Determinants of Financial Inclusion in Sub-Sahara African Countries

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Abstract: As the exclusion of large percentage of population has been identified as major obstacle to inclusive growth and development in developing countries of the world it is against this background this study investigates the determinants of financial inclusion in Sub-Saharan Africa using Panel Autoregressive Distributed Lag (ARDL). The results from the study reveal that financial inclusion in the region is meaningfully influenced by both demand side factors (level of income and literacy) and Supply side factors (Interest rate and bank innovation proxy by ATM usage). Government in the sub region should put policy in place to promote financial literacy and other forms of innovative banking in their respective country as this will go a long way in promoting financial inclusion in the region.

Keywords: Financial Inclusion, Financial Access, Africa, ARDL, Africa, Dvelopment

JEL Classifications: G21, G0.N27

1. Introduction

The contribution of financial sector to an improved economic performance has been extensively discussed in the literature. But, there is a need to continuously discuss how better this sector can serve the economy especially such vulnerable economies of many Sub-Sahara African countries. This bring to the fore the issue of financial

inclusion and its determinants in developing economy. Specifically, this study empirically investigates several hypothetical factors that have been linked to financial inclusion as determinants in the recent time.

Financial inclusion as a concept is very difficult to define but generally it has been conceived in term of financial exclusion which is construed as the inability to access necessary financial services in an appropriate form due to problems associated with access, conditions, prices, marketing or self-exclusion (Mohan, 2006). According to the World Bank, in 2011 only 50% of all adults (aged 15+) in the world have an account at a formal financial institution. The exclusion of large population shares from access to comprehensive banking services has been discovered as a major obstacle to development in recent years (Govind and Marcus ,2012).

The implication of financial exclusion could be that poor segment of the population will have to rely on their personal saving to pursue growth agenda and this might have terrible implication for the existing income inequality gap especially in developing economies. As a result of this, it is worthy of empirical attention to analyse immediate and remote causes of financial inclusion. This is in an effort to bring about all inclusive growth through better financial spread. Apart from this introductory Section which is Section one; this paper is divided into five Sections: Section two discusses stylized facts about financial inclusion in Africa and sub Saharan Africa. Section three examines empirical literature on the subject matter, Section four discusses data and methodology while section five

discusses the results and findings of study.

2. Stylized Facts of Financial Development and Financial Inclusion In Africa and Sub Saharan Africa.

African countries have performed tremendous well in financial development indicators in in recent times. Individuals and enterprises within the African continents now enjoy more financial services, especially credit, from financial institutions (Govind and Marcus,2012). Also, the recent exposure to ICT in the continent has brought about new technologies such as mobile money and point of sale (POS) and this has helped broadening access to financial services, savings and payment products alike.

However, the financial systems of many African countries still remain under-developed as compared to other developing economies even though most of these countries have undergone extensive financial sector reforms in recent time. Indicators of the use of financial products and services by adults and enterprises in the region comparing to other region of the world show that many challenges remain toward building a more financially inclusive financial system capable of engendering sustainable growth. Some of the challenges include poor infrastructure and low level of income. For instance, Africa has the lowest road density in the world, with the notable exception of South Asia which, in contrast, has a much higher population density (Honohan and Beck ,2007). Similarly, in Ethiopia, Sierra Leone, and Uganda, a sum equivalent to more than 50% of per capita ''GDP'' is needed to open a checking account. In Malawi, Sierra Leone, Uganda, and Zimbabwe, annual fees associated with a checking account

amount to more than 20 percent of per capita GDP Compare this system with many developing and advanced financial systems that have no minimum

