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The Relevance of Financial Inclusion on Sustainable Economic Growth in Sub-Saharan African Nations

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Abstract: The primary concern of this examination is to systematically survey the importance of inclusive access to finance on the growth in terms of the economy in 48 sub-Saharan African (SSA) sovereign states with periodicity from 1995 to 2017. This study reports the results using both static and dynamic estimation techniques. For consistency, the baseline finding of the study estimation is based on the Generalized Method of Moments (GMM) system GMM. This article finds that there is a complimentary association between the present degree of inclusiveness of finance and economic advancement in SSA. The suggestion deduced in this examination is that programs with the plan of comprehensive financing ought to be custom fitted to the agricultural segment of the economy to encourage more economic opportunities for development in a sustainable manner.

Keywords: sub-Saharan African (SSA); Generalised Method of Moments (GMM); financial inclusion; economic growth

1. Introduction

It is not possible to underestimate the role of effective financial intermediation services in fostering wealth creation and economic growth [1,2]. An efficient financial infrastructure is needed for financial services such as deposit mobilization, transaction facilitation, payment processing provision, and risk management [3]. The World Bank describes inclusive financing as the scale to which finance-related resources, such as savings, advances, transfers, and indemnification, can be obtained by individuals and small businesses [4]. However, accessibility of conventional monetary markets continues to be a significant restriction in many developing territories. In sub-Saharan Africa (SSA), relative to other developed countries, the proportion of the mature populace with accounts or borrowings from formal financial institutions continues to decline [5]. Heterogeneously, only 7% of the working-age citizens in Burundi, Guinea and Niger are banked, relative to 82%, 75% and 70% respectively in Mauritius, Kenya and South Africa [6].

Over the past two decades, the banking industry, which forms the backbone of the financial sector, has experienced significant shifts in Sub-Saharan Africa [7]. The structured financial mechanism in Sub-Saharan Africa (SSA) amid these changes is still not all-inclusive enough [8]. The previous decade has seen concerted attempts by regulators and the global community for growth to extend the availability of quality finance products to the concerned populace disconnected from the traditional monetary system [7]. It is predicted that if "unbanked" citizens funnel their private savings into the formal financial sector, the global economy could produce $157 billion further in potential savings [9,10]. The projection has prompted policymakers and other international organisations to launch

financial inclusion promotion initiatives. For starters, the introduction of M-Pesa in Kenya is one of the most successful mobile money operators in the world [11]. In its effort to encourage financial inclusion, the World Bank has announced one of its priorities to provide comprehensive access to monetary services and produces by 2020 [12].

Sub-Saharan Africa's economic future tends to flourish as its actual GDP growth is estimated to rise to 3.9% in 2020 and 4.1% in 2021 [13]. Despite Sub-Saharan Africa's strong growth performance, only about one-third of nations have achieved inclusive growth [14]. An increasing body of longitudinal research has demonstrated that financial inclusion has beneficial consequences on a variety of implications of growth [7,15]. Higher economic development is achieved by countries with an elevated degree of inclusive financing, as greater accessibility to financial resources allows the vulnerable and other disadvantaged communities to participate in entrepreneurship practices [3]. The economic gap is also reduced by financial inclusion [16,17]. In comparison, exclusive financing contributes to money related maleducation also the creation of a financial market that is uncoordinated and exploitative [1].

In addition to the background, the impetus for this paper is the development of a continuing realistic debate and the absence of analytical research on the significant correlation between the expansion of the economy and inclusive financing. Hence, this article evaluates the relevance of financial inclusion to the sustainable growth of the SSA economy. Using the newly developed global Findex platform, multiple studies have attempted to explain the factors of inclusive financing across the world [18–23]. The majority of these researches rely on specific traits to classify those that are unbanked, lacking the importance of macro-scale variables that enables a framework for recognizing financial inclusion's micro-level determinants [7,24]. Besides, amid the recent enhancement of financial integration initiatives, little analytical work has been undertaken to regularly record updated developments in financial inclusion to help regulators to recognise areas where further policy measures are needed. By reflecting on accessibility in SSA countries, this article subscribes to the developing body of research on inclusive financing, as scholars such as [25] has termed the SSA region as the region with low inclusive financing. However, [26] found that finance inclusive access has the ability to mitigate earnings disparity in the sub-region. Our principal literature inputs are three-fold. First, by explaining developments from 1995 to 2017, we record recent patterns in inclusive financing for 48 countries in the sub-region. In terms of the sum of nations covered, our analysis varies from preceding research in the field. Explicitly, we evaluate three indicators from the accessibility area of financial integration, namely bank loans on bank savings proportion, Private domestic credit from deposit banks (% of GDP), Private domestic credit from financial institutions (% of GDP) which are macro-level determinants, the indicators of economic growth (GDP and GNI per capita) and other control variables. Thirdly, following an analytical strategy, the usage of the GMM estimation model should resolve the consideration for simultaneity or reverse causality induced by endogeneity. Our results will provide valid and compelling evidence to policymakers, regulators and researchers in the discourse on the outcome of inclusive financing on SSA economic development.

The rest of the paper is organized accordingly. In regards to applicable theories and scientific evidence, Section 2 briefly explains the publication's assessment. The technique of analysis is presented in Section 3. In Section 4 of the paper, the evidence and analytical observations from this article are analyzed and presented, accompanied by the conclusions in Section 5.

2. Literature Review

2.1. Theoretical Framework

Solow's Exogenous Economic Growth Model

From a discussion angle of the framework of accumulated production, the influence of finance (Inclusive access to finance) such as affordable payment facilities, mediation of finance, efficient risk administration, the mitigation of lopsided knowledge within the financial system amongst others [27,28], leads significantly to the transition of saved funds

and venture outlay inputs into more outstanding production in the economy, either by a mechanism of wealth accumulation [29] or a process of technical progress [30].

Focusing on the capital aggregation channel, for instance, the Solow growth model which assumes first that output (Y) has both capital (K) and work (L) as a feature (Y = F (K, L) for K, L > 0) shows that the consistent amount of capital (k) and per capita yield (y) will expand by an expansion in the rate of funds saved, (δ). Such a move in δ is as outlined from δ1 to δ2 generates constant state k to ascend from k*1 to k*2 and per capita yield to ascend from y*1 to y*2.

