

Access to Finance and Human Development in Sub-Saharan Africa

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ABSTRACT

The study examines the relationship between access to finance and human development in Sub-Saharan Africa. The study used a panel data covering the period 2004–2021 and employed the two-step system Generalized Method of Moments for the analysis of the data. The indicators of financial access used in the study are number of bank branches, commercial bank private sector credits and number of automatic teller machines (ATM) per. The study found that commercial bank private sector credits and number of number of automatic teller machines per 1000 adults have a positive and significant relationship with human development index in Sub-Saharan Africa. Base on the findings, the study recommends that the government of various Sub-Saharan African countries should intensify efforts to increase the access to financial services for the poor and low income group. This include reducing the costs and charges on credits for the low income earners and building more bank agents and automatic teller machines that will provide financial services to the populace especially the unbanked. The findings of the study lead to the conclusion that most Sub-Saharan African countries need to do more to boost access to finance for the unbanked and low income earners.

Keywords: Access to finance, human development, Sub-Saharan Africa.

JEL Classifications: E58, C33, I31.

INTRODUCTION

The human development is a process of widening the choices made by people which include, increasing education opportunities, health care services, income, productivity and empowerment. These choices form the bases for assessing the living conditions of the people (United Nations Development Programme, 2021). In other words, human development focused on average achievement made by a country in key dimensions of life like access to a good, long and healthy life, access to education and a decent standard of living. Health is a very important dimension of human development. Access to health and healthy living is recognized as a vital part of good living conditions. The health of a country is primarily reflected by life expectancy at birth which has increased in Sub-Saharan Africa (SSA) since 2000 yet remains below the global average (World Health Organization, 2021). Africa lags behind Asia, the continent with the second lowest average life expectancy, by nearly 10 years for both men and women, (UNCTAD, 2021). An Africa's life expectancy is 63.4 years on average, compared with 70.9 years worldwide (WHO, 2021).

In addition to a healthy living, education is another indicator of human development which helps in promoting skills and development for having a rewarding living condition. For this, the United Nations set the goals of ensuring that all children complete free, equitable and good basic education by 2030. However, countries in SSA are far from achieving the goal, as the quality of education is decreasing and some especially girls continue to face discrimination in terms of access to quality education, (United Nations Educational, Scientific and Cultural Organization, 2019). Thus, the poor health conditions and lack of access to quality healthcare and education, in SSA has not contributed significantly to progress in the human

development index of the region.

The United Nations Development Programme (2021) attests that SSA has not made enough progress in terms of human development since 2004 when compared to other regions of the world. In 2004, 55 countries were considered to have high HDI, while 86 have medium HDI and 36 have low HDI. Sub-Saharan African countries are not among the 55 nations with high human development scores, only Libya and South Africa were placed in the medium HDI countries. The 36 countries with lowest HDI score, are in Sub-Saharan Africa (United Nations Human Development, 2004). In 2021 the HDI for Organization for Economic Co-operation and Development countries stood at 0.899. Europe and Central Asia stood at 0.796, Latin America and the Caribbean has an index of 0.754, while East Asia and the adjoining countries stood at 0.749. The Middle East countries and South Asia records stood at 0.708 and 0.634 respectively, whereas Sub-Saharan Africa has a low HDI of 0.547 (UNDP, 2021).

It is generally believed that access to finance will help to facilitate the improvement in income level thereby enhancing healthy life, good education and a decent living conditions in both developed and developing countries by (Chinweze (2017). The role of finance on the economy especially as it relates to human development is clear from theoretical literature. Theories of (Galor & Zeira, 1993; Banerjee & Newman 1993 and Levine, 1997) brought out theoretical propositions supporting the positive impact of finance on economy outcomes. Thus, increasing financial access has been earmarked as important in welfare improvement as poor human development still ravages Sub-Saharan African economies (Rewilak, 2017).

