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UNRAVELLING THE GROWTH NEXUS: HOW FINANCIAL DEVELOPMENT FUELS ECONOMIC EXPANSION IN SUB-SAHARAN AFRICA (1990 – 2020)

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Abstract

This study investigates the impact of financial development on economic growth in Sub-Saharan Africa from 1990 to 2020. Secondary data from 10 Sub-Sahara African countries were obtained from world development indicators (WDI), comprehensive environmental information collection (CEIC) and world governance indicators (WGI) and analysed using the panel PMG / ARDL estimation technique. Economic growth was the dependent variable captured by the real GDP per capita growth rate (GDPGR). The independent variables were financial development (captured by Broad money, Credit to private sectors, stock market capitalisation and stock traded), gross fixed capital formation, population growth rate, institutional quality, government expenditures and trade openness. Findings revealed that certain financial development indicators, like credit to the private sector (CPS) and stock traded (STED), positively impacted economic growth (GDPGR) while other indicators, such as broad money supply (BM) and stock market capitalization (MCAP), had a negative effect on growth during the same period. The study recommends the strengthening of financial regulations, the promotion of private credit to the private sector, the reformation of stock markets, the encouragement of active stock trading, the improvement of institutional quality, and the adoption of FinTech solutions.

Keywords: Financial Development, Financial System, Economic Growth, ARDL.

1. INTRODUCTION

Economic growth is essential for raising living standards and promoting national prosperity. Significant increases in the labour force, capital, trade volume, and per capita output or income are all part of it (Usman & Adeyinka, 2019). Financial development is essential for enabling investment and channelling savings from savers to investors (Shaheen et al., 2019). There is disagreement over the relationship between financial

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development and economic growth; some see it as responsive to demands from the real sector (Lucas, 2019), while others see it as a growth engine (Levine, 2020).

Despite its resources, Sub-Saharan Africa (SSA) suffers from issues like poverty and undeveloped financial systems (Leke et al., 2019). With some of the fastest-growing economies, Sub-Saharan Africa (SSA) grows at a varying rate, influenced by countries such as Nigeria, Angola, and South Africa (Abebe, 2019). A robust economy with a sophisticated financial system and efficient public financial management are necessary for maintaining growth (IMF, 2019). SSA's financial sector has historically been shallow and inefficient, prioritising foreign trade financing. Growth and efficiency have been the goals of post-independence reforms, but their results have been uneven (Moyo et al., 2017). According to recent studies, a healthy financial system is essential for SSA's economy to flourish since it can encourage savings and investment (Mlachila et al., 2019).

According to Pellettier (2016), policymaking, poverty alleviation, and growth are impeded by the underdeveloped financial systems in Sub-Saharan Africa. Inefficiency, poor interaction between financial institutions and markets, and restricted access to financial services aggravate these problems. North (2019) argues that promoting investment and growth needs strong institutions that uphold property rights and enforce contracts. Changes to increase efficiency and openness may be required to support financial development in Sub-Saharan Africa (SSA) due to institutional influences that are cultural, political, and economic.

There is ongoing debate over the theoretical and empirical relationship between financial development and economic growth. According to recent research, excessive financial development may hinder economic growth by taking resources away from the real economy (Cecchetti & Kharroubi, 2019). Due to its multifaceted structure, which includes the depth, accessibility, stability, and efficiency of financial institutions and markets, accurately assessing financial development is difficult (Cihak et al., 2020). Several empirical research employs single financial development measurements, which may result in misestimation. To precisely capture the effects of financial development on economic growth in SSA, this study uses a multidimensional approach. Resolving issues in the financial sector of SSA is essential to long-term economic expansion. Realising the region's economic potential and promoting financial development require customised policies that take into account its particular circumstances.

2. LITERATURE REVIEW

2.1 Theoretical Framework: Endogenous Growth Model

In the endogenous growth model, internal forces are emphasised as essential drivers of economic growth, and this relationship between financial development and economic growth is firmly rooted. By efficiently allocating capital, financial intermediaries play a crucial role in supporting investment in productive ventures and resource distribution (Levine, 1997; Bencivenga & Smith, 1991). Bencivenga & Smith, 1991; Greenwood &

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Jovanovic, 1990) state that a strong financial system that finances R&D and entrepreneurial endeavours is a prerequisite for technological innovation. Investments in high-risk, high-return initiatives are encouraged by financial markets, which also help to diversify risk (Saint-Paul, 1992; Obstfeld, 1994). Financial institutions also improve resource allocation and production by reducing information asymmetries (King & Levine, 1993; Aghion, Howitt, & Mayer-Foulkes, 2005). These theoretical revelations highlight the vital role that financial development plays in maintaining long-term economic growth through mechanisms including information sharing, capital allocation, innovation, and risk management.

