

Barriers of Financial Inclusion in Sub-Saharan Africa

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Abstract

This paper examines barriers to financial inclusion across sub-Saharan Africa (SSA) using the 2014 Global Findex dataset from the demand-side perspective. A two-level model is estimated with individual households nested in the country level variables. Lower levels of income are associated with lower levels of access to formal account. Similarly, literacy rates have significant effect on the level of account ownership. Estimation results also reveals that as individuals grow old, they tend to switch from one form of account to the other. Owning a debit card is more likely to increase account ownership. Another important barrier to account ownership is proximity to the nearest financial services. These barriers have the potential to cause market failure and therefore the right policy interventions are required to stabilize the market.

Keywords: Financial Inclusion, Multilevel Analysis, sub-Saharan Africa

1. Introduction

Financial inclusion is considered a key enabler to economic growth and therefore placed high on the policy agenda of most developing countries. However, this concept has attracted varied definitions. For instance, a definition by Sarma (2008) emphasizes the ease with which financial services could be accessed, their availability and affordability. In addition, the author also finds usage as an important aspect of financial inclusion. On the other hand, Fungacova and Weill (2014) view the concept within the context of usage rather than quality of services provided whereas Claessens (2006) views it from the perspective of variety and affordability of financial services. Demircug-Kunt and Levine (2008) define financial inclusion as removal of obstacles in form of price and non-price constraints from financial services. However, the basic understanding across these definitions places greater emphasis on access, usage and less on quality of financial services¹. This paper adopts access² and usage as the working definition for financial inclusion. Majority of the adult population are locked out of the formal financial system that would guarantee better standards of living.

The main objective of this paper is to investigate barriers of financial inclusion across the sub-Saharan Africa. The global agenda has recently focused on financial inclusion imperatives. The realization that the financial sector plays a critical role that can spur growth and reduce prevalence of poverty has led to renewed enthusiasm in financial innovations aimed at bringing more people to the system of formal finance. The global attention aims at ensuring equitable participation in economic growth through financial inclusivity. Available empirical evidence provides proof that access and usage of financial services³ in their variety is welfare improving (Oya et al., 2011). Conversely, inadequacy of regular and methodical data has been a major hindrance to detailed examination of financial inclusion.

Although remarkable progress in quantitative access has been made, it is yet to translate into economic inclusivity in most of the developing countries. Financial systems that are inclusive allow for a wide variety of financial services to be accessed by most people majority of whom are poor. Historically, financial exclusion has removed certain segments of the population from engaging within the context of mainstream financial sector. Financial exclusion limits participation of households in economic growth and development. The potential inherent in these segments of the population is likely to provide a positive and significant input into the economy. This is because to achieve inclusive growth, financial inclusion is considered a critical building block.

Uptake of financial services has been rising in most developing countries alongside informal financial arrangements. As a result, the financial services portfolio does not provide the broad risk-pooling and low-cost services (Honohan 2005) consequently, exposing individuals to unlimited risks and higher costs associated with non-standardized services. The informal financial services have continued to co-exist with formal financial services owing largely to the inability of the financial system to accommodate poor people with low incomes.

Until 2011, little was known about the extent of financial inclusion in most developing countries around the globe. This was because of the inadequacy of systematic data that could support cross-country analysis. With the Global Findex data wave of surveys of 2011 and 2014, different aspects of financial inclusion have been subjected to empirical investigations. However, the number of studies are growing but the focus varies from one region to the other. For instance, Demircug-Kunt et al., (2015) focuses on financial inclusion from the global

¹ We recommend that the focus of future research should be on affordability (price) and quality of financial services provided when appropriate data becomes available.

² The paper uses the terms access and usage interchangeably but in reality, access means the possibility of using a service while usage refers to the actual use of the service.

³ Financial services refer to the following: credit services and products, savings services and products, payments or transactions services, insurance and risk management services.

perspective by providing a cross-section of issues in general. Zins and Weill (2016) focus on some aspects of financial inclusion in Africa by concentrating on what influences financial inclusion. Their definition of financial inclusion relate to banking services. Beck and Cull (2015) show that most banks in Africa do not promote inclusive finance like their counterparts in other parts of the world. On their part, Mlachila et al., (2013) view distributional skewness as the main reason for slow penetration of financial inclusion. By understanding financial inclusion differentials across the SSA region, the relevant policies can be formulated to target specific areas of concern. This is supported by the view that SSA has a myriad of bottlenecks that vary from one country to the other. This study seeks to address the key determinants and barriers of financial inclusion in sub-Saharan Africa.

2. Previous Evidence

The relevance of financial sector development is not only being experienced in most advanced economies but in emerging economies as well (Anderloni and Carluccio 2007). This is mainly because of its role in facilitating access to credit through widening sources of borrowing, savings mobilisation and cushioning consumers against risks of exposure. Legal and institutional strength play a critical role towards creating an enabling environment where financial sector institutions are stable and trusted. Although most developing economies are characterized by unstable and disjointed financial sector, it is imperative to create and empower institutions that will drive the reform agenda. The neoclassical economics views institutional theory in the context of price mechanism and production efficiency but ignores other pertinent parameters such as social norms, behaviour and rules (North 2000; Joskow 2008). Focusing on positive economic theory is not likely to yield the desired results because it fails to incorporate the morality aspects. It is against this rational thinking that New Institutional Economics (NIE) has set new benchmarks for determining public reform and policy agenda that will promote efficacy sectors.

Financial inclusion perception falls within the broader concept of social inclusion whose aim is to ensure social inclusivity and equal treatment. Social inclusion therefore promotes positive values of equal opportunities for all while reducing the ever widening gap between the rich and the poor. Therefore, financial inclusion brings about the total transformation of socioeconomic and financial realities surrounding individuals. Social inclusion encompasses financial inclusion which affects the daily lives of the people in a positive way. For instance, access to a wide variety of financial products promotes smoothing of consumption (Honohan and King 2012), savings mobilisation and reduce exposure to risks.

Literature on development economics has shown that financial progress is key to economic development (Levine 2005). Consequently, it leads to poverty reduction through provision of financial services (Banerjee and Newman 1993). Affordable and trusted financial system is vital to facilitating efficient financial market operations. It is more likely to reduce information costs as well as transaction costs, influence savings mobilisation and promote better investment decisions (Beck et al., 2009). Further, the financial system characterised by trust is more likely to promote financial long-run growth and innovations prospects while facilitating expenditure smoothening as well as risk-pooling effect (Honohan 2005) that will cushion consumers against unprecedented and unforeseen shocks. It is also a means for accessing other basic utilities such as quality education and health as well as clean and safe water (Peachey and Roe 2004). Thus, a stable and trusted financial scheme will control positive strategic decisions while creating a multiplier effect in other areas through its communication mechanisms.

