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Financial Development, Foreign Direct Investment, Government Expenditure and Economic Growth in Sub-Saharan Africa: A Joint-Effect and Causality Analysis

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Abstract

Financial development, foreign direct investment (FDI) and government expenditure are well-established drivers of growth but are rarely studied together. This study examines their joint effect on economic growth in 45 Sub-Saharan African countries over 2002–2021, using correlation analysis, pairwise Granger causality tests and a six-step hierarchical fixed-effects panel regression with country-clustered standard errors. The predictors are jointly significant ($F(6, 659) = 10.71$, $p < 0.001$), though within-country explanatory power is modest (within $R^2 = 0.089$). Broad money ($\beta = -0.097$, $p < 0.001$) and interest rate spread ($\beta = -0.017$, $p < 0.001$) reduce growth, gross capital formation raises it ($\beta = 0.081$, $p = 0.011$), and domestic credit, FDI and government consumption have no significant contemporaneous effect; in a lagged specification FDI raises growth one year later ($\beta = 0.078$, $p < 0.001$). Granger tests show broad money and interest rate spread are bidirectionally related to growth, private credit is demand-following, and gross capital formation and government consumption Granger-cause growth without feedback. Growth within SSA economies responds to intermediation efficiency and productive investment rather than financial depth, and the FDI dividend materialises with a lag. The study recommends intermediation reform, investment promotion and rebalancing public spending toward capital formation.

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Keywords: Financial development, Foreign direct investment, Government expenditure, Economic growth, Granger causality, Sub-Saharan Africa.

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1. Introduction

1.1 Background

Under the United Nations' 2030 Agenda, countries have committed to decent work and sustained economic growth (Goal 8), and for Sub-Saharan Africa (SSA) the challenge is to identify growth strategies that are robust to the external shocks that have repeatedly interrupted its progress (United Nations, 2015). Three candidate drivers dominate both theory and policy. Financial development mobilises savings, allocates capital and manages risk, and a large literature confirms that well-functioning financial systems raise productivity and growth (Ibrahim and Alagidede, 2017; Abbas et al., 2022). Foreign direct investment (FDI) injects external capital, technology and managerial know-how, and has been found to raise growth in African economies (Yeboua, 2019; Ayenew, 2022). Government expenditure is a direct component of GDP under the expenditure approach and, when directed toward productive uses, raises the return on private investment (Barro, 1990).

Yet these three drivers are rarely studied together. The finance–growth literature typically treats FDI and public spending as controls, if at all; the FDI literature examines financial development as a threshold condition (Yeboua, 2019; An and Yeh, 2021); and the public expenditure literature seldom models the financial system. Theory, however, suggests that the three are interdependent. The Classical Theory of Financial Intermediation (Allen and Santomero, 1996) implies that FDI and public investment are more productive when a domestic financial system exists to intermediate the associated flows; endogenous growth models imply that public capital raises the marginal product of both domestic and foreign private capital (Romer, 1986; Barro, 1990); and the Financial Market Theory of Development (World Bank Group, 1999) implies that liberalised financial markets attract foreign capital and reduce reliance on the state. If these mechanisms operate, then the effect of any one driver depends on the level of the others, and single-variable studies will misstate its contribution.

SSA provides a setting in which all three drivers have moved substantially over the past two decades. The region's median ratio of private sector credit to GDP has doubled since 2000, and mobile-based financial services have positioned it as a global leader in financial innovation (International Monetary Fund [IMF], 2016; Tyson, 2021). FDI inflows rose from USD 29 billion in 2020 to USD 73 billion in 2021, still only 3.9% of the global total but a significant increase on the region's 2000–2017 average (UNCTAD, 2022). Public expenditure has remained above 20% of GDP since 2018, with government consumption trending upward and capital formation declining after 2014 (Statista, 2023; World Bank, 2023). Average growth of about 4.6% over 2000–2019 has given way to a post-pandemic slowdown to 3.6% and projections of 3.1%, sharpening the question of how these three levers should be combined (African Development Indicators, 2023; World Bank, 2023).

1.2 Problem Statement

Although the individual contributions of financial development, FDI and government expenditure to growth are well documented, the evidence on their joint effect in SSA is limited, and what evidence exists is inconsistent. Studies pairing financial development with FDI find that the growth effect of FDI depends on financial depth (Bahri et al., 2019; Yeboua, 2019), but that very high financial development can diminish it (An and Yeh, 2021). Studies pairing government expenditure with FDI find that public spending attracts foreign capital (Othman et al., 2018) but can also erode its growth benefits when excessive (Le and Suruga, 2005). Studies pairing financial development with public spending find that the two are jointly determined (Chen et al., 2019). Each pairing implies that the omitted third variable matters, yet no region-wide SSA study has estimated all three together and traced how the contribution of each changes as the others are added.