The evaluation infers the eradication of exclusive financing and mitigation of the financial market disasters which will enhance the viability of investment as investment portfolios with a reduced interest rate and a higher return will be financed. It is expected that the productivity notion feature will transition from f (k) upward to g (k). Savings will further rise as the economy's efficiency improves since $\delta_2 g(k)$ becomes greater than $\delta_2 f(k)$. In the long run, the new-consistent rise in per capital stock (k*3) and per capita production (y*3) will surpass the initial stages, (k*1, y*1) and also the more advanced extents due to rise in savings and investments, k*2, y*2.

Among different deductions, the finance system plays a relevant part in enhancing the productivity framework through compelling observing and administration of portfolios. The Solow model encapsulates just the short term and interim consequences of the advancement of innovations in the monetary system. It omits to account for high-tech advancement or prolong-term progression of the economy. This drawback in the Solow growth model prompted the emergence of the Schumpeterian growth model. Schumpeter theorized that a mature system of finance is totally important if business visionaries are to effectively participate in a cycle of resourcefulness and innovation. New ventures require financing in light of the fact that the potential investments cannot generally be funded by the business individuals themselves. Without a monetary system to inject capital into different segments of the economy, the development would be almost incomprehensible and there would be minimal growth in terms of the economy. Therefore, financial inclusion is essential for economic development on this basis because it offers creative financial goods to enable earners not earning a high amount to invest further [28].

2.2. Conceptual Review

This section critically examines the importance of the inclusive model of financing in the promotion of growth on a sustainable level in the economy. The observations and resulting empirical analysis give further knowledge about SDG 8 which in the actual sense maintains inclusive and sustainable growth of the economy as well as buoyant and productive employment status. The latest theoretical and methodological literature widely confirms the value of financial access, including fostering personal and corporate investment opportunities; raising living conditions and offering work opportunities [31–37].

As much as inclusive finance is seemingly a settled case, it is important to clarify the impact of the financial sector in economic development, "whether finance is a leading sector in the growth or whether its impact is measured by the real output that is generated from other sources?" [38]. Financial inclusion is still quite insignificant in SSA even though has continued to experience some growth in recent years. The development of the financial sector in SSA also remains relatively laid back and lagging in the CFA franc region [39]. A critical study by Soumaré, Tchana and Kengne [40], reveals that only 11% and 23% of adults in central and West Africa respectively have access to proper financing. This lag in the area's sector of finance is traceable to the poor quality of the financial institution as recorded by [41]. Instability of the economic and the political sphere, high level of informality and weak governance as recorded by [42] and low population density [43]. In the case of nations with more advanced operations that has translated into a higher level of institutional quality, it is advised that financial integration can be a viable channel to the development of the financial sector [44] while Ibrahim and Alagidede [45] believes that the differences in the development of the financial sectors across the SSA are significantly due

to their varying territories. Interestingly, the authors' construct using accessible information from the World Development Indicators (WDI) of the World Bank showed that domestic credit non-monotonically decreased over the timeframe of 1995 to 2017 by 79.1% recording an average of 50.38%. This decline is relatively synonymous with the fall in the domestic product (GDPPC) and National Per Capita Income (GNIPC) due to the rising rate of inflation experienced in the sub-region during the time. Arguably, [46] discovered that both development financial accessibility and real sectors have a growth rate that seemed interrelated as both sectors experienced a similar decline in their rate of growth. From 1995 to 2017, these trends are obvious. Therefore, this research is strongly consistent with the ideology that inclusive and socio-economic advancement is driven by an inclusive development of the financial system.

Focusing on the progression of the economy from the financial perspective, the verdict of savings and capital investment can be influenced through the several channels of the financial system. Van, Vo, Nguyen and Vo [4] articulates five main channels namely: (i) the development of ex-ante knowledge on future outlay; (ii) the regulation of financing and the role of business ethics; (iii) the trade, diversifying and risk administration; (iv) the collection and depositing of reserves; and (v) the trade of products and facilities. These channels lead to economic development by a more effective distribution of wealth, quicker acquisition of infrastructure and human capital and quicker progress [47]. Financial inclusion determinants' interaction with economic growth may be evaluated through the provision of financial intermediation utilities which help to ease the challenge of knowledge lopsidedness, thereby enabling trades and fostering economic progression [4].

In the cause of determining the direction regarding the association between inclusive finance and growth in the economy, it can be complicated as they can influence each other through various means. External finance such as FDI and remittances influences a higher rate of growth in nations with mature financial depth [48]. A panel causation experiment showing a rise in banking products and services supports both medium and future term growth rate and an increase in economic progression contributes to a shift in inclusive finance which has thus demonstrated the dual causality between inclusive finance and economic advancement [49]. The study thus reiterates that a key factor of economic development is financial inclusion.

The narrative illustration below provides a philosophical description of the connections between inclusive financing and sustainable growth. The rationale goes as follows: Low-cost financing provided to low wage and vulnerable individuals births coordinated development accomplishments in rural territories which lead to increased output production. This ground-level value addition leads to the growth of state and national production, resulting in strong macro-level growth [49]. Second, equal access for ineligible persons to deposits and insurance policies increases funds in the stock market [49]. Inclusive financing adds to a rise in the quality of life of disadvantaged communities due to increasing income levels. Hence, the importance of financial accessibility in sustainable growth correlates with recent literature on socio-economic progress [50,51].

2.3. Empirical Framework

The interrelations between inclusive financing and growth in economic term have been identified in various evidential academic evaluations [1,27,52–59].

Several researchers have found that financial inclusion promoted growth in economic term—A supply-driven notion [1,27,55–57]. Classic writers like [60–62] holds a different view about the relationship between inclusive financial development and the growth of the economy. In Schumpeter [60], regarding the connection between finance and growth the author believes that a financial system that will aid growth in innovating technology will do so by actively channelling the resources that are concentrated in less productive areas to a more productive sector. Other scholars like [63–65] believes that real per capita GDP is increased by credit facility granted to the private sector. They claim that average growth, productivity and per capita capital stock can be predicted by financial depth. While another

study quotes the inability to access credit facility as a pertinent factor that determines the difference in the growth of MENA and the other regions [66]. Mohan [67] claims that inclusive financial development can be achieved through financial intermediation if financial inclusion is practised and thereby increase the growth of the economy. Dupas and Robinson [68] further states that when individuals have access to savings encourages viable capital outlay which relatively increases the economy. The research was undertaken by [27] to address the factors and influence of inclusive finance on the growth of the Nigerian economy from 1981 to 2012. The Ordinary Minimum Square (OLS) regression model was employed to predict the results. Inclusive financing is a major total aspect determinant of productivity, as is the income per employee, which ultimately determines the final amount of economic productivity. However, this literature primarily stressed the mechanisms of output as a factor in economic growth.

