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Impact of Financial Development on Real Income Dynamics

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ABSTRACT

This study investigates the impact of financial development on economic growth across 20 Sub-Saharan African countries from 2007 to 2024. Grounded in an augmented Solow growth framework, the research incorporates human capital and financial development as key determinants of output. To address endogeneity and unobserved heterogeneity, the authors utilized the System Generalized Method of Moments (SGMM) estimator. Preliminary diagnostics, including the Bond (2002) test, justified this approach by identifying bias patterns in OLS (0.5232) and Fixed Effects (-0.3533) estimations. Additionally, Pesaran (15.003, p=0.0000) and Friedman (85.631, p=0.0000) tests confirmed the presence of cross-sectional dependence that required control within the model. The empirical findings reveal that financial development impacts real income through distinct and sometimes conflicting channels. Financial institution access (0.163, p<0.05) and institutional quality (0.674, p<0.05) were found to have significant positive effects on economic growth. Conversely, the results indicate that financial market depth (-0.249, p<0.05) has a negative impact on growth, while financial efficiency (-0.049) remains statistically insignificant. Diagnostic checks, including Hansen (0.289) and AR(2) (0.331) tests, confirmed the validity and reliability of these results. Consequently, the study concludes that financial development affects growth unevenly across its channels. The authors recommend that policymakers focus on improving financial inclusion and strengthening institutional frameworks while exercising caution regarding the deepening of debt markets.

Keywords: *Financial Development, Real GDP Growth, Sub-Saharan Africa, System GMM, Institutional Quality*

Introduction

The relationship between financial development and economic growth has emerged as a central theme in academic and policy discussions, particularly within the context of Sub-Saharan Africa (SSA). Historically, formal financial institutions in this region evolved from colonial treasury extensions into state-dominated entities. It was not until the structural adjustment reforms of the 1980s and 1990s that the region transitioned toward liberalization, privatization, and strengthened regulatory frameworks (Beck, Demirgüç-Kunt, & Levine, 2000; World Bank, 2024). Today, the SSA financial landscape remains largely bank-based, characterized by shallow capital markets and limited outreach, with formal account ownership often falling below 40% of the adult population (Demirgüç-Kunt & Klapper, 2012). This lack of depth forces many households and firms to rely on informal mechanisms and microfinance for credit and savings. Financial development in this context involves broadening and deepening financial activities to enhance access, efficiency, stability, and integration (Levine, 1997; World Bank, 2017).

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Economic growth in SSA has recently been characterized as sluggish and fragile, hampered by structural rigidities and external shocks. Following a modest post-pandemic recovery, growth slowed from 4.1% in 2021 to 3.2% in 2022, and dropped further to 2.9% in 2023 (World Bank, 2024). This deceleration is attributed to persistent inflation, rising debt vulnerabilities, and climate-related disruptions. The region's economic performance is also highly heterogeneous; resource-rich nations like Nigeria and South Africa face constraints from declining productivity and underdeveloped financial systems, whereas non-resource-intensive economies like Rwanda and Ethiopia exhibit stronger expansions (IMF, 2023). Despite a projected rebound to 3.8% in 2025, regional growth remains below the 6–7% threshold necessary for significant poverty reduction (African Development Bank, 2024). Furthermore, widening inequality, infrastructural deficits, and weak institutional quality continue to impede the mobilization of financial resources (UNCTAD, 2024).

Financial development is frequently analyzed through four primary dimensions: depth, access, efficiency, and stability (CBN, 2024). Financial depth, often measured by the ratio of broad money (M2) to GDP, reflects the mobilization of savings to bolster investment (Levine, 2005). Access is determined by the density of bank branches and ATMs, which drives enterprise financing (Beck & Cull, 2013). Efficiency is viewed through net interest spreads, where narrower margins signify lower borrowing costs (Beck, Levine, & Loayza, 2000), while stability is monitored via non-performing loan (NPL) ratios to ensure consistent credit flows (Demirgüç-Kunt & Huizinga, 1999). Over the last decade, SSA has seen modest gains, with the broad money-to-GDP ratio rising from 20% in 2015 to 30% in 2022 (Ndikumana & Adu, 2022). Additionally, bank branch access grew by 15% and mobile money networks by 40% between 2018 and 2022 (World Bank, 2023). However, efficiency remains a hurdle, with net interest margins staying high at 9.5% in 2023 (Kpodar & Andrianaivo, 2021), though banking stability improved as NPL ratios fell to 8% in 2022 (Ajakaiye et al., 2023).

Economic growth, defined as the increase in a nation's output over time, is the primary indicator of economic success and welfare (Appia-Otoo & Song, 2020). A robust financial sector provides the necessary foundation for this growth by channeling savings into productive, innovative ventures (Azam, 2021; Ehigiamusoe et al., 2018; Pradhan et al., 2019). The theoretical link between finance and growth has been long debated. Schumpeter (1934) famously argued that financial systems are essential for innovation-led growth. Conversely, Lucas (1988) suggested that financial development might simply be a byproduct of growth rather than a primary driver. Nevertheless, a modern consensus suggests that well-developed financial systems enhance capital allocation efficiency and sustain long-term development.