balance requirements and no fees associated with routine checking account use (Beck & Demirgüç-Kunt, 2006)
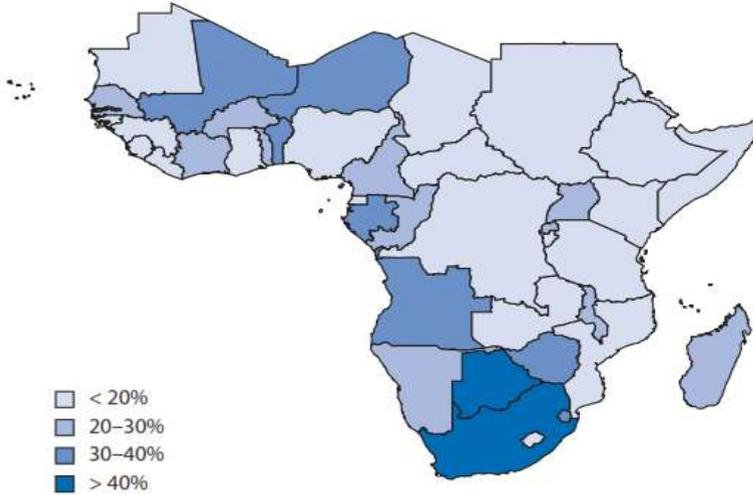

Figure 1: Level of Financial Inclusion in Africa
Sources: Honohan 2006:

The countries in sub-Saharan countries are also facing serious challenge towards their drive to financial inclusion. The figure two compares Sub-

Saharan countries and the rest of the world on financial inclusion at the household level and it obvious that the gap is still wide..
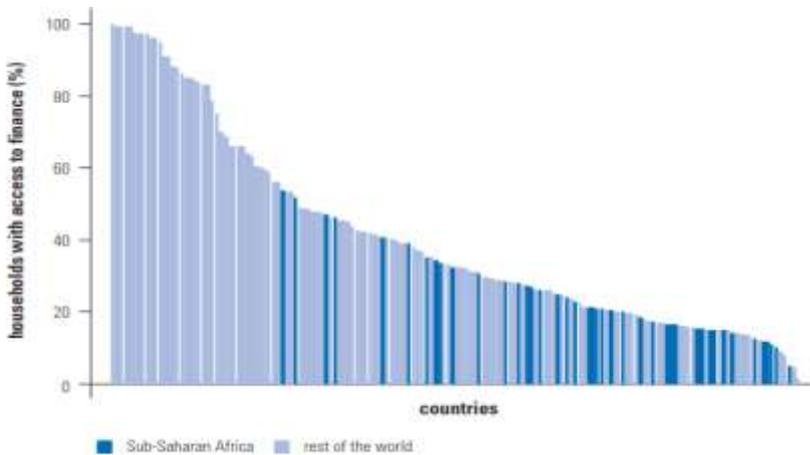

Figure 2: Financial Inclusion (Sub-Saharan vs rest of the world)
Sources: Honohan 2006:

Despite this, Sub-Sahara African countries have made steady progress in financial inclusion index though progress across countries differs. According to Finscope survey in 2008 starting with the country with lowest financial exclusion, 27 per cent of adults in South Africa were financially follow by countries like Nambia with 31% ,Botsawana 33 per cent, Lesotho 19 per cent though with more inclusion at informal level, Swaziland 37 per cent, Rwanda 28 per cent and up to the last country covered in the survey which has the highest financial exclusion of 78 per cent in the region and that Mozambique. Though Finscope survey was carried out at different year in the selected countries ranging from 2008 to 2012 but largely it shows the level of disparity in financial inclusion in the region especially in terms of structure of financial inclusion. While country like Uganda has the highest inclusion (42 per cent) at informal level despite its low formal financial inclusion, Nambia has the least in this category (4 per cent).
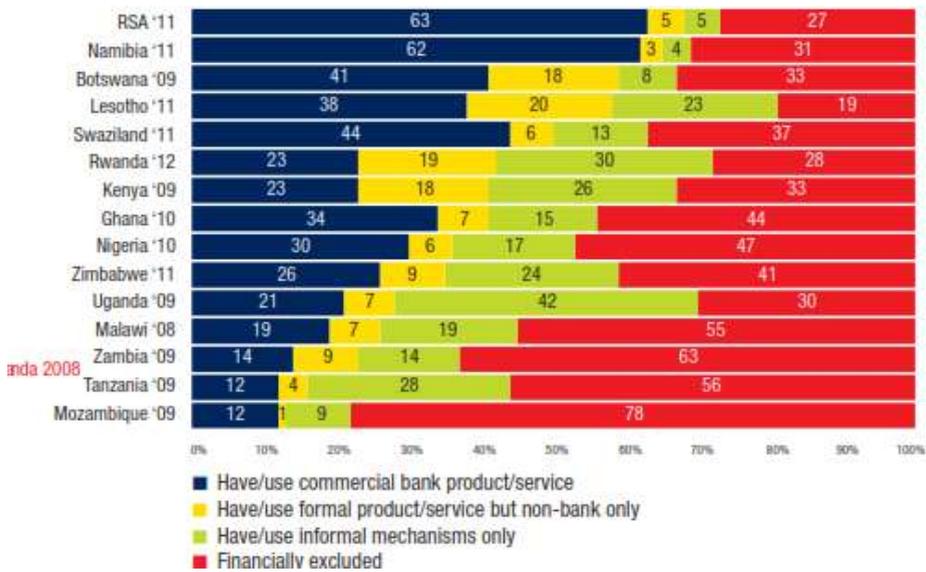