However, some scholars also argued that inclusion in finance term is driven by economic growth; the consumption-driven premise [4,7,61,69]. Kuznet [61] suggests that the growth of the financial market only significantly shows at the intermediate phase and full development occurs at the maturity of the economy. Asuming, Osei-agyei and Ibrahim [7] performed a comparative inclusive financing study in 31 sub-Saharan African territories leveraging statistics from the Findex data warehouse for the Globe. The probit and logit method is engaged to estimate the inclusive financing predictors and also three financial inclusion metrics: (i) account holding, (ii) deposits, and (iii) borrowing. This study finds that while the overall degree of inclusive financing improved substantially between 2011 and 2014, there exist differences between countries in both the degree and the rate of change. It has also been revealed that independent covariates (lifetime, schooling, sex and wealth), economic determinants (GDP progression rate and existence of monetary firms) and trade liberty are essential indicators of inclusive financing. Van, Vo, Nguyen and Vo [4] explored the implications of financial inclusion on international economic development. Econometric panelling methodology is applied to measure the economic growth influence of inclusive finance. The result encourages a constructive association between economic prosperity and inclusive financing. For low-income economies, a better interaction is found with a higher level of financial exclusion. The varying notions can be categorized into the so-called "supply–leading" and "demand–following" hypotheses.

The empirical literature on finance–growth causality remains mixed [70–72]. Sethi, and Acharya [49] evaluated the variant effect of inclusive financing on a progressive economy. This examination utilised some data construct for the panel, for example, individual-static, random and time static impact regressions, panel cointegration, and panel causality tests to inspect the linkage between the variables. The information set on inclusive financing is adopted from Sarma [73] for the periodicity of 7 years from 2004. The same discoveries uncover a complimentary and future term association between inclusive financing and economic progression across 31 nations. Also, the board test of causation demonstrates bidirectional causation between inclusive financing and the progression of the economy. Thus, the examination affirms that earning equality is one of the principal economic drivers. In any case, this investigation considers just banking organisations in the examination. Also, the periodicity of the relationship under review was not sufficiently long. A mutual causality concerning the two factors has also been noted by others [11,74]. Interestingly, panel data analysis was applied in Kim, Yu and Hassan [11], which described the complementary effect of inclusive financing on the growth of the economy in the sovereignties of the Organization of Islamic Cooperation (OIC). The impulse response parameters generated from the panel vector autoregression also support the complimentary association and based on the Granger panel causality tests, the reciprocal causalities between inclusive financing and economic growth are also recorded in this study.

On the (non)linearity linkage of finance and growth, Deidda and Fattouh [75] adopted the threshold regression model to King and Levine [64] dataset and discovered evidence of non–monotonic association. Other studies [76–78] discovered an inverted U–curved interrelationship meaning that inclusive financial development is only viable to a level after

which it becomes harmful to the rate of growth however, Adeniyi, Abimbola, Omisakin and Egwaikhide [79] has a contrary opinion. Favara [80] discovered an S–curved connection between economic growth and financial deepening and concludes that at very low levels of inclusive financial development, growth suffers and vice-versa. Bandura and Dzingirai [81] decided the connection concerning the development of finance and growth in economic terms regarding the condition of the governance of institutions on 27 Sub-Saharan Africa nations utilising a dataset computed at an average of five-year over the period 1982–2016 and the empirical proof depends on direct and nonlinear Generalized Method of Moments (GMM). The discoveries built up proof of a U-formed connection concerning money related development and progressive economy which infers that more (less) fund drives (hinders) development in the area. The study also found that the financial development threshold which can promote economic growth vary from 33% and 37%.

The study by Ibrahim and Alagidede [82] in SSA however shows that, while financial development positively and significantly influences economic growth, below a certain estimated threshold, finance is largely insensitive to growth while significantly influencing economic activity for countries above the thresholds. Others argue that inclusive financing and the growth of economies simply have independence or an inconsequential influence [74].

However, indeed as opined by Demirguc-Kunt, Asli, Klapper and Singer [83], the majority of the researches at specific and micro scales, on the association between inclusive finance and growth employ limited variables with regards to growth indicators. There is also little proof of the extent of the interaction between inclusive finance at the macro segment and SSA macro-economic growth. Therefore, leveraging on the world sustainable development agenda. This research extends the prevailing literature in this study area through the assessment of the current development of inclusive finance expressed as financial accessibility and its influence on economic growth using a panel dataset for the period 1995–2017 from 49 SSA countries in aggregate.

Following an analytical strategy of evaluating the dataset using both static and dynamic estimation techniques, the GMM estimation model should resolve the consideration for simultaneity or reverse causality induced by endogeneity. As per Asongu, Nnanna and Acha-anyi [16], the GMM estimator is the most favoured based on the fact that it also considers endogeneity problems that are not addressed in the fixed effect regressions. From the above empirical study, several empirical pieces of literature have majorly evaluated economic growth from the sole perspective of GDP per capita income; this study shall include the GNI per capita. While inclusive financial access is established to improve economic growth, macro-financial access will be measured by bank credit on bank deposits ratio, Private national loan from banks of deposit (% of GDP), Private national loan from financial organizations (% of GDP). The different measures of macro-level financial accessibility, econometric specifications and control variables which will be later stated are expected to bring about robust results.

3. Data and Methodology
3.1. Data

This article relies on the use of yearly period serial data spanning the duration of 1995–2017 in 48 sub-Saharan African territories. It is necessary to evaluate the degree of relevance of inclusive finance to the economy of nations in the sub-region as well as other reasons for the investigation explained in the introduction, as well as the access to the data restriction at the time of the inquiry, which has given rise to the geographical and periodic feature of the investigation. To collect the data, three primary sources were used. Firstly, adopting from [25,84,85] which are contributing works of literature to this research, two economic growth variables from World Development Indicator (WDI) are utilised namely: GDP per capita and Per capita GNI. The economic growth indicators provide a comparative view of inclusive financial access influence across countries.

