



---

**THE IMPACT OF DEVELOPMENTS IN FINANCIAL INSTITUTIONS ON HUMAN DEVELOPMENT IN SUB-SAHARA AFRICA COUNTRIES: APPLICATION OF SYSTEM GMM PANEL DATA ANALYSIS**

**ANUYA, DAVID ENASAVWERIE (PhD)**

*Department of Banking and Finance, Delta State Polytechnic, Otefe-Oghara, Nigeria*

---

**Abstract**

*The study examines the impact of developments in financial institutions on human development in Sub-Saharan Africa countries from year 2000 to 2019. Particularly, the study examines the three dimensions of financial institutions development in term of access, depth and efficiency on human development. To achieve this objective, the study employed the GMM dynamic panel framework based on Arellano and Bond's (1991) first difference approach. While lagged levels of the dependent variables for different periods are used as the instruments to control the endogeneity bias associated with dynamic panel specifications, the model adequacy is determined using the J-statistic (Sargan's test) and the Arellano-Bond first and second order serial correlation tests. The result reveals that financial institutions development is highly significant to human development within the SSA region under the period consideration. Emphasising that development in financial institutions has positive and significant impact on human development. Thus, development in countries financial institutions in terms of access, depth and efficiency would lead to higher human development in general for SSA Counties. The study therefore, recommended that SSA countries focus on developing and implementing policies and program that will critically improve developments in financial institutions if they must achieve higher human development.*

**Keywords:** *Financial Institutions, Human Development, GMM Panel Data Analysis*

---

**Introduction**

For many countries over the years, evidence are abound that financial institutions offer valuable and indispensable services for economy growth and development. By improving on the financial infrastructure, business environment, investment, and fighting poverty, the financial system is vital and essential for successful growth and development of any economy. Economists supporting the theory that a developed,

well-functioning and efficient financial system can sufficiently mobilize savings and allocate resources by choosing safe and profitable investment projects and avoids inequality, facilitates the exchange of goods and services, impacts on poverty, helps to diversify risks and subsequently improve economy growth and development (Greenwood, Sanchez & Wang, 2010). Financial sector is said to be develop when there exist improvement in efficiency and competitiveness; improvement in regulation; stability of the financial sector; increase in financial services; increase in diversity of institutions that operate in the sector; increase in how capital is allocated by private financial institutions and when more of the population have access to financial services in order to reduce poverty (DFID, 2004).

Financial institutions provide an intermediation service that brings excess fund owners and fund users together, thereby channelling investment funds to the uses that yield the highest returns, thus increasing specialization and the division of labour (Todaro et al., 2003). Risk is pooled, transferred, and reduced by deposit money banks while liquidity and information increase through the use of progressively more sophisticated financial products and technology. The financial status of the individual institutions soundness and viability of the economy determines clearly the financial structure's capacity to perform its functions effectively to a large extent. The more viable and stronger the banking sector, the more capital it can generate and transfer from the surplus to the deficit units of the economy. This promotes the financial development and leads to the growth of economy. The provision of credits to potentials projects and business will promotes and increase industries and subsequently promote innovation and growth (Vazakidis & Adamopoulos, 2009). The role of financial development in reducing information asymmetry and pricing risk is essential for economic growth (Murinde, 2012). Interest rates, savings, investment, and loans play an essential role in human development as they characterize macroeconomic growth (Simplice, 2011). Financial institutions development is determined according to the role they play in effectively directing the savings created within the economic system to investments (Güneş, 2013). While access to financial institution resources requires a complicated process in most cases due to risk and transaction costs, this has implications for human development as well. Ease of access to financial resources and financing can contribute to growth by facilitating entrepreneurship and increasing risk management capacity in a society (Pischke, 1997). At the same time, effective resource allocation in a financial system, productive investment, innovation, and human welfare-enhancing effects are seen (Pischke, 1997).

