



**COMPARATIVE ASSESSMENT OF DETERMINANTS OF FINANCIAL ACCESS AND  
INCLUSION IN NIGERIA AND RWANDA**

**BY**

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**OCTOBER 2018**

DECLARATION

I solemnly declare that this research thesis is the result of my own work and that I have acknowledged all those whose works are cited in this thesis and I bear full responsibility for any shortcomings arisen thereof.

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I hereby certify that this thesis was done in accordance with thesis procedures established by the School of Economics, College of Business and Economics, University of Rwanda.

Prof. Herman MUSAHARA

Date

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Supervisor

## DEDICATION

To my family

## ACKNOWLEDGEMENT

First, all praises and adorations go to the Almighty God for sustaining my life up to this moment. Without His immense blessings, I could not have seen the completion of the programme as it looks never-ending at some moment. My special thank goes to my untiring supervisor, Prof. Herman Musahara for his guidance during this work. My gratitude also extend to the entire staff at the School of Economics, College of Business and Economics, University of Rwanda for their moral support during my study period. To my friends and colleagues in class, I say a big thank you. Finally, I wish to thank my family for keeping with me through the thick and thin of this study. I say thank you for your understanding.

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## ABSTRACT

*This study comparatively assesses the determinants of financial access and inclusion as well as the impact of these factors on the probability of financial access and inclusion in Nigeria and Rwanda. Financial access and inclusion is believed to be a potent tool for poverty and income inequality reduction. Despite the theoretical background stating that financial inclusion can bring tremendous welfare gains to the very poor, empirical evidence is rather scanty. Using the probit regressions and desk study analysis, the results show that high education, high income level, age, informal borrowing and relatives account ownership significantly influence financial access and inclusion in both Nigeria and Rwanda. Country-wise, financial inclusion reduces poverty and income inequality in Rwanda more than in Nigeria. Also, the probability of financial access and inclusion is higher among those who at least completed secondary school in Nigeria relative to Rwanda. However, the results suggest that males are more likely to be financially included than their female counterparts especially in Rwanda due to wider income inequality. In terms of informal borrowing, Nigerians are more likely to borrow from money lenders whereas Rwandans are more likely to borrow from friends/relatives. Finally, the results show that the net wealth benefit derived from financial access and inclusion significantly reduces poverty in both Nigeria and Rwanda. We therefore recommend that the governments should mainstream financial innovation to the poorest people as a key strategy to achieve its 70% and 80% financial inclusion rate by 2020 and 2018 respectively.*

**Key words: ASSESSMENT, DETERMINANTS, FINANCIAL ACCESS, INCLUSION**

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the Study

Despite Africa's rapid economic expansion in the past decades, which moved millions out of poverty, poverty and income inequality remain a greater challenge. In 1990, 37 per cent of the world's population were living below the international poverty line of \$1.90 a day but, by 2013 only 10.7 per cent were. However, the Sustainable Development Goal (SDG) target of eradicating poverty by 2030 is unlikely to be achieved as by 2013 approximately 800 million people lived in poverty. At the core of SDGs attainment, the new 2030 Agenda for Sustainable Development is committed to leaving no one behind. Leaving no one behind (LNOB) is the process of achieving growth while fighting all forms of extreme poverty and inequalities among people (vertical) and income groups (horizontal). Stuart and Samman (2017) state that key to LNOB is the prioritization of policies and accelerating actions to help the chronically poor and most marginalized.

Financial access and inclusion are important element in ensuring inclusive growth since finance access enables economic agents involve in productive economic activities, make consumption and investment decisions and become resilience in face of shocks. Financial access and inclusion of the poorest and the marginalized people will lead to the attainment of peaceful and inclusive societies as envisaged in SDG 16 and as well empower women and girls in accordance to SDG 5. According to Aguera (2015), the "absolute number of savings accounts worldwide is reported to exceed the global population". But over 2.5 billion adult population, almost half world's population, have no access to formal financial institutions. In fact, only 41 percent of adults population are banked in developing countries vis a vis 89% of adults in high income countries.



