

# Access to Finance and Sustainable Human Development: Does Institutional Quality Matters in Developing Countries?

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**Abstracts:** Access to finance plays an important role in boosting economic activities, human capital development and access to health care, which promote human well-being. This study examines the heterogeneous relationship between access to finance and sustainable human development in 21 developing countries, from 1996 to 2020. The study uses group-mean FMOLS and DOLS estimators with deterministic trend. The results show that the three proxies of access to finance promote sustainable human development in developing countries, but the effect of number of ATMs per 100,000 people is higher than that of number of commercial bank branches and domestic credit to private sector. The results also show that institutional quality matters as it enhances the positive effect of access to finance on sustainable human development for all the three proxies of access to finance. Government spending, Institutional quality and FDI found to promote sustainable human development in the long run. To promote sustainable human development, policymakers should pursue policies, programs and incentives that motivate commercial banks to establish more branches and ATMs not only in urban centres but also in villages and remote locations.

**Keywords:** Access to finance, Sustainable human development, Institutional quality, Panel data, Developing countries.

## 1. INTRODUCTION

Access to finance plays an important role in promoting economic activities by providing different financial services such as savings, loans, insurance, mortgages, remittances, payments, internet and mobile banking [1,2]. Access to finance refers to the ability of individuals, households or firms to get affordable financial services in an economy [3]. Access to finance is an important dimension of financial inclusion, as it includes not only accessibility but also usage of financial services. [4] emphasise that for financial system to be inclusive, it has to ensure availability, accessibility and usage of affordable financial services to all members of the society. Individual and firms who involuntarily have no access to financial services “unbanked” are considered financially excluded [5]. Although significant progress has been made in increasing global financial inclusion, almost 31% of adult population (age 15+) in the world have no access to financial services (IMF, 2021).

Access to affordable finance facilitates day-to-day business activities at firms' level, and support household to live a happy life. People with access to financial services can easily start a new business or expand the existing one, acquire human capital, have access to health care services, take care of unforeseen risks and emergencies, thereby, enjoy higher sustainable human development [6]. Sustainable human development concerns with enlarging people's choices, freedoms and opportunities to improve their overall well-being [7]. The existence of market imperfections such as information asymmetry and moral hazards distort the efficient allocation of productive resources, that made some people and firms not to have access to affordable financial services, hence, they are financially excluded [8]. Interestingly, as financial sector develops and the efficiency increase, higher transactions cost brought by market imperfections decreases, thereby, increase access to finance, consequently higher welfare [9]. Nevertheless, sustainable human development in this study means long run human development.

Literature established that access to finance not only boost economic growth, but also alleviate poverty, reduces income inequality [10,11]; promote human capital development [8]; sustainable human development [12–15]. However, lack or lower access to financial services exacerbate income inequality, poverty, unemployment, illiteracy, lower capital formation and investment, hence low sustainable human development [12–15]. In addition, without access to finance, individuals and firms with innovative ideas have to rely on their personal savings or informal sources of finance [11]. Thus, access to affordable finance is a key to decent living as it provides needed funds to individuals and firms, facilitate human capital development, serves as a means of storing value, capital accumulation and investments [18].

This study examines the dynamic relationship between financial access and sustainable human development in developing countries. The argument here is that, access to finance will promote human capabilities, which directly enhances human development. However, previous studies paid little attention to financial access in developing countries, which is more important than the availability of finance. Although finance may be available, access to it may be limited due to certain factors, for instant, required documentations, collateral security, financial illiteracy and lack of income. Therefore, it is vital to examines the access to finance in connection with sustainable human development in developing countries, where, more than 50% of adults have no access to formal financial services. Moreover, it has been established that strong institution facilitates efficient allocation of resources, implement good regulations, protect property right and rule of law [19,20]. Thus, this study argues that the effect of access to finance on sustainable human development can be enhanced where there exist strong institutions. This study choses Dynamic Ordinary Least Square (DOLS) and Fully Modified Ordinary Least Square (FMOLS) estimators because of its power on endogeneity and unobserved common factors, whether in homogenous or heterogenous panel setting.

The rest of this article is organised as follows. Part two, discusses the relevant literatures; in part three, methodology and data; part four, present results and discussions; in the last part, the study concludes and provide policy implications.