However, studies have argued that majority of individuals in SSA are excluded from accessing financial services due to the unavailability of banks or other financial institutions in their area, as is the case in many remote rural areas in Sub-Saharan African countries (Simatele & Maciko, 2022; Peachay & Roe, 2004). Other individuals are excluded because of designed products from banks that do not serve their interest or due to the fact that they could not meet up with the requirements of opening an account. The Financial Access Survey (2017) and World Bank (2021) showed that in Sub-Saharan Africa, access to formal financial institutions is the lowest globally. The spread of automated teller machines (ATM) between 2011 and 2021 is lower than 6 ATMs per 100,000 adults on the average (only South Africa has of 60 ATMs per 100,000 adults). A similar scenario plays for the spread of commercial bank branches, where on average there are less than five commercial bank branches per 100,000 adults within the region (World Bank, 2021).

This poor financial access records in SSA have affected small businesses and production by households and firms which may have culminated to the rising poverty incidence, income inequality and poor human development records which characterized the region (World Bank, 2021). Approximately 40 percent of the SSA population lived in abject poverty in 2020 (World Bank, 2020). The increasing poverty level that makes Nigeria the poverty centre of the world characterized by insufficient finance and income is indicative of the need to examine the link between access to finance and human development in Sub-Saharan Africa. Following the introduction, the rest of the study is structured as follows. A review of theoretical and empirical literature is done in Section 2. Section 3 covers the data and method used for the analysis. Section 4 covers the findings and discussion of findings, while the study is concluded in section 5.

REVIEW OF RELATED LITERATURE

Conceptual Clarifications and Theoretical Literature

Most studies like Demirguc-Kunt et al. (2018) are unanimous that access dimension of financial inclusion entail adults that are able to secure loans or credits or have a transaction account. It also entails availability of financial institutions or facilities that aid acquisition of finance. In this study, access to finance is seen as the ability of individuals to have access to financial institutions and the products supplied by these institutions such as credits and deposits.

The theoretical framework is the vulnerable group financial inclusion theory. The theory explains the need to improve the living conditions of the low income group and bring them into formal financial services (Ozili, 2020). The theory proposed a social financial inclusion policy that will benefit the low income earners who are often the ones mostly affected during periods of adverse economic situations. It is therefore important to bring this group into the formal financial services and one of such ways of doing this is through cash social transfer policies. This theory is most appropriate in this study because many citizens of Sub-Saharan Africa countries fall under the poverty line who are classified as low income earners and hence facilitating access to finance will raise their living standard.

Review of empirical literature

Asongu and Nting (2021) examined the nexus between financial development and inclusive human development for African countries. The analysis was done using the Two-Stage Least Squares panel regression, Fixed Effects Model, the Generalized Method of Moments and the Tobit regressions. The result found that financial development variables of depth, activity and size leads to improvement in inclusive human development, while the inability of banks to channel mobilized deposits into credit for financial access negatively impacts on inclusive human development. Menyelim, Babajide, Omankhanlen and Ehikioya (2021) examined the impact of inclusive financial access on income inequality and economic growth in 48 countries in Sub-Saharan Africa for the period 1995 to 2017. Adopting the system GMM technique, the study found that inclusive financial access reduces income inequality.

Similarly, Okoro, Obiekwe and Okoro (2020) investigated the impact of access dimensions of financial inclusion on unemployment in Sub-Saharan economies with reference to Nigeria and Ghana from 1985 to 2018. Adopting dynamic panel statistical techniques, the study found that there exist a significant relationship between financial access and unemployment. Asongu, Nnanna, and Acha-Anyi, (2019) analyzed the effect of financial access in changing income inequality on gender economic inclusion in 42 Sub-Saharan African countries covering the period 2004-2014. The researchers employed the GMM and Fixed Effects model in analyzing the study. The analysis of the study from the GMM estimations found that financial access has a negative effect in altering the effect of the Palma ratio on female labour force participation while financial access have a positive effect in altering the effect of the Gini coefficient on female unemployment. Also, the result of the study found that financial access have a net negative effects in altering the Gini coefficient and the Palma ratio for female employment.

Bakari, Donga, Idi, Hedima, Willson, Babayo and Ibrahim (2019) examined the impact of access dimensions of financial inclusion on poverty reduction in forty nine Sub-Saharan African countries using data spanning the period of 1980 -2017. The study employ a static panel data model and the result revealed that savings, credits to the private sector as percentage of GDP, access to ATM, access to information Technology, Inflation, and government expenditure impact on poverty reduction in the sub-region. Datta and Singh (2019) studied the variations of financial access and its association with human development across 104 selected developed and developing countries for the period 2011 to 2014. The study adopted the principal component method to calculate the three dimensions of financial access and availability using a pooled OLS with clustered standard error regression model to analyze the study. The results of the study found that there is a wide variation in the level of financial access across high, medium and low developed countries. The study also found a positive relationship between the indices of financial inclusion and human development.