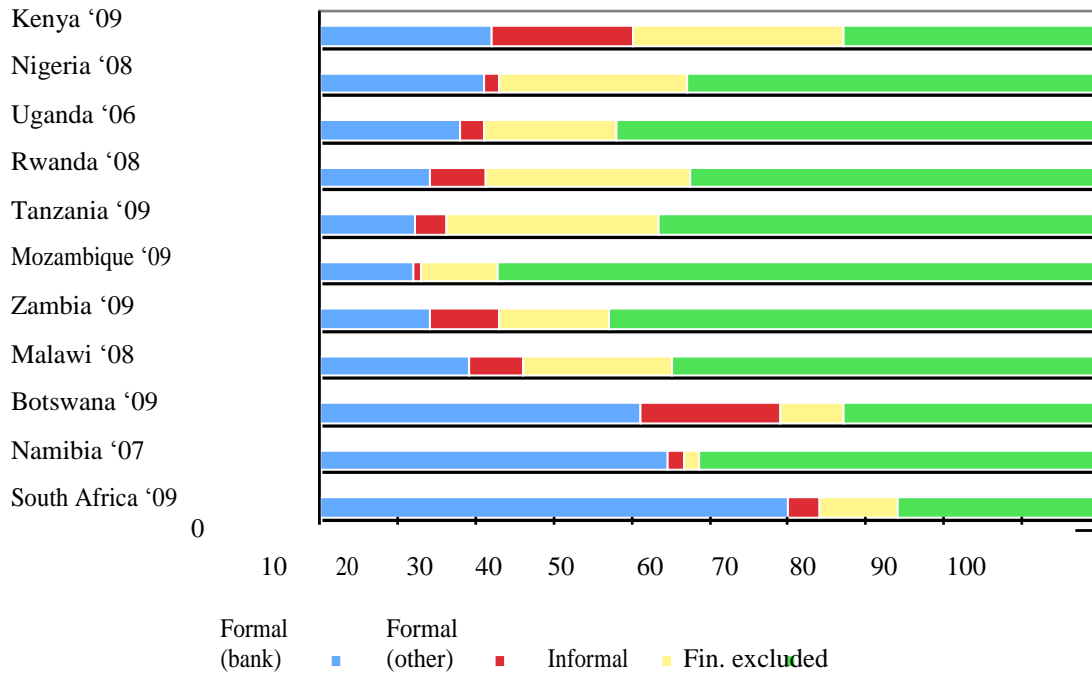
Out of this 41 percent, only 37 percent are women compared to men who are 46 percent banked. Thus, there seems to be a correlation between financial inclusion and poverty level in the world as only 23% of adults living below \$2 per day (poverty line) have a formal account.

This shows that despite the considerable financial inclusion achieved by commercial banks, microfinances, and other financial institutions in the past 20 years, most of the poor still remain unserved by formal financial institutions that intermediate between savers and borrowers. No doubt financial inclusion plays a critical role in sustainable development, reducing poverty, and boosting shared prosperity. However, financial inclusion varies widely around the world with the poor, young and small firms facing the greatest barriers to inclusion.

Financial inclusion according to The World Bank (2016) is ensuring people and businesses get affordable and useful financial products geared towards customers needs in a sustainable and responsible way. It represents a revolution in developing countries financial intermediation policies and manifest positive impact of financial innovation on the poor livelihood. Thus, as a policy objective, it seems to resolve the age long debate of finance contribution to poverty and economic growth.

Africa faces substantially larger challenges than all the other continents, mostly due to a much higher incidence of financial exclusion as illustrated in Figure 1 below. Mankjee (2009) states 25 percent of poor households have access to formal financial services in Asia but such feat is hardly demonstrated by African countries. The percentage of adults banked 24.1 in Sub-Saharan Africa, where as it is 39 for Latin America and the Caribbean and 33 for South Asia.

**Figure 1. Formal Financial Access in Africa**



The World Bank Report (2013) opines that savings and payments are strongly linked to poverty reduction. It stressed that access to credit, insurance, savings, and payments opens economic opportunities for the bottom 40 percent to increase their incomes sustainably. The report adds that women in particular can benefit from financial inclusion initiatives, as they are more excluded than men from formal financial services. This is also supported by Findex (2014) report shown in table 1 below. The table thus shows that despite both Nigeria and Rwanda outperforming most countries in Sub-Sahara Africa, they are far below developing economies and the world average financial inclusion performances. To this end, the president of the World Bank, Jim Yong Kim, has expressed optimism to achieving universal financial access by 2020. This indicates the crucial role important role financial inclusion play in economic growth and poverty alleviation (World Bank, 2014).