## **2. LITERATURE REVIEW**

Theoretical postulations recognised the importance of financial development in promoting economic growth and development. However, the concerns now in the literature is on the accessibility and usability of financial services for all individuals and firms, to achieve equal opportunities and shared prosperity [21]. When financial access is expanded, small and medium scale firms will have access to funds, facilitate the entry of new firms with innovative ideas and rises household expenditure, consequently higher growth and development [22]. Similarly, access to affordable finance provide employment, investments, reduces income gap and vulnerable population, hence, promote economic growth and development [23]. In his work, [24] maintained that inclusive financial system as development strategy, facilitate equitable distribution of the benefits of economic growth to disadvantage members of the society, especially people from minority and female gender. However, inability of individuals and firms to have access to affordable formal finance is the reasons why the income gap keep widening, hence low sustainable human development [14].

The debates on alternative measure of wellbeing necessitate the emergence of sustainable human development approach in the 90s, built on enlarging and enriching overall societal welfare [25]. Instead of growing GNP/GDP as being popularised by growth theories, human development is anchored on human capabilities, “to do” and “be” what they aspire in life. The basic capabilities are being knowledgeable, healthy and decent living, which formed the basis of sustainable human development index (HDI) as conceived in sustainable human development report [26]. According to [27] capabilities are what human beings are capable of doing or being that promote their wellbeing, and the achieved capabilities are “functionings”. [28] emphasise that access to finance enhances conditions for the development of human capabilities to achieve functionings, which directly promote human development.

Providing affordable finance to individuals and firms hitherto outside the financial system, will boost economic activities, promote capital formation and investments, human capital development, employments, income, growth and development [16]. Thus, to achieve a well-functioning economy, formal financial products and services should be made available and accessible to all, especially the productive sectors of the economy and individuals with innovative ideas [14]. In his study, [24] argued that access to finance provide individuals an avenue to save, to access credits, invest in human capital, obtains mortgages, insure themselves against unforeseen risks and emergencies, hence, achieve higher sustainable human development . Moreover, [15] argued that increasing access to finance is synonymous to increasing the level of financial inclusion he further argued that access to finance can be increase through electronic social security transfers directly to the beneficiaries, thereby, promote efficiency, cut mismanagement and effective services delivery.

Numerous studies in the literature established the connection between financial development and GDP growth empirically [29–32]. However, the argument is that, is the finance accessible to all? The study by [11] shows that access to finance ameliorate inequality and promote welfare. Similarly, [33] found that access to finance favour the equitable distribution of income in African countries. Also, [34] examines the determinants of inclusive financial system and how its moderate remittance-welfare relationship. The study reveals that financial inclusion enhances the positive effect of remittance on income inequality in developing countries. In another study, [35] found that availability and accessibility of finance mitigate income inequality in both urban and rural areas. Whereas, [36] reported that inclusive sustainable human development promotes quality human capital in sub-Saharan Africa. Moreover, financial inclusion found to promote human development [14,16,21,37,38]

Contrarily, [15] show that financial inclusion has no connection with poverty and sustainable human development in south east Asia, while, it has increasing effect on income inequality. In another study by [39] found that microfinance banks deviated from initial conceptualisation of pro-poor and promoting small scale enterprises, unable to promote wider access to finance, consequently, negatively affect inclusive development. Nonetheless, the bulk of previous studies reviewed focuses on the effect of financial inclusion on human development, poverty and income inequality, that directly or indirectly affect welfare. However, only few studies focused on the effect access to finance and sustainable human development, hence this study will fill this gap by exploring the heterogenous connection between access to finance and sustainable human development in developing countries, using cointegrated methods of FMOLS and DOLS estimators provided by [40] based on group-mean with deterministic trends.

### 3. METHODOLOGY AND DATA

#### 3.1. Methodology

This study examines the dynamic relationship between access to finance and sustainable human development in 20 developing countries, from 1996 to 2020. These countries were selected based on the availability of full data set; hence this study has balanced data. The study employs Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) estimators to examine the long run relationship between access to finance and sustainable human development. The FMOLS estimator is based on nonparametric correction bias, while DOLS is based on parametric correction bias, with lags and leads derive from differenced regression, together with endogeneity bias regression. Considering the fact that OLS regressions exhibit substantial bias standard errors with very low D.W. statistics, which makes t-statistics of little importance, however, for inferential point of view, DOLS and FMOLS performs better than OLS as they provide efficient and less bias estimators [41]. The work of [40] provided the framework model for group mean FMOLS and DOLS estimators based on as follows

$$\hat{\beta}_{iF} = N^{-1} \sum_{i=1}^N \left[ \sum_{t=1}^T (Z_{i,t} - Z_i^*)^2 \right]^{-1} \tag{1}$$

$$\hat{\beta}_{iD} = \left[ N^{-1} \sum_{i=1}^N \left( \sum_{t=1}^T W_{i,t} W_{i,t}^* \right)^{-1} \left( \sum_{t=1}^T W_{i,t} W_{i,t}^* \right) \right] \tag{2}$$