Financial inclusion imperative is known in academic and policy circles. It has been recognised that for the growth benefits to trickle down to the lower spectrum, it is vital for financial inclusion to target the people who are under-served. Financial services access is likely to ease poverty growth if it targets majority of consumers (Galor and Zeira 1993). Further, constrained access to and utilization of financial services exposes individuals to risks, decelerates savings rate and leads households to switch to informal network alternatives and access to credit (Kimenyi and Ndung'u 2009). Love and Bruhn (2009) opine that more financial services access has the potential to improve the macroeconomic environment and in turn financial inclusion.

Demirguc-Kunt and Klapper (2012) argue that investments have drawn individuals closer to services provided by commercial banks while expanding individuals' financial literacy. At all income levels, it is generally acceptable that not all households are sufficiently serviced given the available formal financial institutions (Shankar 2013). Consequently, utilization of financial services is still limited primarily due to the supply side constraint. Although access to credit is progressively informing key policy aspects of poverty alleviation in developing countries, its theoretical underpinning is not apparent. Theoretical literature holds that the association between access to credit and growth depends largely on the nature of credit in question. It has also been shown that household investment that results in improved productivity may be driven by access to credit according to the most popular hypothesized view. Access to savings and credit could potentially reduce the effects of negative shocks arising from volatilities in income (Eswaran and Kotwal 1990). Access to credit undermines vulnerabilities to negative shocks thereby enhancing household capability to smooth consumption

during periods of low income by providing an opportunity to take part in less riskier investments. Financial services use across most developing countries is subject to supply- and demand-side factors. This paper, however, looks at demand-side factors and how they are impacted by the supply-side dynamics. According to Ayenew and Zewdie (2010), availability and accessibility to financial services provides ingredients to nurturing economic growth and ensuring a decline in income inequalities among households.

Multi-level theories can be used to address multi-level problems which are commonly found in our societies. Although the multi-level techniques are a recent phenomenon (Huttner and van den Eeden, 1993), they have nevertheless occupied an important space that was initially void. In a multi-level approach, specification of the boundaries of variables is necessary so that a clear criterion of assigning measures to sub-groups suffice. Multi-level theory in effect postulates situations where there are direct effects between individuals and cross-level effects through relational variables. The advantage of this approach is that no group telepathy is assumed but more focus is on the organisational structure and its attendant communication channels and processes inherent in group formations. The multi-level approach is still evolving since the times of Durkheim's sociological concepts. Overall, this approach is more suitable where the subject of investigation involves different levels in-built into each other with individual entity influencing the group entity and in turn the group entity influencing the individual entity. In most multi-level modelling, the outcome variable is to be found at the lowest level (level 1) of the hierarchy. However, fewer studies applying this approach have investigated how individual variables may influence group outcomes (DiPrete and Forristal 1994).

A growing body of knowledge has laid more emphasis on how financial inclusion should be measured. Consequently, more definitions have emerged with each one taking a narrow perspective depending on the stage of development of the country. With this view, financial inclusion becomes a supply side problem. However, this perspective fails to recognise individual limitations of households and therefore ignores the role played by the demand side. More recently, several initiatives have been made by most developing countries to collect consistent and systematic data on financial inclusion indicators. For instance, The World Bank's Global Findex data is a demand side data covering many economies around the world. The Global Findex is so far the most recent data that is comparable across different economies. In the SSA region, a few data collection initiatives have been spearheaded by Central Banks, Fin Mark Trust Fund and Financial Sector Deepening (FSD) Trust. While these initiatives are key to understanding the extent of financial inclusion, many of the indicators remain un-standardized and inconsistent.

The concept of financial inclusion is increasingly gaining worldwide recognition in many policy debates not just because it brings people to using the financial services but also to choosing among the available options such as payments, credit and insurance. Burgess and Pande (2005) investigated the relationships among financial inclusion, poverty and income inequalities and found out that expansion in rural bank branches was more likely to lead to reduction in poverty incidences. Similarly, empirical evidence indicates that availability and affordability of financial services is likely to lead to greater utilization which in turn would lead to improving poor people's well-being (Dupas and Robinson 2012; Caskey et al., 2006). However, the poor would need to have a better understanding of the financial concepts to be able to enjoy the full benefits. Globally, the variation in financial services access between male and female adults is explained by among other factors gender-based discriminations that limit women's participation in economic activities. In their study of financial inclusion and discrimination against women in 98 countries, Demircuc-Kunt et al., (2013) identified major gender-based differences in access to credit, savings, and ownership of bank accounts. The study attributed cross-country differences in financial inclusion to gender norms and legal discriminations against women. In particular, female adults were less likely to save, access credit, and own a bank account compared to their male counterparts in countries where women faced legal restrictions in their attempt to work, decide on residence location, inherit wealth, and head their households. In addition, an increase in violence against women and the incidence of early marriage reduced access to financial services among women significantly.

According to Arun and Kamath (2015), financial inclusion is a process that occurs in stages, with payments being the first stage. Therefore adopting a payment platform of financial product is the entry point to financial inclusion. In this case, adopting the product is driven by a payment need such as receiving a salary. The implication of this argument is that measures geared towards promoting financial inclusion should promote economic activities that encourage the use of payment and other financial products. Adoption of a payment product has promoted access to other financial services like insurance, savings, and credit. Use of electronic payment systems enables financial institutions to collect vital transaction information about a customer to assess credit worthiness. This promotes access to credit services. The product adopted after payment products, however, varies from state to state depending on the needs of the customers. For instance, in Brazil customers often adopt savings/ investment services, whereas in Italy they adopt credit services.

Creating awareness about availability and benefits of financial services is expected to improve inclusion, especially in low income countries where the levels of education and financial literacy are still low. Indeed Bayero (2015) in his study of cashless policy in Nigeria found that awareness of electronic channels of accessing

financial services had a positive effect on financial inclusion. Further, payment infrastructure was found to have a positive effect on financial inclusion. An efficient and secure payment infrastructure reduces transaction costs, which in turn motivates adoption of electronic payment products. Bayero (2015) also found that improving customer value proposition enhanced financial access. This is consistent with Terpstra and Verbeeten (2014) who concluded that customer satisfaction improved access to financial services. The results means that product development initiatives should focus on satisfying the felt financial needs of the target population so as to enhance inclusion. The business model adopted by financial institutions did not have any statistically significant effect on financial inclusion.