Figure 3: Inclusion Effort in Sub-Saharan African countries
Source: Finscope 2011 survey

3. Literature Review

Financial inclusion is relatively a new way of broadening the concept of financial development as it helps in overcoming the harmful consequences of financial exclusion. Financial exclusion which hindered access to formal credit and forced investors to patronise informal sector at very high interest rates characterised financial sector accounted for the low financial investment and development in most African countries, (Beck et al. 2004; Levine, 2005; Galor &Zeira 1993 and Honohan 2004). Klapper et el., (2004) argued that a well-developed financial system is highly important for economic development as entry of new firms is likely to ease the constrains imposed on access to credit and financial intermediation ultimately promoting economic growth.

In the economic literature several reasons have been advanced for

financial exclusion. Starting with the recent report of Demirguc-Kunt and Klapper (2012, p. 19), seven important reasons were identified for financial exclusion: They are, Not enough money, too expensive, family member already has account, too far away, lack of necessary documentation, religious reasons and strong informal sector. These reasons follow a descending order of importance. Similarly, Kempson and Whiley (1999a, &1999b), also distinguishes between five factors that can account for financial exclusion (1) Access exclusion due to geography and "risk management of the financial system", (2) Conditional exclusion "due to conditions that are inappropriate for some people," (3) Price exclusion due to non-affordability of financial services, (4) Marketing exclusion due to the non-attractiveness of conducting business with certain groups within society (lending risk), and (5) Self-exclusion, due to "fear of refusal or due to psychological barriers."

Also, Goodwin et al., (2000) identified employment as another factor that can be linked with financial inclusion. They submitted that people that are unemployed or have irregular and insecure employment are less likely to participate in the financial system. Furthermore, some studies have linked mode of payment of employee's remuneration to financial inclusion. Specifically, Kempson and Whyley, (1999) argued that the continued payment of social security benefits and the state pension in cash is significantly related to financial exclusion. Among the developed nations, UK was one of the earliest to realize the importance of financial inclusion (Collard et al., 2001). In another study, Kempson (2004) found payment of wages through automated cash transfer (ACT) to have served as a source of influence on financial inclusion in the UK. In addition, Mihasonirina and Kangni (2011) strongly linked advancement in information and communication technology and provision of infrastructural facilities as another way of influencing financial inclusion. Beck et al. (2007) submitted that telephone network is positively associated with banking outreach. Buckland et al, (2005) also argued that countries with low levels of income inequality tend to have relatively high level of financial inclusion. In Sub Saharan Africa, Chibba (2009) found "fear of complications" as a psychological factor that caused financial exclusion.

Recent study in China by Fungáčová & Weill (2015) argued that education and higher income are associated with higher usage of formal accounts and formal credit in the country. This position is corroborated by another country specific study in Argentina by Tuesta, et al (2015) found that income and education are all significant factors for financial inclusion. Studies elsewhere by Chithra & Selvam (2013) and Camara, Peña & Tuesta (2014) also provide substantial argument that income levels and education are significant variables for the level of financial inclusion.