Secondly, in tandem with recent financial inclusion (access) papers on SSA [16,37,86–89], three indicators are obtained from Global Financial Indicator (GFI) and Financial De-

velopment and Structure Database (FDSD), which are Private Credit issued by deposit Banks (PCRB), Private Credit issued by Financial institutions (PCRF) and Bank Credit to Bank Deposits ratio (BCBD). Compared to the deposit moderator, private domestic credit from the financial institution and deposit banks makes the access to credit moderator better associated with monetary accessibility due to the reasonable linkage to the availability of credit facilities and also used to evaluate financial system and banking system activities respectively in regards to the provision of accessible finance. The third variable (BCBD) indicates financial efficiency with regards to the accessibility of finance.

Finally, the control variable indicators include cell phone usage, personal remittance, and average primary school enrollment ratio, which are obtained from the WDI of the World Bank. These metrics are driven by current African literature on inclusive growth [17,50,86,90]. The predicted results rely on territory-particular impacts that are not considered in the analysis procedure, as the General Method of Moments (GMM) methodology applied is intended to exclude individual nation results to deter the development of endogeneity due to the association between the outcome variable (lagged)and the territory-centric results. In line with the following methodological academic articles, therefore, smartphone usage is projected to improve employment following the corresponding methodological literature [91,92] which is an indicator for economic health. Synonymously, primary school education is expected to stimulate economic growth [93]. Table 1 defines the variables of this research.

Table 1. Origins and Meanings of Variables.

Variable	Acronym	Measurement	Source
Gross Domestic Product (GDP) per capita	GDPPC	The country cumulative production per annum over the amount of populace.	WDI
Gross national income (GNI) per capita	GNIPC	The amount of significant worth added by all inhabitant manufacturers in addition to any goods taxation (less discounts) excluded from the valuation of yield in addition to net receipts of essential earnings (remuneration of workers and property earnings) from abroad.	WDI
Bank credit to bank deposits ratio	BCBD	Bank credit on bank deposits (%)	FDSD
Private domestic credit from financial institution	PCRF	Privates domestic credits from financial institution (% of GDP)	GFI
Private domestic credit from deposit money banks	PCRB	Private domestic credit from deposit banks (% of GDP)	FDSD
mobile penetration Global	Mobile	Mobile cellular subscriptions (per 100 people)	WDI
Remittance	Remit	Remittance inflows to GDP (%)	WDI
Primary school enrollment ratio	PSE	School enrollment, primary (% gross)	WDI

WDI: World Development Indicators. FDSD: Financial Development and Structure Database. GCIP: Consumption and Income Project. GFI: Global Financial Indicator.

3.2. Preliminary Evaluation of Dataset

Expressed in Table 2 are the outcomes pertaining to the statistics of description which discloses the deviation standard, kurtosis, skewness and mean value of the employed indicators for the analysis of financial inclusiveness on growth in terms of the SSA economy between 1995 to 2017.

Table 3 shows the correlation values between factors. The outcomes uncover a low connection within the factors. The low connection among the factors demonstrate that there is no problem pertaining to multicollinearity in the models as the correlation between the independent variables does not exceed 0.8. The lattice of correlation does not reveal the dynamic connection between the used indicators; this is eventually talked about in the segment for analytical impacts, which represents the intricacy of the variables in a relationship. In addition, we use the variance inflation factor (VIF) to prevent the issue of multicollinearity among the variables, and the results (see Table 4) are between 1.16 and 0.87, indicating that there is no serious collinearity among the variables in regression

models. This study is also mindful of the Unit Root Diagnostic (However, the datasets for this study contain a couple of missing values due to poor data gathering in Africa, which made it difficult to estimate unit root test).

Table 2. Statistical Summary of Dataset Employed.

Variables	N	Sum	Mean	Min	Max	S.D.	Kurtosis	Skewness
RGDPPC	1045	2206	2.111	−47.59	140.4	7.140	148.2	7.421
GNIPC	811	1537	1.895	−36.33	38.60	5.553	13.36	−0.544
PCRB	1024	73,327	71.61	8.138	221.9	28.53	3.873	0.434
PCRF	943	17,424	18.48	0.403	160.1	23.56	18.33	3.712
BCBD	1015	16,948	16.70	0.403	106.3	16.29	9.864	2.443
Remittance	861	3283	3.813	0.000183	108.4	8.556	65.39	6.854
PSE	870	84,125	96.70	23.36	156.4	24.36	2.899	−0.271
Mobile	1083	35,457	32.74	0	173.5	39.47	3.769	1.246

Notably: N: observations; S. D: Standard Deviation; Min: minimum; Max: maximum.

Table 3. Matrix of Correlation.

	RGDPPC	GNIPC	PCRB	PCRF	BCBD	Remittance	PSE	Mobile
RGDPPC	1							
GNIPC	0.567 ***	1						
PCRB	−0.0265	−0.0170	1					
PCRF	0.0340	0.0826	0.366 ***	1				
BCBD	0.0583	0.0911	0.365 ***	0.935 ***	1			
Remittance	−0.00718	−0.0280	−0.0000549	0.0554	0.0797	1		
PSE	−0.00627	−0.0149	−0.125 *	0.154 **	0.154 **	0.0600	1	
Mobile	0.136 **	0.0699	−0.0310	0.338 ***	0.387 ***	0.176 ***	0.177 ***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; RGDPPC: Real Gross Domestic Product per Capita. GNIPC: Gross National Income per Capita. BCBD: Bank credit on Bank deposits. PCRB: Private domestic credit from deposit banks. PCRF: Private domestic credit from deposit banks and other financial institutions. Remittance: Personal Remittance. PSE: Primary School Enrollment rate. Mobile: Mobile Penetration.

Table 4. Collinearity statistics using Variance Inflation Factor (VIF).