Human development as measured average achievements of three basic dimensions of a country's development: health, knowledge and income (real GDP) is increasingly seen as the ultimate goal of development rather than economic growth. Moreover, developments in human development are not only a key developmental goal, but

human development itself has made a significant contribution to economic growth over time. However, studies that examine the relationship between the financial institutions development levels of the states and the human development levels by taking into account the human life standards are scanty in literature when compared studies on the relationship of the financial sector development towards economic development . It is interesting to observe that after decade of economic and financial reformation in the sub-Sahara Africa countries little development has taken place. Sub-Sahara Africa region with much endowed resources for development, still at the early stage of development, making it the poorest, least developed and focus of international aid agencies. Most financial institutions in the region are absolutely and relatively small, having low loan-to-deposit ratios, large shares of assets held in the form liquid and government securities while lending is mainly short-term in nature as well as there is still an un-served groups in rural areas that need such financial institutions. Within the region, access to traditional financial services is low. The population that operates financial institution's account or borrow from financial institution is low in relation to other regions. Given the significance of small and medium enterprises (SMEs) in creating employment and reducing poverty, lacks of financial infrastructure to support their activities in the region's financial systems is a major setback for development. Evidence revealed that the region's businesses in general are disadvantaged owing to less access to finance than competitors in other regions.

It is therefore the study objective is to examine empirically the impact of developments in financial institutions (dimensions of access, depth, and efficiency) on human development in sub-Saharan Africa Countries during the period 2000-2019 using the GMM Dynamic Panel Data Analysis, based on the data of 41 sub-Sahara Africa countries whose data are fully available. The rest of the paper is structure as follow: section 2 presents the literature review while section3 discusses methodology and data issues. Section 4 and 5 present empirical analysis and discussion of results, and conclusion respectively

### **Literature Review**

Ferraz et. al. (2019) used advanced methods from Data Envelopment Analysis (DEA) to measure absolute capability values and the social efficiency of 129 Brazilian mesoregions, considering their heterogeneous financial means. They presented a new indicator called Capability Index Adjusted by Social Efficiency (CIASE) that evaluated the human development performance of regions based on their absolute levels of deprivations as well as their social efficiency in translating limited financial resources into human development. They also introduced a Deprivation and Financial Responsibility based Prioritization Index (DFRP) that helped to identify priority regions for higher public expenditures in human development. Their results

for the case of Brazil showed that several poor regions performed relatively better in terms of social efficiency than in terms of absolute human development. Conversely, several rich regions performed relatively worse in terms of social efficiency than in terms of absolute values

Satrovic (2017), studied the relationship between long-term and short-term financial and human capital development in Turkey from 1986-2015 using the ARDL approach. Financial development was measured using two proxy variables: broad money (% of GDP) and liquid debts (% of GDP). The results showed a significant positive impact of human capital on broad money (% of GDP) and liquid debts (% of GDP) in both short and long terms. Pesaran, Shin and Smith's ARDL boundary test confirmed the existence of a long-term relationship.

Cheshti (2017) examined the relationship between the two and the ways of making it complimentary by analysing the various indices of Human development (as developed by the UNDP) and various indices of the financial development in terms of access, depth, efficiency and stability. It was observed from the 78 study that the financial development is essential and has got a good prospect for ensuring Human Development.

Alimi (2015) empirically examined in 7 Sub-Saharan African countries: Nigeria, South Africa, Lesotho, Malawi, Sierra Leone, Botswana and Kenya, the nexus between financial deepening and economic development. The investigation employed the GMM panel data estimator method for year 1981 to 2013. Using real GDP and domestic credit to private sector, the study indicates that financial development in the selected countries' panel did not support economic development, thus providing support for independent hypothesis. The study also indicate that only the interest rate had a positive impact while foreign direct investment inflows to GDP had negative impact based on their determinants considered in the estimated model.

Sehraqt and Giri (2014) analyzed the relationship between financial development indicators and the human development in India using annual data between 1980-2012. Long-term relationships and short-term dynamics were examined by applying the Autoregressive Distributed Lag Model (ARDL) boundary test approach. Three proxy variables were used in this study to measure the financial development: First, the ratio of private-sector loans to GDP, second, the share of loans provided by the banking sector in GDP, and the rate of the broad money supply to GDP. Granger causality test and variance decomposition techniques were also used to examine the impact of financial development indicators on human development. The results confirm a long-term relationship between the variables. Granger causality results show that one-way causality is from financial development indicators to the human development index. Variance decomposition analysis reveals that among all financial signs, broad money supply (M3) is the indicator that contributed the most to the changes in human development in India.

