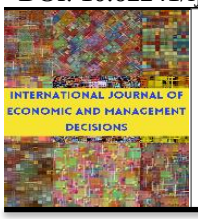
DOI: 10.62241/ijemd.38.113.2401 Vol. 03, No. 08, year 2025, pp. 01-13



International Journal of Economic and Management Decisions

Journal homepage: www.ijemd.org

Financial development and fiscal adjustment in Sub-Saharan Africa: Revenue Gains, Expenditure Pressures, and Limited Growth Complementarity

Hind Ait Haj [a]

[a] Faculty of Economics and Management, Ibn Tofail University, Kenitra, Morocco.

Article Info

Article history:

Received: 11-07-2025
Revised: 01-12-2025
Accepted: 03-12-2025

Keywords:

Financial development
Fiscal adjustment
Revenue gains
Expenditure pressures
Public revenue

ABSTRACT

Financial development can strengthen public revenue collection while simultaneously expanding governments' capacity to finance expenditure. Whether these processes improve the fiscal balance therefore depends on their relative strength, rather than on financial expansion alone. This study examines these relationships using an unbalanced annual panel covering 30 sub-Saharan African countries between 2005 and 2023. Separate dynamic equations for government revenue, government expenditure, and fiscal balance are estimated through system generalized method of moments. The analysis incorporates a comprehensive financial development index, real GDP per capita growth, their interaction, and relevant institutional, domestic, and external controls. Two-step estimates provide the principal results, with one-step estimates used to assess sensitivity and dynamic coefficients used to derive long-run responses. Financial development is positively associated with both revenue and expenditure, but its estimated relationship with fiscal balance is statistically insignificant. Economic growth independently improves fiscal balance, whereas its interaction with financial development remains insignificant across the three fiscal equations. Institutional quality and its interaction with financial development also lack statistically significant effects. Foreign direct investment growth is associated with stronger revenue and fiscal balance, while aid growth and public debt growth are associated with fiscal deterioration. Natural resource rents support revenue, although their estimated contribution to fiscal balance does not remain significant over the longer horizon. These findings indicate that stronger financial systems can expand fiscal capacity without necessarily producing fiscal consolidation. Their policy value depends on how additional revenue and borrowing opportunities are translated into expenditure decisions. Financial reform should consequently be coordinated with debt management, credible expenditure oversight, and stronger connections between financial intermediation and productive activity. The estimates support these conditional conclusions but do not establish the underlying transmission mechanisms directly.

This is an open access article under the CC BY-SA license.

Corresponding Author:

Hind Ait Haj
Faculty of Economics and Management, Ibn Tofail University, Kenitra, Morocco.
Email: hindhaj@hotmail.com

1. INTRODUCTION

The relationship between financial development and public finances raises a question that cannot be answered by examining government revenue alone. Financial systems make transactions more visible, facilitate investment, and potentially enlarge the resources available for taxation. They also provide governments with additional opportunities to borrow. These developments may occur together, leaving the fiscal balance little changed even when both revenue collection and public expenditure expand. Understanding this distinction is particularly relevant in sub-Saharan Africa, where financial reform takes place alongside persistent development needs, constrained tax capacity, and substantial exposure to external disturbances.

Fiscal balance measures the difference between government revenue and expenditure during a given period. Its significance extends beyond the accounting relationship itself. Persistent financing gaps can restrict policy flexibility, increase refinancing pressures, and weaken the capacity to respond to recessions or other disruptions. Nevertheless, a deficit does not automatically indicate inappropriate policy. Borrowing may finance infrastructure, public health, education, or other investments whose benefits emerge over time. Equally, an improved balance achieved through reductions in essential expenditure may weaken productive capacity. Fiscal assessment therefore requires attention to the sources of adjustment and the economic conditions surrounding them, rather than an exclusive preference for smaller deficits.

These considerations complicate fiscal consolidation in sub-Saharan Africa. Governments face demands for improved public services while operating within revenue systems that often capture only part of economic activity. Financial markets remain unevenly developed, and institutional constraints can limit the effectiveness of both revenue administration and expenditure management. Regional research describes financial development as an unfinished process characterized by differences in access, depth, efficiency, and market structure [2], [3]. These conditions suggest that the fiscal consequences of financial expansion may differ from those observed in economies with broader tax bases and more mature domestic capital markets.

The relevant policy problem is therefore not simply how to increase financial activity. It is how to ensure that financial development contributes to public resource mobilization without creating expenditure commitments that exceed the resulting revenue gains. A government may benefit from a larger domestic investor base, longer borrowing maturities, and reduced reliance on foreign currency financing. Yet easier access to finance may also weaken the immediate constraint imposed by insufficient revenue. Where borrowing decisions are poorly coordinated with expenditure priorities and repayment capacity, the same financial developments that improve financing conditions can contribute to fiscal vulnerability.

Existing research offers reasons to expect both outcomes. Greater participation in formal financial services can reduce the attractiveness of operating outside observable economic channels, potentially strengthening tax compliance and widening the effective tax base [4]. Broader financial development has also been linked to improved tax mobilization in developing countries [5]. Conversely, the demand for government securities and banks' preference for relatively accessible sovereign lending can redirect financial resources toward the public sector without necessarily generating equivalent improvements in productive private activity [6], [7]. The net fiscal effect remains an empirical question.

Economic growth introduces an additional source of uncertainty. Financial development may support investment and productivity, while expanding economic activity increases demand for financial services. This reciprocal relationship provides a basis for expecting finance and growth to reinforce revenue mobilization [8]. However, growth may also increase demand for government services and expand public responsibilities, as suggested by the literature on Wagner's law [9]. Consequently, even a productive relationship between finance and growth need not improve fiscal balance if expenditure responds as strongly as revenue.

A central weakness in the empirical literature is the tendency to study one component of this process in isolation. Revenue studies can identify an association between financial development and tax collection but cannot determine whether the additional revenue exceeds accompanying expenditure. Studies of government spending face the corresponding limitation. Investigations based on private credit, money aggregates, savings, or bank deposits also capture particular aspects of financial development rather than its broader institutional and market dimensions. A more informative assessment requires a multidimensional financial indicator and an explicit comparison of revenue, expenditure, and their net fiscal outcome.

The present analysis addresses this problem using the financial development index described by Svirydzenka [10]. The index incorporates financial institutions and financial markets through measures of access, depth, and efficiency. The empirical design considers three separate fiscal outcomes and allows each to depend on its previous value. It also examines whether real GDP per capita growth changes the estimated relationship between financial development and public finances. Institutional quality enters both independently and through an interaction with financial development, while additional controls represent domestic macroeconomic conditions, external financial flows, natural resources, and selected policy or crisis indicators.