2.2 Empirical Evidence

In Sub-Saharan Africa (SSA), empirical research frequently demonstrates a positive relationship between financial development and economic growth. Ibrahim and Sare (2018) revealed that, particularly in regions with high financial inclusion, financial development significantly boosts economic growth in Sub-Saharan Africa. According to Asongu and Odhiambo (2021), financial development has a positive impact on economic growth, especially when it comes to domestic savings and loans to the private sector. Research conducted by Saci, Giorgioni, and Holden (2009) demonstrated that financial development, whether market- or bank-based, has a positive effect on economic growth in developing countries such as those in Sub-Saharan Africa. Financial development has a positive effect on economic growth, and its impacts are greater in countries with strong institutional frameworks, (Adu, Marbuah, & Mensah, 2020). Akinlo and Egbetunde (2010) demonstrated the positive impact of financial development on economic growth over the short and long term in selected SSA countries using the ARDL model. Ghosh and Phillips (2021) supported the positive impact in SSA by highlighting the significance of financial development in boosting productivity and growth across multiple industries.

Nonetheless, certain research indicates an ambiguous or negative relationship between financial development and economic growth. Law, Singh, and Sahut (2020) contended that institutional quality and governance have a major role in the advantages of financial development. According to Bist (2020), financial instability and weak regulatory environments might counteract the growth-promoting benefits of financial development. Rioja and Valev (2021) emphasised that there are declining returns in more advanced financial systems, indicating that the relationship between growth and financial development varies with the financial development level. Evidence of a weak financial development-growth nexus in Sub-Saharan Africa (SSA) was illustrated by Nyasha and Odhiambo (2019), indicating that the benefits of growth are limited by underdeveloped financial systems. Fowowe (2019) highlighted that for financial development to have a major impact on economic growth, complementing reforms in institutions and governance is required. The effects of financial development on growth vary greatly throughout industries and phases of economic development, as demonstrated by Rousseau and Wachtel (2021).

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3. DATA, MODEL AND METHODOLOGY

3.1 Data

The *ex post facto* research design was employed for this study using secondary data obtained from the World Development Indicators (WDI), Comprehensive Environmental Information Collection (CEIC) and World Governance Indicators (WGI) for the period 1990 to 2020. Ten Sub-Sahara African countries selected include South Africa, Mauritius, Nigeria, Kenya, Namibia, Ghana, Tanzania, Zimbabwe, Zambia, and Eswatini. The base years and countries selected were based on data availability.

3.2 Empirical Model

The endogenous growth theory, which is the framework of this study, holds that internal variables including financial development, human capital, and innovation are what propel economic growth (Romer, 1986; Lucas, 1988). In line with this idea, a healthy financial system fosters innovation and effectively allocates resources, both of which are necessary for long-term economic growth (King & Levine, 1993a; 1993b). In Sub-Saharan Africa, we use the following empirical model to examine the relationship between financial development and economic growth:

$$GDPGR_{it} = \alpha_i + \beta_1 BM_{it} + \beta_2 CPS_{it} + \beta_3 MCAP_{it} + \beta_4 STED_{it} + \beta_5 GFCF_{it} + \beta_6 POPGR_{it} + \beta_7 IQ_{it} + \beta_8 GOVEXP_{it} + \beta_9 TRD_{it} + \varepsilon_{it} \quad (1)$$

Where: *GDPGR* represents real GDP growth rate used as a proxy for economic growth; *BM, CPS, MCAP* and *STED* represent broad money, credit to private sector, market capitalisation and stock traded respectively used as proxies for financial development; *GFCF* represents gross fixed capital formation; *POPGR* represents population growth rate; *IQ* represents institutional quality; *GOVEXP* represents government expenditure; *TRD* represents trade openness; α_i represents country-specific fixed effects, accounting for unique, unobserved factors in each country; β_1 to β_7 are the coefficients representing the effect of each independent variable on economic growth; and ε_{it} represents the error term which captures the unobserved factors and random variations.