	Model One		Model Two		Model Three		Model Four		Model Five		Model Six	
	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
PCRB	1.12	0.89	1.15	0.87	–	–	–	–	–	–	–	–
PCRF	–	–	–	–	1.12	0.89	1.15	0.87	–	–	–	–
BCBD	–	–	–	–	–	–	–	–	1.02	0.98	1.00	0.99
PSE	1.07	0.93	1.05	0.96	1.07	0.93	1.05	0.96	1.07	0.94	1.03	0.98
Mobile	1.16	0.86	1.21	0.83	1.16	0.86	1.21	0.83	1.05	0.96	1.06	0.95
Remit	1.01	0.99	1.04	0.96	1.01	0.98	1.04	0.95	1.02	0.98	1.04	0.97
Mean	1.09		1.11		1.09		1.11		1.04		1.03	

3.3. Empirical Estimation Techniques

Following the standardized procedures in extant development literature, this study employs both static and dynamic panel data estimations.

3.3.1. Static Estimations

The estimations proceed with the standard ordinary least squares (OLS) procedure, which pools all of the observations. The results of the OLS specification are shown in Tables 5–7, column 1 and 5. It is necessary to mention that the standard OLS method has two significant flaws. It does not account for country-specific conditions and claims that the countries' intercept values are the same. Two-panel calculation techniques that allow for the peculiar existence of the countries are used to test whether they are implausible characteristics.

Table 5. Private Domestic Credit from Deposit Banks and Economic Dynamics.

Variables	Model One				Model Two			
	GDP (per Capita Growth)				GNI (per Capita Growth)			
	OLS	FE	GLS	GMM	OLS	FE	GLS	GMM
GDP (−1) _	−	−	−	0.207 ***	−	−	−	−
	−	−	−	(0.0461)	−	−	−	−
GNI (−1)	−	−	−	−	−	−	−	0.159 ***
	−	−	−	−	−	−	−	(0.0337)
PCRB	0.0146	−0.0434	−0.0115	0.0586 **	0.0206 *	0.00317	0.0130	0.0958
	(0.00950)	(0.0309)	(0.0201)	(0.0255)	(0.0118)	(0.0441)	(0.0195)	(0.0906)
Remit	0.00670	−0.00170	−0.00291	0.328 **	−0.0466	−0.0105	−0.0325	−0.302
	(0.0157)	(0.0286)	(0.0251)	(0.143)	(0.0445)	(0.102)	(0.0616)	(0.547)
Enrolment	0.00678	0.0352 ***	0.0276 ***	0.00551	−0.00142	0.0196	0.00620	0.00156
	(0.00610)	(0.0121)	(0.0102)	(0.0445)	(0.00835)	(0.0177)	(0.0121)	(0.0327)
Mobile	0.00121	0.00146	−0.000214	−0.0178 **	0.00334	−(0.0000837)	0.00265	0.00566
	(0.00388)	(0.00546)	(0.00457)	(0.00817)	(0.00503)	(0.00769)	(0.00568)	(0.0104)
Constant	1.096 *	−0.664	−0.658	−0.314	1.702 **	−0.0819	1.003	1.242
	(0.606)	(1.264)	(1.085)	(3.894)	(0.859)	(1.788)	(1.248)	(3.499)
R-squared	0.008	0.016	0.009	−	0.010	0.003	0.0013	−
Fisher	1.429	2.770	−	−	1.457	0.371	−	−
Hausman Prob	−	−	0.318	−	−	−	0.652	−
Sargan Prob	−	−	−	0.0528	−	−	−	0.000
Hansen Prob	−	−	−	0.312	−	−	−	0.118
AR (1) Prob	−	−	−	0.003	−	−	−	0.000
AR (2) Prob	−	−	−	0.064	−	−	−	0.851
Observations	709	709	709	681	566	566	566	537
Countries	44	44	44	44	41	41	41	41
Instrument	−	−	−	26	−	−	−	26

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6. Private Domestic Credits from Financial Institutions and Economic Dynamics.

Variables	Model Three				Model Four			
	GDP (per Capita Growth)				GDP (per Capita Growth)			
	OLS	FE	RE	GMM	OLS	FE	RE	GMM
GDP (−1) _	–	–	–	0.215 ***	–	–	–	–
	–	–	–	(0.0402)	–	–	–	–
GNI (−1)	–	–	–	–	–	–	–	0.178 ***
	–	–	–	–	–	–	–	(0.0331)
PCRF	0.00607	−0.0531 *	−0.0142	0.0468 **	0.0148	0.00171	0.00700	0.152 **
	(0.00777)	(0.0320)	(0.0160)	(0.0206)	(0.00994)	(0.0456)	(0.0149)	(0.0677)
Remit	0.00891	−0.000643	−0.00191	0.287 *	−0.0511	−0.0187	−0.0336	−0.502
	(0.0161)	(0.0291)	(0.0256)	(0.153)	(0.0457)	(0.105)	(0.0634)	(0.447)
PSE	0.00476	0.0335 ***	0.0255 **	0.0284	−0.00396	0.0184	0.00368	0.0104
	(0.00638)	(0.0127)	(0.0107)	(0.0438)	(0.00873)	(0.0185)	(0.0127)	(0.0315)
Mobile	0.00344	0.00402	0.00127	−0.019 **	0.00518	0.00102	0.00428	0.000660
	(0.00396)	(0.00579)	(0.00457)	(0.00985)	(0.00519)	(0.00817)	(0.00575)	(0.0126)
Constant	1.283 **	−0.427	−0.561	−2.347	1.935 **	0.0111	1.213	−0.0860
	(0.623)	(1.295)	(1.116)	(3.990)	(0.883)	(1.848)	(1.286)	(3.308)
R-squared	0.005	0.017	0.006	–	0.010	0.003	0.008	–
Fisher	0.893	2.667	–	–	1.364	0.349	–	–
Hausman Prob	–	–	0.367	–	–	–	0.733	–
Sargan Prob	–	–	–	0.0445	–	–	–	0.000
Hansen Prob	–	–	–	0.302	–	–	–	0.163
AR (1) Prob	–	–	–	0.00388	–	–	–	0.000
AR (2) Prob	–	–	–	0.0739	–	–	–	0.869
Observations	667	667	667	640	532	532	532	504
Countries	44	44	44	44	41	41	41	41
Instrument	–	–	–	26	–	–	–	26

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7. Bank Credit to Bank Deposit and Economic Dynamics.