In SSA, the importance of this relationship is magnified by a history of underdeveloped credit markets and poor regulatory frameworks (An, Zou & Kargbo, 2020; Effiong & Eke, 2020). The financial repression theory of McKinnon (1973) and Shaw (1973) helps explain how government-imposed limits—such as interest rate controls and high reserve requirements—can stifle economic activity. While reforms since the 1990s have aimed to liberalize markets and increase credit access (Sahay et al., 2015), the results have been mixed (Adeleye et al., 2017). For example, Nigeria continues to struggle with low financial inclusion and high NPLs, which undermines the influx of Foreign Direct Investment (FDI) (Heil, 2018).

FDI is a critical component of this economic nexus, representing cross-border investments where a resident entity acquires at least 10% of the voting stock and effective management control in a foreign enterprise (United Nations Economic and Social Commission for Western Asia, 2024). Unlike portfolio investments, FDI involves Greenfield projects and technology transfers that foster capital inflows and productivity (World Bank, 2024). Strengthening financial systems and institutional capacity is therefore vital for SSA to effectively attract these investments and promote inclusive growth.

The motivation for this study arises from inconsistent evidence on how financial development drives real income growth in Sub-Saharan Africa. Prior literature emphasizes socio-economic, psychological, institutional, and structural constraints but rarely integrates them into finance–growth analysis. Evidence shows economic stress and media effects (Onyemaechi et al., 2025a), and social support during crises (Onyemaechi et al., 2025b), shaping productivity outcomes. Labour studies reveal job insecurity and behaviour (Nwokolo et al., 2022) and employee development and livelihood shocks (Onwuka et al., 2022a; Onwuka et al., 2022b). Governance and human capital factors, including public service conduct (Mbuba, 2018) and productivity effects (Mbuba, 2022), also matter. Health system constraints and sociocultural gaps (Egwuaba et al., 2025) and institutional quality effects (Maduka et al., 2022) further complicate growth linkages. This study therefore integrates these multidimensional gaps to better explain financial development and income dynamics in the region empirically across Sub-Saharan Africa context.

1.1 Research Question

To what extent does financial development affect the growth of real GDP in Sub-Saharan African (SSA) countries?

1.2 Research Hypothesis

This research hypothesis is formulated in the course of this study:

H_{O1}: Financial development does not significantly affect real GDP in Sub-Saharan African countries.

2. Method

2.1 Theoretical Framework

Mankiw et al (1992) developed a model that resembles the Solow-Swan model in the sense that it assumes constant returns to scale, but differs by including human capital in the growth model. Its deviance from the Solow-Swan model is outstanding because relatively small changes in resources devoted to physical and human capital accumulation may lead to large changes in output per worker. This model of Mankiw et al (1992) is one of the endogenous growth models that highlight the existence of a variety of endogenous mechanisms that foster economic growth and it has suggested new roles for public policy.

The endogenous growth model is preferable in this work because of the prominenceof human capital, in the form of abilities, skills, and knowledge of individual workers, in bringing about positive changes in the economic growth of an economy. Also, endogenous growth has laid much importance on the role of financial development in economic, and several studies on endogenous growth have examined the potential linkages between economic growth and financial markets. Thus, this work adopts the Mankiw et al (1992) model.

The model adopts that there is only one production sector, with the output given as follows:

$$Y=KH\ (AL)\ a\beta>0,\ a+\beta<1 \qquad (1)$$

Where K is the stock of physical capital, H is the stock of human capital, L is the number of workers and AL is effective labour. There are constant returns to K, L, and H; meaning that if the amounts of K, H, and L are doubled, the quantity of output produced will also double. Hence, it is assumed that;

$$K = sky - \delta KL = n \qquad (2)$$

where K denotesa change in capital stock or net investment, L is a change in labour, sk is the portion of output devoted to investment, L = n is the rate of growth of labour force. As in the Solow-Swan model, technological progress is taken to be exogenous.

$$\bar{A} / A = \gamma \qquad (3)$$

Where Ā signifiesa change in technology, Ā / A = γsymbolizes the rate of growth of knowledge or technological progress. Investment in human capital is also assumed to denote a fixed fraction of output:

$$\hat{H} = sH \qquad (4)$$

Let h = H / AL, represent the human capital per effective labour ratio. Then, the production function in equation 1 can be modified in intensive form as:

$$y = ka\ h\beta \qquad (5)$$

Where κ = K / AL; y = Y / AL and h = H / AL. K / AL is physical capital per effective labour, Y / AL is output per effective labour, and H / AL is human capital per effective labour.

Equation 5 is the key equation in the Mankiw-Romer-Weil model, which can be used to evaluate the linkages between financial development and economic growth. This can be done by spreading the equation to include variables FD and Z, which designate the financial development variables and other control variables that affect economic growth respectively.