In India, Gwalani and Parkhi (2014) found that expansion of bank branch network had little contribution to financial inclusion. This was attributed to several social and economic barriers experienced by the rural poor despite expansion of bank branch network. The barriers identified included high cost of financial services, inefficiencies at the bank level that prevented delivery of relevant and affordable financial services, and inadequate incentive structure to promote use of financial products such as savings bank accounts. Inadequate staff and lack of appropriate technology to deliver appropriate services were also major barriers to financial inclusion. Although Arun and Kamath (2015) argue that adopting a payment system should be the first step in promoting financial inclusion, Gwalani and Parkhi (2014) opine that creating awareness about existing products should be the first step. Specifically, the focus should be on financial literacy and eradicating poverty to increase financial inclusion. Banks being the main beneficiaries of inclusion should invest upfront in financial literacy in order to create a large market for their products in the long term. According to Gwalani and Parkhi (2014) providing adequate income opportunities to the poor will improve inclusion by enhancing the use of products such as electronic payment systems. This means that the use of technology to deliver financial services must also improve to enhance inclusion.

In their study of the effect of access to financial services in India's manufacturing sector, Beck and Hoseini (2014) concluded that financial deepening and bank outreach reduce informality. The use of private firms as proxy to financial deepening and bank branch penetration as proxy to bank outreach reduced the entry barriers to the formal sector while increasing the productivity of formal manufacturing firms. Financial depth also increased production efficiency, especially among firms that relied heavily on external funds to finance their operations. Bank outreach, on the other hand, had no effect on production efficiency.

Ayyagari and Hoseini (2013) supported the premise that financial deepening alleviates poverty, especially in rural areas by promoting inclusive growth in India. Household data analysis revealed that commercial bank credit to state domestic product (SDP) used as proxy to financial depth had a negative effect on poverty. This implies that an improvement in financial deepening reduced poverty in rural areas. By contrast, financial deepening had no statistically significant effect on poverty in urban areas. Overall, financial depth had a greater impact on rural poverty than financial outreach. Entrepreneurship was the main channel through which financial deepening reduced poverty. This finding is attributed in part to the fact that credit supply in rural areas mainly benefits the self-employed who use it to expand their businesses, thereby reducing poverty.

Firm characteristics are likely to determine the extent to which they respond to financial obstacles. Firms with a large capital/ asset base are likely to have greater access to internal funds to finance their operations than small firms. This suggests that small firms are more vulnerable to financial obstacles than medium growth firms. This discourse is supported by Beck et al., (2007) who found that the degree to which legal and financial underdevelopment and corruption hinder firm growth mainly depended on size of the firm. In addition, the growth of small firms is consistently affected negatively by legal, financial and corruption related bottlenecks. The effect of financial and legal obstacles was higher in countries where corruption was rampant. The financial obstacles that adversely affect firm growth included bank paper work, bureaucracies, and the need to have special relationship with a bank. This obstacles limit access to financial services, which in turn constrain firm growth.

Djankov et al., (2005) investigated private credit in 129 countries and found out that creditor protection rights and availability of information sharing institutions promoted inclusive financial growth. Private and public credit bureaus were found to promote private credit development in poorer rather than rich and developed countries. Credit bureaus provide vital information that lenders use to assess the credit worthiness of prospective customers. An increase in credit reference bureaus, thus, is expected to improve access to relevant customer information, thereby increasing access to credit, especially in poor countries where transaction information is difficult to obtain through alternative means such as credit cards.

Financial intermediation plays an important role in promoting financial inclusion by channelling funds from savers to borrowers. However, intermediation is associated with costs that if not controlled can impede rather than enhance financial inclusion. Poghosyan (2013) provided evidence in support of a negative effect of interest rate margin on credit supply used as proxy to intermediation costs. At the firm level, intermediation costs increased with higher riskiness of credit portfolio, low bank capitalization, and small bank size. In addition, lack of competition measured by concentration in the banking industry increased intermediation costs. This suggests

that measures geared towards promoting competition can reduce intermediation costs in terms of low interest margins. As a result, financial inclusion is likely to increase in terms of access to loans and ownership of bank accounts.

Adamo (2013) distinguishes two noteworthy classifications of individuals who are financially included: Those who assume a dynamic part and those that are uninvolved. The dynamic part of financial inclusion is played by strategy creators, sentiment shapers, specialists in financial sector while the inactive part is played by individuals in low income and social orientation. Peach and Van de Werff (2013) contend that changes in the approach are critical to macroeconomic dependability and mitigates the unfavourable outcomes of financial exclusion. Policy fortifies the connections among growth, democracy and integrated society. This perspective is supported by a number of studies that view advancement in financial sector as more likely to promote growth in economy (Rajan and Zingales 2003; Aghion et al., 2003). Utilizing information from 109 countries both from developing and developed nations, Calderon and Liu (2003), observed that the direction of causality is from financial development to economic growth. Yet other studies have established economic development to be the cause of financial development (Luintel and Khan 1999; Demetriades and Hussein 1996). The direction of causality notwithstanding, economic development has greater benefits to the poor and the lower segments of the society (Beck et al., 2007).

Available evidence shows that a large proportion of the rural population's interest is captured in the informal financial market (Rutherford 2000). This is mainly because the activities in these markets within economies of developing countries outweigh those in developed economies (Khandker and Faruquee 2003). The recent evidence reveals that with availability of a variety of financial services, less rural populations are using informal channels¹.

A few studies have investigated the determinants of financial inclusion and found that robust explanatory variables of access to formal financial services are varied by income level and its distribution across income quintiles. According to Honohan (2007), distributional efficiency of income affects social inequality such that the lower the income inequality the greater are the financial inclusion indicators. Using Honohan (2008) access indicators, Park and Mercado (2015) concluded that a higher per capita income increases financial inclusion. They constructed the financial inclusion indicators for 37 Asian countries using macro data from the World Development Indicators. Their findings are corroborated by a similar study by Demircug-Kunt and Klapper (2013), which investigated the financial inclusion in multiple countries. They established that a higher-income quintile was associated with deeper penetration of financial services. Therefore, empirical findings predict a positive relationship between income and financial inclusion, although studies on the distributional aspects of income show a completely different scenario.