Zaman et. al. (2012) investigated the impact of financial indicators on human development in Pakistan by using annual data from 1975 to 2010. Data was analyzed by cointegration theory, Granger causality test and variance decomposition, etc. The results revealed that financial development indicators act as an important driver for an increase in human capital in Pakistan. Results indicate that causality runs from financial indicators to human capital except credit to private sector (CPS) but not vice versa. Financial indicators were closely associated with economic growth and human development in Pakistan. Variance decomposition analysis showed that among all the financial indicators, broad money supply (M2) made the largest contribution to changes in human capital.

Monacelli, Iovino and Pascucci (2012) presented a cross-country evidence of the role of the financial system in promoting human development, using data from 68 countries from 1990-2005. Various measures of financial development concerning both financial market and financial architecture were robustly associated with the Human Development Index, a composite indicator of health, education and income. The analysis also identified the main policy channels through which financial reforms enhancements affect the Human Development Index.

Sarma (2012). Examine empirically the relationship between financial inclusion and human development across countries. The author found that the levels of human development and financial inclusion in a country moved closely with each other, although a few exceptions existed. The correlation coefficient between IFI and HDI values and ranks were calculated to be 0.82 and 0.85 respectively implying significant positive correlation between the two indices. The results also showed that income level and financial inclusion in a country moved closely with each other. A majority of the high income countries are the high IFI countries.

Asongu (2011) assessed the determinants of human development from the financial dynamics of depth, efficiency, size, and activity on data from 38 developing countries. While the importance of financial activity, size, and depth (in decreasing order) are significant for inequality-adjusted human development, financial allocation efficiency significantly undermines welfare. Policy implication results do not support financial allocation efficiency as a driver of human development.

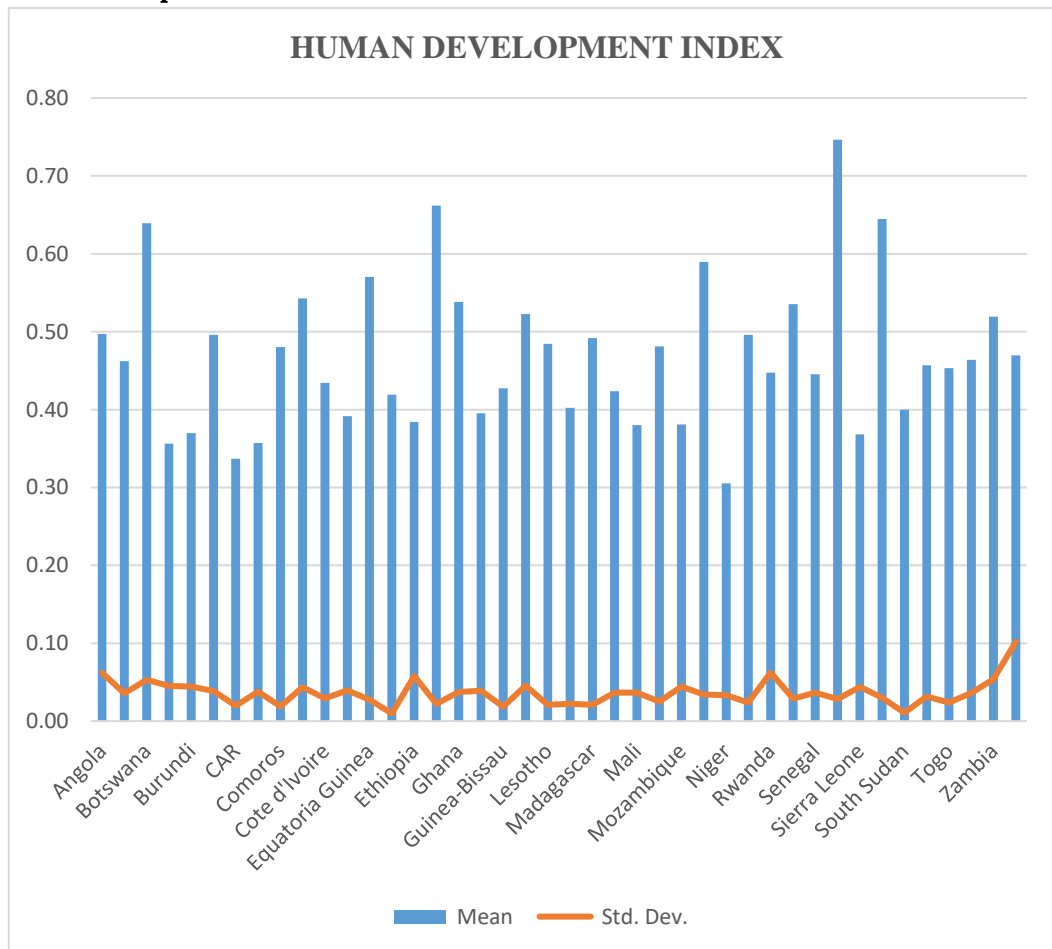
Based on panel data from 137 banks in 29 countries in sub-Saharan Africa for 1980 to 2002, Kablan (2010) assesses the determinants of the banking system efficiency and the degree of financial growth. The study uses stochastic frontier analysis (SFA) to calculate efficiency and the Arellano and Bover (1995) generalized moment method (GMM) framework. The study follows the intermediate approach and the value-added theory in evaluating the outputs and inputs of SSA banks while using GDP per capita, non-performing loans, return on equity, and percentage of the population as variables of bank efficiency. The results show that SSA banks are generally cost-efficient at 76 percent given their strategy of transforming deposits