Variables	Model Five				Model Six			
	GDP (per Capita Growth)				GNI (per Capita Growth)			
	OLS	FE	RE	GMM	OLS	FE	RE	GMM
GDP (−1)	–	–	–	0.207 ***	–	–	–	–
	–	–	–	(0.0391)	–	–	–	–
GNI (−1)	–	–	–	–	–	–	–	0.186 ***
	–	–	–	–	–	–	–	(0.0261)
BCBD	0.00121	−0.00132	0.00324	0.0283 *	0.00438	−0.0270 *	−0.00134	0.00976
	(0.00601)	(0.0102)	(0.00873)	(0.0156)	(0.00783)	(0.0150)	(0.0102)	(0.0140)
Remit	0.0114	0.000204	0.00335	0.311 *	−0.0301	−0.00664	−0.0137	0.0819
	(0.0159)	(0.0287)	(0.0249)	(0.183)	(0.0465)	(0.110)	(0.0606)	(0.241)
PSE	0.00722	0.0348 ***	0.0254 **	0.00984	−0.000191	0.0195	0.00398	−0.00666
	(0.00611)	(0.0122)	(0.0100)	(0.0253)	(0.00833)	(0.0178)	(0.0113)	(0.0268)
Mobile	0.00391	−0.00265	−0.000702	−0.00935	0.00663	0.00305	0.00509	0.00226
	(0.00366)	(0.00422)	(0.00399)	(0.00576)	(0.00471)	(0.00582)	(0.00507)	(0.00803)
Constant	1.134	−1.131	−0.805	−2.035	1.480	1.817	1.448	1.395
	(0.778)	(1.424)	(1.223)	(2.786)	(1.046)	(1.957)	(1.347)	(3.551)
R-squared	0.005	0.013	0.003	–	0.005	0.009	0.003	–
Fisher	0.963	2.116	–	–	0.632	1.187	–	–
Hausman Prob	–	–	0.355	–	–	–	0.055	–
Sargan Prob	–	–	–	0.003	–	–	–	0.000
Hansen Prob	–	–	–	0.266	–	–	–	0.109
AR (1) Prob	–	–	–	0.004	–	–	–	0.000
AR (2) Prob	–	–	–	0.074	–	–	–	0.773
Observations	705	705	705	677	562	562	562	533
Countries	44	44	44	44	41	41	41	41
Instrument	–	–	–	26	–	–	–	26

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

By using dummy variables to control country-specific consequences, the fixed-effect model (FE) allows the intercept to differ for each country. The Fisher test is used to determine if the dummies belong to the model. The null hypothesis states that the additional coefficients are proportional to zero. The null hypothesis is rejected in this case as a consequence of the test. As a result, the FE is preferable. In Tables 5–7, columns 2 and 6, the FE findings are presented.

Differences across countries are captured in the random effect model (RE) by a disturbance term ω_{it}, which goes like this: $\omega_{it} = \varepsilon_i + \mu_i$ where ε_i is an unobservable term that describes the individual unique error component and μ_i is the cumulative time series and cross-section error component. The RE suggests that ε_i has no relationship with either of the equation's explanatory variables, X_{kit}. The Lagrange Multiplier test developed by [94] is used to test random test. Tables 5–7, column 3 and 7, display the RE results.

The FE and RE specifications are also more versatile than the OLS model. The Hausman test for the specification is used in this study to select between the FE and the RE. The test is based on the null hypothesis that the regressors and the unobservable individual's specific random error are unrelated. If the null hypothesis is rejected by the test statistic based on an asymptotic distribution, the random effect estimators are skewed and the fixed effect model is selected. The Hausman test results, shown in Tables 5–7, show that the FE estimates are unreliable and that the RE will be more acceptable.

3.3.2. Dynamic Strategies

For two major factors, this econometric approach is important to this research. To begin, a lagged dependent variable must be included in the model to investigate the impact of economic growth values on current values and, as a result, to determine whether the variable can be explained solely by itself. Second, to deal with autocorrelation, it is important to investigate the likelihood that the issue is caused by model misspecification, namely, an excluded lagged dependent variable.

In order to estimate the dynamic panel data, this study employs the Generalized Method of Moments (GMM) initially proposed by [95,96]. According to extant GMM literature [97,98], the fundamental reasons for this strategy include (i) in this review, the number of chosen countries (N) is considerably more than the quantity of cycles in each cross-segment region (T). The N > T conditions required for the use of the tool are then satisfied. (ii) The feature of data in the research panel tells the report that cross-nation variances are reasoned into account in the forecasts. (iii) The measured indicators of this research are consistently based on the correlation between their level and the first-order series is greater than 0.8 which is the assumption to validate consistency in a variable. (iv) The study also addresses the topic of endogeneity since, the use of internal tools explores reverse causation or simultaneity also, unnoticed heterogeneity is controlled by time-invariant absent variables.

This study adopts the two-step Arellano-Bond Generalized Method of Moment estimator for this empirical analysis. Although dynamic panel estimators allow for dynamic economic activities, it also controls for unobserved heterogeneity. Among other dynamic estimators, the commonest ones used are the Difference Generalized Method of Moment (DGMM) and System Generalized Method of Moment (SGMM). For instance, if Fixed Effect or Random Effect is applied to dynamic panel data, the unobserved individual effect could correlate with both the endogenous regressors and predetermined regressors. To eliminate such bias, Arellano and Bond [95] developed the DGMM estimator to eliminate the unobserved individual effect and its associated variable bias by the first differentiation equation. However, DGMM has been criticized in that when time series are continuous and the time dimension is minimal, the estimator behaves poorly [99]. To address these problems and improve performance, "system-GMM" models merge the normal equation in first-differences using lagged levels as instruments with an additional equation in levels using lagged first-differences as instruments, using an additional set of moment constraints. For these purposes, system GMM estimation has largely replaced difference GMM estimation.