Education indicator for households has remained a big challenge despite the existence of a clear relationship between educational achievement and financial inclusivity (Atkinson and Messy 2013). Education accomplishment has been shown to rise linearly in relation to consumption of financial services. This view is supported by Camara and Tuesta (2014) in their analysis of a nationally representative sample in Peru using the probit models and found out that education plays a significant role in financial inclusion. They used a dichotomous depended variable for formal financial services. This analysis had one fundamental flaw in that the data used is not amenable to cross-country comparisons. Numerous family units burdened by training restrictions will probably endure absence of job and in this manner be prevented from securing access to financial services. The education variable is predicted in many empirical findings to be positively related to financial inclusion although a variation on the levels of education has shown quite different results. Numerous countries classified as developing nations are affected by ethnicity bias and social exclusion although there is limited data to conduct full analysis (Khan 2008). Empirical findings show that black and minority groups (Goodwin et al., 1999) are more likely to be excluded from financial services not because of their ethnicity per se or gender but largely because of their low incomes. Some studies however have paid attention to the location of the banks measured in terms of residence. Accordingly, Burgess and Pande (2005) observed that expansion policy on bank branches to diverse rural settings had a welfare improving effect on the households in India.

Honohan and King (2012) carried out a cross-country analysis of causes and effects of financial access. This study surveyed on several African countries using a nationally representative sample that found out that location measured by urban and rural residency was a key factor for financial access. The analysis employed the probit and Ordinary Least Squares (OLS) regression approaches with location variable being highly significant. Different studies have considered other variables, for instance; work status, financial knowledge, numeracy and risk aversion metric being the essential factors affecting financial services access. In another study, cross country gender analysis showed less likelihood of women utilizing formal financial services compared to their male counterparts. The gender crevice is more conspicuous in developing countries where poverty is rife (Demircug-Kunt et al., 2012). This gender gap has tended to persist relative to different income sub-groups.

¹ FinAccess 2013, FinScope 2013

Focusing on the Mexican economy, Ambrosius and Cuecuecha (2015) provided strong evidence in support of the premise that foreign remittance has a positive effect on financial deepening in the domestic economy. The analysis of Mexican household level data further revealed that remittances had a positive effect on access to credit, savings, and ownership of savings bank account. However, remittance was found to promote access to credit from the informal rather than the formal banking industry. The implication is that remittances create demand for financial services such as lending and savings. However, the formal financial sector does not fully cater for the demand, thereby forcing the recipients of remittances to rely on the informal financial sector.

Munyegera and Matsumoto (2016) investigated household welfare in Uganda and concluded that access to mobile phone financial services had a positive effect on remittances. Specifically, households that had access to mobile phone based money transfer services were more likely to receive remittances than those who did not. In addition, the frequency and value of remittance increased with access to mobile phone based financial services. The increase in remittance was attributed to the reduction in transaction costs associated with mobile phone money transfer services, especially in the rural areas where financial institutions such as banks are not easily accessible. An increase in remittances improved welfare in terms of increased real per capita consumption.

Percentage of individuals in a population with formal bank account and savings used as proxy for financial inclusion has been found to promote economic growth and development by enhancing access to education and promoting entrepreneurship. However, the level of financial inclusion varies from one country to the other mainly due to socio-economic and demographic factors such as the level of income and age of an individual. Indeed Fungacova and Weill (2014) in their financial inclusion study in China found out that financial inclusion was deeper in China than in other BRICs. A key factor explaining the difference in the level of financial inclusion was that voluntary exclusion was higher in China than in other BRICs where barriers such as high bank charges and lack of trust in the banking system prevented access to financial services. Overall, education, income, age, and gender had a positive effect on financial inclusion.

Financial services have to meet the expectations of the target population in terms of cost, quality, and availability for their uptake to increase. Thus, financial institutions often focus on improving customer satisfaction in a bid to attract more customers, thereby increasing financial inclusion. According to Terpstra and Verbeeten (2014), improving customer satisfaction is associated with costs that can potentially prevent access to financial services, especially among the low-income earners. They found a positive relationship between the cost of service to customers and the satisfaction of customers. Additionally, they found out that the satisfaction of customers creates higher returns in the most profitable customer segment. This means that financial institutions are more likely to ignore the low income earners who often constitute the least profitable segment of the customer base in their effort to improve profits. The resulting reduction in customer satisfaction is attributable to barriers to financial inclusion. Moreover, financial services will remain inaccessible to the low income earners due to their inability to pay a premium to access high quality services. This paper however, does not use the customer satisfaction indicator mainly because it was not considered in the survey instrument.

According to Allen et al., (2012), account ownership, frequent account use, and using a bank account to save provide an enabling environment for accessing financial services through the cost channel. Allen et al., (2012) concur with Fungacova and Weill (2014) that individuals who are poor, young and unemployed are likely to be financially excluded. Additionally, financial inclusion increases with education and urbanization. This is based on the fact that people who are highly educated are likely to have higher incomes, which enable them to afford financial services. Urbanization has led to increased financial inclusion due to availability of financial institutions that provide financial services in most urban areas.

3. Methodology

Most countries in Africa and especially the SSA region experience erratic growth characterized by high volatility and low investment potential. This paper utilized the second wave of the Global Financial inclusion dataset collected by World Bank in 148 economies around the world. The dataset is a global survey on the purpose for use of certain financial services. The key areas of focus include: savings, credit, insurance and payments. The paper also examines the barriers to financial inclusion across the SSA region. The paper focused on different account ownership components namely: Bank account, account in financial institutions other than banks and mobile phone account. The definition of financial inclusion adopted in this paper relates to financial services consumed by households.

The paper adopts a modified conceptual framework based on World Bank (2014) model which assumes that financial inclusion is affected by not only economic factors but non-economic factors as well. In the modified framework, economic, financial as well as demographic factors that affect financial inclusion are utilized. The empirical model therefore takes these components into account.

3.1 Empirical Model

The paper recognises that individual households are nested within countries and therefore the data is treated as

consisting of different layers. The natural grouping of households in countries tends to differentiate individuals, implying that countries and their citizens influence each other. This explains the observed behavioural differences of individuals in different countries. If this relationship is not taken into account, the country effects may render the results invalid. This calls for the use of the multilevel approach.