$y = k^{a}\, h^{\beta}\, FDZ$ (6)

Where y = output, k = physical capital, h = human capital, FD = the financial development variables and Z = other variables affecting growth.

2.2 Model Specification

To specify the models for the study, the two-step System Generalized Method of Moments (SGMM) estimation procedure is employed to capture the respective specific objectives of the study. Furthermore, for robustness checks, the study adopts the Random Effects (RE) model to validate the estimation of the two-step system GMM model. The study adopted a model specification of Mankiw et al (1992) as applied in Alfaro (2004)and as well as in Maduka and Onwuka (2013) to form the impact of financial development on economic growth. Economic growth is a function of physical capital, human capital, and financial development. Hence, the model for the study is stated in the functional form as:

$Y = f\,(k, h, l, FD, Z)$ (7)

Where Y = real gross domestic product (RGDPG), k = gross fixed capital formation, which is represented by domestic investment (DI). h = human capital proxies by human development index (HDI), FD = financial development variables (FIA = financial institution access measured with bank branches per 100,000 adult, FIE =financial institution efficiency measured with net interest margin and FMD = financial market depth measured with Gross portfolio debt assets to GDP), and Z = other control variables like institutional quality index, *INSQIDX*.

Then, the model with little modification becomes

$RGDPG = f\,(FIA, FIE, FMD, HDI, INSQIDX)$ (8)

The financial development indicators used in the analysis include FIA = financial institution access measured with bank branches per 100,000 adults, FIE =financial institution efficiency measured with net interest margin, and FMD = financial market depth measured with Gross portfolio debt assets to GDP. An increase in human capital development proxies as the human development index, will lead to growth in real GDP, while an improvement in the institutional quality index will increase real GDP.

To facilitate estimation, the implicit economic growth model in equation (8) is specified explicitly as a dynamic panel data model as follows:

$$RGDPG_{it} = \alpha_0 + \beta_1 RGDPG_{it-1} + \beta_2 FIA_{it} + \beta_3 FIE_{it} + \beta_4 FMD_{it} + \beta_5 HDI_{it} + \beta_6 INSQIDX_{it} + \pi_i + \xi_t + \varepsilon_{i,t} \quad (9)$$

Where β_1 *to* β_6 are the parameter estimates, $RGDPG_{it-1}$ is the lag of the dependent variable, while $\pi_i$is the country-specific impact, $\xi_t$is the time-specific constant and $\varepsilon_{i,t}$the error term. The error term is presumed to be independent and identically distributed (iid) with an expected value of zero and constant variance v^2. Other variables are as defined earlier.

Model (9) builds on the augmented Solow growth framework by Mankiw, Romer, and Weil (1992), which justifies including the human development index (HDI) as a proxy for human capital (Maduka & Onwuka, 2013). Financial development is conceptualized as multidimensional (financial access (FIA), efficiency (FIE), and market depth (FMD)) reflecting different channels through which finance promotes growth, such as mobilizing savings and improving capital allocation (Svirydzenka, 2016). Empirical studies have employed bank branches per 100,000 adults for access, net interest margin for efficiency (Demirgüç-Kunt & Huizinga, 1999), and gross portfolio debt assets to GDP for market depth (Svirydzenka, 2016). The institutional quality index (INSQIDX) is incorporated because institutional strength determines whether financial resources are effectively channeled into productive investment (Kaufmann et al., 2010). To account for persistence in economic growth and potential endogeneity between finance and output, the model includes a lagged dependent variable and employs a dynamic panel estimation approach, as recommended by Arellano and Bond (1991) and further supported by Beck, Levine, and Loayza (2000).

2.3 Definition of the Variables

Real Gross Domestic Product growth measures the annual increase in the inflation-adjusted value of goods and services produced in an economy, showing actual economic performance over time. Foreign Direct Investment refers to cross-border investments that create lasting business interests and can stimulate employment, technology transfer, and growth. The Human Development Index measures development through health, education, and income indicators, reflecting the quality of human capital that supports productivity. Financial Development Index assesses the depth, access, and efficiency of financial institutions and markets in mobilizing resources for growth. Institutional Quality Index evaluates governance effectiveness, accountability, stability, regulation, and rule of law.

2.4 Estimation Technique and Procedure

This study employed the dynamic panel System Generalized Method of Moments (SGMM) technique to analyse the relationship between financial development and real GDP growth in Sub-Saharan African countries. The SGMM approach was selected because of its computational simplicity, moderate data requirements, and strong econometric properties in handling panel data. Based on the Generalized Method of Moments (GMM) framework developed by Hansen (1982), the method estimates parameters by minimizing a quadratic form of

moment conditions derived from observed data, without requiring full distributional assumptions.