More recent studies in Africa by Olaniyi and Adeoye (2016), Zins & Weill (2016), Soumaré, Tchana Tchana & Kengne (2016) posit that variable such level of education, GDP per capita, mobile banking, population and interest rate can positively influence inclusion in the sub-region though without categorizing the variables into demand and supply side of the financial inclusion.

4. Data and Methodology
Data

Several financial services ''exist'' some of them include deposit, credit, insurance, money transfer and each of them could be of importance to economic growth and development. As a result of this, different measures of financial inclusion exist and there is no consensus in the literature on their relative importance. Following the practice in the literature on financial inclusion and in line with Beck et al. (2007) and Sarma (2008) access to and use of banking services are used either as explained or explanatory variables. Specifically financial inclusion is measured by Borrowers from commercial banks (per 1,000 adults) and Depositors with commercial banks (per 1,000 adults) as explained variables. More importantly, these variables are available for many Sub-Sahara African countries and thus providing opportunity to have large cross sections which also compensate for short time duration of the study (2004-2015).

The explanatory variables are divided into two main categories: They are banking variables and social-economic variables. Banking variables include, Automated teller machines (ATMs) (per 100,000 adults), Point-of-sale terminals (per 100,000 adults), liquidity liability, Commercial bank branches (per 100,000 adults), and commercial bank branches per 1000km. Social-Economic variables include: Gross Domestic product (per capita), Mobile cellular subscriptions (per 100 people), Secondary school enrolment, Government expenditure and Employment to population ratio, 15+, as per cent of total population. Also, social-economic variables such as per capita income, level of education and nature of employment have been argued in the literature to reflect the demand side of financial inclusion (Demirguc-Kunt and Klapper 2013).

Due to non availability of data, our data span from 2004 to 2015 and we focused on 26 Sub Saharan African countries selected based on data availability. The countries are; Botswana, Burundi, Cabo Verde, Cameroon, Chad, Comoros, Congo, Dem. Rep., Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Madagascar, Mozambique, Namibia, Nigeria, Rwanda, Seychelles, Sierra Leone, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe.

Methodology

Following Pesaran, Shin, & Smith, (1999), the Pool Mean Group (PMG) method of Panel ARDL is employed to investigate the determinants of financial inclusion due its capability to impose homogeneity in the long-run coefficients while still allowing for heterogeneity in the short-run coefficients and error variances. Several studies have used this method to carry out dynamic panel analysis with tremendous success especially in term of efficiency (Kim and Lin, 2010 and Lee & Wang, 2015). The choice of the dynamic ARDL panel is based on the fact that the dataset has a short time dimension (T =11) but relatively large country dimension (N =26). This method has proven to be an efficient estimator as pointed out by (Pesaran and Shin, 1999). Further, ARDL with sufficiently long lags can as well tackle the issue of endogeneity problem which is another concern in this study. However, this is preconditioned on the fact that the regressors are not cointegrated among themselves, and where interest focuses on the long run parameters.

The PMG and its varied estimators are based on the following assumptions: the error terms are serially uncorrelated and are distributed independently of the regressors; there is a long-run relationship between the dependent and explanatory variables; the long-run parameters are the same across countries. The general form of Pooled Mean Group (PMG) can be constructed thus

$$y_{it} = \sum_{j=1}^{n} \lambda_{ij}\, y_{i,t-j} + \sum_{j=0}^{q} \delta_{ij}\, x_{i,t-j} + \mu_t + \varepsilon_{it}$$

(4.1)

From equation one above, the number of cross section is denoted by i= 1, 2,......N and t = 1,2,……T. Similarly, $x_{i,t-j}$ is a vector of K * 1 regressors. λ_t and δ_t represent the coefficients of vectors for scalars and exogenous variables and μ_t is a group specific effect. Also, ε_{it} captures the disturbance term and If the variables are I(1) and co-integrated then the disturbance term is an I(0) process. This characteristic infers error correction dynamics of the variables in the system are swayed by the deviance from equilibrium thus equation one can be re-parameterized to account for error correction as follow:

$$\Delta y_t = \phi_i\, y_{i,t-1} + \theta_t^*\, X_{i,t-j} + \sum_{j=1}^{p-1} \lambda_{ij}^* \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}^* \Delta x_{i,t-i} + \mu_t + \varepsilon_t$$

(4.2)

The error correction parameter is indicated by ϕ and it shows the speed of adjustment. If the parameter is zero, then there is no evidence that variables have long run association. Also, this parameter is expected to be negative and statistically significant to indicate long run equilibrium in case of any disturbance.