Multilevel analysis has been widely used in sociological, demographic, education fields to depict an approach that permits concurrent study of the effects of level one and level two variables on individual-level results. Overtime, there has been greater need to use this approach to explain similar situations in other fields of study. Additionally, the developments of statistical methods and softwares that incorporate multilevel structures have led to greater demand for the approach. The fact that individuals and groups may interact to cause an outcome has been the subject of intense debate in empirical literature (DiPrete and Forristal, 1994). The rationale for multilevel models has also been prompted by unavailability of individual level variables that explain the effect at that level. In this case, group level variables are only used as proxy variables. For a long time, studies have continued to use the assumption of homogeneity which is not appropriate for addressing multi-level problems. Single-level models are anchored on the assumption of independence of different population sub-groups yet it is obvious that this assumption is more likely to be violated due to the existence of the nested data structures (Goldstein 2003). The assumption of homogeneity is relaxed by the multi-level model essentially rendering single-level model inadequate in handling hierarchical data structures. The key advantage of using multi-level framework is in its ability to examine the extent of heterogeneity among different sub-groups (Srholec 2010). Heterogeneity arises from differences between entities (firms; countries; schools) in terms of size, population, technological advancement, firm-specific processes among others.

This paper considered variables at two levels, individual level and country level. Individual level variables were separated from country level variables. Models that focus on individual households ignoring group membership may be represented as follows:

$$y_i = \alpha + \beta x_i + \mu_i \dots\dots\dots 1$$

where y_i is the dependent variable, i is the categories of the response variable, x_i is a vector of explanatory variables, α is the intercept, β is the slope and μ_i is the error term. This model cannot be used to describe simultaneous relationships involving complex survey data. For instance, to describe the relationship between individual households and group membership requires a two-level model. The model is thus augmented as follows;

$$y_{ij} = \alpha_j + \beta_j x_{ij} + \gamma_{ij} \dots\dots\dots 2$$

Where j is a subscript that refers to level 2 units (different countries) and i is a subscript that refers to level 1 units (individual households). y_{ij} is the response variable and x_{ij} is a vector of independent variables. For consistency, this study adopts Goldstein (2003) notation standard. Hence, we let $\alpha_j = \beta_{0j}$ and $\beta_j = \beta_{1j}$. The paper also notes that β_0 and β_{1j} are level 2 specifications. The group j intercept can be estimated by $\beta_{0j} = \beta_0 + \mu_{0j}$ where β_0 is the population intercept estimate and μ_{0j} is the variation around the individual groups. On the other hand, $\beta_{1j} = \beta_1 + \mu_{1j}$ ¹ represents the slopes of groups which is assumed to be identical only when the subscript j is omitted. μ_{1j} represents random variables that is normally distributed.

Combining level 1 and level 2 units yields the two-level model of the form:

$$y_{ij} = \beta_0 + \beta_1 x_{ij} + (\mu_{0j} + \mu_{1j} x_{ij} + \gamma_{0ij}) \dots\dots\dots 3$$

Where $\text{var}(\gamma_{0ij}) = \sigma_{\gamma_0}^2$

Equation 3 expresses the response variable y_{ij} into two parts: fixed and random. In general, equation 3 can be expressed as follows:

$$y_{ij} = \beta_0 + \beta_1 x_{1ij} + \sum_{h=2}^p \beta_h x_{hij} + (\mu_{0j} + \mu_{1j} x_{1ij} + \gamma_{0ij}) \dots\dots\dots 4$$

Based on equation 3, the empirical model is specified as:

$$\begin{aligned} \text{finInc}_{ij} = & \beta_{00} + \beta_{10} \text{Edu}_{ij} + \beta_{20} \text{Gender}_{ij} + \beta_{30} \text{Age}_{ij} + \beta_{01} \text{Income}_{ij} + \beta_{11} \text{debitcard}_{ij} \\ & + \beta_{21} \text{saved}_{ij} + \beta_{31} \text{Borrowed}_{ij} + \beta_{41} \text{Govttransf er}_{ij} + \beta_{51} \text{Domremit tan ce}_{ij} + \dots + (\mu_{ij} + \gamma_{ij}) \dots\dots 5 \end{aligned}$$

Where *finInc* denotes categorical indicators of financial inclusion, i represents the index for individuals and j is the index denoting the country. The predictor variables captures individuals' characteristics found in the survey dataset. Equation 5 assumes that the variables do not interact. It has both the fixed part and the random part. Level 1 variables include age, education and gender while level 2 units are income, saved, borrowed, government transfers, domestic remittances and debit card ownership as depicted by the notation in equation 5.

¹ μ_{0j} and μ_{1j} are random variables. Their corresponding parameters are $E(\mu_{0j}) = E(\mu_{1j}) = 0$; $\text{var}(\mu_{0j}) = \sigma^2$, $\text{var}(\mu_{1j}) = \sigma^2$, $\text{cov}(\mu_{0j}, \mu_{1j}) = \sigma$

Although technological and cultural factors are not explicitly stated, some of the socioeconomic and demographic factors are in-built within those factors. In addition, the dataset does not capture cultural and technological aspects within the data. Equation 6 estimates barriers to financial inclusion. The estimation is based on the probit regression.

$$\begin{aligned} finIncBarrier_i = & \beta_0 + \beta_1 Edu_i + \beta_2 Gender_i + \beta_3 Age_i + \beta_4 debitcard_i + \beta_5 Domremittance_i \\ & + \beta_6 Income_i + \beta_7 Govttransfer_i + \beta_8 saved_i + \beta_9 borrowed_i + \gamma_i \end{aligned} \dots 6$$

Where i represents the various barriers to financial inclusion identified in the Global Findex data. Equation 7 estimates the intra-group correlation. This model takes into account variations arising from group membership. Intra-group correlation is thus measured as follows:

$$\rho = \frac{\sigma_{\mu 0}^2}{\sigma_{\mu 0}^2 + \sigma_e^2} \dots 7$$

The intra-group correlation is indicative of the proportion of variation explained by the organisational structure of the population.

3.2 Definition and Measurement of Variables

Dependent Variable

The dependent variables used in this study include: *Account Ownership (Bank)*, *Account Ownership (Mobile phone)* and *Account ownership (other financial institution other than bank)*. Previous studies that have used similar variables include Demircuc-Kunt and Klapper (2012)

Independent Variables

The explanatory variables used have also been used in other studies that sought to understand the dynamics of financial inclusion (Fungacova and Weill 2014; Beck et al., 2009). However, this paper considers Education, Income, Gender, debit card possession, government transfer received through account, domestic remittances received through mobile phone, saving and borrowing behaviour, and Age as relevant explanatory variables. Table 1 shows variable description and variable measurements.