According to this concept, financial development enhances capital allocation and promotes innovation, which in turn boosts economic growth. Trade openness and institutional quality are further factors that affect this relationship.

3.2 Estimation technique

Using a Panel Autoregressive Distributed Lag (ARDL) model with Pooled Mean Group (PMG) estimation, this study examines the short-run and long-run relationships between financial development and economic growth in Sub-Saharan African countries. Given the diversity of economic structures in the region, the PMG estimator, as proposed by Pesaran, Shin, and Smith (1999), is appropriate since it assumes homogeneous long-run coefficients while permitting heterogeneous short-run dynamics across countries.

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The model is specified as follows:

$$GDPGR_{it} = \sum_{j=1}^{p} \lambda_{ij} GDPGR_{i,t-j} + \sum_{j=0}^{q} \beta_{ij} X_{i,t-j} + \mu_{it} + \varepsilon_{it} \quad (2)$$

Where: $GDPGR_{it}$ is the real GDP growth rate for country ***i*** at time ***t***; X_{it} is a vector of independent variables including Broad Money (BM), Credit to Private Sector (CPS), Market Capitalisation (MCAP), Stocks Traded (STED), Gross Fixed Capital Formation (GFCF), Population Growth Rate (POPGR), Institutional Quality (IQ), Government Expenditure (GOVEXP), and Trade Openness (TRD); λ_{ij} represents the coefficients of the lagged dependent variable; β_{ij} represents the coefficients of the lagged independent variables; μ_{it} denotes the country-specific effects; ε_{it} is the error term.

The PMG-ARDL model assumes the following long-run relationship:

$$GDPGR_{it} = \theta_0 + \theta_1 BM_{it} + \theta_2 CPS_{it} + \theta_3 MCAP_{it} + \theta_4 STED_{it} + \theta_5 GFCF_{it} + \theta_6 POPGR_{it} + \theta_7 IQ_{it} + \theta_8 GOVEXP_{it} + \theta_9 TRD_{it} + \eta_{it} \quad (3)$$

Where: θ_1 to θ_9 are the long-run coefficients of the independent variables.

The error correction model, capturing the short-run dynamics, is given by:

$$\Delta GDPGR_{it} = \emptyset_i \big(GDPGR_{i,t-1} - \theta_0 - \theta_1 BM_{i,t-1} - \theta_2 CPS_{i,t-1} - \theta_3 MCAP_{i,t-1} - \theta_4 STED_{i,t-1} - \theta_5 GFCF_{i,t-1} - \theta_6 POPGR_{i,t-1} - \theta_7 IQ_{i,t-1} - \theta_8 GOVEXP_{i,t-1} - \theta_9 TRD_{i,t-1} \big) + \sum_{j=1}^{p-1} \lambda_{ij} \Delta GDPGR_{i,t-j} + \sum_{j=0}^{q-1} \beta_{ij} \Delta X_{i,t-j} + \varepsilon_{it} \quad (4)$$

Where: $\emptyset_i$ is the speed of adjustment coefficient, indicating how quickly the economy returns to its long-run equilibrium after a shock.

The effects of financial development (measured by BM, CPS, MCAP, and STED), investment (GFCF), population growth (POPGR), institutional quality (IQ), government spending (GOVEXP), and trade openness (TRD) on the region's economic growth (GDPGR) is examined with this specification. According to Pesaran et al. (1999), the use of the PMG technique is suitable given the potential heterogeneity in the short-run responses while ensuring a consistent long-run relationship across countries.

4. RESULTS AND DISCUSSION

Descriptive statistic

The descriptive statistics presented in Table 1 provide an initial understanding of the dataset by summarising the basic features of the data, including measures of central tendency and dispersion (Wooldridge, 2010).