The sample consists of 30 sub-Saharan African countries observed over 2005–2023. System generalized method of moments is used to address fiscal persistence and potential endogeneity, following the dynamic panel framework established by Arellano and Bover and Blundell and Bond [11], [12]. The approach allows the analysis to distinguish short-run coefficients from longer-run responses implied by the estimated adjustment process. Its usefulness nevertheless depends on instrument validity and other identifying assumptions, which remain substantive conditions rather than automatic properties of the estimator.

The findings show why fiscal capacity and fiscal consolidation should be distinguished. Financial development is associated with higher revenue and expenditure, but its estimated effect on fiscal balance is not statistically significant. Growth improves fiscal balance independently, yet the interaction between finance and growth does not provide evidence of additional fiscal benefits. These results qualify the expectation that financial expansion will translate directly into deficit reduction. They instead direct attention toward the policies governing borrowing, expenditure allocation, and the connection between financial services and productive economic activity.

The contribution is therefore analytical as well as empirical. Examining the three fiscal outcomes together reveals patterns that a single revenue or balance equation could obscure. The results do not identify every underlying mechanism, but they provide a coherent basis for evaluating whether the fiscal opportunities associated with financial development are accompanied by comparable spending pressures.

Literature Review

Financial development can influence public finances through several channels that operate simultaneously and need not have the same direction. A useful starting point is the distinction between financial development as a source of productive capacity and financial development as a source of financing capacity. The former concerns how financial services support investment, enterprise activity, and economic formalization. The latter concerns how financial institutions and markets enable governments to obtain resources beyond current revenue. Both matter for fiscal performance, but their implications for the budget balance can differ.

The revenue argument rests partly on the relationship between formal finance and economic visibility. Firms and households may gain access to credit, payment services, or other financial products by maintaining records and participating in regulated transactions. These arrangements can increase the information available to public authorities and reduce opportunities to conceal taxable activity. Capasso and Jappelli connect financial development with the incentives surrounding participation in the underground economy [4]. The implication for fiscal policy is that financial services may influence not only the level of economic activity but also the proportion of that activity that can be observed and taxed.

This mechanism is particularly relevant where the informal economy is substantial. Medina, Jonelis, and Cangul document the importance of informality in sub-Saharan Africa [13]. Nevertheless, the existence of informal activity does not imply that financial development automatically converts it into taxable formal activity. Businesses may use financial services selectively while retaining informal employment, incomplete records, or limited interaction with tax authorities. Revenue gains therefore depend on administrative capacity, compliance incentives, and the ability to connect financial information with workable tax procedures.

The empirical revenue literature broadly supports the possibility of fiscal gains while emphasizing contextual differences. Lompo examines financial sector development and tax mobilization in developing countries using a broader financial measure [5]. Kamasa and colleagues investigate the channels through which financial development affects tax revenue in Ghana, including the relevance of formalization and complementary capabilities [14]. Oulai finds that the relationship in sub-Saharan Africa depends on institutional conditions and is not adequately represented by a uniform effect across all settings [15]. Together, these studies suggest that financial development can strengthen the revenue base, although the magnitude and reliability of that contribution remain conditional.

Expenditure effects are less straightforward. Better financial infrastructure can support payment verification, improve transaction records, and facilitate more effective allocation of public resources. Research linking financial development to corruption provides a related rationale for expecting improvements in spending efficiency [16]. However, greater efficiency does not necessarily imply lower aggregate expenditure. Governments may use savings from improved administration to expand service delivery, or financial reforms may facilitate the execution of previously constrained investment plans. An increase in spending can therefore coexist with better financial management.

A competing mechanism concerns the relaxation of borrowing constraints. Deeper domestic markets may enlarge the investor base for government securities and improve access to financing. The safe asset literature explains why sovereign instruments can attract sustained demand within financial systems [7]. The lazy bank perspective emphasizes a related possibility: financial intermediaries may prefer sovereign lending to the information and monitoring requirements of private lending [6]. These mechanisms can make public borrowing easier without ensuring that the resulting expenditure produces sufficient future revenue.

The implication is not that domestic financial markets are inherently harmful to fiscal sustainability. They can reduce exposure to foreign currency liabilities and provide more stable financing options. The relevant concern

is whether improved access to credit is accompanied by credible control over the scale, composition, and maturity of public obligations. Gnimassoun and Do Santos identify structural determinants of deficits in developing countries that are consistent with the importance of financing opportunities and broader economic conditions [17]. Evidence on financial development and fiscal responses in European and selected OECD economies also suggests that the relationship can vary with the financial environment [18].

Financial cycles introduce another qualification. Revenue may increase during periods of expanding credit, rising asset values, and stronger transaction activity, creating the appearance of durable fiscal improvement. If expenditure commitments rise in response to these temporary revenues, subsequent financial weakness can leave the public sector with a structural financing gap. Borio, Lombardi, and Zampolli emphasize the importance of the financial cycle for fiscal sustainability [19]. This perspective cautions against interpreting contemporaneous revenue growth as sufficient evidence of a stronger underlying fiscal position.

Economic growth is connected to both sides of this argument. Finance–growth theory recognizes that financial services can support economic expansion by mobilizing savings, allocating capital, and facilitating risk management. It also recognizes that growing economies create additional demand for financial products and institutions [8]. For public finances, the expected consequence is a potentially larger and more diversified tax base. Yet the strength of this channel depends on the activities receiving finance, their productivity, and the extent to which their returns remain within the taxable domestic economy.

Wagner's law adds an expenditure response to the same process. Rising income can increase demand for public administration, infrastructure, social services, and other collective goods [9]. Thus, economic growth may increase both revenue and expenditure. Whether growth improves fiscal balance depends on their relative responsiveness. The same reasoning applies to an interaction between finance and growth: stronger financial development may amplify the fiscal effects of economic expansion, but the net balance need not improve if spending pressures expand alongside revenue capacity.

This distinction also clarifies what an insignificant interaction can establish. It indicates that the estimated conditional relationship is not sufficiently precise to distinguish it from zero within the specified model. It does not establish that finance and growth are economically unrelated, nor does it invalidate the broader finance–growth literature. Aggregate indicators may conceal sectoral differences, delayed effects, or thresholds. The fiscal interaction is a narrower empirical proposition than the general claim that financial systems and economic activity influence one another.

Institutional quality potentially conditions these relationships. Revenue benefits require the capacity to enforce tax rules, manage information, and limit avoidance. Expenditure benefits require procurement oversight, budget execution controls, and credible management of contingent liabilities. Bah's investigation of tax revenue and institutional quality illustrates the relevance of governance to revenue mobilization [20]. However, a broad institutional index may combine dimensions with different fiscal implications, and improvements in governance may affect revenue and spending together. A positive theoretical role for institutions therefore does not guarantee a statistically significant coefficient in an aggregate fiscal equation.