Arellano and Bond [96] also suggests a test for the hypothesis that the unobserved disruption of the differenced equation has no second-order serial correlation. This is unavoidable since the GMM estimator's accuracy is based on the hypothesis. The applicability of the Difference GMM estimator is required to be verified by two autocorrelation measures, namely the first order [AR (1)] and second-order [AR (2)] autocorrelation tests, among other diagnostics. As a result, for the Arellano-Bond GMM estimator to be correct, we expect to reject the null hypothesis for the [AR (1)] case, but not for the [AR (2)] test. Sargan's test and Hansen's test of over-identifying restrictions have been suggested for determining the validity of the instruments used. However, according to Roodman [100], whether to use Hansen's J or Sargan's test depends on whether the errors are heteroscedastic or non-sphericity. For both the Sargan's and Hansen's J tests, we do not expect to reject the null hypothesis. However, when homoscedasticity is present, the Sargan statistics are assumed to be a special case of Hansen's J, rendering the Sargan test statistic inadequate for robust GMM.

3.4. Model Specification

The following static and dynamic data models are determined to accomplish the research purpose:

The static panel model specification:

$$Growth_{i,t} = \beta_0 + \beta_1 Inclusion_{i,t} + \sum_{j=1}^{J} a_j X_{jit} + \beta_2 \gamma_i + \beta_3 \theta_t + \varepsilon_{i,t} \tag{1}$$

The dynamic panel model specification:

$$Growth_{i,t} = \beta_0 + \beta_1 Growth_{i,t-1} + \beta_2 Inclusion_{i,t} + \sum_{j=1}^{J} a_j X_{jit} + \beta_4 \gamma_i + \beta_5 \theta_t + \varepsilon_{i,t} \tag{2}$$

where $Growth_{i,t}$ is the economic growth (i.e., GDP per capita growth and GNI per capita growth) for country $_i$ in time $_t$. $Growth_{i,t-1}$ is the one year lagged of the economic growth (i.e., GDP per capita growth and GNI per capita growth) for, which captures the dependent variable persistency. This signifies the estimate for the linear dynamic panel data model. Also, *Inclusion* measure financial accessibility (i.e., bank credit to bank deposits ratio, private domestic credit from the financial institution (% of GDP) and private domestic credit from deposit money banks (% of GDP) for country $_i$ in time $_t$. $X_{ji,t}$ measures the control variable (i.e., remittance, mobile penetration, school enrolment), γ_t is the country fixed effect, $\theta_{i,t}$ is the time effect and $\varepsilon_{i,t}$ is the error term. Also, our coefficients of interest are β_2 and β_3, which considers the influence between dependent and independent variables. It is to be noted that the various indicators of financial accessibility, econometric model and variables for control purposes are considered to yield robust inferences.

4. Empirical Results

Tables 5–7 report the empirical findings relating to linkages between 'Bank Credit to Bank Deposit and Economic Dynamics'; 'Private Domestic Credits from Financial Institutions and Economic Dynamics'; and Private Domestic Credit from Deposit Banks and Economic Dynamics' respectively. Each Table contains eight (8) columns that present the diverse estimation techniques adopted for this study. Also, each table has two panels where the first panel (i.e., the first four columns) relates to Gross Domestic Product per capita whereas the second panel (i.e., the last four columns) relates to Gross Nation Income per capita.

For robust analysis, the study reveals the results using both static and dynamic estimation techniques. However, for consistency, the study estimation is based on the system GMM. Empirical outcomes for the GMM empirical approach are expressed in the last column of each Panel in Tables 5–7, which explains the nexus between inclusive finance and sustainable growth of the economy in SSA. The result presentation reveals alongside

the interpretation and the discussion of findings. The utilization of multiple indicators to capture inclusive finance and growth in terms of the economy is paramount and procedures used in a test of robustness. The right panel of the tabulation presents the relevance of inclusive finance indicators (BCDB, PCRF and PCRB) on the economic growth (RGDPPC) while the left side of the panel expresses the influence of finance inclusiveness metrics (BCDB, PCRF and PCRB) on the GNIPC (economic growth). All columns in each panel tell the analysis of regression with the effect of the control variables for a robust evaluation.

There remain essential information criteria that validate the GMM specification. Among others, it is necessary to note that, as a knowledge criterion, the second-order Arellano and Bond autocorrelation test (AR [2]) is more important than the preceding first-order test since the literature has defined only a higher one with no first-order disclosure [86,101]. It is to be noted that the Arellano-bond test is employed to tackle certain endogeneity issues [102] while The Sargan examination is hinged on the ideology that model parameters are identified via a priori restrictions on the value, and evaluates the validity of over-identifying restrictions [103] also the Hansen test further develops the Sargan test to suit general dynamic GMM [104]. Secondly, 'the Sargan and Hansen over-identification limitations (OIR) examinations ought not to be significant on the grounds that their null hypotheses are of the assumption that instruments are logical or not related with the error terms. While the Sargan OIR analysis is not meant to be robust but not instrumentally weakened, the Hansen OIR is substantial yet instrumentally weakened. To mitigate the proliferation of instruments, we have ensured that instruments are lower than the cross-sectional quantity in most model specification' [105].

From Tables 5–7, the validation of estimations depends on Hansen's J tests and the Arellano-Bond test. The findings of the tests reveal that there exists no proof of autocorrelation at the lagged second for the model at the significance stage of 5% [AR (2) p-value > 5%]. In addition, there is also no evidence of correlation with error terms and instrument variables [p-value of Hansen J test > 5%] at 5% significance levels.

From Tables 5–7, column 4, respectively, it can be observed that a percentage change in financial inclusion proxies (i.e., domestic credit to the private sector by banks (% of GDP) (PCRB)) is associated with a 0.0283% increase in Gross Domestic Product (per capita growth) (economic growth) on average ceteris paribus. Similarly, a percentage change in financial accessibility proxies (i.e., domestic credit to the private sector by the financial institution (% of GDP) (PCRF)) is associated with a 0.0468% improvement in Gross Domestic Product (per capita growth) (economic growth) on average ceteris paribus. Consequently, a percentage change in bank credit to bank deposit (%) (BCBD) encourages Gross Domestic Product (per capita growth) by 0.0586% on average *ceteris paribus*. Hence, financial accessibility and GDP per capita exhibit an inelastic relationship. The coefficient implies that financial and banking system efficiency and activity in terms of lending practices and the maintenance of adequate liquidity progressively affects the GDP per capita in SSA.