From equation (1) and (2)  $Z_{i,t} = (Z_{i,t} - Z_i^*)$  and  $W_{i,t} = 2(k + 1) \times 1$ , Where  $Z_i^*$  stand for the average of  $Z_{i,t}$  and  $\Delta Z_{i,t-k}$  is the differential of Z for i cross-section at time period t.

The FMOLS and DOLS estimators provide efficient and consistent coefficients when the data is stationary at level or at first difference, and are also cointegrated. Thus, this study uses group-mean FMOLS and DOLS as provided by Pedroni, (2001). Both the DOLS and FMOLS are asymptotically equivalent. They provide long run

coefficients of cointegrating variables, takes into account the endogeneity, serial correlation and unobserved common factors that may have different effect on individual cross sections, thereby, at the same time produce consistent, and efficient estimators [42]. However, DOLS estimators are considered to have considerable power when compared with FMOLS, as they do not require pre-estimation and nonparametric correction, because they fully parametric in nature [41]. Therefore, this study follows the model of [43] that examine the role of human capital in growth. Where, economic growth is replaced with sustainable human development, and human capital is replaced with access to finance. The model is as follows:

$$HDI_{it} = \beta_i AF_{it} + \beta_i X_{it} + \mu_{it} \quad (3)$$

From the equation [3], HDI is the proxy of human development, AF represent the proxy of access to finance (CB, ATM & DC), X is the vector of control variables,  $\beta$  is the parameter to be estimated,  $\mu$  is the normal error term for individual cross section (*i*) at time period (*t*). the empirical model is given by the following

$$HDI_{it} = \beta_0 + \beta_1 LAX_{it} + \beta_2 LGE_{it} + \beta_3 LFDI_{it} + \beta_4 LIQ_{it} + \mu_{it} \quad (4)$$

Equation (4) is the basic model, the variable of interest is Access to finance (LAF), proxy with 3 variables: commercial bank branches per 100,000 people (LCB), number of ATMs per 100,000 (LATM) and domestic credits to private sector (LDC); LGE stand for government final consumption expenditure, FDI is foreign direct investment, LIQ is institutional quality,  $\beta_0$  is the intercept and  $\beta_1$  to  $\beta_4$  are the parameters.

$$HDI_{it} = \beta_0 + \beta_1 LCB_{it} + \beta_2 LGE_{it} + \beta_3 LFDI_{it} + \beta_4 LIQ_{it} + \beta_5 (LAF \times LIQ)_{it} + \mu_{it} \quad (5)$$

Where in equation (5),  $LAF \times LIQ$  is the interaction term that evaluate the effect of access to finance on sustainable human development conditioned upon institutional quality. The study uses the three dimensions of access to finance (LCB, LATM and LDC) for the interaction with institutional quality (LIQ). The  $\beta_5$  is the interaction coefficient to be estimated.

### 3.2. Data

The variables of this study are explained briefly below

### 3.3. Sustainable Human Development

Sustainable human development is the dependent variable of this study. Human development simply refers to enlarging people's choice, opportunities and freedom to lead a decent life. Thus, sustainable human development in this study means long run human development. Sustainable human development is multidimensional and cannot be measured with a single variable. This study uses human development Index (HDI) as proxy for sustainable human development. This index is constructed using dimensions of knowledge, healthy life and per capita income, which is considered comprehensive measure of well-being than the traditional GNP/GDP per capita [44,45]. The data is obtained from United Nations Development Programs (UNDP). Although the index suffers some criticism of ignoring other dimensions, still is considered much better, as the current report on sustainable human development is adding additional dimensions, like inequality and multidimensional poverty, only that no long time series available so far.