Formal fiscal rules represent a more specific institutional mechanism. Rules may constrain deficits, borrowing, or expenditure, but their practical influence depends on design, coverage, enforcement, and the treatment of exceptional circumstances. Nabieu and colleagues examine these issues in sub-Saharan Africa [21]. Their relevance to the present study is that the legal presence of a rule is an incomplete indicator of operational fiscal discipline. A binary rule variable can identify an average association but cannot fully distinguish a credible framework from a formally similar arrangement with weak implementation.

External financing further complicates fiscal responses. Foreign direct investment may expand employment, profits, and transactions, potentially supporting revenue. Camara examines the relationship between foreign direct investment and taxation [22]. Yet the fiscal return depends on incentives, exemptions, profit allocation, and linkages with domestic suppliers. Foreign aid can support public services and relieve financing constraints, but it may also affect domestic revenue incentives. Belmonte, Bove, and Di Salvatore investigate aid and tax morale in sub-Saharan Africa, providing one basis for considering these behavioral responses [23].

Natural resources offer a related example of revenue capacity that may not produce durable fiscal improvement. Resource rents can generate substantial receipts, but commodity volatility and limited diversification may weaken their reliability. Taylor's analysis of resource dependence in Africa and Lashitew, Ross, and Werker's work on diversification both indicate why resource income should be assessed alongside the structure of the wider economy [24], [25]. Strong current receipts may coexist with long-term vulnerability when expenditure becomes difficult to adjust after prices or production decline.

The literature consequently supports an integrated empirical strategy rather than a single directional prediction. Financial development may increase revenue, improve spending efficiency, and expand borrowing simultaneously. Growth may strengthen the revenue base while increasing demand for public expenditure. Institutional conditions may influence each process without producing a simple aggregate effect. Estimating

revenue, expenditure, and fiscal balance separately provides a way to compare these patterns while acknowledging that reduced-form coefficients do not directly identify the specific mechanisms responsible.

2. METHODS

The analysis uses the country sample, variable definitions, transformations, and estimation results reported in the original study [1]. It is an unbalanced annual panel covering 2005–2023 and comprising Angola, Burundi, Benin, Burkina Faso, Botswana, Côte d'Ivoire, Cameroon, the Democratic Republic of the Congo, Comoros, Ethiopia, Gabon, Ghana, The Gambia, Kenya, Lesotho, Madagascar, Mali, Mozambique, Mauritius, Malawi, Niger, Nigeria, Rwanda, Senegal, Togo, Tanzania, Uganda, South Africa, Zambia, and Eswatini. Sample inclusion reflects data availability. The resulting coverage captures substantial regional diversity, although it does not establish that excluded countries are interchangeable with included countries.

Government revenue and expenditure are measured as percentages of GDP using International Monetary Fund data. Fiscal balance is defined as revenue minus expenditure, also relative to GDP. Financial development is represented by the IMF composite index, scaled between zero and one, covering access, depth, and efficiency across financial institutions and financial markets [10]. Real GDP per capita growth, obtained from World Bank development indicators, represents economic growth. Institutional quality is a composite of six Worldwide Governance Indicators, reported on a percentage scale.

The external variables include growth in foreign direct investment inflows, growth in net official development assistance, and the real effective exchange rate. Foreign direct investment information comes from the World Bank, development assistance from the Organisation for Economic Co-operation and Development, and the exchange rate series from Bruegel. The source describes the exchange rate indicator as a measure against 170 countries. Public debt growth is constructed from the public debt-to-GDP ratio using the source identified in the original study. Natural resource rents and consumer price changes are obtained from World Bank development indicators.

Additional indicators represent financial openness, formal fiscal rules, and the pandemic period. The Chinn–Ito index is used as the financial liberalization proxy and an external instrument for financial development. The source attributes its data provision to the IMF. The fiscal rule indicator equals one when at least one legally binding formal rule is present and zero otherwise. The pandemic indicator equals one in 2020 and 2021. These binary measures provide parsimonious controls, although they cannot represent the intensity of implementation or the diversity of national crisis responses.

The original data preparation addresses short gaps of one or two years through country-specific means, interpolation, or extrapolation, depending on the variable. The available article does not provide an observation-level record of these decisions. Consequently, the reported estimates are preserved here without implying that the underlying panel has been independently reconstructed. Such a record would be necessary to assess how sensitive the results are to alternative treatments of missing values.

Continuous variables are transformed logarithmically to reduce scale differences and skewness. Where series contain zero or negative observations, the source adds a positive constant exceeding the absolute magnitude of the minimum before taking logarithms. Aid, foreign direct investment, and public debt growth are described as logarithmic differences of their underlying series. These procedures are important for interpretation. A coefficient estimated using a shifted logarithm is not automatically an elasticity of the original variable, and its magnitude depends partly on the chosen shift. The source does not report all transformation constants, limiting exact replication and comparisons in original measurement units.

The empirical framework separates revenue and expenditure because financial development may affect them in opposing fiscal directions. Revenue can increase through formalization, a broader tax base, and improved administration. Expenditure can decline through efficiency improvements or increase through expanded borrowing capacity. Growth can similarly strengthen receipts while increasing public spending demands. Fiscal balance reflects the combined outcome, but estimating it directly also allows the analysis to assess whether the net association is statistically distinguishable from zero.

Each fiscal outcome is modeled dynamically as a function of its previous value, centered financial development, centered growth, their interaction, and selected controls. Centering subtracts the sample mean before constructing interactions. It changes the reference point for interpreting the component coefficients and can reduce nonessential collinearity. It does not remove endogeneity or establish that an interaction is economically meaningful. The financial development coefficient is therefore interpreted at the centered reference values of growth and institutional quality. The interaction coefficients indicate whether the estimated relationship changes with those conditioning variables within the imposed functional form.

The control sets differ across equations. Foreign direct investment growth and natural resource rents enter the revenue and balance models but are excluded from the expenditure equation. Public debt growth enters the expenditure and balance equations but is excluded from revenue because borrowing does not constitute ordinary government revenue. The original methodological discussion describes debt growth as lagged to capture delayed

expenditure effects, although the results table labels the regressor simply as PDG. This timing ambiguity is retained as a reporting limitation rather than resolved through an undocumented assumption.

System GMM combines equations in first differences with equations in levels [11], [12]. Lagged levels provide instruments for appropriate variables in the differenced equations, while lagged differences provide instruments for the level equations under additional moment restrictions. This approach is motivated by the presence of lagged dependent variables, potentially endogenous regressors, and unobserved country characteristics. With 30 countries and a maximum of 19 annual observations, the panel has a larger cross-sectional than temporal dimension, although its cross-sectional size remains modest for asymptotic inference.

Two-step estimation supplies the baseline coefficients. The source applies the Windmeijer finite-sample correction to address downward bias in conventional two-step standard errors [26]. One-step estimates provide a sensitivity comparison. Instruments are collapsed to constrain their number, yielding 24 instruments in the balance and revenue models and 21 in the expenditure model. Each specification contains 482 observations from 30 countries. Appropriate year indicators are reported as controls for common shocks, although the exact set is not documented in the published results.