A second gap concerns the direction of causality. The finance–growth literature has long debated whether financial development is supply-leading (finance causes growth) or demand-following (growth causes finance), and single-country SSA evidence is divided: Pinshi (2020) found growth driving finance in the Democratic Republic of the Congo, while Puatwoe and Piabuo (2017) found finance driving growth in Cameroon. Whether FDI and public spending lead or follow growth in SSA is likewise unsettled. Without evidence on causal direction, joint-effect estimates are difficult to translate into policy: a variable that follows growth cannot be used to generate it.

Recent African evidence on the finance–growth nexus is also narrow in scope (Masila et al., 2025a, 2025b): three studies examined single countries (Gashirayi, 2017; Puatwoe and Piabuo, 2017; Pinshi, 2020), and the one region-wide study by Asante et al. (2023) conditioned the relationship on institutional quality while leaving FDI and fiscal policy aside. This study therefore addresses two questions: What is the joint effect of financial development, FDI and government expenditure on economic growth in Sub-Saharan Africa? And which of these variables Granger-cause growth, and which are Granger-caused by it?

2. Literature Review

2.1 Theoretical Review

The study is anchored on the Endogenous Growth Theory and draws supporting propositions from the Neoclassical Growth Theory, the Classical Theory of Financial Intermediation, the Financial Market Theory of Development and institutional theory. The Neoclassical Growth Theory (Solow, 1956) attributes long-run growth to capital, labour and exogenous technological progress. In an SSA context, FDI is the principal channel through which foreign technology enters, so the theory links FDI to growth; but because it treats technology and policy as exogenous, it cannot explain why the growth effect of FDI should depend on the domestic financial system or on fiscal choices.

The Endogenous Growth Theory (Romer, 1986) supplies that explanation by attributing growth to knowledge, innovation and human capital accumulated through investment that the financial system finances. Barro (1990) extended the framework by placing productive government spending in the production function, so that public capital raises the marginal product of private capital—domestic and foreign alike. Within this framework, financial development, FDI and public investment are complements: each raises the return on the others, and their joint effect exceeds the sum of their separate effects. Critics such as Onyimadu (2015) note that the theory understates the institutional weaknesses of developing economies; that critique is addressed here by allowing the empirical model to test rather than assume complementarity.

The Classical Theory of Financial Intermediation (Allen and Santomero, 1996) explains the mechanism through which finance enables the other two drivers: intermediaries reduce information asymmetries, pool risk and lower transaction costs, so that both foreign capital and public investment are more efficiently deployed where the financial system is deeper. The Financial Market Theory of Development (World Bank Group, 1999) argues that market liberalisation attracts private and foreign capital and reduces reliance on the state, although Singh (1997) questioned whether stock markets are necessary for development. Finally, institutional theory holds that the effectiveness of any of these drivers depends on the quality of the institutions that govern them—the credibility of fiscal policy, the regulation of banks and the investment climate—which motivates the inclusion of government behaviour in the joint model rather than treating growth as a purely market outcome.

2.2 Empirical Review

Le and Suruga (2005) developed a theoretical growth model incorporating FDI and public expenditure and tested it on panel data. They found that both FDI and public capital expenditure raise growth, but that excessive public spending—beyond roughly 25% of GDP—reduces the growth benefits of FDI. Their study is one of the earliest to model two of the three drivers jointly but did not include the financial system.

Sirag et al. (2018) examined financial development, FDI and growth in Sudan using fully modified and dynamic OLS on annual data, with GDP per capita as the dependent variable and private sector credit and money supply as financial development proxies. Both financial development and FDI raised growth, with financial development having the larger effect. The study was confined to a single country and did not model government expenditure.

Juma et al. (2018) used a vector error correction model on 25 years of Tanzanian data, including government expenditure, FDI inflows, gross capital formation, inflation and growth. All variables had positive and significant long- and short-run relationships with growth. The authors emphasised capital expenditure and infrastructure but did not include financial development, and their single-country design limits generalisation.

Othman et al. (2018) applied pooled mean group estimation to 24 developing countries and found that general government final consumption expenditure has a significant positive long-run effect on FDI inflows, with market size a key determinant. Their work establishes a link between public spending and foreign capital but stops short of growth.

Yeboua (2019) used a panel smooth transition regression on 26 African countries over 1990–2013 and found a minimum threshold of financial development above which FDI raises growth. Bahri et al. (2019) reached a similar conclusion using a dynamic panel model: the growth effect of FDI is nonlinear and depends on the level of financial development. Neither study incorporated public expenditure.

Chen et al. (2019) showed, in a 105-country panel, that financial development shapes the composition of government expenditure, with more financially developed countries allocating less to productive spending. Their finding that finance and fiscal composition are interdependent implies that models omitting one will be misspecified with respect to the other.

Asante et al. (2023) examined 29 SSA countries over 2000–2019 with GMM and found that financial development raises growth and that the effect is strengthened by institutional quality. Ayenew (2022) found a positive effect of FDI on growth across SSA. Both studies confirm the individual contributions of finance and FDI at the regional level but do not model them jointly with public spending.