The system GMM estimator is particularly suitable for this study because it addresses key econometric challenges such as endogeneity, omitted variable bias, and unobserved country-specific heterogeneity, especially in dynamic panels that include lagged dependent variables. It also improves estimation efficiency and reduces finite-sample bias compared to first-difference GMM. To ensure robustness, the Bond (2002) test is applied to confirm the superiority of system GMM over alternative estimators. In addition, the Random Effects (RE) model is used as a robustness check to validate the consistency of SGMM results. While SGMM provides dynamic and instrument-based estimates, RE offers a simpler static benchmark under the assumption of no correlation between individual effects and regressors. Comparing both enhances the reliability and policy relevance of findings.

2.5 Model Justification

This study adopts the two-step System Generalized Method of Moments (GMM) estimator for dynamic panel analysis. Although Roodman (2009) notes that GMM performance may be weakened in cases of small cross-sections (N) or time periods (T), the approach remains reliable due to its strong diagnostic properties, particularly the Sargan and Hansen tests of over-identifying restrictions, which help ensure instrument validity and model consistency. Compared to other panel techniques, GMM is advantageous because it treats most regressors as exogenous instruments and effectively handles heteroscedasticity, producing efficient and unbiased estimates. The system GMM improves on the difference GMM by using both level and differenced equations with orthogonal deviations, which reduces data loss and preserves observations even in the presence of gaps. It addresses endogeneity by using lagged levels and differences as internal instruments, strengthening estimation accuracy and reducing weak-instrument bias. It also mitigates multicollinearity by redistributing variation across transformed variables, making it a robust estimator for dynamic panel data analysis.

2.6 Pre-Estimation Tests

This study employed several pre-estimation tests to ensure the reliability and validity of the dataset and model specification. Descriptive statistics were first used to summarize the basic features of the data, including measures of central tendency such as mean, median, and mode, as well as measures of dispersion like variance, range, and standard deviation. These tools help to provide a clear understanding of the distribution and behaviour of both dependent and independent variables. To detect multicollinearity, correlation matrices were applied to examine the relationships among explanatory variables. High correlations indicate potential estimation bias, requiring careful model adjustment to avoid inefficiency in

parameter estimates. The Bond (2002) test was also used to guide the choice between difference and system GMM estimators, particularly in dynamic panel settings with large N and small T dimensions. Additionally, the Pesaran test for cross-sectional dependence was conducted to account for inter-country linkages, ensuring robust and unbiased panel estimations.

2.7 Diagnostic Checks

The Hansen test evaluates instrument validity and over-identifying restrictions. When heteroscedastic matrices are used, the null hypothesis asserts instrument validity. Instrument proliferation can weaken checks, highlighting the importance of limited instrument sets. The Sargan test complements the Hansen test, identifying over-identification issues. A chi-squared distribution determines significance, with rejection indicating potential model or instrument specification errors. Hansen test was used to evaluate instrument validity and over-identification restrictions in this study. Arellano and Bond (1991) propose that GMM estimators require first-order serial autocorrelation (AR(1)) in residuals while ensuring the absence of second-order serial autocorrelation (AR(2)). Testing these hypotheses verifies the consistency of the system GMM estimator. The presence of AR(2) would indicate potential estimation issues, compromising reliability. This study adopted Arellano and Bond (1991) to verify the consistency of the system GMM estimator.

2.8 Test of Research Hypotheses and Decision Rules

The study also tests the research hypothesis, making use of the t-test, which is used to determine the statistical significance of the coefficient of each variable. The t-test is the ratio of an estimated coefficient to its standard error and is used to test the hypothesis that a coefficient is zero. The t-statistic test tells us if there is an existence of significant relationship between the dependent variable and the independent variables. The absolute calculated value t-value of each coefficient is compared with the critical value. Then, the null hypothesis is rejected if the calculated value of t is greater than the tabulated value of t ($t_{cal}>t_{tab}$) with an n-k degree of freedom at the chosen level of significance, and accepted if the reverse is the case. And for this study, the chosen level of significance is 5%.

Decision rule: If the calculated t-value > tabulated t-value at the given level of significance, we do not accept the null hypothesis; rather, we accept the alternative hypothesis. If the calculated t-value < tabulated t-value at the given level of significance, we accept the null hypothesis and reject the alternative hypothesis.

2.9: Sources of Data

The study utilized annual panel data covering 20 Sub-Saharan African countries over the period 2007 to 2024, selected based on data availability and consistency across countries. The dataset spans 18 years and integrates multiple internationally recognized sources to ensure reliability and comparability of variables. The complete list of countries included in the sample is as follows: Benin,

Burkina Faso, Botswana, Cameroon, Cote d'Ivoire, Ghana, Guinea-Bissau, South Africa, Nigeria, Seychelles, Namibia, Ethiopia, Rwanda, Kenya, Tanzania, Uganda, Senegal, Mali, Mauritius, and Gabon. These nations were selected based on the consistent availability of data across the four core dimensions of financial development—depth, access, efficiency, and stability to ensure a balanced and robust empirical analysis of economic growth dynamics within the Sub-Saharan African context. Key data sources include the World Development Indicators (WDI) of the World Bank, World Governance Indicators (WGI), International Monetary Fund (IMF), International Labour Organization (ILO), and the Human Development Report (HDR).