Financial liberalization is introduced as an external instrument for financial development. Its reported correlation with centered logged financial development is 0.549, which supports relevance in a descriptive sense. Relevance alone does not establish instrument validity. The exclusion restriction requires financial openness to influence fiscal outcomes only through the modeled financial development channel, conditional on included variables. Because financial openness could also affect capital flows, financing conditions, and macroeconomic adjustment, this restriction remains a substantive identifying assumption.

Diagnostic assessment uses first- and second-order serial correlation tests, the Hansen overidentification test, and a cross-sectional dependence test. The required serial correlation pattern is evidence of first-order correlation in differenced residuals without rejection of the absence of second-order correlation. Hansen nonrejection is treated as supportive evidence, rather than proof that every instrument is valid. The article also states that difference-in-Hansen tests support the additional instruments, but it does not provide their numerical results in the principal estimation table. Practical interpretation follows the cautions associated with dynamic panel GMM implementation [27].

The original study reports IPS tests indicating stationarity of the transformed series at levels [28]. Correlation statistics are used to assess potential collinearity, while descriptive comparisons examine variation between and within countries. These checks inform the empirical assessment but do not independently establish causal identification. Long-run coefficients are calculated as \(b/(1-\lambda)\), provided the dynamic process is stable. Because the dependent variables are transformed separately and the equations use different controls, their coefficients should not be subtracted as if they were components of an identical linear accounting decomposition.

3. RESULTS

The findings are organized into five tables that retain the original descriptive statistics, growth-quartile comparisons, regression estimates, diagnostic results, unit-root tests, and correlation information. The underlying estimates have not been recalculated. This distinction matters because several discrepancies in the source require qualification, particularly where prose descriptions differ from tabulated values. Throughout the interpretation, the numerical regression table takes precedence over contradictory narrative statements.

Table 1 describes the distribution of the continuous variables. It distinguishes overall dispersion from variation between countries and variation within countries over time. This decomposition helps identify whether the sample primarily reflects persistent national differences or shorter-term movements.

Table 1. Descriptive statistics for fiscal, financial, institutional, and macroeconomic variables

Variable	Mean	Overall SD	Between SD	Within SD	Minimum	Maximum
Fiscal balance	−2.591	4.560	2.031	4.110	−17.44	31.051
Government revenue	18.911	8.981	8.320	3.690	5.120	62.681
Government expenditure	21.38	9.040	8.391	3.670	7.740	66.441
Aid growth	0.039	0.3791	0.044	0.376	−1.878	2.550
FDI growth	0.004	0.500	0.008	0.500	−7.889	5.855
Financial development	0.146	0.106	0.106	0.018	0.031	0.591
GDP per capita growth	1.870	3.591	1.440	3.290	−36.821	11.341
Natural resource rents	9.710	8.511	7.770	3.720	0.050	52.561
Consumer price changes	7.220	7.610	5.011	5.790	−5.510	54.710
Institutional quality	33.471	17.510	17.151	4.691	3.380	77.150

Variable	Mean	Overall SD	Between SD	Within SD	Minimum	Maximum
Real effective exchange rate	108.010	22.150	16.651	14.91	60.051	224.360
Financial liberalization	−0.718	1.240	1.229	0.273	−1.94	2.280
Public debt growth	0.452	10.176	2.014	9.981	−76.825	38.774

Note: Values and precision reproduce the source. Revenue, expenditure, balance, and resource rents are expressed relative to GDP. Growth measures and transformed variables follow the source definitions.

Average fiscal balance is negative, indicating a predominantly deficit-oriented sample. Revenue and expenditure display considerable between-country variation, while fiscal balance varies more strongly within countries. Financial development has relatively limited within-country movement compared with its between-country dispersion. This pattern is consistent with persistent differences in financial structure, whereas growth, aid, investment flows, and debt growth contain stronger temporal movements.

The descriptive means should not be treated as a fully reconciled accounting dataset. The reported revenue mean minus the expenditure mean does not exactly equal the reported balance mean. Different observation coverage, data preparation, or rounding may contribute, but the published information does not establish the cause. The values are therefore preserved without adjustment. The source's graphical comparisons also describe regional financial development as below advanced-economy levels and fiscal revenue and expenditure as relatively constrained. Those comparisons provide context rather than additional numerical estimates.

Table 2 examines whether financial development and fiscal outcomes move systematically across ascending growth quartiles. Such comparisons are descriptive and do not control for country composition, persistence, or other determinants.

Table 2. Fiscal outcomes and financial development across GDP per capita growth quartiles

Growth quartile	Government revenue	Government expenditure	Fiscal balance	Financial development
Q1, lowest growth	19.706 (9.285)	21.920 (8.372)	−1.666 (4.287)	0.161 (0.103)
Q2	18.721 (9.491)	21.353 (9.657)	−3.123 (4.076)	0.137 (0.105)
Q3	17.909 (7.462)	19.758 (7.603)	−1.958 (5.386)	0.136 (0.094)
Q4, highest growth	19.289 (9.511)	22.495 (10.155)	−3.628 (4.136)	0.151 (0.119)
Overall	18.905 (8.979)	21.381 (9.038)	−2.595 (4.565)	0.146 (0.106)

Note: Entries are means, with standard deviations in parentheses. Overall values differ slightly from Table 1, as in the original publication.

Neither financial development nor fiscal balance follows a monotonic pattern across the quartiles. The highest-growth group does not have the highest average financial development or the strongest average balance. These comparisons are consistent with the absence of a simple descriptive complementarity, but they cannot determine whether growth moderates the relationship once other factors are controlled. They also demonstrate why an unconditional association should not be interpreted as an estimate of the conditional growth effect.

The principal regression estimates appear in Table 3. Each fiscal outcome has one-step and two-step short-run estimates, followed by the long-run coefficients derived from the two-step model. Keeping the three outcomes together makes the contrast between expanding fiscal activity and improving fiscal balance visible.