Table 1: Definition, measurement and predicted sign for each explanatory variable

Variable	Notation	Measure	Predicted Effect	Source of data
LEVEL ONE				
VARIABLES				
Age	AGE	Years lived (Continuous)	-	Global Findex
Education	EDU	0=completed primary or less 1=secondary 2=completed tertiary or more	+	Global Findex
Gender	GENDER	0=female 1= male	+/-	Global Findex
LEVEL TWO				
VARIABLES				
Income quintiles	INCQUIN	0=poorest 20% 1=second 20% 2=middle 20% 3=fourth 20% 4=richest 20%	+	Global Findex
Saved in the last year				Global Findex
Borrowed in the last year		0-No 1-Yes	+	Global Findex
Debit card possession		0-No 1-Yes	+	Global Findex
Domestic remittances received through phone		0-No 1-Yes	+	Global Findex
Government transfers received through account		0-No 1-Yes	+	Global Findex

3.3 Sources of data

The demand-side Global Findex dataset covers access and use indicators of more than 140 economies of the world. This dataset consists of a nationally representative sample randomly selected among adults of 15 years or above. The data contains a record of data collected in 2014 calendar year. An aggregate of 34 nations from sub-Saharan Africa were analysed. On average about 1,000 individuals 15 years or above in each country were considered. The data collection procedures were standardized across all the countries. The margin of error considered in this survey was not significantly different from one country to the other. The database is the first one that provides insights into households' use of financial services across different economies. Additionally, the database contains information on financial exclusion. Although financial exclusion separates people from benefiting from the usage of financial services, individual characteristics do hinder households from using such services. Efforts towards gathering standard data on regular basis at all levels of usage have been made in most emerging economies although the scope has remained limited (Claessens, 2006). Qualitative surveys on usage of financial services have been undertaken within the context of SSA since 2002. Data collected from the surveys remains inadequate as it does not place focus on other critical variables such as savings, credit and risk management. The individual level variables included are; age, education, gender, while the country level variables included are income quintiles, saving, borrowing, debit card ownership, received government transfers through account, and received domestic remittances through mobile phone. These factors are important for examining the extent of financial inclusion in SSA region.

4. Empirical Results

This section is based on a variance components model which addresses the question of whether or not there is sufficient variance represented at the individual level that warrants adoption of the mixed approach. The rule of the thumb states that more than 10 percent of the total variance needs to be represented at a given level.

Applying the multilevel modelling with individual households at level 1 and country being level 2, the approach was justified. Using the null model with nothing but constant term gives the variance estimates at level 2(country level) and level 1 residuals. Approximately 17 percent of the total variance in mobile phone account ownership is represented at the country level being greater than 10 percent which is the minimum expected proportion for further multilevel modelling. Similarly, the total variances explaining differences in account ownership at financial institution and account ownership in general are above the minimum threshold of 10 percent.

4.1 Descriptive Statistics

Table 2 presents the summary statistics for the variables used. The dependent variables are measured as 0 if the individual has no access to an account and 1 if the individual has access to an account. Age is measured in single years. The minimum age considered in this paper is 18 years and the highest is 70 years. The rest of the variables are indicated with minimum and maximum categories. Table 2 also shows the mean values and standard deviations. The total observations sum up to 33,930 respondents each country contributing on average 1000 respondents. Intuitively, the statistics show that the variables are fairly spread around the mean an indication that there is no clustering.

Table 2: Summary Statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Account Ownership	33,930	0.35	0.00	0.48	0	1
Account financial institution	33,930	0.29	0.00	0.46	0	1
Mobile account	31,937	0.14	0.00	0.34	0	1
Income quintile	33,930	2.24	2.00	1.43	0	4
Education	33,930	0.51	0.00	0.59	0	2
Age	30,074	35.30	32.00	13.13	18	70
Gender	33,930	0.51	1.00	0.50	0	1
Debit card ownership	33,489	0.18	0.00	0.38	0	1
Domestic remittances received through mobile phone	12,313	0.29	0.00	0.45	0	1
Government transfers through account or card	2,384	0.46	0.00	0.50	0	1
Saved in the last one year	33,930	0.58	1.00	0.49	0	1
Borrowed in the last one year	33,930	0.53	1.00	0.50	0	1

Figure 1 shows the random effects illustration by country. Mauritius, South Africa and Kenya are the leading countries in access to financial services according to World Development Indicators 2012 which gives credence to our findings. These economies have embraced innovation in the financial sector by providing people with a variety of financial services (Ikhide, 2015). In addition, the governments have not put much restriction in terms of regulating the financial sector especially the mobile money transfer platform. The model used by the three leading lights is the ideal although inherently risky. Where mobile money has succeeded, to a large extent the mainstream banking services have also improved. Therefore, the three leading countries in SSA also have a well-functioning financial sector capable of interfacing with the mobile money technology and indeed any other financial innovations.