Empirical findings relating access to finance and indicators of wellbeing have also received attention across other regions. Studies such as Maity and Sahu, (2023) studied how bank branch penetration and ATM penetration influence financial inclusion in India for the periods from 2008–2009 and 2019–2020. The study adopted the Welch's t-test comparing bank branch penetration and ATM penetration; it further used a regression analysis to analyze how the bank branch, ATM network expansion and usage influence financial inclusion. The result of the study found no significant differences between the growth of bank branches and

ATM penetration. Also, the results of regression showed both bank branches and ATM usage has significant impacts on financial inclusion.

Ouechtati (2020) examined the impact of financial access on poverty and income inequality for a sample of 53 developing countries selected from different parts of the world between 2004 and 2017. The study employed three different dynamic panel data methods the bias-corrected fixed effects, difference GMM, and system GMM estimators to examine the impact of financial inclusion on poverty and income inequality. The study found that a high bank penetration rate and credit facilitate access to financial services for the poor and reduce income. The study also found that access to deposit accounts at commercial banks tends to significantly alleviate poverty. Also, Thathsarani, Wei and Samaraweera (2021) examined the role of access to finance on economic growth and human capital in South Asia using data from eight countries in South Asia from 2004 to 2018. The study employed a principal component analysis panel data vector error correction models and Granger causality test. The study found that financial access has a long-run impact on human capital development in South Asian countries, and has a short-run positive impact on economic growth.

Despite the multitude of literature reviewed particularly on Sub-Saharan Africa, it is an obvious fact that the aim of these studies is farfetched as poverty and poor human development in all facades of life characterize the SSA till date. This is an obvious attestation that further studies on access to finance is inevitable and hence this study.

METHODOLOGY

Sources of data

Data on ATM, commercial banks credit to private sector, number of bank branches, GDP per capita and commercial bank deposits were sourced from World Bank (2021) databank, while data on the human development index (HDI) were sourced from the United Nation Development Programme (2021) database, all covering the sample period from 2004 to 2021 for 45 SSA countries base on World Bank classifications. The study period and sample size are chosen due to data availability on financial access for Sub-Saharan Africa.

Method of Data Analysis

The study utilized the system Generalized Method of Moments (GMM) estimation technique suggested by (Arellano & Bover 1995), (Blundell & Bond 1998) for the analysis of the data. The two step GMM approach was chosen because it accounts for time-invariant omitted variables. At least a necessary condition needed for the adoption of this estimation technique is that the number of cross-sections should be higher than the number of years in each time series ($T < N$). This condition is met because we have 18 years (T) and 45 countries (N). The necessary post estimation tests are Arellano-Bond (AR) test for autocorrelation of the error term. There is also the Sargan and Hansen tests of over identifying restrictions specification tests to validate the instruments used in the estimation that are peculiar with the use of system-GMM.

Model Specification

The model that captures the link between financial access and human development index (HDI) is stated as follows;

$$HDI_{it} = PSC, ATM, NBB, CBDEP, GDP \dots \dots \dots (1)$$

Equation (1) is transform to a panel model specified as:

$$HDI_{it} = \alpha_i + \beta_1 PSC_{it} + \beta_2 ATM_{it} + \beta_3 NBB_{it} + \beta_4 DEP_{it} + \beta_5 GDP_{it} + \varepsilon_{it} \dots \dots \dots (2)$$

In order to also eliminate the individual effects and get a consistent estimate of α as $N \rightarrow \infty$ with T fixed, equation (2) is rewritten in first difference notations as:

$$HDI_{it} - HDI_{it-1} = \gamma_t - \gamma_{t-1} + \beta_0 \Delta HDI_{it-1} + \beta_1 \Delta PSC_{it} + \beta_2 \Delta ATM_{it} + \beta_3 \Delta NBB_{it} + \beta_4 \Delta DEP_{it} + \beta_5 \Delta GDP_{it} + \Delta \varepsilon_{it} \dots \dots \dots (3)$$

for $i=1, \dots, 45$ and $t=1, \dots, 18$.