**Table 1. 2014 Account Penetration in %**

	All Adults	Women	Poorest 40%
Nigeria	44	34	34
Rwanda	42	35	18
Sub-Sahara Africa	34	30	25
Developing Economies	54	50	46
World	62	58	54

*Source: Findex, (2014).*

Despite the important role financial inclusion plays, few empirical studies exist which analyses the determinants of financial access and inclusion on the microeconomic perspective by quantifying the impact of different demographic and socio-economic elements on participation in the formal financial system (Allen *et al.*, 2012; Cámara *et al.*, 2014; Efobi *et al.*, 2014; Tuesta *et al.*, 2015). Thus, this study attempts to understand which socio-economic factors encourage the adoption of the formal financial system in both Nigeria and Rwanda. Also, it tries to measure their impacts on poverty reduction in these countries, which had similar financial services access in 2010 (21.6 for Nigeria and 21% for Rwanda) and 2014 (see Table 1). Both countries are also committed to Maya Declaration and G20 Peer Learning Program aimed at financial inclusion and poverty reduction. Essentially, this study examines whether the commitment of Nigeria and Rwanda to have 70% and 80% financial inclusion by 2020 and 2017 respectively is plausible. This will help to deepen our knowledge on economic policies designed to encourage financial inclusion in Nigeria, Rwanda and Sub-Saharan Africa in general.

## 1.2 Statement of the Problem

Financial inclusion is an emerging issue of interest as the then World Bank Group President, Jim Yong Kim challenged the world to achieve “universal financial access by 2020” as key to fostering inclusive economic growth and shared prosperity. Empirical evidence and theories

opine that access to financial services play an important role in alleviating poverty, but sub-Saharan Africa is still largely undeserved. As already indicated, despite financial inclusion being one of the surest ways of inclusive economic growth and development, many adults in Africa are financially excluded.

Literature on financial inclusion have largely focused on indices of financial access and inclusion (Arora, 2010; Chakravarty & Pal, 2012; Gupte, Venkataramani, & Gupta, 2012; Sarma, 2008). All these authors have all constructed indices for financial inclusion and access respectively without examining the impact of those indices on poverty reduction. Hitherto, the only studies that have gone further to establish the link between finance and poverty is Honohan (2008) and Jabil (2015). They constructed indices for financial access for almost 162 countries and 33 sub-Saharan countries respectively and then assessed the impact of the indices on poverty reduction in the sample countries. Their findings were inconclusive since they did not find causal link between poverty and financial access. This therefore provides an avenue for further studies in this area.

Aside the indices of financial inclusion and of access, one other issue that has received considerable prominence in the financial inclusion literature is the use of the Global Financial Inclusion Index 2011 dataset to explore the socio-economic determinants and barriers to financial inclusion (see Demirguc Kunt & Klapper, 2012, 2013, Allen *et al.*, 2012, Klapper and Singer, 2013, Efobi *et al.*, 2014, Camara *et al.*, 2014 and Tuesta *et al.*, 2015). Some of these authors only provide the descriptive statistics of the measurement of financial inclusion without testing for any statistical significance. Others also provide the link between the individual characteristics without examining the impact it has on poverty. These therefore, leave a gap to be filled on the link between financial inclusion and poverty reduction nexus.

Thus, this study attempts to close this research gap by employing micro-level data from the global Findex (2014) dataset to comparatively investigate the financial access and inclusion determinants impact on poverty reduction for sustainable development in both Nigeria and Rwanda.

### 1.3 Objectives of the Study

The main objective of this study was to comparatively examine the determinates of financial access, inclusion and innovation in both Nigeria and Rwanda using the demand side data of the Global Financial Findex (2014) dataset.

In particular, the study sought to:

1. identify the socio-economic factors that influence financial access and inclusion in Nigeria and Rwanda;
2. investigate the effects of financial access and inclusion on poverty reduction in Nigeria and Rwanda;
3. examine the impact of financial innovation on poverty in Nigeria and Rwanda; and
4. identify lessons that can influence policy in these countries and Sub-Sahara Africa generally?

### 1.4 Research Questions

The research questions include:

- i. What socio-economic factors influence financial access and inclusion in Nigeria and Rwanda?
- ii. Is there any significant welfare gain arising from improved financial access for the poor in Nigeria and Rwanda?

iii. What role technology plays in increasing financial access and thus in reducing poverty in these countries?