Inserting both dependent and independent variables required for linear ARDL estimation in equation (2): Specifically, two Pooled Mean Group (PMG) /ARDL are specified and estimated one for each measure of financial inclusion (Borrowers from commercial banks per 1,000 adults and Depositors with commercial banks per 1,000 adults). Apart from financial inclusion generally, these two variables also capture usage of financial institution.

$$\Delta depositor_{ij} = \lambda_0 + \sum_{j=1}^{n1} a_{ij}\,\Delta school_{i-j} + \sum_{j=1}^{n2} b_{ji}\,\Delta int\,erest_{t-j} + \sum_{j=1}^{n3} c_{ij}\,\Delta GDP_{t-j} + \sum_{j=1}^{n4} d_{ij}\,\Delta ATM_{t-j} + \sum_{j=1}^{n5} e_{ij}\,\Delta int\,ernet_{t-j} + \theta_1 school_{t-1} + \theta_2 Interest_{t-1} + \theta_3 GDP_{t-1} + \theta_3 ATM_{t-1} + \theta_3 Private +_{t-1} \varepsilon$$

(4.3)

$$\Delta borrower_{ij} = \lambda_0 + \sum_{j=1}^{n1} f_{ij}\,\Delta school_{i-j} + \sum_{j=1}^{n2} g_{ji}\,\Delta int\,erest_{t-j} + \sum_{j=1}^{n3} h_{ij}\,\Delta GDP_{t-j} + \sum_{j=1}^{n4} i_{ij}\,\Delta ATM_{t-j} + \sum_{j=1}^{n5} j_{ij}\,\Delta int\,ernet_{t-j} + \theta_1 school_{t-1} + \theta_2 Interest_{t-1} + \theta_3 GDP_{t-1} + \theta_3 ATM_{t-1} + \theta_3 int\,ernet +_{t-1} \varepsilon$$

(4.4)

Where equation 4.3 comprises of '$depositor_{ij}$'' which represent the depositor from commercial banks per 1,000 adults in 26 Sub-Sahara African countries. $school_{t-j}$ is annual secondary school enrolment , $int\,erest_{t-j}$ is depositor interest rate on saving account GDP_{t-j} is the gross domestic product per capita, ATM_{t-j} is the number of ATM users per 1000 adults and $int\,ernet_{t-j}$ is the number of internet users per 1000 adults. All the variables have been linked to financial inclusion in different studies, specifically (Beck et al., 2007& Sarma ,2008). In the same manner, equation 4.4 comprises of similar variable with equation three, apart from the dependent variable which is $borrower_{ij}$ and interest rate which capture lending rate as against depositor interest rate in

equation 4.3. The introduction of all these independent variables is predicated on assumption that a good model of financial inclusion should capture both the demand and supply side of financial Inclusion. Variable such as ATM, INTEREST and INTERNET capture the supply side of financial Inclusion, GDP per capita, School enrolment capture the supply side of the variable.

Results

The results in table one gives the descriptive statistics of the variables employed for estimation. The average value of one of the dependent variables is low (borrower) and the other one is high (Depositor) with the maximum being 78.11015 and 519.3147, minimum 24.99358 and 519.314. This quickly suggests that the average values of the two variables are not equal. Out of the dependent variables, GDP per capital has the highest average values followed by school enrolment and automated teller user comes last in term of the average value. Standard deviation results reveal that GDP is the most volatile of all the exogenous variables number.