The reviewed literature therefore establishes each pairwise relationship among the four variables but leaves the joint effect untested at the SSA level, and provides conflicting single-country evidence on the direction of causality between finance and growth. This study addresses both gaps.

2.3 Conceptual Framework and Hypotheses

The conceptual framework is presented in Figure 1. Economic growth, measured as the annual growth rate of real GDP, is modelled as a joint function of three sets of predictors: financial development (broad money, domestic credit to the private sector, interest rate spread), foreign direct investment (net inflows) and government expenditure (general government final consumption expenditure, gross capital formation). The predictors are entered in that order, which follows the study's conceptual logic: financial development is the primary driver, FDI the channel through which it is transmitted, and government expenditure the fiscal environment that conditions both.

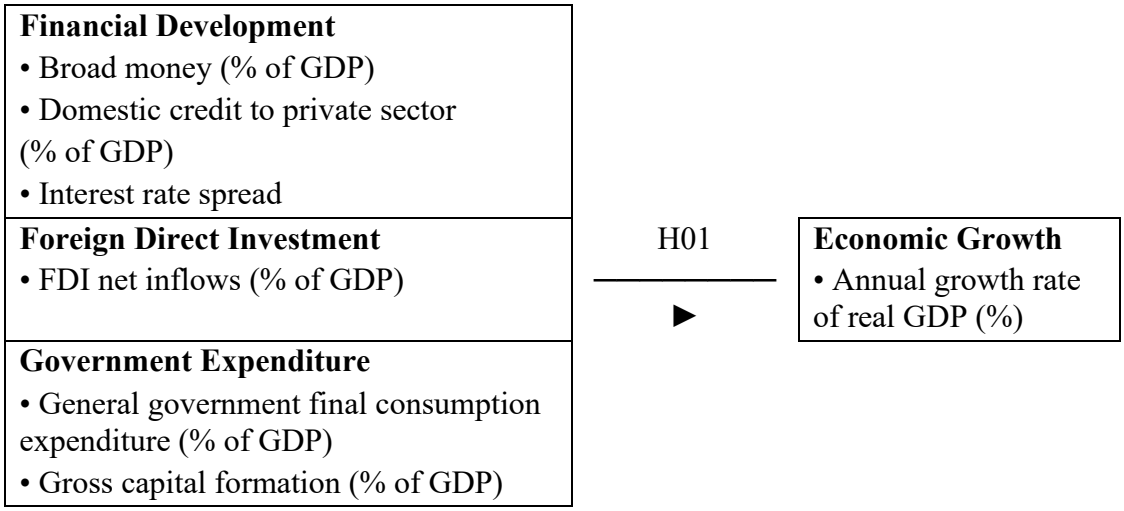


Figure 1: The conceptual model

The null hypothesis tested was:

H01: Financial development, foreign direct investment and government expenditure have no significant joint effect on economic growth among Sub-Saharan Africa countries.

In addition, pairwise Granger causality tests were used to establish, for each predictor, whether it Granger-causes economic growth, is Granger-caused by it, or both.

3. Methodology

3.1 Research Design and Data

The study adopted a positivist philosophy and a panel longitudinal design covering the 20-year period 2002–2021, beginning with the launch of the African Union. The target population was all 48 SSA countries; the analytical panel comprised the 45 countries with comparable observations. The panel was unbalanced, retaining all available country-year observations, and yielded 900 observations for most variables and 700 observations (35 countries) for interest rate spread. Financial development indicators were sourced from the IMF's International Financial Statistics; FDI, government expenditure and growth data from the World Bank's World Development Indicators and UNCTAD. Broad money was measured as M2 to GDP; domestic credit to the private sector as a percentage of GDP; interest rate spread as the lending rate minus the deposit rate; FDI as net inflows as a percentage of GDP; general government final consumption expenditure and gross capital formation as percentages of GDP; and economic growth as the annual percentage growth rate of real GDP. No human participants were involved; a research permit was obtained from NACOSTI.

3.2 Data Analysis

The analysis proceeded in three stages. First, Pearson correlation analysis established the strength and direction of the bivariate associations between growth and each predictor and among the predictors, and variance inflation factors (VIFs) were computed to assess multicollinearity. Second, pairwise Granger causality tests were run using the lag order selected by the Akaike Information Criterion from a vector autoregression. Granger causality indicates whether lagged values of one variable improve the prediction of another beyond the information in its own lags; it therefore establishes predictive precedence rather than structural causation, and the null hypothesis of no Granger causality was rejected at $p < 0.05$. Third, the joint effect was estimated by hierarchical (stepwise-entry) fixed-effects panel regression, with predictors entered in six blocks in the order set out in the conceptual framework:

$$EGit = \beta0 + \beta1\ BMit + \beta2\ DCPSit + \beta3\ IRSit + \beta4\ FDIit + \beta5\ GGFCEit + \beta6\ GCFit + \mu i + \varepsilon it \quad (1)$$

where EG is economic growth, BM broad money, DCPS domestic credit to the private sector, IRS interest rate spread, FDI foreign direct investment net inflows, GGFCE general government final consumption expenditure and GCF gross capital formation, for country i in year t, and μi is a country-specific fixed effect. The fixed effects absorb all time-invariant country characteristics—geography, resource endowments, colonial and legal origin, long-run institutional quality—so that the coefficients are identified from within-country variation over time; the Hausman test rejected the random-effects alternative ($\chi^2(6) = 48.69$, $p < 0.001$). Standard errors are clustered by country to allow for arbitrary heteroscedasticity and serial correlation within countries. The within R^2 and the classical F-statistic for the k slope coefficients, $F(k, N - k - G)$ where G is the number of countries, are reported for each model; the change in within R^2 between successive models and the corresponding F-change statistic, $F(1, N - k - G)$, measure the incremental contribution of each predictor, and the F-statistic of the final model tests the joint null hypothesis. Two robustness checks address endogeneity: a two-way specification adding year fixed effects to absorb common shocks such as the global financial crisis and COVID-19, and a specification in which all six predictors are lagged one year, so that the regressors are predetermined with respect to current growth and simultaneity bias is reduced; a full system-GMM treatment is left for further research. Because interest rate spread was available for 35 countries, the regression models were estimated on the 700-observation common sample. Stationarity was assessed with panel-specific unit root tests—the Fisher-type ADF test of Maddala and Wu (1999), which combines country-level ADF p-values into a $\chi^2(2N)$ statistic, and the Choi (2001) inverse-normal Z statistic—at levels and first differences; the Kao residual cointegration test rejected the null of no cointegration (ADF $t = -4.46$, $p < 0.001$), supporting estimation in levels. Diagnostic tests for normality, linearity and heteroscedasticity were also conducted. The analysis was carried out in EViews 13, SPSS 26 and Python (statsmodels 0.15).

4. Results and Discussion

4.1 Panel Unit Root Tests

Table 1 reports the panel unit root tests. At levels, the Fisher-ADF χ^2 statistic rejects the null of a unit root for economic growth, domestic credit to the private sector, interest rate spread, FDI, government consumption expenditure and gross capital formation, and the Choi Z statistic concurs for all except domestic credit, for which the evidence is mixed. Broad money is non-stationary at levels on both statistics ($\chi^2 = 76.4$, $p = 0.847$; $Z = 4.41$) and stationary in first differences ($\chi^2 = 700.6$, $p < 0.001$), as are all other variables. The panel therefore contains a mix of I(0) and one I(1) series. Given that the Kao residual test rejects the null of no cointegration (ADF $t = -4.46$, $p < 0.001$), the long-run relationship among the levels is well defined and the fixed-effects models are estimated in levels, with the lagged-regressor specification in Table 6 providing a check on dynamic misspecification.

Table 1: Panel unit root tests (Fisher-type ADF and Choi Z)

Variable	Countries	Level: Fisher χ^2	p	Level: Choi Z	p	1st diff.: Fisher χ^2	p	Order
Economic growth	45	505.2***	0.000	−16.26***	0.000	1367.7***	0.000	I(0)
Broad money	45	76.4	0.847	4.41	1.000	700.6***	0.000	I(1)
Domestic credit to private sector	45	153.4***	0.000	0.06	0.525	602.0***	0.000	I(0)
Interest rate spread	35	153.3***	0.000	−4.82***	0.000	552.2***	0.000	I(0)
FDI net inflows	45	249.6***	0.000	−6.73***	0.000	1053.9***	0.000	I(0)
Govt. final consumption expenditure	45	123.6**	0.011	−2.65***	0.004	774.5***	0.000	I(0)
Gross capital formation	45	164.8***	0.000	−3.54***	0.000	772.3***	0.000	I(0)

Source: Authors' computation. Country-level ADF regressions with constant, lag length by AIC (max 2). Fisher χ^2 has 2N degrees of freedom (Maddala & Wu, 1999); Choi Z is the inverse-normal combination (Choi, 2001). *** $p < 0.01$; ** $p < 0.05$.

4.2 Correlation Analysis

Table 2 reports the correlations between economic growth and the six predictors on the 700-observation common sample. Three predictors are significantly correlated with growth. Gross capital formation has the strongest and a positive association ($r = 0.126$, $p = 0.001$); interest rate spread ($r = -0.108$, $p = 0.004$) and broad money ($r = -0.088$, $p = 0.020$) are negatively associated with growth. Domestic credit to the private sector ($r = -0.046$, $p = 0.224$), FDI ($r = 0.026$, $p = 0.484$) and general government final consumption expenditure ($r = -0.054$, $p = 0.152$) are not significantly correlated with growth at the bivariate level. The negative bivariate correlation of broad money with growth is noteworthy: it means that the negative regression coefficient reported below is not a sign reversal induced by other regressors but the unconditional direction of the relationship in these data.