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Table 1: Descriptive statistics

	GDPGR	BM	CPS	MCAP	STED	GFCF	POPGR	IQ	GOVEXP	TRD
Mean	1.516965	36.67313	59.55281	40.05665	6.018165	21.55108	2.034422	49.06116	14.86200	65.27127
Maximum	19.93898	156.8433	212.8039	322.7110	124.3686	53.12219	6.094361	168.4020	27.96200	175.7980
Minimum	-18.32350	1.731223	-24.48226	-13.53810	-49.82913	2.000441	-0.017197	5.152532	-8.243667	16.35219
Std. Dev.	4.126035	24.96158	56.56043	63.59620	17.82695	9.185181	0.977978	38.47766	6.520258	28.33888
Skewness	-0.619922	1.736970	1.238105	2.465894	3.272627	0.595525	-0.159332	1.791770	-0.467896	1.204232
Kurtosis	8.581738	6.325216	3.290627	8.958264	16.84400	3.389433	2.830269	5.644030	3.115085	4.670161
Jarque-Bera	422.2847	298.7021	80.29105	772.7194	3028.917	20.28247	1.683747	181.7993	11.48229	110.9559
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000039	0.430902	0.000000	0.003211	0.000000

Source: Authors' construct (2024)

Table 1 provides a clear description of the variables under consideration. We observed that the real GDP growth rate (GDPGR) has a mean of 1.52%, a range from -18.32% to 19.94% and a standard deviation of 4.13%. Broad money (BM) has a mean of 36.67% and ranges from 1.73% to 156.84% with a standard deviation of 24.96%. CPS, MCAP and STED average 59.55%, 40.06% and 6.02% respectively. Similarly, they range from -24.48% to 212.80%, -13.54% to 322.71% and -49.83% to 124.37% respectively. The skewness and kurtosis of the variables which is further backed by the probability value of Jarque-Bera statistics reveal that all the variables except for POPGR are not normally distributed. A thorough econometric analysis is needed, as these results demonstrate a significant degree of variation in the data.

Correlation analysis

Pearson correlation coefficients as presented in **Table 2** are calculated to analyse the linear relationships between the variables in the study, identifying the strength and direction of these relationships (Gujarati & Porter, 2009).

Table 2: Correlation analysis

Variables	GDPGR	BM	CPS	MCAP	STED	GFCF	POPGR	IQ	GOVEXP	TRD
GDPGR	1.000000									
BM	-0.140373	1.000000								
CPS	-0.089711	0.859145	1.000000							
MCAP	-0.232314	0.453216	0.663474	1.000000						
STED	-0.151633	0.319623	0.606622	0.892612	1.000000					
GFCF	0.197472	-0.220115	-0.365258	-0.523174	-0.462348	1.000000				
POPGR	0.089654	-0.620950	-0.582773	-0.395195	-0.299620	0.528491	1.000000			
IQ	0.126218	0.807792	0.654348	0.112053	0.044231	0.016062	-0.543913	1.000000		
GOVEXP	-0.045014	0.435293	0.397220	0.166589	0.148993	-0.164015	-0.423442	0.327265	1.000000	
TRD	0.001746	-0.096435	-0.163156	-0.142143	-0.101522	-0.093427	-0.292551	-0.005116	0.415701	1.000000

Source: Authors' construct (2024)

Table 2 reveals weak negative correlations between GDPGR and financial indicators like BM (-0.14) and MCAP (-0.23) suggesting that financial development is not effectively

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promoting growth in Sub-Saharan Africa. The positive correlation with GFCF (0.20) however highlights the importance of investment in physical capital. Sustainable growth could be enhanced by strengthening the efficiency of the financial market and ensuring that financial development is beneficial to the broader economy.

Unit root tests

Unit root tests as presented in **Table 3** are conducted to test for stationarity of the time series data. Various tests including the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are conducted to determine if differencing is needed (Dickey & Fuller, 1979; Phillips & Perron, 1988).

Table 3: Stationarity test

Variables	Common Unit Root Process		Individual Unit Root Process			Order of Integration
	Levin, Lin & Chu t*	Breitung t-stat	Im, Pesaran & Shin W-stat	ADF – Fisher Chi – square	PP – Fisher Chi – square	
GDPGR	2.08135	1.09129	-10.1444***	123.296***	1074.46***	I(1)
BM	-2.64064***	1.27042	-5.11924***	67.2713***	168.920***	I(1)
CPS	-5.83257***	-6.27147***	-6.75283***	79.4404***	321.940***	I(1)
MCAP	0.00901	-1.18323	-1.80771**	32.4771**	37.2854**	I(0)
STED	-2.52102***	2.56457	-3.46640***	46.7883***	51.3119***	I(0)
GFCF	-6.06282***	-5.63903***	-7.68030***	92.1735***	200.999***	I(1)
POPGR	0.11979	-0.35965	-1.76087**	40.2872***	38.5360***	I(0)
IQ	-6.82427***	-0.22848	-6.82427***	78.5751***	129.322***	I(1)
GOVEXP	-4.41843***	-4.49689***	-6.18235***	73.8991***	183.779***	I(1)
TRD	-7.64776***	-5.34026***	-8.16469***	97.7595***	536.558***	I(1)