Table 3. System GMM estimates for fiscal balance, government revenue, and government expenditure

Regressor	Balance, one-step	Balance, two-step	Balance, long-run	Revenue, one-step	Revenue, two-step	Revenue, long-run	Expenditure, one-step	Expenditure, two-step	Expenditure, long-run
Lagged dependent variable	.295*** (0.050)	.285*** (0.052)	–	.405** (0.163)	.380*** (0.109)	–	.694*** (0.081)	.685*** (0.083)	–
Financial development	0.157 (0.144)	0.223 (0.145)	0.311 (0.202)	.116** (0.058)	.155*** (0.056)	.250** (0.106)	.205*** (0.067)	.177*** (0.059)	.561*** (0.193)
Economic growth	.324** (0.154)	.341*** (0.130)	.477** (0.186)	.370*** (0.045)	.346*** (0.046)	.558*** (0.074)	.068** (0.031)	.064** (0.030)	.204** (0.082)
Consumer price changes	.017 (0.018)	.014 (0.020)	.020 (0.028)	.002 (0.027)	.012 (0.023)	.019 (0.037)	0.041 (0.027)	0.027 (0.024)	0.085 (0.087)
Finance × growth	0.133 (0.131)	0.182 (0.114)	0.255 (0.160)	0.054 (0.066)	0.095 (0.066)	0.153 (0.107)	0.004 (0.040)	0.019 (0.043)	0.060 (0.146)
Aid growth	0.052*** (0.016)	0.060*** (0.018)	0.083*** (0.025)	0.033*** (0.001)	0.021*** (0.009)	0.033*** (0.010)	0.051*** (0.015)	0.057*** (0.015)	0.180*** (0.053)
FDI growth	.035*** (0.007)	.029*** (0.007)	.040*** (0.010)	.011*** (0.003)	.014*** (0.003)	.023*** (0.005)			

Public debt growth	0.053*** (0.002)	−0.053*** (0.003)	−0.074*** (0.004)	–	–	–	–	0.002** (0.001)	−.002** (0.001)	0.006** (0.003)	0	0
Institutional quality	0.052 (0.084)	0.091 (0.110)	0.127 (0.150)	0.058 (0.070)	0.020 (0.071)	0.032 (0.113)	0	0.041 (0.055)	−0.003 (0.045)	−0.011 (0.141)	–	–
Finance × institutions	0.016 (0.041)	0.011 (0.056)	0.015 (0.078)	0.047 (0.043)	0.029 (0.042)	0.047 (0.076)	0	0.004 (0.040)	−.002 (0.050)	0.006 (0.158)	0	0
Real effective exchange rate	0.188*** (0.056)	0.248* (0.146)	0.347* (0.196)	0.046 (0.106)	−0.019 (0.141)	0.031 (0.227)	0	0.008 (0.140)	−.009 (0.123)	0.027 (0.394)	0	0
Natural resource rents	0.045* (0.024)	0.064** (0.024)	0.089 (0.054)	0.064*** (0.018)	0.063*** (0.016)	0.102*** (0.026)	0	0	–	–	–	–
Formal fiscal rule	0.055 (0.035)	0.043 (0.041)	0	–	0.043 (0.072)	−0.051 (0.079)	–	–	0.095* (0.053)	−0.090* (0.052)	–	–
Pandemic indicator	0.020 (0.030)	−0.012 (0.032)	–	–	0.069*** (0.020)	−0.071*** (0.026)	–	–	0	.036* (0.020)	0	−.028* (0.013)
Constant	0.947 (0.631)	1.836 (0.593)	1	–	1.706 (1.150)	3.216 (1.136)	3	–	2.007** (0.881)	1.799** (0.797)	1	–

Note: Parentheses contain reported standard errors. Asterisks retain the source's significance markings; some markings are not fully consistent with the displayed coefficient-to-standard-error ratios. Continuous fiscal outcomes are logged, with shifts where required. Financial development, growth, and institutional quality are centered after transformation. Dashes indicate omitted regressors or unreported long-run values.

Financial development is positively associated with revenue and expenditure in both estimation procedures. Its two-step coefficients are 0.155 for revenue and 0.177 for expenditure, with long-run values of 0.250 and 0.561. The corresponding balance coefficient is −0.223 in the short run and −0.311 in the long run, neither statistically significant. This pattern is consistent with revenue gains occurring alongside expenditure expansion. It does not provide a formal accounting decomposition of the balance coefficient.

Growth has positive, significant coefficients across all three outcomes. The two-step revenue coefficient is 0.346, compared with 0.064 for expenditure and 0.341 for balance. The finance–growth interaction remains insignificant throughout. Institutional quality and the finance–institution interaction are also insignificant. Aid growth has negative coefficients in every equation, whereas FDI growth has positive coefficients in the revenue and balance equations.

Debt growth is negatively associated with fiscal balance in both estimators. Its expenditure coefficient changes from −0.002 in the one-step model to 0.002 in the two-step model, contradicting a claim of complete sign stability across estimators. Natural resource rents support revenue, but their balance effect loses significance in the long run. Exchange rates have a positive balance coefficient, while their separate revenue and expenditure coefficients are insignificant. Pandemic estimates indicate lower revenue and higher expenditure, without a significant balance coefficient. Formal rules have weakly negative expenditure coefficients but insignificant revenue and balance effects.

Table 4 combines the estimation diagnostics with the reported stationarity results. The numerical evidence is reproduced separately from the substantive coefficient interpretation because diagnostic nonrejection supports particular assumptions without validating every aspect of the model.

Table 4. Estimation diagnostics and IPS stationarity tests

Test or variable	Model or selected lag	AIC-value	Statistic or p-value	Additional reported information
Observations, instruments, countries	Balance, both estimators		482 / 24 / 30	Same counts for one-step and two-step
Observations, instruments, countries	Revenue, both estimators		482 / 24 / 30	Same counts for one-step and two-step
Observations, instruments, countries	Expenditure, both estimators		482 / 21 / 30	Same counts for one-step and two-step
AR(1), balance	One-step; two-step		0.007; 0.008	p-values
AR(2), balance	One-step; two-step		0.389; 0.564	p-values
Hansen, balance	One-step; two-step		0.349; 0.349	p-values
Cross-sectional dependence, balance	One-step; two-step		0.625; 0.429	p-values
AR(1), revenue	One-step; two-step		0.003; 0.008	p-values
AR(2), revenue	One-step; two-step		0.623; 0.713	p-values
Hansen, revenue	One-step; two-step		0.521; 0.521	p-values

Cross-sectional dependence, revenue	One-step; two-step	0.233; 0.179	p-values
AR(1), expenditure	One-step; two-step	0.000; 0.001	p-values, as reported
AR(2), expenditure	One-step; two-step	0.109; 0.144	p-values
Hansen, expenditure	One-step; two-step	0.516; 0.516	p-values
Cross-sectional dependence, expenditure	One-step; two-step	0.833; 0.776	p-values
Logged fiscal balance	1.07	−7.7740***	Trend: yes; demeaned: yes
Logged revenue	1.43	−4.3082***	Trend: yes; demeaned: yes
Logged expenditure	1.23	−3.5159***	Trend: yes; demeaned: yes
Centered logged finance	1.27	−5.0462***	Trend: yes; demeaned: yes
Logged consumer price variable	0.57	−11.5792***	Trend: no; demeaned: yes
Aid growth	1.43	−3.5821***	Trend: yes; demeaned: yes
FDI growth	0.39	−8.6311***	Trend: no; demeaned: yes
Centered logged growth	1.27	−6.6614**	Trend: yes; demeaned: yes
Finance × growth	1.47	−9.3446***	Trend: yes; demeaned: yes
Finance × institutions	1.10	−5.6436**	Trend: no; demeaned: yes
Logged natural resource rents	1.57	−3.0071***	Trend: yes; demeaned: yes
Logged financial liberalization	0.00	−24.3100***	Trend: no; demeaned: yes
Public debt growth	1.00	−10.0785***	Trend: yes; demeaned: yes
Logged exchange rate	0.02	−1.9955**	Trend: yes; demeaned: yes
Logged institutional quality	1.27	−4.7048***	Trend: yes; demeaned: yes

Note: Stationarity entries report IPS W-t-bar statistics and the source's significance markings. Diagnostic entries are p-values. The source discusses Pesaran's cross-sectional dependence test but labels the regression-table row "Pearson CD"; the numerical values are retained without resolving that labeling discrepancy.