Table One: Descriptive Statistics of Variables Used for Estimations

	BORROWERS_FROM_COMMERCIA	DEPOSITORS_WITH_COMMERCI	DEPOSIT_INTEREST_RATE___	LENDING_INTEREST_RATE___	GDP_PER_CAPITA_CONSTANT	AUTOMA_TED TELLER_MACHINE	COMMERCIAL_BANK_BRANCHES	SCHOOL_ENROLLMENT	INDIVIDUALS_USING_THE_INTERNET
Mean	45.93315	296.7543	8.760694	22.86730	2949.580	9.744079	6.407841	107.3279	8.861710
Median	41.57952	266.0923	7.367713	18.54337	2993.023	9.685117	6.300400	107.2820	7.185558
Maximum	78.11015	519.3147	15.74185	41.19237	3215.868	15.77401	8.940460	110.6456	19.62227
Minimum	24.99358	174.1249	6.030142	16.57571	2463.118	4.414027	4.577409	101.5661	2.437606
Std. Dev.	17.23106	106.4337	2.956371	8.086037	234.1486	3.627013	1.414378	2.740092	5.456734
Skewness	0.718621	0.755044	1.101752	1.253621	-0.736369	0.118057	0.277858	-0.656760	0.578808
Kurtosis	2.246307	2.335495	3.053625	3.119378	2.396000	1.871397	1.835142	2.508014	2.066418
Jarque-Bera	34.23835	35.38513	63.15797	81.90667	32.93909	17.28341	21.65427	25.57599	28.75144
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000177	0.000020	0.000003	0.000001
Sum	14331.14	92587.35	2733.337	7134.597	920268.9	3040.153	1999.247	33486.29	2764.853
Sum Sq. Dev.	92338.78	3523050.	2718.179	20334.42	17050745	4091.274	622.1444	2335.021	9260.321
Observations	312	312	312	312	312	312	312	312	312

Source. Author's Computation

The results of unit root tests are presented in table two. We specifically employed three panel unit tests techniques to test for robustness. The results indicate that generally the variables are mixed in their order of integration across all the test techniques. One of the dependent variables is stationary at level (Borrower) and the other one (Depositor) is stationary at first difference. This divide is also extended to the independent variables. All variables are integrated of order one excerpt Automated teller users and Bank branches. This situation makes ARDL an appropriate method of estimation (Pesaran et al., 2001).

Table two: Panel Unit Root Results

Variables	Level			First Difference		
		With intercept	With trend & intercept		With intercept	With trend & intercept
Borrowers	LL & C	0.997	0.000*	LL & C		
	IP &S	0.999	0.002*	IP &S		
	ADF	0.99	0.009*	ADF		
Depositor	LL & C	0.997	0.922	LL & C	0.999	0.000***
	IP &S	0.999	0.997	IP &S	0.999	0.000***
	ADF	0.999	0.999	ADF	0.999	0.000***
Internet users	LL & C	0.922	0.997	LL & C	0.999	0.000***
	IP &S	0.997	0.999	IP &S	0.999	0.000***
	ADF	0.999	0.999	ADF	0.999	0.000***
School Enrolment	LL & C	0.000***	0.000*	LL & C		
	IP &S	0.001***	0.999	IP &S		
	ADF	0.002***	0.999	ADF		
Lending Interest rate	LL & C	0.000***	0.000***	LL & C		
	IP &S	0.815	0.001***	IP &S		
	ADF	0.997	0.002***	ADF		
Borrowing Interest rate	LL & C	0.997	0.000***	LL & C		
	IP &S	0.999	0.002***	IP &S		
	ADF	0.999	0.009***	ADF		
Automated Teller Users	LL & C	0.963	0.000***	LL & C	0.000***	0.000***
	IP &S	0.999	0.778	IP &S	0.000***	0.221
	ADF	0.999	0.984	ADF	0.000***	0.199
GDP Per Capita	LL & C	0.00*	0.000****	LL & C		
	IP &S	0.02***	0.973*	IP &S		
	ADF	0.17	0.999	ADF		
Bank Branches	LL & C	0.997	0.000*	LL & C	0.000***	0.000***

	IP &S	0.999	0.081**	IP &S	0.000***	0.007***
	ADF	0.999	0.234	ADF	0.000***	0.001***
Domestic Credit	LL & C	0.75	0.000***	LL & C		
	IP &S	0.99*	0.023***	IP &S		
	ADF	0.99*	0.076**	ADF		