The first difference operators in equation (3) have eliminated the unobserved individual-level effects (α_i) and removed the fixed effect elements from the model. This necessitated the following assumptions; First, the transient errors are serially uncorrelated (i.e. $E[\varepsilon_{it} \varepsilon_{is}] = 0$ for $i=1, \dots, N$ and $t \neq s$). Second, the initial conditions satisfy $E[hdi_{i1} \varepsilon_{is}] = 0$ for $t \geq 2$. Thus, hdi_{it-2} and earlier values are correlated with, Δhdi_{it-1} but not with $\Delta \varepsilon_{it}$. The values of hdi_{it} lagged one period or more are valid instruments in the first-differenced the model. As a result, the moment conditions hold for the first differences equations following (Arellano and Bond, 1991) are as follows: $E(\Delta \varepsilon_{it} hdi_{it-r}) = 0$; $E(\Delta \varepsilon_{it} X_{it-r}) = 0$, with $r = 2, \dots, t - 1$ and $t = 3, \dots, T$. However, to take into consideration the problem of endogeneity, the system GMM estimator is used which combines two sets of equations: the standard set of equations in first differences and an additional set of levels equations and is specified as.:

$$HDI_{it} = \alpha_i + \gamma_t + \beta_0 HDI_{it-1} + \sum_{j=0}^1 \beta_{1j} PSC_{it-j} + \sum_{j=0}^1 \beta_{2j} ATM_{it-j} + \sum_{j=0}^1 \beta_{3j} NBB_{it-j} + \sum_{j=0}^1 \beta_{4j} CBDEP_{it-j} + \sum_{j=0}^1 \beta_{5j} GDP_{it-j} + v_{it} \dots \dots \dots (4)$$

$$E(\alpha_{it} \Delta hdi_{it}) = 0; \quad E(\alpha_{it} \Delta x_{it}) = 0$$

where; $i = 1, 2, \dots, 48$ (countries); $t = 1, 2, \dots, 18$ (years – 2004-2021), and ε is the error term. The intercept term (α_i) carrying subscript suggests that the intercepts of the selected countries may be different. The coefficients $\beta_1 \dots \beta_4$ are elasticities because they measure the rate of change, (α_i) is the intercept. Equation (2) is the system GMM estimator which takes into consideration the problem of endogeneity and combines two sets of equations: the standard set of equations in first differences and an additional set of levels equations.

Measurement and description of variables

HDI is the Human Development Index –the dependent variable, while HDI_{t-1} is the one period lag of HDI; and other variables used as the independent variables (indicators of financial access) are defined as follows; Credit defined as the ratio of private sector credit to GDP(PSC/GDP) it is a measure of financial access; ATM is defined as number of automatic teller machines per 1000 adults-also a measure of how people can access financial services; NBB is the spread of commercial bank branches (per 100,000 adults) which is also a measure of financial access. It is expected that the more access to financial services the populace have,

the more improved their human development indicators. Also, commercial bank deposits (CBDEP) is included in the study to account for how people make use of formal financial services. The control variables used in the study is income (proxied by GDP), previous studies such as (Okoro, Obiekwe & Okoro, 2020; Bakari, Donga, Idi, Hedima, Willson, Babayo & Ibrahim, 2019; and Datta & Singh, 2019) have found a positive relationship between income and measures of human development.

Robustness check

To check the robustness of the system two step GMM results, the paper estimated another econometric technique – the quasi-maximum likelihood (QML) estimation of linear dynamic (GMM) technique with a short time horizon. The QML technique proposed by (Kripfganz, 2016) was adopted following (Bhargava and Sargan, 1983) for dynamic random-effects models and (Hsiao, Pesaran, and Tahmiscioglu, 2002) for dynamic fixed-effects models. The QML was used a robust check technique because it has the advantage of using a fixed number of orthogonality conditions independent of the sample size. It also boast of making use of the entire available sample, hence may yield more efficient estimator than the GMM (Hsiao, Pesaran & Tahmiscioglu 2002).