Source: Authors' construct (2024)

***,** &* represents 1%, 5% and 10% level of significance

We observe from **Table 3** that the variables are a mix of order zero and order one variable. GDPGR, BM, CPS, GFCF, IQ, GOVEXP and TRD are stationary at first difference (I(1)), meanwhile MCAP, STED and POPGR on the other hand are stationary at levels (I(0)).

Cross-section dependence tests

The presence of correlation between cross-sectional units is analysed in **Table 4** using The Breusch-Pagan (1980) test and Pesaran (2004) CD test. This permits us to account for potential cross-sectional dependence.

Table 4: Cross-Section dependence test

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	198.7035	45	0.0000
Pesaran scaled LM	16.20177		0.0000
Pesaran CD	12.74803		0.0000

Source: Authors' construct using Eviews 10 (2024)

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The Breusch-Pagan LM, Pesaran Scaled LM, and Pesaran CD test results presented in **Table 4** reveal a significant correlation between cross-sectional units as their p-values of 0.0000 fail to accept the null hypothesis of no cross-sectional dependence.

Lag Selection Criteria

The Akaike Information Criterion (AIC) by Akaike (1974) and Schwarz Bayesian Criterion (SC) by Schwarz (1978) as presented in **Table 5**, are used to select the optimal lag length for the model which helps in minimising information loss.

Table 5: Optimal lag selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3960.971	NA	1.07e+19	72.19946	72.44496	72.29904
1	-2847.217	2004.756	1.07e+11	53.76759	56.46807*	54.86292*

Source: Authors' construct using Eviews (2024)

From the results presented in **Table 5,** lag 1 is selected as the optimal lag length for the model based on the Schwarz information criterion (SC).

Cointegration Tests

The existence of a long-run relationship among the variables is tested using the Johansen (1991) and Kao (1999) cointegration tests as presented in **Table 6**.

Table 6: Johansen and kao cointegration tests

a. Johansen Cointegration Test				
Hypothesized No. of CE(s)	**Fisher Stat.* (from trace test)**	**Prob.**	**Fisher Stat.* (from max-eigen test)**	**Prob.**
None	12.48	0.8987	30.90	0.0566
At most 1	1.386	1.0000	167.2	0.0000
At most 2	1008.	0.0000	338.3	0.0000
At most 3	474.8	0.0000	264.8	0.0000
At most 4	320.5	0.0000	153.9	0.0000
At most 5	194.4	0.0000	96.74	0.0000
At most 6	115.7	0.0000	63.17	0.0000
At most 7	66.81	0.0000	50.06	0.0002
At most 8	35.97	0.0155	31.99	0.0434
At most 9	29.44	0.0795	29.44	0.0795
b. Kao Cointegration Test				
			t-Statistic	**Prob.**
ADF			-3.686883	0.0001
Residual variance			16.60111	
HAC variance			6.450056	

Source: Authors' construct using Eviews (2024)

As seen in **Table 6**, the Johansen cointegration test shows the variables are cointegrated with up to 9 equations based on both the Max-Eigen and the Trace tests. The Kao

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cointegration test also reveals the existence of cointegration amongst the variables with a p-value of less than 0.0001 (less than 5%).

Panel PMG/ARDL estimation

According to Pesaran, Shin, and Smith (1999), panel PMG/ARDL is appropriate for non-stationary data and cointegration analysis in panel settings because it takes into account short-term heterogeneity between countries while assuming long-term homogeneity. For heterogeneous panel data, the Autoregressive Distributed Lag (ARDL) framework uses the Panel Mean Group (PMG) estimator to capture both long-run and short-run dynamics (Pesaran, Shin, & Smith, 1999; Pesaran, 2006). The panel ARDL results are presented in **Table 7**.