The correlations among the predictors are also informative. Broad money and domestic credit to the private sector are strongly correlated ($r = 0.745$), as expected for two measures of financial depth; their VIFs of 2.54 and 2.31 (Table 3) are well below the conventional threshold of 10, and the remaining VIFs are close to 1, so the regression coefficients are not unduly inflated, though the shared variance of the two depth measures is addressed explicitly in Section 4.5. Gross capital formation is positively correlated with FDI ($r = 0.369$), broad money ($r = 0.181$) and government consumption ($r = 0.261$), which is consistent with the view that public investment, foreign capital and financial depth move together. Interest rate spread is negatively correlated with every other predictor, indicating that inefficient intermediation coincides with lower financial depth, less investment and lower public spending.

Table 2: Correlation matrix

Variable	EG	GGFCE	GCF	IRS	BM	DCPS	FDI
Economic growth (EG)	1.000						
Govt. final consumption exp. (GGFCE)	−0.054 (0.152)	1.000					
Gross capital formation (GCF)	0.126*** (0.001)	0.261*** (0.000)	1.000				
Interest rate spread (IRS)	−0.108*** (0.004)	−0.086** (0.023)	−0.117*** (0.002)	1.000			
Broad money (BM)	−0.088** (0.020)	0.386*** (0.000)	0.181*** (0.000)	−0.094** (0.012)	1.000		
Domestic credit to private sector (DCPS)	−0.046 (0.220)	0.256*** (0.000)	0.036 (0.337)	−0.087** (0.022)	0.745*** (0.000)	1.000	
FDI net inflows (FDI)	0.026 (0.484)	0.160*** (0.000)	0.369*** (0.000)	0.030 (0.427)	0.031 (0.417)	−0.052 (0.173)	1.000

Source: Authors' computation. N = 700 (35 countries). Pearson correlation coefficients with p-values in parentheses. *** $p < 0.01$; ** $p < 0.05$.

Table 3: Variance inflation factors

Predictor	VIF	1/VIF
Broad money	2.54	0.39
Domestic credit to private sector	2.31	0.43
Govt. final consumption exp.	1.24	0.80
Gross capital formation	1.26	0.79
FDI net inflows	1.18	0.85
Interest rate spread	1.03	0.97

Source: Authors' computation.

4.3 Granger Causality

Table 4 reports the pairwise Granger causality tests between economic growth and each predictor. Three patterns emerge. First, two financial development indicators have a bidirectional relationship with growth. Broad money Granger-causes growth ($F = 6.67$, $p = 0.0013$) and growth Granger-causes broad money ($F = 3.88$, $p = 0.0210$); interest rate spread Granger-causes growth ($F = 17.26$, $p < 0.0001$) and growth Granger-causes the spread ($F = 4.22$, $p = 0.0151$). For depth and efficiency, then, finance and growth reinforce one another—the supply-leading and demand-following hypotheses both hold.

Second, domestic credit to the private sector is predominantly demand-following. Growth strongly Granger-causes private sector credit ($F = 15.40$, $p < 0.0001$), while the reverse relationship is only marginal ($F = 2.72$, $p = 0.0666$). This is consistent with Pinshi's (2020) finding for the DRC and suggests that, in SSA, credit expands in response to economic activity more than it initiates it—a result that qualifies the strong positive coefficient on private credit in the growth regressions below.

Third, the fiscal and investment variables lead growth without feedback. Gross capital formation Granger-causes growth ($F = 6.95$, $p = 0.0010$) but growth does not Granger-cause capital formation ($p = 0.6077$). General government final consumption expenditure Granger-causes growth at the margin ($F = 2.99$, $p = 0.0507$) with no reverse causality ($p = 0.4555$). FDI likewise Granger-causes growth at the margin ($F = 2.90$, $p = 0.0556$) with no feedback ($p = 0.4536$). These variables are therefore exogenous policy levers in the Granger sense: they can be used to generate growth and are not merely its by-products. Among the predictors, broad money Granger-causes gross capital formation ($p = 0.0454$) and FDI Granger-causes gross capital formation ($p = 0.0295$), indicating that both financial depth and foreign capital feed domestic investment.