The serial correlation results exhibit the expected first-order rejection and second-order nonrejection. Hansen tests do not reject the instrument restrictions, and the reported cross-sectional dependence tests are also insignificant. These findings support the reported specification under their maintained assumptions. They do not establish the exclusion restriction for financial liberalization, eliminate finite-sample concerns, or substitute for disclosure of the complete instrument matrix.

Table 5 preserves the original correlation information in compact lower-triangle form. Each row lists correlations with earlier variables in the stated order, avoiding duplication of the symmetric entries.

Table 5. Lower-triangle correlations among transformed model variables

Position	Variable	Correlations with preceding positions, in order
1	Lagged logged balance	Diagonal: 1.000
2	Lagged logged expenditure	—
3	Lagged logged revenue	—; —
4	Centered logged finance	−0.195; 0.394; 0.263
5	Centered logged growth	0.056; −0.048; −0.066; −0.090
6	Logged consumer price variable	−0.128; 0.028; −0.085; 0.052; 0.016
7	Finance × growth	0.071; −0.026; −0.024; −0.079; 0.596; 0.018
8	Finance × institutions	0.044; −0.051; 0.008; 0.111; −0.026; 0.038; −0.133
9	Aid growth	−0.209; −0.286; −0.409; −0.068; 0.146; 0.217; −0.036; −0.061
10	FDI growth	−0.012; 0.007; 0.005; −0.017; 0.013; −0.023; 0.020; 0.008; −0.015
11	Public debt growth	−0.131; 0.076; 0.033; 0.143; −0.133; −0.045; −0.007; −0.067; −0.024; 0.097
12	Centered logged institutions	−0.163; 0.319; 0.208; 0.544; 0.067; −0.145; −0.016; −0.093; −0.163; 0.015; 0.110
13	Logged exchange rate	0.114; −0.122; −0.133; 0.058; 0.019; 0.014; 0.027; −0.123; 0.106; −0.060; −0.010; −0.278
14	Logged financial liberalization	0.074; −0.202; −0.170; 0.549; 0.120; −0.206; 0.004; 0.135; 0.125; 0.008; 0.046; 0.250; 0.002
15	Logged natural resource rents	0.073; −0.060; 0.020; −0.396; 0.063; 0.209; 0.121; −0.300; 0.334; 0.003; −0.072; −0.447; −0.072; −0.348

The correlation structure does not show uniformly extreme pairwise relationships, although some associations are economically relevant. Finance correlates positively with institutional quality and financial liberalization, while the finance–growth interaction correlates with growth. These patterns are compatible with the rationale for centering, but pairwise correlations cannot fully diagnose multicollinearity in a model containing interactions and instruments. Overall, the descriptive and regression evidence supports a restrained conclusion: financial development accompanies greater fiscal activity, while a reliable improvement in the fiscal balance is not established.

4. DISCUSSION

The principal finding is a distinction between the capacity to mobilize and spend public resources and the capacity to improve the fiscal balance. Financial development is associated with higher revenue and expenditure, but the estimated balance response remains insignificant. This combination is economically plausible. Financial services can increase the visibility of transactions, support enterprise activity, and improve access to taxable economic flows while simultaneously expanding the resources available to the state through borrowing. The resulting fiscal position depends on how governments respond to both opportunities.

The revenue estimates are consistent with the formalization and tax mobilization literature [4], [5], [14]. Nevertheless, the present models do not observe formalization directly. They contain no separate measure of newly registered firms, improved tax compliance, digital reporting, or administrative efficiency. It would therefore be too strong to claim that these mechanisms have been demonstrated. They provide plausible explanations for the estimated relationship, but alternative channels, including broader changes in economic structure or financial-sector profitability, may also contribute.

The expenditure findings require a similar distinction between observed association and inferred mechanism. A positive relationship with financial development is compatible with easier sovereign borrowing, as suggested by the safe asset and lazy bank perspectives [6], [7]. It is also compatible with governments financing productive investment or improving the execution of existing budgets. Aggregate expenditure does not distinguish these possibilities. The study therefore supports concern about expenditure pressures but cannot determine how much of the additional spending is inefficient, politically motivated, or growth enhancing.

This qualification changes the policy interpretation. The evidence does not justify reducing public expenditure indiscriminately. A financially constrained government may increase spending precisely because improved financing permits investments that were previously postponed. The relevant question is whether these commitments are affordable and whether their expected social and economic returns justify their financing costs. Expenditure oversight should therefore evaluate composition, execution quality, and future obligations rather than treating every expansion as a failure of discipline.

The balance coefficient also deserves careful treatment. Its negative sign is consistent across the reported finance specifications, but statistical insignificance means that the study does not establish a reliably negative effect. The appropriate conclusion is that a fiscal improvement is not demonstrated, not that financial development necessarily causes deterioration. The confidence implied by the standard errors leaves room for a range of underlying effects. This distinction is especially important when moving from regional average estimates to recommendations for individual countries.

Economic growth displays a different pattern. It is positively associated with revenue, expenditure, and fiscal balance. The results are consistent with growth strengthening the revenue base sufficiently to accompany an improved balance, despite some increase in spending. Yet the estimates do not reveal whether this reflects employment, consumption, profits, trade, or other taxable activities. Nor do they establish that any particular growth strategy will produce the same fiscal response. The structure and tax intensity of economic expansion remain relevant.

The insignificant finance–growth interaction indicates that the specified model does not identify an additional fiscal benefit from their joint variation. It should not be interpreted as proof that financial services fail to support economic growth. The interaction concerns fiscal outcomes conditional on the model's controls and transformations. A relationship between finance and productivity may exist without producing a statistically detectable change in the finance–fiscal coefficient. The limited within-country movement in the financial development index may also make such conditional effects difficult to estimate precisely.