Figure 1: Random intercepts by Country

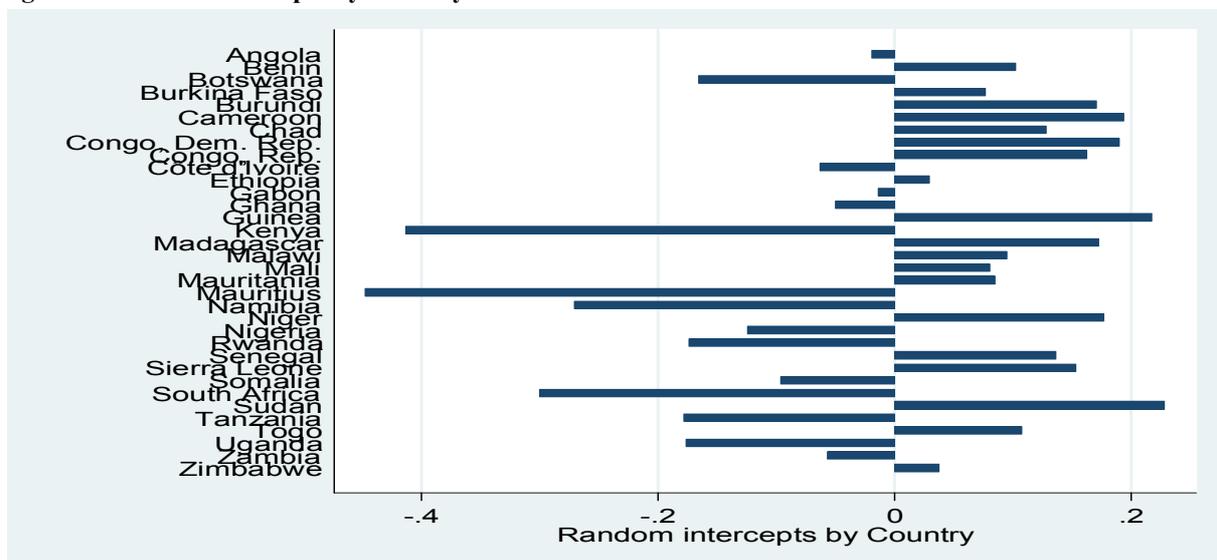


Table 3 depicts a null and the fuller model for mobile phone account ownership as shown in equation 5. Empirical analysis reveals that more people had mobile phone accounts compared to owning an account with a financial institution. Table 3 also assumes that the first category is the reference category and therefore omitted since it forms the basis for comparisons. The multilevel regression results in which the main dependent variables are Account ownership (Bank Account), Account with a financial institution other than bank, and account with mobile service provider (MSP) are shown in Table 3. The results show that owning a formal account is related to the level of income of an individual. Based on the income quintiles variable, the results show that the lowest income quintiles for the fuller model are all significant and negative. We observe that as you ascend from the lowest quintile (poorest 20 percent) to the highest quintile (richest 20 percent), the magnitude of the coefficients tend to reduce an indication that lower quintiles are associated with lower account ownership. The findings corroborate Demirguc-Kunt and Klapper (2013) and Fungacova and Weill (2014) who established a similar pattern between income and the financial inclusion.

This paper also examined education variable and found it to have negative coefficients that were significant. Having primary education or less compared to having tertiary education reduces the likelihood of owning an account. The coefficient for primary education or less is large and negative compared to the coefficient of secondary education indicating that education variable is positively related to account ownership. As you move from low levels of education to the highest level of education, the magnitude of the coefficient reduces, that is, it tends to move towards the positive side (smaller negative number). These findings are consistent with Atkinson and Messy (2013) who found out that financial literacy is key to promoting financial inclusion. This paper has also established that having tertiary education or more influences individuals to own formal accounts whether with the financial institutions or with mobile service providers. The findings may not be surprising given that in sub-Saharan Africa, majority of the people have low levels of education.

Across all the account ownership categories, age is found to be negatively related to account ownership. As individuals advance in age, they tend to be less likely to own an account at any given category. However, observing the coefficients across all the account ownership categories, as individuals advance in age, they are more likely to switch from holding an account in a formal financial institution to having a mobile account with the mobile service providers. The age at which this switch occurs is necessary for policy intervention. Allen et al., (2012) investigated this relationship and established that ownership of formal account and age were non-linearly related.

The paper also investigated the effect of owning a debit card on account ownership. Individuals with debit cards were more likely to own an account with a financial institution compared to owning a mobile account with a mobile service provider. The coefficient for debit card ownership is larger for account ownership with a formal financial institution than for mobile account ownership. According to Damodaran (2012), individuals with debit or credit cards, were also found to own formal accounts in India in the formal financial institutions.

Table 3: Multilevel linear regression model with Account Ownership

VARIABLES	Account Ownership(Bank)		Account in financial institution (Other than Bank)		Mobile account	
	Null Model	Fuller Model	Null Model	Fuller Model	Null Model	Fuller Model
Fourth 20%		-0.0240*** (0.00665)		-0.0140** (0.00591)		-0.0128** (0.00582)
Middle 20%		-0.0575*** (0.00655)		-0.0391*** (0.00583)		-0.0303*** (0.00573)
Second20%		-0.0905*** (0.00641)		-0.0666*** (0.00570)		-0.0445*** (0.00560)
Poorest 20%		-0.150*** (0.00631)		-0.123*** (0.00562)		-0.0879*** (0.00552)
Secondary		-0.121*** (0.00467)		-0.107*** (0.00416)		-0.0519*** (0.00409)
Completed primary or less		-0.188*** (0.0102)		-0.178*** (0.00905)		-0.131*** (0.00929)
Age		-0.0115*** (0.000586)		-0.0101*** (0.000521)		-0.00366*** (0.000512)
Female		0.0327 (0.00392)		0.0195 (0.00349)		0.0202 (0.00343)
Debit card ownership		0.518*** (0.00556)		0.591*** (0.00495)		0.108*** (0.00491)
Constant	1.649*** (0.0344)	0.405*** (0.0923)	1.706*** (0.0333)	0.376*** (0.0855)	1.862*** (0.0260)	1.780*** (0.0295)
lns1_1_1	-1.608*** (0.122)	-1.674*** (0.205)	-1.641*** (0.122)	-4.191 (5.955)	-1.921*** (0.126)	-0.868*** (0.147)
lns1_1_2		-0.900*** (0.138)		-0.716*** (0.132)		-1.763*** (0.218)
lns1_1_3		-1.923*** (0.301)		-1.950*** (0.302)		-2.699*** (0.640)
lns1_1_4		-2.607*** (0.597)		-2.739*** (0.708)		-19.60*** (4.660)
lns1_1_5		-2.171*** (0.625)		-2.106*** (0.446)		-1.428*** (0.356)
lnsig_e	-0.837*** (0.00384)	-1.242*** (0.0226)	-0.886*** (0.00384)	-1.277*** (0.0227)	-1.166*** (0.00396)	-1.072*** (0.0215)
Observations	33,930	1,221	33,930	1,221	31,937	1,201
Number of groups	34	34	34	34	32	32

Standard errors in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Although the findings are largely corroborated by other studies across the world, it is imperative to point out that contradicting findings have also been documented in the literature. For instance, this paper considers gender to be insignificant contrary to other studies which view gender and financial inclusion to be strongly associated. Such studies include (Fungáčová et al., 2014, Tuesta et al., 2013).

4.2 Barriers to Financial Inclusion

This paper also sought to investigate the barriers to financial inclusion in sub-Saharan Africa. Table 4 shows estimation results based on equation 6. From the available data, the barriers to account ownership show that income, education, age, government transfers and having saved affect the barriers to financial inclusion and are significant at different levels. Being in the richest 20 percent category of income quintile implies that being too far away from the financial service provider is not a major problem to this category. This finding is consistent with other studies because richer individuals have greater mobility and therefore distance is not a major factor (Brevoort and Wolken 2009). "Lack of money" and "too expensive" explain why individuals cannot own a mobile phone account. These barriers are affected by income, age, government transfers, having saved, and

having borrowed and are consistent with the findings from previous studies (Fungacova and Weill 2014). The findings further show that lack of documentation, lack of trust in financial institutions, religion, a family member having an account and having no need for financial services were affected by most of the variables in the dataset. These findings provide a view that is consistent with the current state of acquiring ownership of a mobile phone account. However, it is surprising that there exist some individuals who perceive mobile phone account as “hard to get” as depicted by “cannot get one” barrier. These findings however are consistent with Allen et al., (2012) who established that more educated and wealthier individuals are more likely to own a mobile phone account than the reverse.