Table 4: Pairwise Granger causality tests between economic growth and predictors

Null hypothesis	Obs.	F-statistic	Prob.	Decision
Broad money does not Granger-cause EG	810	6.666	0.0013	Reject
EG does not Granger-cause broad money		3.881	0.0210	Reject
Domestic credit to private sector does not Granger-cause EG	810	2.718	0.0666	Do not reject
EG does not Granger-cause domestic credit to private sector		15.398	0.0000	Reject
Interest rate spread does not Granger-cause EG	630	17.258	0.0000	Reject
EG does not Granger-cause interest rate spread		4.219	0.0151	Reject
FDI does not Granger-cause EG	810	2.901	0.0556	Do not reject (marginal)
EG does not Granger-cause FDI		0.791	0.4536	Do not reject
Govt. final consumption exp. does not Granger-cause EG	810	2.992	0.0507	Do not reject (marginal)
EG does not Granger-cause govt. final consumption exp.		0.787	0.4555	Do not reject
Gross capital formation does not Granger-cause EG	810	6.947	0.0010	Reject
EG does not Granger-cause gross capital formation		0.498	0.6077	Do not reject

Source: Authors' computation. EG = economic growth. Lag order 2, selected by AIC.

4.4 Joint Effect: Hierarchical Fixed-Effects Regression

Table 5 reports the goodness of fit and overall significance of the six hierarchical fixed-effects models, and Table 6 the coefficients. Broad money alone explains 5.9% of the within-country variation in growth (Model 1; $F(1, 664) = 41.45$, $p < 0.001$). Adding domestic credit to the private sector contributes nothing ($\Delta R^2 = 0.001$, F-change = 1.02, $p = 0.313$), whereas adding interest rate spread ($\Delta R^2 = 0.009$, F-change = 6.54, $p = 0.011$) and gross capital formation ($\Delta R^2 = 0.012$, F-change = 8.87, $p = 0.003$) each produce a significant increment. FDI adds a marginally significant increment ($\Delta R^2 = 0.005$, F-change = 3.42, $p = 0.065$) and government consumption expenditure an insignificant one ($\Delta R^2 = 0.002$, F-change = 1.71, $p = 0.192$). The full model explains 8.9% of within-country variation and 17.5% of total variation once country effects are included, and the six predictors are jointly significant ($F(6, 659) = 10.71$, $p < 0.001$). The joint null hypothesis H01 is therefore rejected. The modest within R^2 is typical of growth regressions on annual data, where year-to-year growth is dominated by shocks; the Granger tests in Table 4 show that the predictors nonetheless carry systematic information about future growth.

Table 5: Hierarchical fixed-effects model summary and overall significance

Model	Predictors added	Within R^2	Over all R^2	ΔR^2 (within)	F-change	p	Model F	df	p
1	Broad money	0.059	0.148	0.059	41.45	0.000	41.45	(1, 664)	0.000
2	+ Domestic credit to private sector	0.060	0.149	0.001	1.02	0.313	21.24	(2, 663)	0.000
3	+ Interest rate spread	0.069	0.158	0.009	6.54	0.011	16.45	(3, 662)	0.000
4	+ FDI net inflows	0.074	0.162	0.005	3.42	0.065	13.24	(4, 661)	0.000
5	+ Govt. final consumption expenditure	0.077	0.164	0.002	1.71	0.192	10.95	(5, 660)	0.000
6	+ Gross capital formation	0.089	0.175	0.012	8.87	0.003	10.71	(6, 659)	0.000

Source: Authors' computation. Dependent variable: economic growth. N = 700 (35 countries, 2002–2021), country fixed effects (G = 35). Model F tests the joint significance of the k slope coefficients, $F(k, N - k - G)$, computed from the within R^2; F-change tests the added predictor, $F(1, N - k - G)$, computed from ΔR^2.

The coefficients in Table 6 show how the contribution of each predictor changes as the others are added. Broad money is negative and significant in every model, ending at $\beta = -0.097$ ($p < 0.001$) in the full model: within SSA countries over time, increases in monetary depth relative to GDP are associated with lower growth. Interest rate spread is negative and significant from the moment it enters ($\beta = -0.020$, $p < 0.001$ in Model 3) and remains so in the full model ($\beta = -0.017$, $p < 0.001$), confirming that inefficient intermediation is a persistent drag on growth regardless of what else is in the model. Gross capital formation enters with a positive and significant coefficient ($\beta = 0.081$, $p = 0.011$) and produces the largest single improvement in fit.

Domestic credit to the private sector, FDI and government consumption expenditure do not have significant contemporaneous effects once country heterogeneity is controlled for. Private sector credit is negative and insignificant in every model ($\beta = -0.051$, $p = 0.215$ in Model 6). FDI is positive and significant at the 5% level when first entered ($\beta = 0.042$, $p = 0.043$ in Model 4), marginal once government consumption is added ($p = 0.068$) and insignificant in the full model ($\beta = 0.021$, $p = 0.235$), indicating that part of its contemporaneous association with growth is shared with gross capital formation—consistent with the Granger finding that FDI predicts capital formation ($p = 0.030$). Government consumption expenditure is positive but insignificant ($\beta = 0.080$, $p = 0.458$).

