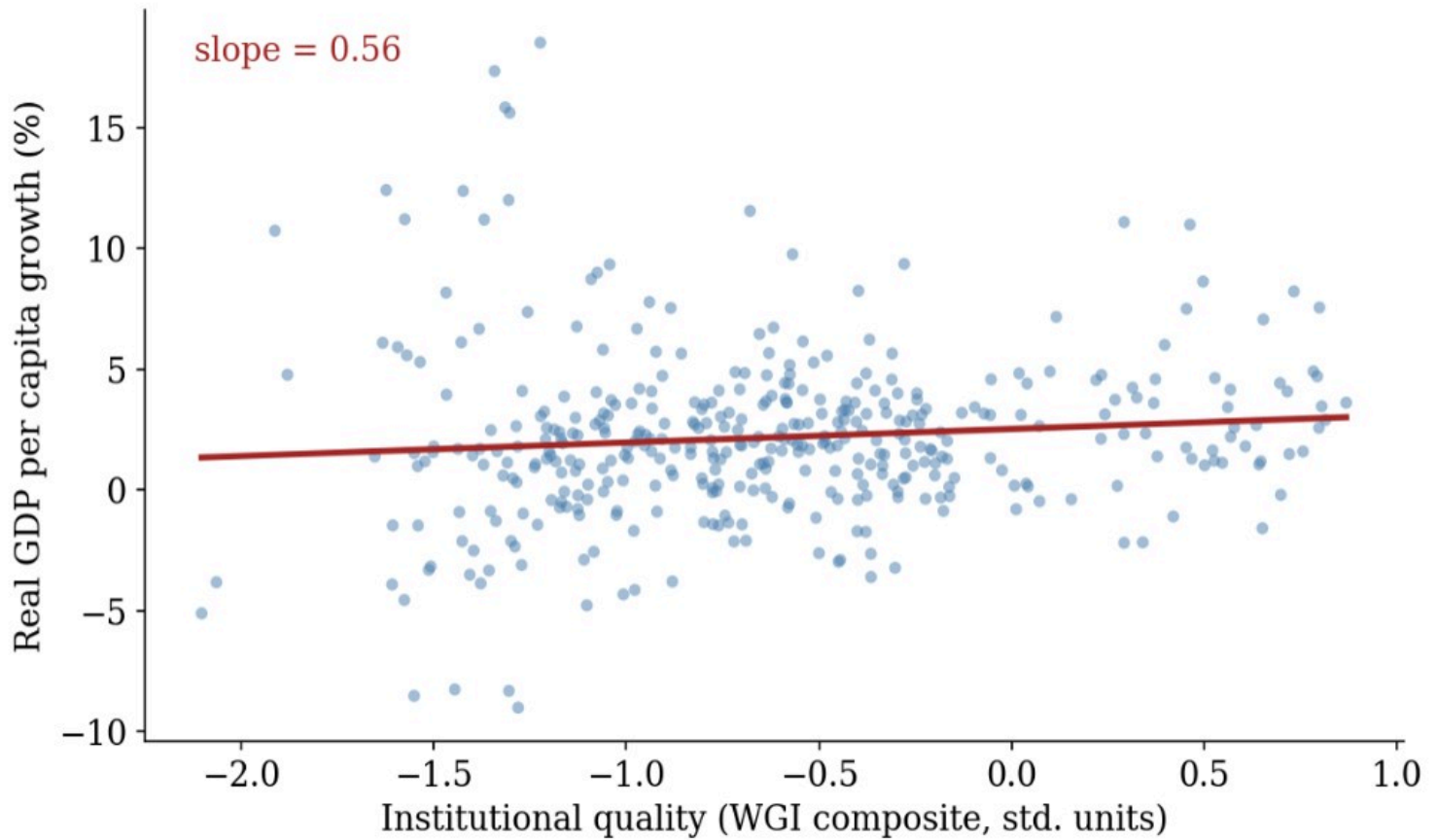


Figure 2

Point observations are three-year averages. The fitted line has a positive slope of 0.56

Source: The authors' construction is based on the data in the Government Revenue Dataset (Prichard, Cobham, & Goodall, 2014) and [World Bank World Development Indicators, 2024 / Penn World Table 10.01].

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