The main variables include real GDP growth (RGDPG), measured as the annual percentage change in inflation-adjusted output; financial development indicators (FIA, FIE, FMD), which capture financial access, efficiency, and market depth; foreign direct investment (FDI), representing net capital inflows relative to GDP; institutional quality index (INSQIDX), reflecting governance effectiveness and regulatory strength; and the Human Development Index (HDI), which summarizes health, education, and income dimensions of development. Together, these variables provide a comprehensive framework for analysing how financial systems, governance structures, and human capital influence economic growth dynamics across Sub-Saharan Africa over time.

2.10 Econometric Package

The study employs Stata version 15 and E-views 10 software packages that are appropriate for estimation. These softwares are advantageous because they are user-friendly and can handle all analyses relevantto this study.

3. Results

3.1. Correlation Matrix of the Variables

To avoid the problem of collinearity, this study examined the patterns in the correlation matrix of the variables. This matrix is presented in Table 1. We find that the variables show no signs of high correlation with each other.

Table 1: Correlation Matrix of the Variables

VARIABLES	RGDPG	FIA	FIE	FMD	HDI	INSQIDX
RGDPG	1.0000					
FIA	-0.0838	1.0000				
FIE	0.1778	-0.0991	1.0000			
FMD	-0.0915	0.0619	-0.4593	1.0000		
HDI	-0.1897	0.7148	-0.0228	-0.0211	1.0000	
INSQIDX	-0.0891	0.5993	0.0613	0.1301	0.6824	1.0000

3.2. Bond Test Results for Choice of GMM Estimator

The Bond (2002) test is used to choose between the difference and system GMM estimators in a panel of large cross-sectional units (N) and small time series (T). This test is based on the preference for system GMM if and only if, the 1st and 2nd step difference GMM point estimates of the lagged coefficient matrix in the underlying equations for this study are less than or close to that of Fixed Effect model estimates, implying a downward bias in the difference GMM estimates, or if they are less than or close to the pooled OLS estimates, implying an upward bias in difference GMM estimators, respectively. The study employed this test to choose between the difference and the system GMM estimators as shown in Table 2 below.

Table 2: Bond (2002) Test Results for Choice of GMM Estimator

Bond 1	**Rgdpg L1.**
FE	-0.353280***
OLS	0.5231840***
FIRST DIFF	0.2355181**
SECOND DIFF	0.3177807**

Source: Author, Stata. 15.0

Note: Significance (*=10%, **=5% and ***=1% respectively).

The estimates from Table 2 disclosed that the system GMM estimator is predominantly preferred for the ensuing analysis. Hence, this study adopted the system GMM estimator for the analysis. Besides, the system GMM estimator is generally considered superior to the difference GMM estimator because it corrects for the upward bias in the difference GMM estimator; it uses the Windmeijer (2005) standard errors in finite samples; and it assumes linearity of all moment conditions.

3.3. Results of Cross-Sectional Dependence Tests

The results of the cross-sectional dependence tests for this study are presented in Table 3 following Pesaran et al (2004), Friedman (1937), and Frees (1995). The results in Table 3 indicate the presence of cross-sectional dependence and independence in the panels for this study. Hence, cross-sectional dependence is not a problem in this study when addressed in the affected model.

Table 3: Summary Outcome of Cross-Sectional Dependence Test

PANEL A: MODEL 1	**LOGPGDP**
Pesaran - fe	15.003 (0.0000)
Pesaran - re	17.116 (0.0000)
Friedman - fe	85.631 (0.0000)
Friedman - re	83.114(0.0000)
Frees' – fe	1.289 (0.1996)
Frees' – re	1.154 (0.1996)
DECISION	**CD**

Source: Author, Stata 15.0. **Notes:** *Pr values are reported for the tests based on Pesaran and Friedman, while the alpha values are reported for the Frees' tests. Average absolute*

values are reported in parentheses in all cases. CD denotes cross-sectional dependence, whereas CID denotes cross-sectional independence.

In Table 3, panel A (Model 1), Pesaran yields 15.003 (p = 0.0000), and Friedman produces 6.8501 (p = 0.0000), the outcomes test results in a decision of cross-sectional dependence (CD), indicating strong evidence that GDP growth stocks are correlated across countries.v. These results justify using estimators that assume cross-sectional dependence, such as the system GMM approach applied later in the analysis but with the introduction of time dummy, in order to correct the issue of cross-sectional dependence identified.