Table 6: Hierarchical fixed-effects regression coefficients

Predictor	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Broad money	−0.104*** (0.021)	−0.089*** (0.024)	−0.093*** (0.024)	−0.093*** (0.025)	−0.098*** (0.027)	−0.097*** (0.027)
Domestic credit to private sector		−0.033 (0.039)	−0.032 (0.039)	−0.033 (0.039)	−0.037 (0.040)	−0.051 (0.041)
Interest rate spread			−0.020*** (0.004)	−0.020*** (0.004)	−0.019*** (0.004)	−0.017*** (0.003)
FDI net inflows				0.042** (0.021)	0.040* (0.022)	0.021 (0.017)
Govt. final consumption expenditure					0.069 (0.111)	0.080 (0.108)
Gross capital formation						0.081** (0.032)
Within R^2	0.059	0.060	0.069	0.074	0.077	0.089
Observations	700	700	700	700	700	700

Source: Authors' computation. Dependent variable: economic growth. Country fixed effects included; the constant is absorbed. Coefficients with country-clustered standard errors in parentheses; significance from the cluster-robust t-statistic ($t = \beta/SE$). *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

4.5 Robustness: Two-Way Fixed Effects, Lagged Regressors and the Depth Measures

Table 7 reports three robustness checks. Adding year fixed effects (column 1) to absorb common shocks leaves the pattern intact: broad money ($\beta = -0.057$, $p = 0.036$), interest rate spread ($\beta = -0.018$, $p < 0.001$) and gross capital formation ($\beta = 0.086$, $p = 0.012$) remain significant with the same signs, and the other three predictors remain insignificant. Lagging all regressors by one year (column 2), so that each is predetermined relative to current growth, changes the picture in two instructive ways. First, FDI becomes strongly significant and positive ($\beta = 0.078$, $p < 0.001$): foreign investment raises growth in the following year rather than contemporaneously, consistent with the time needed for investment projects to come on stream. Second, lagged private sector credit is negative and significant ($\beta = -0.101$, $p = 0.031$), while lagged gross capital formation is insignificant, suggesting that the contemporaneous effect of capital formation reflects the demand impulse of investment spending in the year it occurs. Interest rate spread remains negative and significant in every specification.

Columns 3 and 4 address a possible concern that the high correlation between broad money and private sector credit ($r = 0.745$) might generate a suppressor artefact. Dropping either depth measure does not change the sign or significance of the other: without broad money, private sector credit becomes negative and significant ($\beta = -0.141$, $p = 0.001$); without private sector credit, broad money remains negative and significant ($\beta = -0.118$, $p < 0.001$). Together with the negative bivariate correlation of both measures with growth (Table 2), this indicates that the negative

effect of financial depth is a feature of the within-country data rather than a statistical artefact of collinearity. The substantive interpretation is nonetheless offered with caution: broad money and private credit are proxies for depth and access, and their negative within-country association with growth is consistent with episodes in which monetary and credit expansion outpaced productive absorption—the 'too much finance' pattern documented in the threshold literature—rather than with a claim that financial development harms growth in the long run.

Table 7: Robustness checks

Predictor	(1) Two-way FE	(2) Lagged regressors	(3) Without broad money	(4) Without private credit
Broad money	−0.057** (0.027)	−0.047 (0.040)	—	−0.118*** (0.024)
Domestic credit to private sector	−0.070 (0.046)	−0.101** (0.047)	−0.141*** (0.042)	—
Interest rate spread	−0.018*** (0.005)	−0.038*** (0.006)	−0.015*** (0.004)	−0.017*** (0.004)
FDI net inflows	−0.005 (0.018)	0.078*** (0.023)	0.021 (0.020)	0.022 (0.017)
Govt. final consumption expenditure	0.078 (0.106)	0.097 (0.073)	0.038 (0.110)	0.072 (0.111)
Gross capital formation	0.086** (0.034)	0.020 (0.035)	0.085** (0.035)	0.075** (0.032)
Fixed effects	Country + year	Country	Country	Country
Regressors	Contemporaneous	Lagged one year	Contemporaneous	Contemporaneous
Observations	700	665	700	700

Source: Authors' computation. Dependent variable: economic growth. Country-clustered standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

4.6 Discussion

Taken together, the regression and causality results support the joint-effect hypothesis but overturn the expectation, common in the finance–growth literature, that financial depth is the primary channel. Within SSA countries over 2002–2021, growth has responded to the efficiency of intermediation (interest rate spread), to investment in productive capacity (gross capital formation) and, with a one-year lag, to FDI—not to the expansion of broad money or private credit relative to GDP. This pattern is consistent with the Endogenous Growth Theory in Barro's (1990) formulation, in which it is productive investment, public and private, that raises the marginal product of capital and hence growth, and with the Classical Theory of

Financial Intermediation, in which it is the cost of intermediation rather than its volume that determines how efficiently savings become productive investment. It is also consistent with the threshold evidence of Yeboua (2019) and An and Yeh (2021): several SSA economies in the panel have levels of broad money and private credit far above the regional median, and the within-country estimates suggest that further deepening in such economies has not translated into growth.