Table 7: PMG / ARDL estimation result

Dependent Variable: D(GDPGR)					
Method: ARDL					
Dynamic regressors (1 lag, automatic): BM CPS MCAP STED GFCF POPGR IQ GOVEXP TRD					
Fixed regressors: C					
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Coefficient**	**Std. Error**
Long Run Equation			**Short Run Equation**		
			COINTEQ01	-0.616***	0.128778
BM	-0.232***	0.028	D(BM)	0.053	0.137222
CPS	0.040***	0.011	D(CPS)	-0.159**	0.070289
MCAP	-0.030***	0.004	D(MCAP)	0.092	0.083882
STED	0.061***	0.008	D(STED)	11.201	12.54330
GFCF	0.078***	0.015	D(GFCF)	0.116	0.194093
POPGR	-1.804***	0.213	D(POPGR)	5.085*	2.961059
IQ	0.315***	0.021	D(IQ)	-0.005	0.106767
GOVEXP	-0.363***	0.056	D(GOVEXP)	-0.279	0.347096
TRD	0.017**	0.007	D(TRD)	0.011	0.056481
			C	0.047	1.510986

Source: Authors' construct using Eviews 10 (2024)

***, ** &* represents 1%, 5% and 10% level of significance

The PMG / ARDL results presented in **Table 7**, reveal both the long-run and short-run dynamics for GDPGR. We observe that BM, MCAP, POPGR and GOVEXP negatively and significantly affect GDPGR at a 1% level of significance in the long run. A unit increase in BM, MCAP, POPGR and GOVEXP will lead to a fall in GDPGR by -0.232, -0.030, -1.804, and -0.363 respectively. CPS, STED, GFCF, and IQ on the other hand, affect GDPGR positively in the long run at a 1% level of significance with coefficients of 0.040, 0.061, 0.078, and 0.315 respectively. We also observe that TRD positively and significantly affects GDPGR at a 5% level of significance with a coefficient of 0.017. Only CPS and POPGR have significant effects on GDPGR in the short run at 5% and 1% levels of significance respectively where CPS exhibits a negative effect and POPGR exhibits a positive effect with respective coefficients of -0.159 and 5.085. The error correction term

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(COINTEQ01) is significant at 1% with a coefficient of -0.616 which confirms the model's speed of adjustment towards long-run equilibrium.

Granger Causality Test

The Granger causality test presented in **Table 8** evaluates the causal relationships between variables, determining whether one variable can predict the future values of another (Granger, 1969).

Table 8: Granger causality test result

Null Hypothesis:	F-Statistic	P-Value	Remark	Direction
BM does not Granger Cause GDPGR	1.25013	0.2644	No Causality	Unidirectional Causality
GDPGR does not Granger Cause BM	7.50808	0.0065	Causality	
CPS does not Granger Cause GDPGR	0.77483	0.3794	No Causality	Unidirectional Causality
GDPGR does not Granger Cause CPS	14.2973	0.0002	Causality	
MCAP does not Granger Cause GDPGR	3.40887	0.0658	No Causality	Unidirectional Causality
GDPGR does not Granger Cause MCAP	4.25013	0.0401	Causality	
STED does not Granger Cause GDPGR	0.18996	0.6633	No Causality	None
GDPGR does not Granger Cause STED	0.05785	0.8101	No Causality	

Source: Athors' construct using Eviews 10 (2024)

The Granger causality test results presented in **Table 8** reveal a unidirectional causality flowing from GDPGR to BM, CPS and MCAP with probability values of 0.0065, 0.0002 and 0.0401 respectively. We observed that there was no causality between STED and GDPGR. Similarly, causality did not flow from BM, CPS and MCAP to GDPGR.