### 1.5 Hypothesis of the study

H<sub>1</sub>: Demographic and socio-economic factors explain the extent of financial access and inclusion in Nigeria and Rwanda

H<sub>2</sub>: Financial access and inclusion indicators such as ownership of account, and access to formal credit do reduce poverty in Nigeria and Rwanda

H<sub>3</sub>: Financial innovation such as mobile money, agent banking etc. increases financial access and reduces poverty in Nigeria and Rwanda

### 1.6 Significance of the Study

The study findings provide an implication for the poor (especially economic interventions targeted at them), development finance, policymaking and future research on financial inclusion in other developing countries. First, the poor is the utmost beneficiary of this study because it indicates how financial access and inclusion contribute to improve their lives especially on poverty reduction to those who have access to formal financial services. This provides the enabling avenue for a lot of them to participate in financial inclusion programmes in their respective countries. Development finance and development economists have a share in applying the findings of the study in fashioning out modules on how to use financial inclusion to tackle poverty problems instead of only sticking to the traditional modules of growth.

Furthermore, the findings of this study will be useful for policymaking regarding financial development and financial inclusion in the African continent. Development organizations all have their share in the findings of this study. Finally, the study adds to the few strands of literature currently available on financial inclusion and poverty reduction nexus.

### 1.7 Scope of the Study

The study exclusively concentrates on financial access, inclusion and innovation and poverty reduction nexus in Nigeria and Rwanda. It uses data on the two countries from the Global Financial Inclusion Database 2014 as it is conducted every three (3) years (next survey is 2017). The Global Findex (2014) is a survey conducted by the Gallup World Poll on individual level characteristics on financial inclusion across the world for 148 countries including 42 countries from Africa. It is the only survey agency that uses the same methodology in collecting data on these 148 countries including Nigeria and Rwanda and hence provides comparable data on the countries covered.

### 1.8 Limitations of the Study

The study is limited to Nigeria and Rwanda. It uses country study cross-sectional data to analyse the key determinants of financial access and inclusion. This study has not been able to draw a long run relationship between financial access and inclusion and poverty reduction since the data is only one-year data point and does not encompass several periods that would be used to establish causality. Again, the data for SSA from Global Financial Inclusion Findex 2014 did not stratify the individuals into urban and rural thereby making the study to fall short of comparisons between the two (Efobi *et al.*, 2014). These limitations do not, however mean that the results from the study could be of less value for policymaking and implementation.

### 1.9 Organization of the Study

The rest of the thesis is organised as follows: Chapter two considers the literature review mainly on the concept of financial inclusion and poverty in both Nigeria and Rwanda; and empirical review of the study. Chapter three, discusses in detail the required methodology, comprising source of data, the dependent and independent variables, and econometric model specification.

Chapter four presents the results and discussions in line with the objectives and hypothesis stated. The study ends with Chapter five, which summarises the key findings, concludes and makes policy recommendations, and areas for future research.



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

The general objective of this chapter is to present the conceptual, theoretical and empirical evidence on the key factors that influence financial access and inclusion and their impact thereof on poverty reduction in Nigeria and Rwanda. This section is divided into two main parts. The first section presents an overview of financial access and inclusion and poverty reduction nexus in both countries. It also presents empirical literature on determinants of financial inclusion; and financial inclusion and poverty reduction nexus respectively.

#### 2.2. The concept of Financial Inclusion and Poverty Reduction

##### 2.2.1 Overview

There is no exact theory that explains financial inclusion and poverty reduction nexus in the literature. However, studies such as Schumpeter (1911), Goldsmith (1969), and Shaw (1973) with Amartya Sen's capabilities approach to poverty (Sen, 1999) have all stressed on the importance of financial sector development on growth as well as poverty reduction. They argue that a well-functioning financial sector if it is properly developed could lead to economic growth and financial development.

For inclusion growth and poverty reduction, financial access and inclusion has been earmarked as a critical element. It increases entrepreneurship as financial included people are better suited to start and expand businesses, efficiently manage risk, comfortably invest in education, and more resilience. In terms of difference, financial access involves owning accounts, but financial inclusion focuses on usage in areas of credits or withdrawals. Many people are involuntarily excluded due to prohibitive costs or significant barriers such as regulations, paperwork, travel

distance, legal hurdles, or other market failures to financial services. A few number of people might be voluntarily excluded. Nevertheless, (The Global Findex Report, 2014) believed that many people are involuntarily excluded and that better policies could overcome such barriers.

Importantly, The World Bank Report (2012) on financial inclusion strategies provide an overview of how the different aspects of financial intermediation could be measured.