### 3.4. Access to Finance

Access to finance is one of the dimensions of financial inclusion. Basically, access to finance means that supply of financial services is available and affordable. However, access to financial services is different from the use of financial services. Whereas, the use of financial services relate to the actual consumption of financial services, access refers to availability and affordability of financial services [3]. Although the supply of financial services may

be readily available, but some people may chose not use them (voluntarily exclusion), while, others may want to use them but they have restrictions, like bad credit record, lack of income or minority group (involuntarily exclusion). This shows that, access to finance include both the demand and supply of financial services, while the use of financial services indicates the demand side only. For instance, even if financial services are available (access), they have to be affordable (access) before people start demanding them (use). Thus, the cost of accessing financial services determine the intersection of demand and supply for financial services. Hence, the lower the cost of access to finance, the higher the number of people using the financial services.

Therefore, to measure access to finance in developing countries, this study follows by using number of commercial banks branches per 100,000 people, automated teller machines (ATMs) per 100,000 people and domestic credit to private sector (% of GDP). The number of commercial banks branches and ATMs per 100,000 measure the physical access of finance, representing the supply side, while, the domestic credits to private sector measure the use of financial services, representing the demand angle of financial services. The data is obtained from world development indicators, world bank database.

### 3.5. Control Variables

This study employs four control variables that according literature have significant influence on sustainable human development. First, the study uses government final consumption expenditure as percentage of GDP (%GDP). Government final consumption expenditure includes all government expenditures on goods and services. Thus, higher government expenditure means higher quality services in education, health and other essential infrastructures, hence higher sustainable human development [46]. The second control, this study uses institutional quality. Capability approach to sustainable human development recognises the importance of in institutions in promoting human capability to achieve better functioning [18]. Previous studies established that quality institutions promote efficient allocation of resources, curve mismanagement, control corruption, promote impartial application of rule of law and regulatory laws [16,28,47] This study expects that institutional quality to have positive effect on sustainable human development. The third control variable, this study uses foreign direct investment (FDI) to control for external shocks to the economy. FDI is being considered as an additional income to the economy, which facilitate transfer of technology and provide employments, hence uplift human well-being [48,49]. This study also expects FDI to have positive effect on sustainable human development. The data for all the control variables are obtained from world development indicators, world bank database.

### 3.6. Estimation Strategy

The estimation strategy includes the following diagnostic checks:

### 3.7. Cross-section Dependency Tests

Literature established that, pooling individual cross-sections may likely produce significant dependency in the errors. Cross-section dependency may result from the presence of common shocks and unobserved common factor that affect the error term, spatial dependence and idiosyncratic pairwise dependency with any particular pattern [50]. Therefore, it is important to determine the nature of the cross-section dependency and magnitude of the correlation between the individual units for the choice of efficient estimator [51]. If the interdependency across the panel is as result of unobserved common factors, uncorrelated with the regressors, then, fixed effect and random effect will be consistent but not efficient estimators, because the standard errors are biased. However, where the unobserved common factors are correlated with regressors, dynamic panel methods will produce consistent and efficient estimators. Two cross sectional dependency tests that include [52] LM test and [53] Cross-section Dependency (CD) test are as follows:

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\nu}_{i,j}^2 \quad [6]$$

The LM statistics is valid when  $T > N$

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left( \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{y}_{i,j} \right) \quad (7)$$

Where Pesaran (2004) CD statistics is valid for  $N > T$ , and  $T$  relatively large as well as unbalanced panel; LM is more efficient in large sample.

### 3.8. Panel Stationarity Tests

One of the advantages of using panel unit root tests instead of univariate tests is the power obtained from pooling individual cross-sections. Nevertheless, ignoring cross-section dependence in testing the null of panel unit root can result in deceptive conclusion [54]. There are two generations of panel unit root test. The first-generation tests ignore the cross-section dependency, while the second-generation account for cross sectional dependence. This study uses first generation panel unit root as provided by [55] and second generation panel unit root provided by [56] known as Cross-section Augmented IPS (CIPS) test.

$$CIPS_{NT} = N^{-1} \sum_{i=1}^N t_i(N, T) \quad (8)$$

Equation (8) is the CIPS model that account for cross-section dependency.