Structural explanations remain plausible. Financial expansion may be concentrated in activities with limited domestic tax contributions or weak connections to employment-intensive production. Banks may expand sovereign exposure more readily than lending to productive firms. Improvements in access may not be matched by effective use of credit, and increases in growth may occur in sectors that generate limited demand for sophisticated financial services. These possibilities are consistent with regional financial development concerns [2], [3], but the aggregate panel cannot establish their relative importance.

The institutional results should be read with equal restraint. Insignificant coefficients for institutional quality and its interaction with finance do not imply that governance is irrelevant to public finances. A composite index may average together dimensions whose effects differ in timing and direction. Better institutions can increase revenue while also enabling governments to deliver additional services, leaving the balance response ambiguous. Measurement error and limited annual variation may further weaken precision. These results therefore qualify the estimated aggregate relationship rather than overturning the broader institutional argument.

The formal fiscal rule indicator is negatively associated with expenditure at the source's weakest significance level, while its balance effect remains insignificant. This suggests that legal adoption alone does not guarantee a measurable fiscal improvement. The indicator does not distinguish expenditure ceilings from debt or

balance rules, nor does it capture monitoring, sanctions, escape clauses, or compliance. The findings are consequently compatible with the view that operational credibility matters more than formal presence [21]. Stronger implementation could be valuable even though the binary variable does not establish its effect.

Debt growth has a clear negative association with balance, but the expenditure interpretation is less stable. The one-step expenditure coefficient is negative, whereas the two-step coefficient is positive. The source's conclusion also contains a statement suggesting that public debt growth improves the balance, which conflicts with its regression table. Retaining the tabulated negative balance estimates avoids reproducing that contradiction. The broader implication is that debt accumulation accompanies fiscal pressure in this sample, while the precise expenditure channel requires better documentation and sensitivity analysis.

Aid growth is negatively associated with all three fiscal outcomes. One interpretation is that external assistance affects domestic revenue effort and substitutes for expenditure financed through domestic resources. Research on aid and tax morale provides a basis for considering such responses [23]. However, the estimates do not establish that aid is diverted or that recipients systematically reduce effort. Assistance may respond to fiscal stress, and different forms of aid have different budgetary treatment. These issues make the result relevant for coordination and evaluation rather than a general argument against development assistance.

There is also an accounting limitation in the source's explanation of aid. A larger decline in expenditure than in revenue would, other things equal, improve an untransformed balance. The reported negative coefficients across separately transformed equations cannot be reconciled through simple subtraction. The balance estimate should therefore be treated as a separately estimated conditional association. This reinforces the need to distinguish a comparison of regression patterns from a formal decomposition of fiscal change.

The positive FDI coefficients suggest that investment inflows can accompany stronger revenue and balance outcomes. This is consistent with an expanded taxable base, but the fiscal value of investment depends on the treatment of profits, exemptions, employment, and domestic linkages [22]. The models do not examine the expenditure costs of attracting investment because FDI growth is excluded from the expenditure equation. The evidence consequently supports attention to investment quality and tax design, while leaving the full net fiscal return unresolved.

Natural resource rents strengthen revenue, yet their long-run balance effect is insignificant. This is compatible with the concern that resource receipts do not necessarily produce durable fiscal resilience [24], [25]. Governments may face volatile revenues and expenditure commitments that become difficult to adjust. The result supports diversification and prudent management of temporary receipts, but it does not identify a particular fiscal rule or savings mechanism as optimal. Such choices require country-specific information about resource dependence, financing needs, and administrative capacity.

The exchange rate finding is positive for balance despite insignificant component coefficients. This does not establish a special synergistic mechanism. The balance equation differs in transformation, controls, and statistical precision, so its significance can differ without a directly observable additive explanation. Similarly, the pandemic's insignificant balance coefficient should not be interpreted as evidence of negligible fiscal disruption. The significant revenue reduction and expenditure increase indicate pressure on public finances, while the balance estimate remains imprecise.

Several reporting limitations constrain stronger claims. Shifted logarithms complicate substantive interpretation, and undisclosed transformation constants hinder replication. Imputation decisions are not documented observation by observation. The full instrument specification and difference-in-Hansen results are unavailable in the main results. The source also reports year controls alongside a pandemic indicator; if a complete set of year indicators were included, the pandemic dummy would be collinear with them. The precise coding must therefore be clarified before that coefficient can be independently reproduced.

Future analysis would benefit from transparent data and code, alternative treatments of negative fiscal balances, country-specific heterogeneity, and measures of expenditure composition. Threshold or nonlinear specifications could examine whether financial maturity or institutional capacity changes the relationship. Direct measures of sovereign exposure, tax formalization, and productive credit allocation would help separate the proposed mechanisms. These extensions would strengthen interpretation without changing the central finding preserved here: financial development expands fiscal opportunities, but the evidence does not establish that those opportunities automatically improve the fiscal balance.

5. CONCLUSION

Financial development creates opportunities for stronger public finances, but the evidence from this panel does not support a direct progression from financial expansion to fiscal consolidation. Across 30 sub-Saharan African countries during 2005–2023, the reported system GMM estimates associate financial development with higher government revenue and expenditure. Its relationship with fiscal balance remains statistically insignificant in both the short-run and long-run specifications. The central implication is that expanding fiscal capacity and improving the fiscal balance are related but distinct outcomes.

Economic growth independently accompanies a stronger fiscal balance, whereas the interaction between growth and financial development is insignificant. Institutional quality and its interaction with financial development are similarly insignificant within the estimated framework. These findings do not establish that economic or institutional complementarities are absent. They indicate that the aggregate measures and linear interactions used in the study do not identify a sufficiently precise additional fiscal contribution. Explanations involving weak productive linkages, limited financial depth, or institutional constraints remain plausible but require direct investigation.

The other estimates reinforce the importance of financing composition and economic structure. FDI growth is associated with stronger revenue and balance outcomes. Aid growth and debt growth are associated with weaker balances, although their interpretation is constrained by endogeneity and reporting issues. Resource rents contribute to revenue without establishing a significant long-run balance improvement. Formal fiscal rules and the pandemic indicator show component-level effects that do not translate into significant balance coefficients. These results favor a differentiated assessment of fiscal adjustment rather than a single explanation based on financial development alone.

Policy should therefore connect financial reform with the management of the opportunities it creates. Improvements in financial access, depth, and efficiency can support revenue mobilization, but additional borrowing capacity should be evaluated against repayment obligations and expenditure quality. Stronger tax administration, transparent budget execution, and credible debt management can help governments convert financial expansion into durable fiscal capacity. These measures should preserve room for productive expenditure rather than equating fiscal discipline with indiscriminate reductions in public services and investment.

The conclusions remain conditional on the study's data preparation, functional form, and identifying assumptions. No new estimations have been introduced in this rewritten manuscript. Greater transparency regarding transformation constants, missing observations, instruments, time controls, and inconsistent table annotations is necessary for replication. Subject to these limitations, the evidence provides a measured conclusion: financial development can enlarge the resources available to the state, but achieving a stronger fiscal balance depends on how those resources and financing opportunities are governed.