5. SUMMARY, CONCLUSION AND RECOMMENDATION

SSA's financial systems are among the least developed globally, hindering policy-making, poverty alleviation, and growth (Pelletier, 2016). The empirical and theoretical relationship between financial development and economic growth remains controversial. This study examines the effect of financial development on economic growth in selected Sub-Saharan African countries. Specifically, the study examines the long-run effect of broad money supply on economic growth in selected sub-Saharan African countries, assesses the long-run effect of credit to the private sector on economic growth, examines the long-run effect of stock market capitalisation on economic growth, assesses the long-run effect of stock traded on economic growth, examine the role of institutional quality on economic growth, determine if credit to private sector Granger-cause economic growth, and to ascertain if the amount of stock traded Granger-cause economic growth in selected subsahara African countries. The *ex post facto* research design was used considering secondary data from 10 selected SSA countries for the period 1990 to 2020 obtained from WDI, CEIC and WGI. Economic growth (GDPGR) was the dependent variable while Broad Money (BM), Credit to Private Sector (CPS), Market Capitalisation (MCAP), Stocks Traded (STED), Gross Fixed Capital Formation (GFCF), Population Growth Rate (POPGR), Institutional Quality (IQ), Government Expenditure (GOVEXP), and Trade Openness (TRD) were the independent variables under consideration. BM, CPS, MCAP

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and STED were used as proxies for financial development. Pre-tests such as descriptive statistics revealed the dataset was not normally distributed, the unit root test revealed that the dataset was a mix of stationary and order one variable, the cross-sectional dependency test revealed that the cross-sectional units were dependent and the cointegration tests revealed that the variables had a long-run relationship. The panel PMG / ARDL estimation technique was employed to estimate the long-run and short-run dynamics, while the Granger causality test was employed to estimate the causal relationship among the variables.

The study found that certain financial development indicators, like credit to the private sector (CPS) and stock traded (STED), positively impacted economic growth (GDPGR) from 1990 to 2020. However, other indicators, such as broad money supply (BM) and stock market capitalization (MCAP), had a negative effect on growth during the same period., Institutional quality (IQ) had a positive and significant role on economic growth (GDPGR), Credit to the private sector (CPS) did not Granger-cause economic growth (GDPGR and Stock traded (STED) did not Granger-Cause economic growth (GDPGR) in Sub-Sahara Africa for the period 1990 to 2020.

The study recommends the strengthening of financial regulations to manage money supply, the promotion of private credit to the private sector by reducing barriers, the reformation of stock markets to enhance efficiency and transparency, the encouragement of active stock trading, the improvement of institutional quality by reducing corruption and enhancing public services, and the adoption of FinTech solutions to boost financial sector efficiency and inclusion.

References

1) Adu, G., Marbuah, G., & Mensah, J. T. (2020). Financial Development and Economic Growth in Ghana: Does the Measure of Financial Development Matter? *Review of Development Finance*, 10(1), 17-30.

2) Aghion, P., Howitt, P., & Mayer-Foulkes, D. (2005). The Effect of Financial Development on Convergence: Theory and Evidence. *Quarterly Journal of Economics*, 120(1), 173-222.

3) Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control, 19*(6), 716-723. https://doi.org/10.1109/TAC.1974.1100705

4) Akinlo, A. E., & Egbetunde, T. (2010). Financial Development and Economic Growth: The Experience of 10 Sub-Saharan African Countries Revisited. *The Review of Finance and Banking*, 2(1), 17-28.

5) Asongu, S. A., & Odhiambo, N. M. (2021). Financial Development Thresholds for Financial Globalization: Evidence from Africa. *European Journal of Development Research*, 33(3), 497-520.

6) Bencivenga, V. R., & Smith, B. D. (1991). Financial Intermediation and Endogenous Growth. *The Review of Economic Studies*, 58(2), 195-209.

7) Bist, J. P. (2020). Financial Development and Economic Growth: Evidence from a Panel of 16 African and Non-African Low-Income Countries. *Cogent Economics & Finance*, 8(1), 1729311.

8) Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. *Econometrica, 47*(5), 1287-1294. https://doi.org/10.2307/1911963

ISSN: 1673-064X
E-Publication: Online Open Access
Vol: 67 Issue 09 | 2024
DOI: 10.5281/zenodo.13739927

9) Breusch, T. S., & Pagan, A. R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *Review of Economic Studies, 47*(1), 239-253. https://doi.org/10.2307/2297111

10) Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association, 74*(366), 427-431. https://doi.org/10.2307/2286348

11) Durbin, J., & Watson, G. S. (1951). Testing for serial correlation in least squares regression. *Biometrika, 38*(1/2), 159-179. https://doi.org/10.1093/biomet/38.1-2.159

12) Fowowe, B. (2019). Financial Sector Reforms and Private Investment in Sub-Saharan African Countries. *Journal of Economic Development*, 44(1), 67-85.