into short and long-term loans, but nonperforming loans undermine efficiency, highlighting moral hazard problems, which suggests that improvement in the regulatory and credit environment are needed to make SSA banking system more efficient. Per capita GDP against conventional wisdom has significant negative impact on cost-efficiency of SSA banks, suggesting its importance as a factor affecting the banking sector. The result also indicated the adverse effect on financial development in SSA by inflation, banks concentration (dominance of the system by a few banks), political and the economic environment.

Ranis, Stewart, and Ramirez (2000) state that public spending in health and education is essential, especially in the chain of economic growth to human development, and there is a significant two-way relationship. In the chain of human development to economic growth, the critical factors are investment rate and income distribution.

**Research Methodology**

**Data Description**



**Figure 1: Mean and Standard Deviation for Human Development Index**

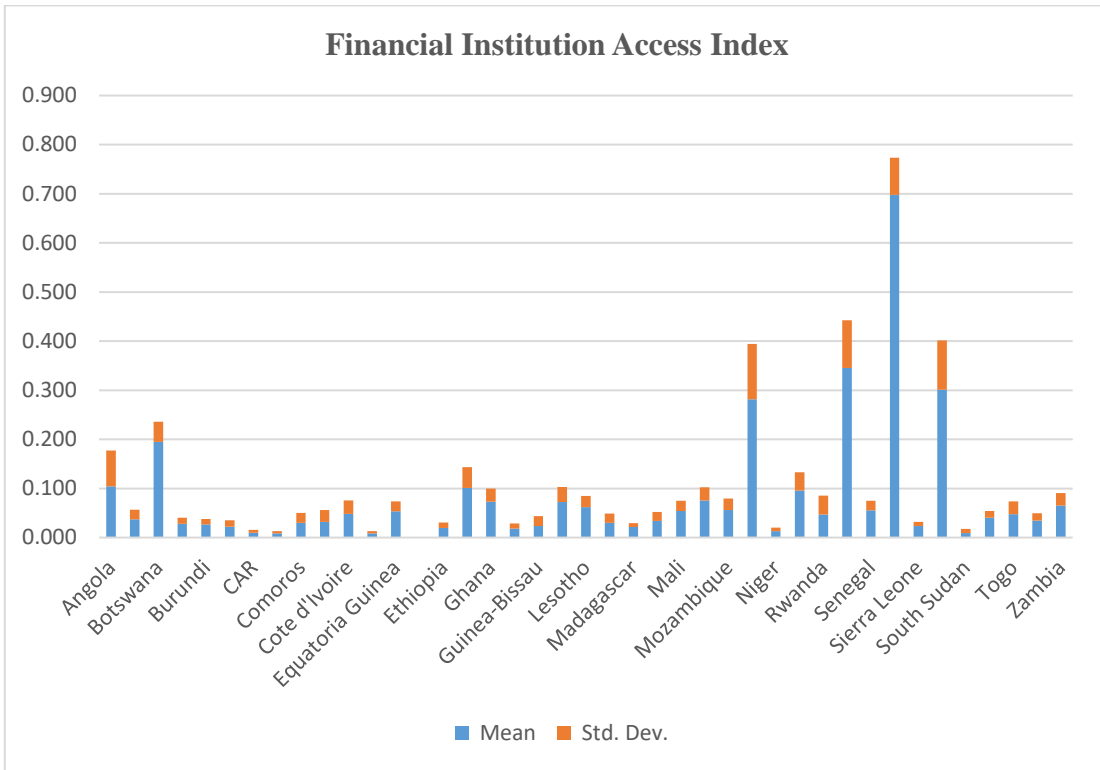


Figure 2: Mean and Standard Deviation for FIAI

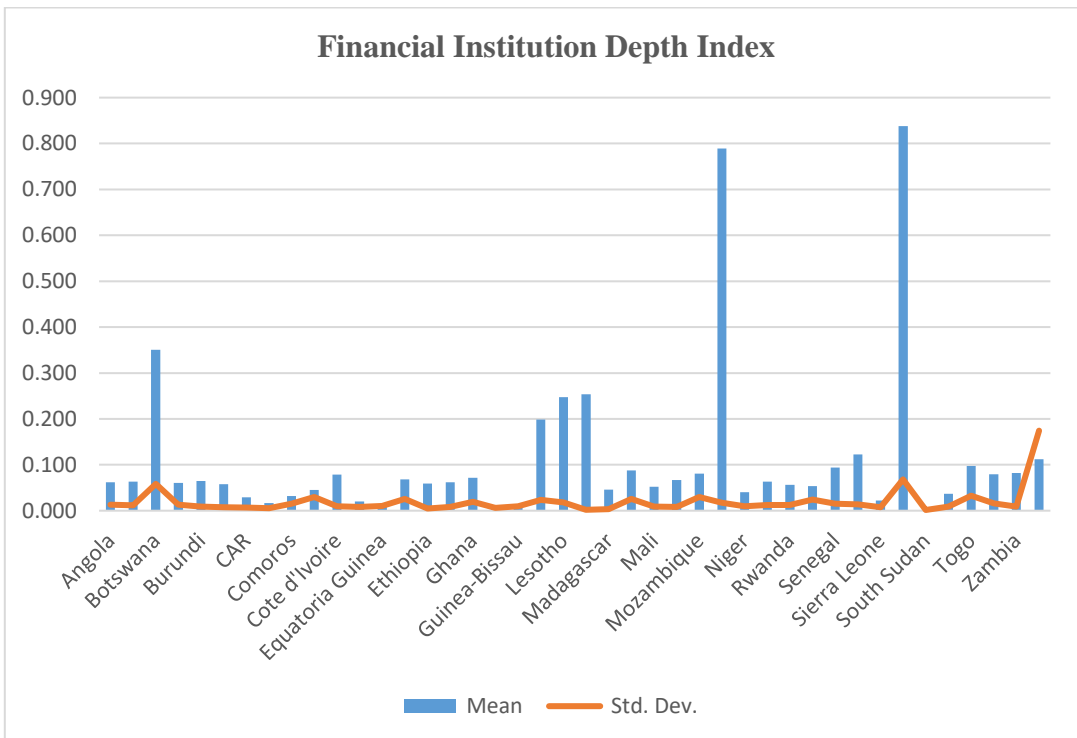