### 3.9. Panel Cointegration Test

Most of the economic data achieve stationarity at first difference. Cointegration test is use to determine whether the independent and dependent variables have long run relationship, hence, they move together in the long run. In other words, cointegration test confirmed that two or more variables have a unit root, but their linear combination will become stationary. Panel cointegration tests are available in two forms. Residual based test by [57] while maximum likelihood test by [58] considered first generation tests. While, [59] develop four cointegration statistics for testing long run relationship, that account for cross-sectional dependency, considered as second generation test.

$$P_r = \frac{\hat{\delta}_i}{SE(\hat{\delta}_i)} \quad \text{and} \quad P_\delta = T \hat{\delta} \quad (9)$$

$$G_r = \frac{1}{N} \sum_{i=1}^N \frac{\hat{\delta}_i}{SE(\hat{\delta}_i)} \quad \text{and} \quad G_\delta = \frac{1}{N} \sum_{i=1}^N \frac{T \hat{\delta}_i}{\hat{\delta}_i(1)} \quad (10)$$

In equation (9)  $P_r$  and  $P_\delta$  are based on panel statistics and equation (10)  $G_r$  and  $G_\delta$  are based on group mean statistics. Thus, this study will use second generation panel cointegration tests by [59]. It also uses one first generation tests based on maximum likelihood by [60]

### 3.10. Panel Causality Tests

The shift in panel data econometrics from micro-panel with large  $N$  and small  $T$ , to macro-panels, with large  $N$  and relatively large  $T$  increases the time series problems of non-stationary and non-causality in panel data. [61] extended the Granger causality test to capture causality in panel data. The DH test is provided as follows

$$y_{it} = \alpha_i + \sum_{k=1}^K \delta_{ik} y_{it-k} + \sum_{k=1}^K \beta_{ik} x_{it-k} + \mu_{it} \tag{11}$$

Thus,  $y_{it}$  and  $x_{it}$  are dependent and independent observations for stationary variables in period  $t$  for cross-section  $i$ . This study uses [60] to evaluate the causal link between the study variables, with the null hypothesis of Wald test as  $H_0 = 0$ .

#### 4. RESULTS AND DISCUSSIONS

One of the most important diagnostic checks in panel data is to examine the cross-section dependency in order to determine whether to use first or second-generation method to analyse the data. The results of cross-section dependency tests in tables 1 reject the null hypothesis of no cross-section dependency in Breusch-Pagan LM test, Bias-Corrected Scaled LM test and Pesaran CD test. Thus, sustainable human development (LSHD), access to finance (LCB, LATM & LDC), government expenditure (LGE), institutional quality (LIQ) and foreign direct investment (LFDI) have cross-section dependency, hence only methods that account for cross-section dependency will produce consistent and efficient estimators.

**Table 1.** Cross-Section Dependency Tests.

Variables	Breusch-Pagan LM test	Bias-corrected scaled LM test	Pesaran CD test
LSHD	2366.80*** (0.00)	144.66*** (0.00)	48.427*** (0.00)
LCB	784.53*** (0.00)	42.531*** (0.00)	8.323*** (0.00)
LATM	1587.60*** (0.00)	94.369*** (0.00)	34.565*** (0.00)
LDC	909.25*** (0.00)	50.582*** (0.00)	15.7899** (0.00)
LGE	803.22*** (0.00)	43.738*** (0.00)	15.079*** (0.00)
LFDI	204.17*** (0.00)	5.069*** (0.00)	4.3409*** (0.00)
LIQ	534.09*** (0.00)	29.269*** (0.00)	9.4911** (0.00)

**Note:** \*\*\*, \*\* & \* stand for 1%, 5% & 10% level of significance, and the values in the parenthesis ( ) contains the standard errors.

The results of descriptive statistics in table 2 shows that average LSHD value is 0.478 and the maximum is 0.983, which shows that countries like Botswana and Fiji have medium level of human development, while some like Malaysia have very high human development. The average value of access to finance indicators shows that there 2.4 bank branches and 3.35 ATMs per 100,000 people respectively. Also, the measure of skewness and kurtosis shows that the data not normally distributed. Table 3 is the correlation matrix and it shows that all the regressors have a positive correlation with the regressed (LSHD). There is no any correlation higher than 70% which is less than 80% above which multicollinearity may arise in the data [62]