From Tables 5–7, column 8, respectively, the coefficient estimates of financial accessibility proxies (i.e., domestic credit to the private sector by banks (% of GDP) (PCRB), domestic credit to the private sector (% of GDP) (PCRF) and bank credit to bank deposit (%) (BCBD) respectively) on Gross National Income (per capita growth) (0.00976, 0.152, and 0.0958 respectively) is positive. However, solely domestic credit to the private sector by the financial institution (% of GDP) (PCRF) is statistically significant at a 5% level of significance. The positive sign signifies a direct and inelastic relationship between inclusive finance indicators and the extent of Gross National Income (per capita growth) (growth of the economy) in SSA territories.

Discussion of Findings

This research has evaluated the degree to which financial accessibility can improve economic growth in SSA. To evaluate this objective, mainly two hypotheses were verified. The analytical inferences have for the most part validated and the verified apriori

expectation because: (i) Financial accessibility indicators (PCRB; PCRF and BCBD) has a complimentary robust effect on GDP per capita growth in SSA from 1995 to 2017 substantiates *Hypothesis* 1 (Panel A of Table 1) (ii) As for alternate *Hypothesis* 2, financial accessibility indicators (PCRB; PCRF and BCBD) has a complimentary robust effect on GNI per capita growth in SSA from 1995 to 2017 (Panel B of Table 1). The underlying factor is the coefficient of accessibility of monetary services in terms of the quality of the banking system (PCRB), the effectiveness of the financial system (PCRF) and the operation of the banking system (BCBD) is robustly positive reflecting that the development of an inclusive financial sector encourages growth with regards to the economy. A further improvement in this trend will enable individuals to funnel their funds into the traditional monetary sector, resulting in robust economic progression through the multiplier effect. In other words, it is possible to achieve sustained long-term development with a greater focus on the extension of financial facilities and products. Good monetary facilities promote economic development through attracting savings for constructive investment, effective distribution of funds and risk management. This result is in tandem with academic literature supporting the assumption that inclusive financial accessibility strategies can boost inclusive growth and development [26,27,46,59,63–65]. These outcomes are in tandem with the inferences concluded in [26] that finance inclusive access has a complementary effect on growth in an economy due to its mitigating tendency of earnings disparity in the sub-region. Consequently, this affirmed the contentions of Rajan [106], which make express reference to the way that widespread accessibility to services and products from insurance, savings funds and other money-related products would lessen the income fragility of poor people. Bhattacharya and Wolde [66] effectively called attention to the fact that inadequate credit access is a significant factor driving growth differentials among MENA and other areas.

Assessing the Solow growth model theoretically, total productivity is dependent on the actions of output while empirical assessment of per capita labour was carried out. Deductions from this empirical work further confirm that there is a significant impact on the output growth rate of an economy through financial inclusion.

5. Conclusions and Recommendation

Inclusion in finance gives significant advantages to emerging countries. Consequently, many developed countries have launched initiatives to extend their unbanked populations' access to financial services. Little is known, however, as to how such programs have affected the extent to which financial integration through accessibility affects the SSA's economic growth. Hence, this study attempted to investigate the relationship between inclusive finance and growth in economic terms for the collection of 48 countries in SSA. Using the system General Method of Moments (GMM) estimator a positively robust association between inclusive finance and economic progress in the SSA was found from 1995 to 2017. In other words, it is possible to achieve sustained long-term growth via the targeted expansion of financial technology and services. As for the control variables remittance had a significant complementary effect on growth (economic) and the primary school enrollment rate is insignificantly positive; this indicates the ill funding and inequality of the educational sector. Lastly, mobile penetration is however negative which indicates the underdevelopment of mobile technology in SSA. Having concluded the analysis, it was discovered that it is quite expensive to access mobile technologies in Sub-Saharan Africa; most of the inhabitants of this region utilize mobile technological devices for non-commercial purposes, low capital investment for science and information and communication technology research and adoption have contributed to the slow rate of growth and development of mobile technology industry. Therefore, it will be a welcomed idea to encourage investment into the telecommunication industry and other associated industries that may also provide tax holidays to aid productions for this sector in Sub-Saharan Africa.

To stimulate economic development in the SSA, the government and policymakers need to strengthen access to financial services. It is further advised that serious efforts should be taken towards mitigating the high rate of inflation in Sub-Saharan Africa. Higher

rates of inflation reduce the rate of deposit return and reduce the real rates of interest that lenders pay in return. This raises the desire for people to borrow with fewer savers. In situations where the financial sector responds by raising credit, such finances are then further channelled into private consumption which exacerbates inflation. While, credits may be rationalised and in some cases are driven politically and once inflation is on the increase, a possible resultant effect is that the financial system will not provide the capital investment that is required which is going to lead to lower capital formation. In the same vein, there is a high tendency that endogenous macroeconomic instability can be triggered by rising inflation.

Supporting enterprises necessitates a well–informed government strategy focused on a thorough understanding of the various business segments of the economy, as well as the intrinsic factors that influence them. For example, several countries in Sub-Saharan Africa, as well as South Africa, Malawi, Gambia, Nigeria, Gambia and Ghana, are faced with challenges of inadequate energy supply especially in the industrial sectors being that the crisis of energy supply is a pertinent source of fluctuation in activities of production [46], therefore policies of energy that are made by the government must provide reserve capacity to aid other sectors in the economy as well as meeting the demands of the real sector. A formidable strand of information technology, innovation and optimal finance aids productivity of the real sector and ultimately economic growth.

SSA monetary entities should develop programs that are capable of reaching young people and women to improve their degree of inclusive financing, as they are the demography most exempted from the monetary system. Due to the fact that the SSA features many of the globe's young workforce, with the increase in technological innovation, their response to monetary services would be exponential. Therefore, monetary entities in the SSA should utilize this to model technology-driven transactional facilities in order to attract young people so that they can be financially integrated. Moreover, policies and programs for financial inclusion should be customized to sectors that are omitted from the recognized monetary system, such as the agricultural sector. Such precision strategy would enable policymakers to define clear challenges on inclusive financing for these segments of the economy in order to devise policies to overcome these constraints. More academic evaluations using a country-centric measure of inclusive finance for the minimum financially included territories in the SSA is expected in this field for future studies to checkmate the level of impact of financial inclusiveness on the growth of the economy as this is one of the limitations of this study as well as recent data availability. Besides, recognizing through academic research the connection between inclusive finance, poverty and development of the economy will assist policymakers plan and enforce policies that increase admittance to credit facilities, resulting in poverty eradication and income inequality.

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