Figure 3: Mean and Standard Deviation for FIDI

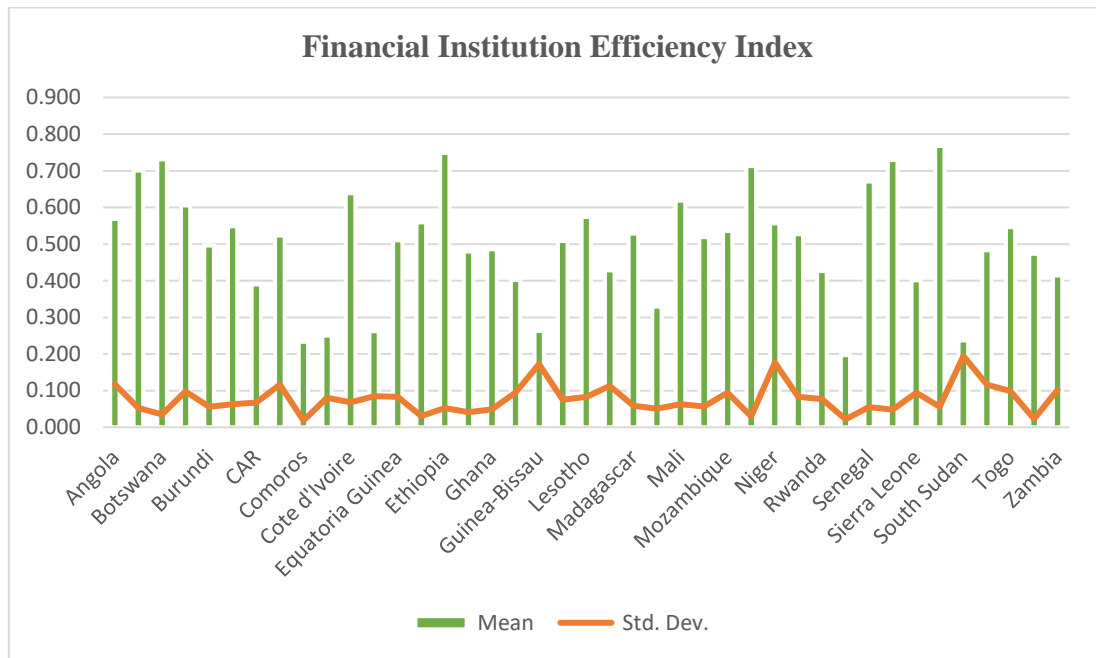


Figure 4: Mean and Standard Deviation for FIEI

### Model Specifications

This paper employed the GMM dynamic panel analysis based on the first difference Arellano and Bond (1991) approach to examine the impact of developments in financial institutions on human development in SSA Countries. The framework, that is based on instrumental variables, is particularly used because of the large body of evidence suggesting that it is suitable for controlling the possible endogeneity bias arising from the possibility that the causal relationship between dimensions of developments in financial institutions and human development.

The econometric representation of our model is given as follow:

$$\Delta HDI_{it} = \phi_0 + \phi_1 \Delta HDI_{it-1} + \phi_2 \Delta FIAI_{it} + \phi_3 \Delta FIDI_{it} + \phi_4 \Delta FIEI_{it} + v_{it}$$

Where;

*HDI* = Human Development Index

*FIAI* = Financial Institutions Access Index

*FIDI* = Financial Institutions Depth Index

*FIEI* = Financial Institutions Efficiency Index

$\Delta$  is the first difference operator, and  $\phi_0$  is the regression intercepts, and  $v_{it}$  is the error terms. Whereas  $\phi_1$  captures the effect of past innovation in human capital development. The slope  $\phi_2$ , capture the effects of financial institutions access index on human development index and  $\phi_3$  capture the effects of financial institutions depth while  $\phi_4$  capture the effect of financial institutions efficiency index. The subscript  $i$  represents the cross-sectional dimension of the panel data while the subscript  $t$  represents the time index.



**Empirical Analysis and Discussion of findings**

**Model estimation and Results**

For our empirical model, log of human development index is specified to depend on the three dimensions of development of financial institution; namely, financial institution access, financial institution depth and financial institution efficiency. Tables 1 and 2 show the estimation results for the dynamic panel GMM methods. Whereas Table 1 shows the model parameter estimates, Table 2 shows the model fit statistics and diagnostic tests. To control for endogeneity problem associated with dynamic panel GMM estimation, lags of the dependent variable (HDI) from 2 to 5 as instruments for each period.