**Table 2.** Descriptive Statistics.

Statistics	LSHD	LCB	LATM	LDC	LGE	LFDI	LIQ
Mean	0.478	2.442	3.359	3.681	2.754	1.040	0.021
Median	0.344	2.549	3.501	3.757	2.782	1.124	0.141
Maximum	0.983	3.651	5.223	5.005	3.590	4.165	1.468
Minimum	0.260	0.920	-1.708	0.765	1.007	-3.345	-1.079
Std. Dev	0.154	0.576	1.105	0.852	0.337	0.991	0.648
Skewness	-1.792	-0.467	-2.006	-0.832	-1.004	-0.993	-1.370
kurtosis	6.722	2.853	8.752	3.726	7.280	3.726	2.136

**Note.** L attached to variables means the variable is in logarithms form.

**Table 3.** Correlation Matrix.

Variables	LSHD	LCB	LATM	LDC	LGE	LFDI	LIQ
LSHD	-	0.122	0.288	0.059	0.147	-0.032	0.057
LCB	0.249	-	0.285	0.144	0.379	-0.141	-0.282
LATM	0.331	0.585	-	0.237	0.492	-0.271	-0.343
LDC	0.066	0.444	0.137	-	0.359	-0.169	-0.285
LGE	0.171	0.379	0.092	0.359	-	-0.328	-0.103
LFDI	-0.019	-0.141	-0.271	-0.169	-0.328	-	0.124
LIQ	0.203	-0.282	-0.343	-0.285	-0.103	0.124	-

Based on the result of cross-section dependency tests, this study uses CIPS test that account for cross-section dependency and Maddala and Wu test that did account for cross-section dependency. The results presented in table 4 failed to reject the null hypothesis of unit root at level, but it was rejected at first difference for all the variables except LFDI that achieve stationarity at level in Maddala and Wu test. Thus, based on CIPS results, all the variables are stationary at first difference I (1). In table 5, the results of panel cointegration tests failed to accept the null of no cointegration in 3 out of 4 statistics by [59] at 1%. Also, the result of Kao (1999) test also failed to accept the null of no cointegration at 5%. Similarly, the results of [60] tests failed to accept the null of no cointegration at 5% for at most 3. Therefore, results from all the two different cointegration tests confirmed that the study variables are cointegrated, hence have long run relationship. This validates the choice of FMOLS and DOLS estimators by this study, as they can only be use with cointegrated variables [41].

**Table 4.** Panel Unit Root Tests.

Variables	Maddala and Wu		CIPS	
	Level	1st Diff	Level	1st Diff
LSHD	4.439 (1.00)	54.861*** (0.01)	1.129 (0.87)	-5.033*** (0.00)
LCB	17.739 (0.98)	50.116** (0.02)	2.433 (0.99)	-5.806*** (0.00)
LATM	18.421 (0.97)	58.977*** (0.00)	4.642 (1.00)	-2.032** (0.02)
LDC	30.298 (0.55)	62.806*** (0.00)	-0.602 (0.27)	-2.553*** (0.01)
LGE	29.200 (0.61)	119.15*** (0.00)	2.223 (0.99)	-7.512*** (0.00)
LFDI	47.144** (0.04)	60.052*** (0.00)	-1.158 (0.12)	-3.776*** (0.00)
LIQ	41.739 (0.12)	55.491*** (0.00)	4.591 (1.00)	-6.473*** (0.00)

Note: \*\*\*, \*\*&\* stand for 1%, 5% &10% level of significance, and the values in the parenthesis () contains the standard errors.

**Table 5.** Panel Cointegration Tests.

Westerlund test		Johansen fisher test		
Statistics	Value	Hypothesis	Trace test	Max-Eigen test
Gt	-7.643***	None	323.0***	206.3***
Ga	-5.027***	At most 1	179.7***	107.1***
Pt	-0.836	At most 2	98.8***	56.12***
Pa	-4.117***	At most 3	67.44***	47.23**

Note: \*\*\*, \*\*&\* stand for 1%, 5% &10% level of significance.

Table 6 present the results of FMOLS and DOLS using group-mean estimators with deterministic trends by [40]. Sustainable human development (LSHD) is the dependent variable; access to finance (LCB, LATM and LDC) is the variable of interest. The results for FMOLS show that LCB is positive and insignificant in model 1, while LATM and LDC are positive and significant in models 2 and 3 at 1% respectively. Similarly, the results for DOLS reveals that LCB, LATM and LDC are positive and significant in model 1-3 at 1% level respectively. Therefore, all the three proxies of access to finance used in this study has positive and statistically significant effect on sustainable human development in 5 out of the 6 models estimated. These results mean that when access to finance increase by 1%, human development will increase between 0.08% to 0.29% in developing countries.