RESULTS AND DISCUSSION

Result

The descriptive statistics of the variables is presented in table 1, from the table, numbers of ATM, number of bank branches and deposits with commercial banks have observations 801, 797, 759 and 557, while HDI and GDP growth have 810 data observations. HDI has a mean of 0.51057 and a standard deviation of 0.10274, which indicates how close the standard deviation deviates from the mean, implying that human development index has increased by 0.51057 on average. Niger has the minimum value for the human development index in SSA, while Mauritius has the highest value.

Table 1: Descriptive statistics

	Obs	Mean	Std. dev	Maximum	Minimum
HDI	810	0.51057	0.10274	0.8170	0
PSC	801	10.0495	16.4932	92.5253	0
ATM	797	17.6401	16.9399	104.8486	0
NBB	759	6.2375	8.85002	55.071	0
DEPCB	557	313.5788	437.6448	2424.755	0
GDPGR	810	4.08828	4.87184	37.9987	0

Source: Authors computation using stata

The number of bank branches which is one of the proxies for access to financial services has a mean of 6.2374 per cent and a standard deviation of 8.85 per cent, indicating that the standard deviation and the mean also are not different from the other. Congo Republic has the least value in the spread of commercial branches in SSA, while Seychelles has the highest spread of bank branches. In the distribution of commercial banks private capital in SSA, Mauritius has the highest value while Congo Democratic.

Republic has the lowest value. In the spread of ATMs per 1000 adults, Ethiopia has the lowest value while Mauritius has the highest value. The result of the two step system GMM used to address the objective of the study is presented in table 2.

Table 2: Two step system GMM result

Variable	Coefficient	Std. error	p-value
Constant	0.0518909	0.0185206	0.008***
L.HDI	0.8766861	0.0386054	0.000***
ATM	0.0003606	0.0001802	0.052***
PSC/GDP	0.0002873	0.0001033	0.008***
NBB	-0.0001873	0.0003905	0.634
DEPCB	0.0005613	0.0001919	0.005***
GDP	0.0004175	0.0001235	0.002***
AR (1)	z = -2.15; (pr>z = 0.032)		
AR (2)	z = -1.66; (pr>z = 0.096)		
Sargan test (OIR)	chi2(25) = 12.35; (Prob > chi2 = 0.983)		
Hansen test (OIR)	chi2(25) = 28.37; (Prob > chi2 = 0.291)		
DHT for instruments			
Hansen test excl.group	chi2(23) = 26.96; (Prob > chi2 = 0.258)		
Diff (null H exogenous)	chi2(2) = 1.41; (Prob > chi2 = 0.494)		
IV (eq. diff)			
Hansen test excl. group	chi2(24) = 27.58; (Prob > chi2 = 0.278)		
Diff (null H exogenous)	chi2(1) = 0.71; (Prob > chi2 = 0.375)		
Observations	753		
No of groups	45		
No of instruments	32		
Wald (F-test)	F(6, 44) = 25853.87; Prob > F = 0.000		

Source: Authors computation

Note: *** indicates significance at 1%, ** and * indicates significance at 5% and 10%.

(OIR-over identification restrictions; DHT-difference in Hansen test)

DISCUSSION OF FINDINGS

From the two step GMM result in table 2, the first lag of human development index has a positive relationship with current value of human development index; implying the past values of human development index in Sub-Saharan Africa affects the current values or follows the future pattern. A percentage increase in past values of human development index leads to 88 percent increase in current values of human development index in SSA. This implies the past values of the indicators that make up the human development index in SSA such as health, education and income affect their current values. Two of the indicators of access to financial services, number of ATMs per 1000 adults and commercial bank credits

to the private sector have positive impact on human development index in Sub-Saharan Africa. The number of automatic teller machine has a significant and positive impact on human development index in SSA. The same is applicable to commercial banks private sector credit, where commercial banks private sector credit has a positive and significant impact on human development index in SSA. The positive sign of commercial bank credits on human development index is in line with the findings of (Thathsarani, Wei & Samaraweera, 2021), (Bakari, Donga, Idi, Hedima, Willson, Babayo & Ibrahim (2019) and (Ouechtati 2020). These studies found that access to commercial bank credits has a positive impact on human development index and its indicators.