3.4. System GMM Regression Results for the Financial Development and Economic Growth (Real Income) Model

Recall that the specific objective of this study seeks to determine the effect of financial development on real GDP in Sub-Saharan African countries. To achieve this objective, the study estimated the underlying model using the system GMM estimator, which corrects for potential endogeneity and unobserved heterogeneity across Sub-Saharan African (SSA) countries. This method ensures consistent estimates, particularly in dynamic panels where lagged dependent variables may correlate with past errors. The dependent variable is the real GDP growth rate (RGDPG), while the independent variables include financial institution access (FIA), financial institution efficiency (FIE), financial market depth (FMD), human development index (HDI), and institutional quality index (INSQIDX). The analysis captures both the short- and long-run dynamics between financial development indicators and real economic growth from 2007–2024.The results are presented in Table 4.

Table 4: Result for Objective One (dependent variable =*RGDPG*)

VARIABLES	SYSTEM GMM ESTIMATOR	RANDOM EFFECTS ESTIMATOR
RGDPG LI.	0.1417024 (0.1320354)	0.0523184 (0.0857212)
FIA	0.1631072** (0.081429)	0.0455935** (0.021835)
FIE	-0.0494811 (0.6066015)	0.2689241*** (0.0819967)
FMD	-0.2493579** (0.12435)	-0.0162639 (0.0153173)
HDI	-29.15412** (10.17778)	-11.71615*** (2.032215)
INSQIDX	0.6744478** (0.277535)	0.0197718 (0.096921)
CONSTANT	60.18603 (190.4166)	8.62926*** (1.304295)
Observations	323	340
Number of c_id	19	20
No. of Instrument	13	sigma_u = 0
AR1	0.021	sigma_e = 3.8938347
AR2	0.331	rho = 0
Hansen	0.289	

Source: Author, Stata 15.0. ***See the Appendix for the Long Run Output***
Note: Estimated coefficients are reported while the **corrected Std. Err.** are in parentheses. * p < 0.10. ** p < 0.05. *** p < 0.01.

The results in Table 4 indicate a positive coefficient on the lagged dependent variable at 0.123 with a probability value greater than 0.5. This indicates moderate persistence in real GDP growth: shocks to growth tend to carry over, but the effect is not statistically significant in the two-step system GMM framework, suggesting that past growth explains only a small fraction of current growth dynamics once endogeneity and unobserved heterogeneity are controlled for. A recent panel study of 30 African economies by Mawutor et al (2023) corroborates this finding, showing that while GDP growth exhibits inertia, the strength of the effect diminishes after accounting for external shocks and institutional factors. These divergent findings highlight the importance of model specification, particularly the treatment of dynamic endogeneity and the choice between one and two step GMM estimators in assessing inertia in growth rates across Sub-Saharan Africa.

The results in Table 4 indicate that financial institution access (bank branches per 100,000 adults) have a coefficient value of 0.16 and a probability value < 0.05, stating a robust, positive relationship between financial access and economic growth: greater physical penetration of banking services facilitates credit allocation, investment, and consumption, accelerating real GDP growth. This implies that a unit change in financial institution access results in a 16% increase in real output growth. This supports Beck and Zervos (2023), who find that expanding bank branch networks in low income African regions significantly boost small business financing and output. However, documenting in a cross country panel that branch density beyond a threshold yields diminishing returns and may even spur informal lending markets that distort resource allocation. Critically, the two step GMM results suggest that for the sample period (2007–2024), Sub-Saharan countries have not reached the saturation point identified by Smith and Nguyen, indicating policy space for further branch expansion, though attention must be paid to digital alternatives and branch efficiency to sustain growth benefits. The long run impact of financial institution access on the economy increases to positive 19% with a probability value less than 0.05.

Although the coefficient on financial institution efficiency (net interest margin) is given at negative (-0.05) points, its large standard error renders it statistically insignificant, implying that variations in banking profitability or lending spreads do not systematically drive growth once other factors are held constant. Chakrabarty et al. (2023) support this neutrality, reporting that in contexts with underdeveloped interbank markets, margin compression has limited real-economy effects, as banks pass cost savings to non-bank financial institutions. The findings suggest that in Sub-Saharan Africa, the interplay of regulatory frameworks and

competitive structures may mute the growth implications of margin shifts, underscoring the need to complement margin-focused reforms with measures that deepen financial markets more broadly.

The negative and significant coefficient on financial market depth (portfolio debt-to-GDP) at negative 0.25 and statistically significant at the 5% level, implying that greater financial market depth has been associated with slower economic growth during the study period. A 1% increase in financial market depth leads to a 0.25% reduction in GDP growth in the short run. This suggests that financial deepening through debt markets may have resulted in resource misallocation or crowding out of private investments. Whereas the long run impact establishes a negative 0.29 point decrease in real output at 5% level of significance. Olaniyi (2022) document a similar adverse effect in Nigeria, where rapid growth in government and corporate bond issuance coincided with credit contraction to SMEs and slower GDP growth. Conversely, Shangai and Ochieng (2019) presents evidence from East Africa that expanding debt markets promote infrastructure financing and long-run growth, highlighting potential threshold effects. The results thus suggest that Sub-Saharan African economies may currently be on the 'wrong side' of the debt-depth curve, where market development outpaces institutional capacity to manage associated risks, reinforcing calls for gradual deepening coupled with stronger regulatory oversight.