Table 6. FMOLS and DOLS Results.

DV: LHDI	FMOLS			DOLS		
Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
LCB	0.022			0.289***		
LATM		0.096***			0.079***	
LDC			0.087***			0.078***
LGE	0.023**	0.089***	0.088**	0.076**	0.060	0.118***
LFDI	0.002**	0.005**	0.004**	-0.006***	0.017**	0.009***
LIQ	0.043***	0.039**	0.008	0.059***	0.162***	0.088***
Number. of Obs.	352	352	352	320	320	320
Adjusted R-squared	-16.149	-24.526	-26.302	-361.62	-134.20	-142.42

Note: \*\*\*, \*\*&\* stand for 1%, 5% &10% level of significance.

These findings confirm the assertion that increasing geographical coverage of financial institutions, by establishing more branches and ATMs centres especially in remote locations, will provide easy access to financial services [3,14,63]. The result is also in line with the literature that higher percentage of domestic credit to private sector, boost economic activities, employments and income, hence, higher human development [64]. Moreover, the result is consistent with the findings that providing access to financial services to people and communities excluded from formal financial system, will enable them access basic healthcare and education [8,21], reduces income inequality [3], ameliorate poverty and income inequality [65], consequently, promote higher level of sustainable human development . However, using micro level data, [11] reported positive effect of access to finance on inequality in Nigeria, which is contrary to the findings of this study.

The results of the three control variables in table 6 shows that, first, government final consumption expenditure (LGE) produce positive and statistically significant coefficients in 5 out of 6 models estimated. These results means that government spending have positive effect on sustainable human development. This result is consistent with the assertion that government spending is an injection to the economy, which rises effective demand and production [66,67], hence, higher economic growth and development. Secondly, foreign direct investment (LFDI) reveals positive and statistically significant long run effect on sustainable human development at 1% level, in 5 out of the 6 models estimated in table 6. These findings is in line with the findings of [48,68] that increasing level of FDI promote higher sustainable human development. Thirdly, the coefficients of institutional quality found to have positive and significant coefficients in 4 out of 6 models in table 6. These findings revealed the significance of better institutions in promoting sustainable human development. The results confirmed the assertion in the literature that quality institutions promote efficient allocation of resources, curb wastages, control corruptions and quality regulations, which directly improve overall well-being [69].

Table 7. FMOLS and DOLS Results with Interactions.

DV: LHDI	FMOLS			DOLS		
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
LCB	-0.735**			-0.767		
LATM		0.0004			0.0018***	
LDC			0.0028***			0.0012
LGE	-0.676**	0.0044**	0.0089**	0.0028**	-0.0014	-0.707
LFDI	0.003***	0.0003	0.0020	0.0036	-0.007***	0.0016
LIQ	0.020***	0.0236***	0.0204***	0.0054	-0.075***	0.024***
LCB*LIQ	0.256**			0.0010**		
LATM*LIQ		-9.570**			0.0023***	
LDC*LIQ			0.0240***			0.2739
Number. of Obs.	352	352	352	320	320	320
Adjusted R-squared	-16.149	-11.138	-17.080	0.992	-134.20	431.521

Note: \*\*\*, \*\*&\* stand for 1%, 5% &10% level of significance.

The results of interaction in table 7 show that the coefficients of interaction between access to finance and institutional quality on sustainable human development revealed positive and statistically significant coefficients in 5

out of the 6 models estimated for FMOLS and DOLS. These findings mean that institutional quality enhances the positive effect of access to finance on sustainable human development. The findings explain that better institutions promote efficient allocation of financial resources, protect property rights, rule of law and improve regulatory quality, hence, encourages financial institutions to open branches and ATMs centres even in remote localities, increases investment in financial infrastructures and increase the domestic credit to private sectors. These will propel economic activities, increases income, capital formation, investments, employments, consequently, sustainable human development [16,64]. However, the insignificant coefficient of interaction in model 3 for DOLS indicates low effect of institutions when bank branches was use as a proxy for access to finance model.