Moreover, the study also found that bank branch expansion has a negative and insignificant relationship with human development index in SSA. This result is contrary to that of (Ouechtati 2020), which found that high bank penetration reduces income inequality. The study also found that the control variable, income proxied by GDP has a significant positive impact on human development index in SSA. This implies that income proxied by GDP is an important determinant of improvement in human development index in SSA. This finding corresponds with the result of (Okoro, Obiekwe & Okoro, 2020; Datta & Singh, 2019) who found also reported a positive relationship between income and indicators of human development. In addition, the overall effectiveness of the GMM result is good as pointed by the AR(1), AR(2) and the result of the Hansen *J* statistics . The AR (1) and AR (2) shows that there is no serial correlation while the Hansen *J* statistics confirmed that the instruments are not over-identified.

Robustness checks

The robustness of the two step GMM findings is checked by estimating quasi-maximum likelihood (QML) linear dynamic (GMM) technique using the same time period. The QML estimates confirmed the GMM findings indicating that financial access indicators (number of ATMs per 1000 adults, access to credit and spread of bank branches) have a significant impact on human development index in SSA. The result of the QML was subjected to a Hausman test and the test favoured the random effect result, which is shown in table .

Table 3: Robustness check – QML Result (random effect)

Variable	Coefficient	Std. error	p-value
Constant	0.15599	0.011493	0.000***
L.HDI	0.667745	0. 0230628	0.000***
NBB	0.000886	0. 0003217	0.006***
ATM	0.003137	0.0011158	0.005***
PSC	0.000197	0.0000985	0.045**
DEPOSIT	0.00000556	0.00000573	0.332
INCOME	0. 0004478	0. 0001974	0.023**

Source: Authors computation

Table 4: Hausman test for robustness check (QML) result

Test: Ho: difference in coefficients not systematic	
$\chi^2(3) = (b-B)'[(V_b-V_B)^{-1}](b-B)$	
$\chi^2(3)$	= 0.08
Prob> χ^2	= 0.9942

CONCLUSION AND RECOMMENDATIONS

This study examined the relationship between access to financial services and human development in Sub-Saharan Africa using two-step system Generalized Method of Moments panel data covering the period 2004–2021. It examined the impact of access to credit and spread of bank branches, and automatic teller machines (ATM) per 1000 adults on human development index in Sub-Saharan Africa. The study found that commercial bank private sector credits and number of ATM per 1000 adults have a positive significant impact on human development index in Sub-Saharan Africa. The study revealed that access to financial services through automatic teller machines impact on human development in SSA more than other indicators of financial access. The study also reported that income proxied by gross domestic product (GDP) is one of the determinants of human development index in SSA.

Based on the findings, the study recommends that the government of various Sub-Saharan African countries should introduce more credit policies that will target the poor and low income group. This include reducing the costs and charges on credits for the low income earners and building more bank agents and automatic teller machines that will provide financial services to the populace especially the unbanked. To conclude, it is important to improve access to financial services in SSA in order to achieve the different financial inclusion targets and goals of many Sub-Saharan African countries. This has been found to be a strong factor leading to improvement in human development index.

However, despite the robustness of the result, the study faced few limitations. Using the World Bank classifications of countries in Sub-Saharan Africa, few countries were not included due to unavailability of data making the study time period less than the number of cross-sections (N) covered. As a result the study could not examine the existence of long-run or short-run relationships between financial access and human development in SSA. However, the inability to examine this does not affect the analysis of this study but this could add more value for future studies.

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APPENDIX

List of sub-Saharan African countries included in the study

Angola, Benin, Botswana, Burkina Faso, Burundi, Cape Verde, Cameroon, Central African Republic, Chad, Comoros, Congo Republic, Congo Democratic. Republic, Cote d'Ivoire, Equatorial Guinea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Guinea, Kenya, Lesotho, Liberia, Madagascar, Mali, Malawi, Mauritania, Mauritius, Mozambique, Namibia, Nigeria, Niger, Sao Tome and Principe, Seychelles, Senegal, Sierra Leone, South Africa, Sudan, Rwanda, Togo, Tanzania, Uganda, Zambia, Zimbabwe.