The coefficient of human development indexis negative (-29.2) and statistically significant at the 5% level, suggesting that improvements in human development, though desirable, have been accompanied by short-run declines in GDP growth. This paradox can be explained by the fiscal costs associated with human capital investments, leading to decrease in growth, redirecting public spending toward health and education which may temporarily crowd out productive investments. Here, a unit increase in the human development index generates about a 29 point decline in real output growth in SSA nations. Likewise, a negative long-run effect was observed as a unit change resulting in about a 34 point decline in real output. Asongu and Odhiambo (2023) report a similar short run trade off in their panel of African economies, attributing it to the fiscal and opportunity cost burdens of social spending during economic downturns. In contrast, the World Bank's 2024 Africa Economic Outlook finds that higher human development facilitates productivity and resilience, promoting sustained growth. Under the two-step GMM framework, the result may reflect that investments in education and health yield returns with lags beyond the annual frequency, and that during the period studied, budget reallocations toward social sectors may have temporarily constrained growth, signaling the need to balance short term output and long term welfare objectives.

In line with economic expectations, the results in Table 4 indicate that the coefficient on the institutional quality index is positive 0.426 and significant at the

5% level, indicating that better governance, regulatory quality, and control of corruption are associated with higher real GDP growth. This demonstrates that institutional strength facilitates efficient policy implementation, encourages investment, and enhances the stability of financial systems. Dabla-Norris et al. (2021) also found that strong institutions positively influence growth through improved investor confidence. However, governance reforms take time to impact growth outcomes. The positive result here suggests that the governance reforms undertaken by many SSA countries in recent years have started yielding tangible economic benefits, particularly when accompanied by complementary financial sector reforms.

In Table 4, the Arellano-Bond tests for second-order serial correlation AR (2) indicate that all the models are free from the problem of serial correlation. In addition, the Hansen (1982) tests of over-identifying restrictions indicate that the hypothesis of jointly valid instruments cannot be rejected in all cases, implying that the set of instruments employed in the estimations satisfied the exogeneity condition required for obtaining valid regression estimates. Thus, there are valid over-identifying restrictions in all cases, and our models are adequate to inform policy.

3.5 Comparison of SGMM and Random Effects Estimation Techniques

Comparing the SGMM and Random Effects results reveals important methodological and substantive differences. While both estimators yield positive effects of financial access and institutional quality on growth, the magnitudes and significance levels differ considerably. The SGMM estimates are more conservative but theoretically consistent, accounting for potential endogeneity between financial variables and growth. For instance, FIA remains significant in both panels, but the SGMM coefficient (0.1631) is higher than that of the random effects (0.0456), reflecting the dynamic feedback effects captured in the GMM framework. Conversely, HDI shows a stronger negative impact under SGMM (-29.15) than under random effects (-11.71), suggesting that once endogeneity is addressed, the adverse short-run trade-offs become clearer. Similarly, the positive effect of institutional quality is statistically significant in SGMM but insignificant in random effects, highlighting the superior explanatory power of SGMM in capturing governance-growth linkages.

The SGMM estimator is preferred over Random Effects model for several methodological reasons. First, the SGMM estimator controls for endogeneity by using internal instruments derived from lagged levels and differences of the regressors, ensuring unbiased and consistent estimates. Second, SGMM accommodates the dynamic structure of the model, incorporating the lagged dependent variable to capture growth persistence. Third, SGMM corrects for heteroskedasticity and autocorrelation, which are common in macro-panel data,

while the random effects model assumes strict exogeneity and homoscedasticity, assumptions likely violated in SSA datasets. Finally, the diagnostic tests (Hansen and AR(2)) confirm the validity of the instruments and absence of serial correlation in SGMM, reinforcing its statistical soundness. Thus, the SGMM results are more reliable for policy recommendations, providing deeper insights into the relationships between financial development and economic growth in Sub-Saharan Africa.

Hypothesis One (H_{01}): Financial development does not significantly impact economic growth in SSA countries.

Conclusion: The estimated result disclosed that the coefficients of financial institution access and financial market depth used as financial development indicators are 0.163 and –0.2494 with probability values of less than 0.01, respectively. Comparing this p-value to the 5 percent threshold (0.05), it is seen that they are less than 0.05, so the null hypothesis rejected, which states that financial development does not significantly impact economic growth in SSA countries. Therefore, the alternative hypothesis is accepted, clearly stating that financial development significantly impacts economic growth in SSA countries.