Table 4: Determinants of barriers to financial inclusion

VARIABLES	Too far away	Too expensive	Lack of documentation	Lack trust	Religious reasons	Lack money	Family member already has	Cannot get one	No need for financial service
Fourth20%	-0.214** (0.106)	-0.274*** (0.103)	-0.195* (0.107)	-0.123 (0.106)	-0.222** (0.107)	-0.181* (0.107)	-0.166 (0.107)	-0.216** (0.106)	-0.200* (0.107)
Middle 20%	-0.335*** (0.104)	-0.354*** (0.102)	-0.428*** (0.104)	-0.343*** (0.103)	-0.386*** (0.105)	-0.375*** (0.105)	-0.411*** (0.104)	-0.372*** (0.104)	-0.386*** (0.104)
Second20%	-0.439*** (0.103)	-0.409*** (0.101)	-0.469*** (0.103)	-0.371*** (0.102)	-0.470*** (0.103)	-0.453*** (0.103)	-0.495*** (0.103)	-0.460*** (0.103)	-0.454*** (0.103)
Poorest 20%	-0.569*** (0.0994)	-0.481*** (0.0975)	-0.565*** (0.0997)	-0.502*** (0.0986)	-0.567*** (0.0996)	-0.555*** (0.0996)	-0.586*** (0.0997)	-0.569*** (0.0995)	-0.577*** (0.0996)
Secondary	-0.655*** (0.0736)	-0.654*** (0.0721)	-0.699*** (0.0740)	-0.676*** (0.0736)	-0.670*** (0.0738)	-0.705*** (0.0740)	-0.674*** (0.0740)	-0.697*** (0.0738)	-0.687*** (0.0738)
Completed primary or less	-1.231*** (0.146)	-1.125*** (0.141)	-1.197*** (0.143)	-1.176*** (0.143)	-1.187*** (0.143)	-1.209*** (0.143)	-1.182*** (0.143)	-1.217*** (0.144)	-1.228*** (0.144)
Age	-0.0407*** (0.00904)	-0.0396*** (0.00886)	-0.0438*** (0.00909)	-0.0414*** (0.00901)	-0.0406*** (0.00907)	-0.0412*** (0.00907)	-0.0447*** (0.00909)	-0.0430*** (0.00906)	-0.0410*** (0.00906)
Female	-0.0901 (0.0628)	-0.0800 (0.0616)	-0.111* (0.0630)	-0.0823 (0.0626)	-0.112* (0.0630)	-0.0879 (0.0630)	-0.0969 (0.0630)	-0.0728 (0.0628)	-0.106* (0.0630)
Has debit card	-0.392 (0.344)	-0.400 (0.316)	0.147 (0.292)	0.161 (0.286)	-0.369 (0.333)	-0.150 (0.312)	0.0166 (0.297)	0.314 (0.289)	-0.361 (0.341)
Domestic remittances	0.00607 (0.0642)	-0.0279 (0.0629)	0.0112 (0.0642)	-0.0122 (0.0639)	0.0291 (0.0644)	-0.000337 (0.0643)	-0.00423 (0.0643)	-0.00395 (0.0641)	0.0126 (0.0643)
Government transfers	1.319*** (0.0644)	1.235*** (0.0634)	1.324*** (0.0644)	1.324*** (0.0641)	1.332*** (0.0644)	1.334*** (0.0643)	1.333*** (0.0643)	1.317*** (0.0643)	1.322*** (0.0643)
Saved	0.698*** (0.0718)	0.637*** (0.0699)	0.692*** (0.0720)	0.661*** (0.0714)	0.715*** (0.0721)	0.665*** (0.0719)	0.680*** (0.0720)	0.650*** (0.0716)	0.667*** (0.0718)
Borrowed	-0.124* (0.0689)	-0.131* (0.0675)	-0.105 (0.0690)	-0.126* (0.0686)	-0.114* (0.0691)	-0.127* (0.0691)	-0.124* (0.0691)	-0.0740 (0.0688)	-0.0809 (0.0690)
Constant	-0.518 (0.443)	-0.408 (0.420)	-0.951** (0.405)	-1.041*** (0.402)	-0.576 (0.432)	-0.678 (0.419)	-0.786* (0.410)	-1.130*** (0.403)	-0.517 (0.438)
Observations	2,384	2,384	2,384	2,384	2,384	2,384	2,384	2,384	2,384

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion and Policy Implications

The use of a multilevel approach was motivated by the nature of the data which formed a hierarchy at two levels: individual level and country level. Estimation results showed that country differences explain more than 10 percent of the observed variations in account ownership. Income was found to influence account ownership. Lower levels of income would negatively impact account ownership. Majority of mobile phone owners are likely to be less endowed with resources and therefore influence their choice to use available financial services. The need to package financial products at different ages is critical. This allows transition from one product to another to happen in a seamless manner. This paper has also shown that there exist differences in financial inclusion across countries. The key differences are largely explained by individual differences although country differences also play a critical role. Many barriers to financial inclusion were investigated with the most critical ones being lack of money resources, too expensive to use the services and the distance to the nearest financial service provider. Having scarcity of money income and distance to the nearest financial service provider play the most critical role in influencing the barriers to financial inclusion in Africa. Specifically, the main barriers to financial inclusion were associated with lower income levels and lower educational attainment. Individuals with less income are more likely to be served by mobile phone account than any other form of account. Distance expressed in terms of proximity to the nearest service provider also affects account ownership pattern.

Overall, the findings raise important questions. There is a threshold on age at which households switch from one aspect of financial inclusion to another. Different income quintiles play different roles in influencing decisions regarding account ownership and therefore participation in financial inclusion matters. The question would be to establish a clear pattern of events across the income quintiles that would lead to certain specific outcomes. In general, the most important barriers that policy interventions should focus on include lack of money income, too far away (distance) and too expensive (cost of accessing financial services). These barriers are critical to unlocking the problem of financial exclusion especially in rural areas where services are greatly on

demand. Longer distances to the service provider could prove a major constraint if the level of income of individuals is low. Similarly, lack of money income and the cost of financial services work to reduce dependence on formal financial services. This perhaps explains why individuals tend to hold onto a portfolio of both formal and informal financial services.

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