**Table 8.** Panel Causality Test Results by Dumitrescu & Hurlin, (2012).

Null (H <sub>0</sub> )	W-statistics	Direction	Null (H <sub>0</sub> )	W-statistics	Direction
LSHD ≠LCB LCB ≠LSHD	4.184** 4.160**	↔	LATM ≠LGE LGE ≠LATM	4.659*** 4.456**	↔
LSHD ≠LATM LATM ≠LSHD	3.399**** 5.590	→	LATM ≠LFDI LFDI ≠LATM	3.710** 2.308**	↔
LSHD ≠LDC LDC ≠LSHD	6.79 3.746**	→	LATM ≠LIQ LIQ ≠LATM	4.938 2.998	
LSHD ≠LGE LGE ≠LSHD	5.620 5.608		LDC ≠LGE LGE ≠LDC	3.121 1.783	
LSHD ≠LIQ LIQ ≠LSHD	4.789*** 4.186**	↔	LDC ≠LFDI LFDI ≠LDC	2.980 3.398	
LSHD ≠LFDI LFDI ≠LSHD	3.134 2.133		LDC ≠LIQ LIQ ≠LDC	7.841*** 5.567	→
LCB ≠LGE LGE ≠LCB	5.058 4.149**	→	LGE ≠LFDI LFDI ≠LGE	1.588 2.973	
LCB ≠LFDI LFDI ≠LCB	1.601 2.152		LGE ≠LIQ LIQ ≠LGE	3.169 3.088	
LCB ≠LIQ LIQ ≠LCB	4.315** 3.839**	↔	LFDI ≠LIQ LIQ ≠LFDI	2.899 5.267	

**Note:** \*\*\*, \*\*&\* stand for 1%, 5% &10% level of significance

Table 8 present the results of panel causality test based on [61], The results show that there is bidirectional causality between number of commercial banks branches (LCB) and sustainable human development (LSHD). This means that increasing the number of commercial banks branches per 100,000 people will promote sustainable human development and vice versa. A unidirectional causality was found between number of ATMs per 100,000 people (LATM) and sustainable human development. This means that the causality runs from number of ATMs to sustainable human development. Moreover, unidirectional causality is reported from sustainable human development to domestic credit to private sector. These findings justified the results in table 6 that providing affordable access to financial services promote long run sustainable human development [70,71]. The result also reveals bidirectional causality between sustainable human development and institutional quality (LIQ). Bidirectional causality between institutional quality and sustainable human development; and similarly bidirectional causality between LATM and government expenditure (LGE). Nevertheless, the causal link between other explanatory variables is insignificant, except LIQ and LCB with bidirectional, unidirectional from LGE to LCB, unidirectional from LIQ to LDC.

### 5. CONCLUSION AND POLICY IMPLICATIONS

This study examines the heterogenous dynamic relationship between access to finance and sustainable human development in developing countries. Basically, all the three dimensions of access to finance that include number of commercial banks per 100,000 people, number of ATMs per 100,000 people and domestic credits to private sector positively affect long run sustainable human development. Thus, this study concluded that access to finance promote long run sustainable human development in developing countries. This study also concluded that

institutional quality matters in access to finance-sustainable human development nexus, as the institutional quality conditioned the positive effect of access to finance on sustainable human development. Moreover, government final consumption expenditure, FDI and institutional quality plays an important role in promoting long run sustainable human development in developing countries.

### **5.1. Policy Implications**

This study provides an important finding that access to finance is a significant determinant of long run sustainable human development in developing countries. Although the goal of all human societies is to promote sustainable human development, policymakers in developing countries should devise policies that can promote access to finance in their countries. Incentives or concession should be given to commercial banks to establish branches and ATMs centres especially in remote areas, around minority groups and border communities. Moreover, needed documentation for opening new bank account should be reduce to make it easier for people to have access to formal financial services. In addition, policymakers should implement cashless policy and programs that will compel people voluntarily excluded to open bank account before accessing certain essential services rendered by government agencies. Also, policymakers should promote building strong institutions capable of controlling corruptions and mismanagement, providing quality regulations, protect rule of law and peoples' freedom, which directly promote human development, or indirectly increases financial access, thereby promote sustainable human development. Lastly, policymakers should also attract FDI, that can provide job opportunities and transfer of technology, by making information of investment opportunities available to prospective investors and maintaining a good image of the country as a good investment destination.

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#### **Conflict of interest**

The authors have no competing interest to declare for this research.

#### **Data availability**

The data used for this study were obtained from World development indicators, world bank data base and sustainable human development report by United Nations Development Programs (UNDP). The data is available with the corresponding author on reasonable request

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