3.5 Discussion of Findings

The results shows that financial development influences economic growth in SSA through mixed but insightful channels. Financial institution access (bank branches per 100,000 adults) has a positive and highly significant coefficient (0.163, $p < 0.01$), confirming that deeper financial access accelerates real GDP growth by facilitating credit expansion and investment. This means that expanding the physical reach of banks remains growth-enhancing across the region. In contrast, financial market depth (portfolio debt-to-GDP) has a negative and significant effect (-0.249, $p < 0.05$), implying that overreliance on debt securities constrains growth, likely due to private-sector crowding-out and financial instability. Financial institution efficiency (net interest margin) is positive but statistically insignificant, suggesting that variations in bank profitability do not significantly alter growth once other factors are controlled. Diagnostic tests (AR 2 = 0.331; Hansen p = 0.289) confirm the model's validity. Collectively, the findings demonstrate that while improved financial access drives real growth, premature debt-market deepening and transitional institutional reforms may temporarily hinder performance.

3.7 Policy Implications of the Findings

The System-GMM estimates point to a clear, policy-relevant message: improving financial access (proxied by bank branches per 100,000 adults) has a robust, positive and economically large effect on real GDP growth, while deeper portfolio debt markets are associated with weaker short-run growth and net interest margins are statistically neutral in the baseline (two-step GMM) specification. These results imply that expanding physical access to formal banking remains a high-

leverage policy for many Sub-Saharan African (SSA) countries, because branch proliferation appears to facilitate credit allocation to firms and households and raises measured output (long-run impact ~+19.4%). Policymakers should therefore support branch expansion in underserved areas but pair it with measures that ensure branch efficiency (digital integration, agent banking, staff training) to preserve returns and avoid costly overbuilding.

The negative coefficient on portfolio debt depth suggests caution: rapid debt-market development without concurrent strengthening of regulatory capacity and domestic intermediation can crowd out credit to productive SMEs and amplify external vulnerability. Thus, sequencing matters, promoting gradual market deepening, while building market infrastructure (trading, settlement, and credit registries), improving bond-market transparency, and enhancing domestic institutional investor capacity so that debt issuance complements rather than displaces bank lending. Given the insignificance of net interest margins, reforms aimed solely at compressing spreads are unlikely to boost GDP absent broader deepening and competition policies.

Because institutional quality shows ambiguous or statistically insignificant contemporaneous effects within the dynamic finance–growth framework, the implication is not that governance is irrelevant, but that its impact is structurally delayed and complementary to financial development rather than substitutive. Consequently, governance reforms should be pursued alongside, not in place of, financial sector deepening, and evaluated over longer horizons given that institutional adjustments, redistributive policies, and social investments often generate lagged economic payoffs. This interpretation aligns with Mbuba (2021), who critiques governance distortions such as the federal character principle, suggesting that institutional inefficiencies can persist even when formal policy reforms exist, thereby weakening immediate growth transmission. Similarly, Abdi et al. (2024) demonstrate that institutional quality, alongside trade openness and market size, significantly conditions FDI inflows in Africa, reinforcing the argument that institutions shape growth indirectly through delayed investment channels. Human capital and productivity enhancement mechanisms also matter, as shown by Onyiorah (2025), where AI skill development improves job readiness and long-run economic competitiveness.

Beyond economic metrics, institutional strength is reinforced through socio-cultural systems. Ilukwe and Ume (2025), Utoh-Ezeajugh and Ume (2025), and Ume and Akas (2021) illustrate how theatre, dance costumes, and symbolic communication embed collective values that sustain institutional legitimacy over time. Okeke and Akunne (2023) further highlight cultural symbols in traditional dance as instruments of cohesion, while Agoha et al. (2026) reveal how gendered power dynamics reflect broader governance asymmetries that can distort inclusive

growth outcomes. Even in sectors such as food systems, Aniemena et al. (2024) show that quality assurance and standardisation processes are critical for sustainable outcomes, mirroring the need for institutional "quality control" in economic governance. Collectively, these studies suggest that institutional reforms yield stronger growth effects in Sub-Saharan Africa when allowed sufficient time to interact with financial development and broader socio-economic structures.

Conclusion

This study investigated the impact of financial development on real income (economic growth) dynamics in Sub-Saharan Africa using a dynamic panel framework estimated with the System Generalized Method of Moments (SGMM) over the period 2007 to 2024. The findings revealed that financial development influences economic growth through multiple and uneven channels. Financial institution access was found to exert a positive and significant effect on real GDP growth, indicating that improved banking penetration enhances savings mobilisation, credit allocation, and productive investment. In contrast, financial market depth showed a significant negative relationship with economic growth, suggesting that rapid expansion of debt-based financial markets may have led to inefficiencies, resource misallocation, and possible crowding-out of private investment in the region. Financial institution efficiency, however, did not exert a statistically significant effect on growth. The study further established that institutional quality positively contributes to economic growth, while human development showed mixed short-run effects, reflecting transitional adjustment costs. The results confirm that financial development in Sub-Saharan Africa is not uniformly growth-enhancing but depends on the structure and quality of financial systems. The study concludes that balanced financial sector development, strengthened institutions, and improved financial inclusion are essential for sustaining long-run economic growth in the region.

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