Note:***,**,* indicate significant at 1%;5% and 10% . IPS= Im, Pesaran and Shin; LLC= Levin, Lin and Chu
Source: Author's computation

Estimates of ARDL Panel Models

Table three and four show the results of the two models estimated with depositors with commercial banks per 1,000 adults, and borrowers from commercial banks per 1,000 adults as dependent variables. Majorly, the results reports in these tables are that of long run estimation and this short time nature of the data employed in this study. Across the two models, Deposit interest rate and Lending Interest rate show significant positive effect on Financial Inclusion variables. While the positive nexus between the depositor interest rate and depositors with commercial banks per 1,000 adults is line with theory that of Lending Interest rate and borrowers from commercial banks per 1,000 adults seems to contradict negative relationship theory suggests. Above all, interest rate proves to be a critical variable in financial inclusion process in sub region and increase in deposit interest rate especially can improve financial inclusion in the region. This evidence is corroborated by similar study by Olaniyi and Adeoye (2016), but unlike their study where the variable is insignificant the variable is statistically significant in this study.

Focusing on the demand side of the financial inclusion, Primary School Enrolment a proxy for literacy provides useful explanation for financial inclusion in the two models estimated. There is significant positive relationship between literacy and inclusion variables. The more literate an individual is the higher the likelihood of such individual being financially included in the sub region especially for borrowing purposes. This suggests that there are several formalities in banking process in the region and this seems deter the less educated people from demanding assess to banking services. Thus, making banking activities simple and less formal can increase financial inclusion in the sub-region. This is similar to the findings by (Zins and Weill,2016; Tuesta et al, 2015; Camara et al ; 2014 Beck et al., 2007 and Sarma, 2008).

Contrary to expectation, GDP per capita does not exert positive effect on financial inclusion in the two models estimated. This is a bit surprising but it could be that the people majorly assess financial services to guarantee financial security and as soon as income increases they stop assessing main stream financial services providers. This contradicts some of the findings in this area (Tuesta et al., 2015 and Fungáčová & Weill, 2015). This might also point to the fact that the proxies for financial inclusion focus more usage than inclusion.

Looking at the supply side of inclusion again, variable such as ATM usage

exerts a significant positive effect on financial inclusion. This suggests that ability of financial institutions to provide their customers with ATM, Internet and mobile banking services can be very important to improving

financial inclusion in the sub-region. This position has been widely argued favorably in similar studies especially micro studies at the country specific level Honohan & Beck (2007) and Sarma & Pais (2011).

Panel ARDL (1, 1, 1, 1, 1) Long Run Results (DEPOSITOR_ TO_ COMMERCIAL)

Variables	
DEPOSIT_INTEREST_RATE___	4.356354(0.00)***
SCHOOL_ENROLLMENT__PRIMA	1.123966(0.238)
GDP_PER_CAPITA__CONSTANT	-0.03339(0.01)***
INDIVIDUALS_USING_THE_IN	19.83228(0.00)***

*** 1% Significance level ** 5% Significance level & *10 % Significance level

Panel ARDL (1, 1, 1, 1, 1) Long Run Results (BORROWERS_FROM_COMMERCIAL)

Variable	
LENDING_INTEREST_RATE___	0.948704 (0.00)***
GDP_PER_CAPITA__CONSTANT	-0.110240(0.00)***
AUTOMATED_TELLER_MACHINE	6.101035 (0.00)***
SCHOOL_ENROLLMENT__PRIMA	5.953660(0.02)***

*** 1% Significance level ** 5% Significance level & *10 % Significance level

5.0 Conclusion and Recommendations
The study concludes that financial inclusion in Sub-Saharan African can be meaningfully influenced by both demand factors (gross domestic per capita and literacy level) and supply side factor also known as
Interest rate and ATM service. Government in the sub region should

put policy in place to promote financial literacy and other form of education in their respective country as this will go a long way in promoting financial inclusion in the region. Also, the financial institutions should be innovative and flexible in the way and manner they render their services to community.

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