REFERENCES

[1] D. D. Tebeje, G. M. Ayele, and S. M. Dilie, "Does financial development improve fiscal balance in sub-Saharan Africa? The muted economic growth synergy," International Review of Economics and Finance, vol. 112, Art. no. 105796, 2026, doi: 10.1016/j.iref.2026.105796.

[2] M. Mlachila et al., Financial Development in Sub-Saharan Africa: Promoting Inclusive and Sustainable Growth. International Monetary Fund, 2016.

[3] I. Soumaré, K. Désiré, J. Tyson, and S. Raga, "Capital market development in sub-Saharan Africa: Progress, challenges and innovations," ODI Research Series for Financial Development in Africa, 2021.

[4] N. A. Charkaoui, "Green Innovation and Sustainable Business Models: A Strategic Management Perspective," International Journal of Economic and Management Decisions, vol. 2, no. 4, pp. 2–12, Dec. 2024. doi:10.62241/ijemd.24.0212.2355.

[5] A. A. B. Lompo, "How does financial sector development improve tax revenue mobilization for developing countries?" Comparative Economic Studies, vol. 66, no. 1, 2024, doi: 10.1057/s41294-023-00207-9.

[6] M. Bdel-Halim and G. Al-assaf, "Lazy banks and safe asset hypothesis: Is it the answer for public debt and financial development indicators puzzle in emerging markets?" Review of Applied Socio-Economic Research, vol. 23, no. 1, pp. 18–27, 2022, doi: 10.54609/reaser.v23i1.127.

[7] A. Triki, "A Deep Learning-Based Framework for Dynamic Ecommerce Recommendation Using Online Reviews and Product Features," International Journal of Intelligent Management and Data Systems, vol. 11, pp. 14–23, July 2025. DOI: 10.62241/ijimds.11.1423.2549.

[8] Ž. Asanović, "Essay on finance-growth nexus," Journal of Central Banking Theory and Practice, vol. 9, no. 1, pp. 97–109, 2020, doi: 10.2478/jcbtp-2020-0006.

[9] N. H. Ghazy, H. Ghoneim, and D. Paparas, "The validity of Wagner's law in Egypt from 1960–2018," Review of Economics and Political Science, vol. 6, no. 2, pp. 98–117, 2020, doi: 10.1108/REPS-01-2020-0004.

[10] K. Svirydzenka, "Introducing a new broad-based index of financial development," IMF Working Papers, no. 16/5, 2016, doi: 10.5089/9781513583709.001.

[11] H. Nouri, "What You See Isn't What You Get: Knowledge Management's Role in Innovation," International Journal of Intelligent Management and Data Systems, vol. 11, pp. 02–13, July 2025. DOI: 10.62241/ijimds.11.213.2553.

[12] R. Blundell and S. Bond, "Initial conditions and moment restrictions in dynamic panel data models," Journal of Econometrics, vol. 87, no. 1, 1998, doi: 10.1016/S0304-4076(98)00009-8.

[13] L. Medina, A. Jonelis, and M. Cangul, "The informal economy in Sub-Saharan Africa," IMF Working Papers, no. 2017/156, 2017, doi: 10.5089/9781484305942.001.

[14] K. Kamasa, E. Korsah, I. Bonuedi, and P. Forson, "Financial development as a catalyst for tax revenue generation in Ghana: Exploring the channels," Scientific African, vol. 28, 2025, doi: 10.1016/j.sciaf.2025.e02715.
[15] S. T. Oulai, "Heterogeneous effects of financial development on tax revenues: Accounting for institutional quality in sub-Saharan Africa," Applied Economics and Finance, vol. 9, no. 1, 2022, doi: 10.11114/aef.v9i1.5468.
[16] C. Sharma and S. R. Paramati, "Does financial development reduce the level of corruption? Evidence from a global sample of 140 countries," International Journal of Finance & Economics, vol. 26, no. 4, 2021, doi: 10.1002/ijfe.2056.
[17] B. Gnimassoun and I. Do Santos, "Robust structural determinants of public deficits in developing countries," Applied Economics, vol. 53, no. 9, 2021, doi: 10.1080/00036846.2020.1824063.
[18] B. Bökemeier, A. Stoian, and B. Owusu, "Does the level of financial development matter for the fiscal response? A PSTR approach for the EU and selected OECD countries," SSRN Electronic Journal, 2023, doi: 10.2139/ssrn.4364928.
[19] C. Borio, M. Lombardi, and F. Zampolli, "Fiscal sustainability and the financial cycle," Bank for International Settlements, Working Paper 552, 2016.
[20] M. Bah, "Tax revenue mobilization and institutional quality in sub-Saharan Africa: An empirical investigation," African Development Review, vol. 36, no. 2, 2024, doi: 10.1111/1467-8268.12752.
[21] G. A. A. Nabieu, G. A. Bokpin, A. K. Osei, and P. O. Asuming, "Fiscal rules, fiscal performance and economic growth in sub-Saharan Africa," African Development Review, vol. 33, no. 4, 2021, doi: 10.1111/1467-8268.12595.
[22] A. Elidrissi, "From Strategy to Sustainability: A Holistic Framework for Corporate Responsibility in Business, Finance, and Energy," International Journal of Economic and Management Decisions, vol. 2, no. 4, pp. 22–31, Dec. 2024. doi:10.62241/ijemd.24.2231.2357.
[23] A. Belmonte, V. Bove, and J. Di Salvatore, "Bad signals? Foreign aid and tax morale across Sub-Saharan Africa," World Development, vol. 194, 2025, doi: 10.1016/j.worlddev.2025.107055.
[24] R. S. Taylor, "The fiscal effects of natural resource dependency in Africa," Natural Resources Forum, vol. 49, no. 1, pp. 384–406, published online 2024, doi: 10.1111/1477-8947.12400.
[25] A. A. Lashitew, M. L. Ross, and E. Werker, "What drives successful economic diversification in resource-rich countries?" The World Bank Research Observer, vol. 36, no. 2, 2021, doi: 10.1093/wbro/lkaa001.
[26] F. Windmeijer, "A finite sample correction for the variance of linear efficient two-step GMM estimators," Journal of Econometrics, vol. 126, no. 1, 2005, doi: 10.1016/j.jeconom.2004.02.005.
[27] D. Roodman, "How to do xtabond2: An introduction to difference and system GMM in Stata," The Stata Journal, vol. 9, no. 1, 2009, doi: 10.1177/1536867X0900900106.
[28] K. S. Im, M. H. Pesaran, and Y. Shin, "Testing for unit roots in heterogeneous panels," Journal of Econometrics, vol. 115, no. 1, 2003, doi: 10.1016/S0304-4076(03)00092-7.