13) Ghosh, A., & Phillips, S. (2021). Financial Development and Growth: Assessing the Impact in Developing Economies. *World Development*, 140, 105295.

14) Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica, 37*(3), 424-438. https://doi.org/10.2307/1912791

15) Greenwood, J., & Jovanovic, B. (1990). Financial Development, Growth, and the Distribution of Income. *Journal of Political Economy*, 98(5), 1076-1107.

16) Gujarati, D. N., & Porter, D. C. (2009). *Basic Econometrics* (5th ed.). McGraw-Hill.

17) Ibrahim, M., & Sare, Y. A. (2018). Determinants of Financial Development in Africa: How Robust is the Interactive Effect of Trade Openness and Human Capital? *Economic Analysis and Policy*, 60, 18-26.

18) Jarque, C. M., & Bera, A. K. (1980). Efficient tests for normality, homoscedasticity, and serial independence of regression residuals. *Economica, 50*(197), 163-182. https://doi.org/10.2307/2552546

19) Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica, 59*(6), 1551-1580. https://doi.org/10.2307/2938266

20) Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. *Journal of Econometrics, 90*(1), 1-44. https://doi.org/10.1016/S0304-4076(98)00023-2

21) King, R. G., & Levine, R. (1993a). Finance and Growth: Schumpeter Might Be Right. *Quarterly Journal of Economics*, 108(3), 717-737.

22) **King, R. G., & Levine, R. (1993b).** Finance, entrepreneurship, and growth: Theory and evidence. *Journal of Monetary Economics, 32*(3), 513-542. https://doi.org/10.1016/0304-3932(93)90028-E

23) Law, S. H., Singh, N., & Sahut, J. M. (2020). Finance and Growth: New Evidence on the Role of Insurance. *Journal of Banking & Finance*, 121, 105347.

24) **Levine, R. (1997).** Financial development and economic growth: Views and agenda. *Journal of Economic Literature, 35*(2), 688-726. https://doi.org/10.1257/jel.35.2.688

25) Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3-42. https://doi.org/10.1016/0304-3932(88)90168-7

26) Nyasha, S., & Odhiambo, N. M. (2019). Financial Development and Economic Growth Nexus: A Revisionist Approach. *Economic Notes: Review of Banking, Finance and Monetary Economics*, 48(1), 43-56.

27) Obstfeld, M. (1994). Risk-taking, Global Diversification, and Growth. *American Economic Review*, 84(5), 1310-1329.

ISSN: 1673-064X
E-Publication: Online Open Access
Vol: 67 Issue 09 | 2024
DOI: 10.5281/zenodo.13739927

28) Pesaran, M. H. (2004). General diagnostic tests for cross-section dependence in panels. *IZA Discussion Paper No. 1240*. https://doi.org/10.2139/ssrn.572204

29) Pesaran, M. H. (2006). Estimation and inference in large panels with a possible factor structure. *Econometrica, 74*(4), 967-1012. https://doi.org/10.1111/j.1468-0262.2006.00783.x

30) Pesaran, M. H., Shin, Y., & Smith, R. J. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association, 94*(446), 621-634. https://doi.org/10.2307/2669918

31) Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75*(2), 335-346. https://doi.org/10.1093/biomet/75.2.335

32) Rioja, F., & Valev, N. (2021). Finance and the Sources of Growth at Various Stages of Economic Development. *Economic Inquiry*, 59(1), 29-45.

33) Robinson, J. (1952). *The Rate of Interest and Other Essays*. London: Macmillan.

34) **Romer, P. M. (1986).** Increasing returns and long-run growth. *Journal of Political Economy, 94*(5), 1002-1037. https://doi.org/10.1086/261420

35) Rousseau, P. L., & Wachtel, P. (2021). Inflation Thresholds and the Finance-Growth Nexus. *Journal of International Money and Finance*, 110, 102279.

36) Saci, K., Giorgioni, G., & Holden, K. (2009). Does Financial Development Affect Growth? *Applied Economics*, 41(13), 1701-1707.

37) Saint-Paul, G. (1992). Technological Choice, Financial Markets and Economic Development. *European Economic Review*, 36(4), 763-781.

38) Schwarz, G. (1978). Estimating the dimension of a model. *Annals of Statistics, 6*(2), 461-464. https://doi.org/10.1214/aos/1183143727

39) Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data* (2nd ed.). MIT Press.