The insignificance of government consumption expenditure, alongside the significant positive effect of gross capital formation, replicates in a joint model the distinction between productive and non-productive public spending drawn by Chu et al. (2020) and Adedeji et al. (2019) and helps explain the inconclusive aggregate findings surveyed by Nyasha and Odhiambo (2019): aggregate government expenditure combines a component that raises growth with one that does not. The Granger results add that government consumption does precede growth ($p = 0.051$) without feedback, so its lack of contemporaneous effect in the regressions does not mean it is irrelevant—only that its influence is not visible in the same year.

The Granger causality results qualify the regression estimates in a second respect. Private sector credit is predominantly demand-following: growth Granger-causes credit far more strongly ($p < 0.0001$) than credit Granger-causes growth ($p = 0.067$), and lagged credit is negatively associated with growth. Credit expansion in SSA therefore appears to accompany growth rather than initiate it, and policies that expand credit without an underlying investment stimulus should not be expected to raise growth on their own. By contrast, gross capital formation and FDI Granger-cause growth without feedback, and FDI's lagged effect is strong, which makes them the exogenous levers in the system. Broad money and interest rate spread are bidirectional, so financial depth and intermediation efficiency both drive and respond to growth; the negative coefficient on broad money should accordingly be read as a within-country association in a system with feedback rather than as a one-directional causal effect.

The results also bear on the Financial Market Theory of Development, which holds that liberalised financial markets attract foreign capital and reduce reliance on the state. The finding here is more nuanced: FDI does raise growth, but with a lag and in a system where it feeds domestic capital formation, and financial depth on its own does not. In SSA, public investment is not displaced by financial development; it is the component of public spending that most reliably raises growth. From the standpoint of institutional theory, this underscores that fiscal composition is itself an institutional choice that determines whether market-based drivers of growth deliver.

5. Conclusion and Recommendations

This study concludes that financial development, foreign direct investment and government expenditure have a significant joint effect on economic growth in Sub-Saharan Africa, but that the contribution of each is uneven. Within countries over time, growth falls as broad money rises and as interest rate spreads widen, rises with gross capital formation, and responds positively to FDI with a one-year lag; domestic credit to the private sector and government consumption expenditure have no significant contemporaneous effect. The direction of causality differs by variable. Capital formation, government consumption and FDI lead growth; private credit follows it; and financial depth and intermediation efficiency both lead and follow. The explanatory power of the predictors for year-to-year growth is modest, which is itself informative: the levers examined here shape the trend of growth rather than its annual fluctuations.

Four recommendations follow. First, growth policy in SSA should be formulated as an integrated package rather than as separate financial, investment and fiscal agendas, because the predictors are jointly rather than individually decisive and because FDI's effect is transmitted through, and lagged behind, domestic capital formation. Second, public investment should be protected: gross capital formation is the only fiscal variable with a significant positive effect, and fiscal consolidation should fall on recurrent rather than capital spending. Third, financial sector policy should prioritise the efficiency over the volume of intermediation. The persistent negative effects of broad money and the absence of a growth effect of private credit indicate that further deepening without intermediation reform will not raise growth; competition in banking, credit information systems, collateral registries and digital channels that narrow interest rate spreads are the measures with a demonstrable growth payoff. Fourth, because private credit is demand-following, credit-expansion measures—guarantee schemes, directed lending, monetary easing—should be tied to public investment programmes that create the demand for productive borrowing rather than deployed as growth instruments in their own right. For financial institutions and investors, the findings indicate that the growth returns to lending and to foreign investment in SSA are realised where capital formation is rising and intermediation costs are falling, and that FDI returns accrue with a lag; credit strategies aligned with public investment pipelines, and investment horizons that allow a year or more for projects to come on stream, are therefore more likely to generate the growth that sustains performance.

6. Suggestions for Further Research

Several extensions are warranted. First, the fixed-effects design with lagged regressors reduces but does not eliminate endogeneity; dynamic panel estimators such as system GMM, with the predictors instrumented by their own lags, would strengthen causal inference and complement the Granger evidence reported here. Second, the finding that broad money is I(1) while the other variables are I(0), together with the Kao cointegration result, invites a panel ARDL or pooled mean

group treatment that separates long-run from short-run effects explicitly. Third, the negative within-country effect of financial depth calls for explicit threshold modelling to identify the level of broad money and private credit beyond which further deepening ceases to raise growth in SSA. Fourth, institutional quality—governance, corruption, political stability—should be added to the joint model, since Asante et al. (2023) found it to condition the finance–growth relationship and it is likely to condition the fiscal and FDI channels as well. Finally, the rapid growth of fintech and mobile money in SSA suggests that future work should test whether digital financial development alters the demand-following character of private credit found in this study.

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