**Table 1: Panel GMM Results**

Variable	Coefficient	p-value
HDI(-1)( $\phi_1$ )	0.9359	0.0000
FIAI ( $\phi_2$ )	-0.0074	0.0000
FIDI( $\phi_3$ )	0.1491	0.0000
FIEI ( $\phi_4$ )	-0.0067	0.0000
<b>Wald (<math>\phi_2 = \phi_3 = \phi_4 = 0</math>)</b>	6055.48	0.0000

Source: E-Views output

**Table 2: Model Diagnostic Tests**

Statistic	Value
<b>Instrument rank</b>	41
<b>J-statistic</b>	37.911
<b>Prob(J-statistic)</b>	0.4275
<b>AR(1)</b>	-3.6912 (0.0002)
<b>AR(2)</b>	0.6056 (0.5447)

Source: E-Views output

From Table 1, we can see that like all previous cases,  $\phi_1$ , which is the autoregressive coefficient in the HDI model, has an estimate of 0.9359 with a p-value of 0.0000, a confirmation that lagged human development index is positive and highly significant relation with current per capita income. Again, this shows that, *ceteris paribus*, an increase in the current period human development index would lead to an increase in the next period human development index in sub-Saharan Africa. Further, whereas FIAI ( $\phi_2 = -0.0074$ ) and FIEI ( $\phi_4 = -0.0067$ ) both are associated with negative coefficients, FIDI ( $\phi_3 = 0.1491$ ) has a positive coefficient. Thus, human

development index moves in opposite direction with both financial institution access and financial institution efficiency but moves in similar direction with financial institution depth. However, the three financial institution variables; FIAI (p-value = 0.0000), FIDI (p-value = 0.0000) and FIEI (p-value = 0.0000) all are associated with a zero probability, suggesting that their effects on HDI are highly statistically significant. The Wald statistic (p-value = 0.0000) is also associated with a zero probability, indicating that the combined effect of FIAI, FIDI and FIEI on HDI is highly statistically significant.

From Table 2, the instrument rank is 41, which, like all previous cases, is greater than the number of the model coefficients, hence, suggesting that our GMM model is overidentified. However, the J-statistic, which tests the validity of the included instruments, has a p-value of 0.4275, indicating that the Sargan validity test is statistically insignificant. Thus, at all conventional significant levels, there is no evidence to reject the null hypothesis of valid overidentifying restrictions, implying that our fitted GMM model for human development is well specified. Further, the first order Arellano-Bond statistic ( $AR(-1) = -3.6912$ , p-value = 0.0002) has the expected negative sign and is highly statistically, whereas the second order statistic ( $AR(-2) = 0.6056$ , p-value = 0.5447) is statistically insignificant. Therefore, we conclude that the model residuals have no serial correlation in levels, which further validates our GMM results.

## **Discussion of Findings**

### **Financial Institutions access and human development index**

The result indicates that financial institutions access is negative and highly significant with human development index. With the negative coefficient of -0.0074 on FIAI ( $\phi_2$ ), human development index moves in opposite direction with financial institution access. The removal of friction in financial institutions is therefore essential to poverty reduction, income inequality and economic growth. Therefore, barrier to financial access and usage lead to an undeveloped financial sector. With the negative coefficient of -0.0074 on FIAI ( $\phi_2$ ), human development index moves in opposite direction with financial institution access. The low level of HDI in the region may be concerned larger population living in rural areas and the dominance of banks branches in the urban centres. It is also attributed to high incidence unemployment opportunities leading to poverty, fall in living standard and ultimately not meeting human development goals.

### **Financial Institutions depth and human development index**

The result shows that financial institutions depth is positive and highly significant with human development index in SSA countries. The positive coefficient of 0.1491 on FIDI ( $\phi_3$ ) indicates that financial institution depth moves in similar direction with

human development index. Holding other factors constant, an increase in financial institution depth would lead to increase in human development. Theories hold that the more available liquid money is, the more opportunities exist for continued increases in ability of firms and individuals to access the basic services. In contrast, financial shallowness limits monetary, fiscal and exchange rate policy choices, impedes opportunities for hedging and diversification of risk hence retards human development.

#### **Financial Institutions efficiency and human development index**

The result reveals that financial institutions efficiency is negative and highly significant with human development index. The negative coefficient of  $-0.0067$  on FIEI ( $\phi_4$ ) indicates that human development index moves in opposite direction with financial institution efficiency in the study of sub-Saharan African countries. Thus, an increase in financial institutions efficiency when other factors are held constant, would lead to a decrease in human development. Meaning that if financing functions are performed well the financial system will contribute positively to human development and prosperity.

#### **Conclusion and Policy Recommendation**

Although, across countries there exist noticeable differences in how developments in financial institutions impact on levels of human development. But collectively, literature has shown that financial institutions development has a strong positive relationship to human development. Higher level of financial institutions development suggests that well-functioning financial sectors are efficient in allocating capital to its most productive uses. Consistent with some studies, the dynamic panel data result from this study reveals that the relationship between developments financial institutions and human development in sub-Saharan African countries is highly significant for the period under consideration. Emphasising that development in financial institutions has positive and significant impact on human development. Thus, development in countries financial institutions in terms of access, depth and efficiency would lead to higher human development in particular and economic growth and development in general for SSA Counties

The study therefore, recommend that Sub-Saharan African countries focus on developing and implementing policies and program that will critically improve on developments of financial institutions if they must achieve higher human development.

#### **References**

- Alimi, R.S. (2015). Financial deepening and economic growth in 7 sub-Saharan Africa: An application of system GMM panel analysis. *Journal of Empirical Economics*, 4(5), 244-252.
- Asongu, S. (2011). Financial determinants of human development in developing countries. African Governance and Development Institute WP/11/012.

- Cheshti, S. (2017), Financial development as an agent of the human development: An economic perspective and prospects of human excellence, *International Journal of Advanced Research and Development*, 2(4), 212-216)
- Department of International Development (2004). The Importance of Financial Sector Development for Growth and Poverty Reduction. *Policy Division Working Paper*. London: DFID.
- Ferraz, D., Mariano, E., Rebelatto, D., & Hartmann, D. (2019). Linking Human Development and the Financial Responsibility of Regions: Combined Index proposals using methods from Data Envelopment Analysis. Available at SSRN 3401374.
- Greenwood, J., Sanchez, J. & Wang, C. (2010). Financing development: The role of information costs. *The American Economic Review*, 100, 1875-1891.
- Kablan, S. (2010). Banking efficiency and financial development in sub-Saharan Africa. *IMF Working Paper* 10/136, African Department, Washington, D.C.: International Monetary Fund.
- Monacelli, T., Iovino, L., & Pascucci, F. (2012). Financial Development and Human Development Index., <https://www.semanticscholar.org/paper/Financial-Development-and-Human-Development-Index->
- Murinde, V. (2012). Financial development and economic growth: Global and African evidence. *Journal of African economies*, 21(suppl\_1), i10-i56.
- Ranis, G., Stewart, F., & Ramirez, A. (2000). Economic growth and human development. *World development*, 28(2), 197-219.
- Todaro, M.P., & Smith, S.C. (2009). *Economic development* (10th ed.). Boston: Addison Wesley. United Nations. (2011). Millennium goals. Retrieved August 15th, 2018, from <http://www.un.org/millenniumgoals/bkgd.shtml>.
- Satrovic, E. (2017). Financial Development and Human Capital in Turkey: ARDL Approach. *Cappadocia Academic Review*, 1(2), 1-15.
- Sehrawat, M., & Giri, A. K. (2014). The relationship between financial development indicators and human development in India. *International Journal of Social Economics*, 41(12), 1194-1208.
- Simplice, A. (2011). Financial determinants of human development in developing countries (No. 33949). University Library of Munich, Germany.
- Vazadikis, A. & Adamopoulos, A. (2009). Stock market development and economic growth. *Am. J. Appl. Sci*, 6(11), 1933-1941.
- Von Pischke, J. D. (1997). Poverty, Human Development and Financial Services (No. HDOCPA-1997-04). Human Development Report Office (HDRO), United Nations Development Programme (UNDP).
- Zaman, K., Izhar, Z., Khan, M. M., & Ahmad, M. (2012). RETRACTED: The relationship between financial indicators and human development in Pakistan. *Economic Modelling*, 5(29), 1515-1523.