—*Financial Access*: How economic agents use financial services and products available in formal institutions. This requires the review of potential barriers to opening and using of bank accounts such as cost and physical proximity of bank service points (for example, branches and ATMs).

—*Financial Quality*: How important are the services or products to the consumers? This is measured through experiences, attitudes and opinions of consumers. Quality could show the depth and nature of financial intermediation in a country.

—*Financial Usage*: In addition to normal account ownership, permanence and financial service depth is very critical too. Thus, there is need for more analysis of the frequency and duration of service usage from the consumers' view point (like the demand-side Findex survey).

—*Financial Impact*: this measures how financial services affect consumers livelihood. This however brings a greater challenge in designing a survey. Both demand-side, or supply-side or both surveys could provide reasonable impact assessment information.

### 2.2.2 Financial Inclusion and Poverty Reduction in Nigeria

To promote financial inclusion, the Central Bank of Nigeria in 1977 adopted rural banking programme requiring the establishment in each local government area at least one bank branch.

In addition, to promote financial depth, policies such as minimum SMEs lending and rural loans were introduced. Violators of the guidelines were punished through fines and penalties, and

transfer of the deficit to development financial institutions or the Central Bank itself for disbursement to the targeted groups.

Furthermore, government formed People’s Bank and later Community Banks in order to promote savings and culture. They were meant to serve low savers and extend microcredit to rural and poor households. But the progress has been slow and mixed. As a result, the government since 2005 has attempted to promote increased financial inclusion through policies like Nigerian Financial System 2020 (FSS 2020). Four (development of varied financial products; enhancement of payment processes; development of credit system; and encouragement of a savings culture) out of the six pillars focus directly on financial access, inclusion and innovation. Despite these efforts , Nigeria lag behind her ranks in the subregion as in 2012 3882 clients were served per bank on average compared to 3,922 clients in Kenya and 8,595 clients in Tanzania (CBN, 2012). Hence, this could present major obstacles to Nigeria’s economic growth and development. There is however regional disparities in financial inclusion in Nigeria as it is progressive in urban areas, especially in the southern parts(Table 2). Table 2 shows that most financial excluded adults are in the North, with 68% in North East and North-West, against only 33% and 32% in South West and South East respectively.

Table 2. Nigeria Financial Access and Inclusion (in percent)

Regions	Formally	Formal	Informally	Financially
	Banked	Other	Served	Excluded
North West	13	6	13	68
North Central	27	6	23	44
South West	42	7	18	33
North East	15	6	11	68
South East	41	6	21	32
South South	39	6	19	36

*Source: EFINA Access to Financial Services in Nigeria, 2010 Survey*

According to the, EFINA (2010) survey, there are five key barriers to financial inclusion. These include: physical access; low and irregular income, affordability, eligibility criteria and financial literacy. Some of these challenges are complex since some financial services are by nature themselves complex. The survey stated that people rely on family and friends; trusted in the community members and religious leaders; bank, employer and work colleagues; and electronic and print media for financial information. Despite all these hindrances, the Nigerian government is determining to achieve a 70 percent financial inclusion by 2020 from the 30 percent in 2010 (CBN, 2012).

### **2.2.3 Financial Inclusion and Poverty Reduction in Rwanda**

Like Nigeria, financial access and inclusion is one of the top priorities on the government of Rwanda agenda and is being promoted through several initiatives. Historically, in 1975 people of Nkamba, a village in the current Eastern province were the first to establish a savings and credit scheme in order to encourage formal financial access and inclusion among themselves. Due to its success, other communities followed which eventually led to in 2008 the formation of "Banques populaires" but still retains its cooperative roots.

The apex bank, National Bank of Rwanda recognizes the important role the financial sector plays in facilitating economic and private sector growth and in 2007 formulated the National Microfinance Strategy (NMS) aiming at promoting a vibrant microfinance sector that offers diversified, inclusive, and sustainable financial services.

According to the FinScope (2008) report more than half (52%) of all adults in Rwanda were financially included as only 21% adults were in the formal financial institutions. These findings led to more focused financial sector interventions and as a result the FinScope (2012) showed that formal financial inclusion doubled from 21% in 2008 to 42% in 2012, within only 4 years proving that Rwanda ambitious targets of 80 percent and 90 percent could be achieved by 2017 and 90% by 2020 respectively.

In that regards, several financial reforms and policies such as payments system bills (e-payments), loan guarantees from the government to increase access to credit for MSMEs, automated transactions, insurance, microfinance and pension laws, credit reference Bureau and financial education strategy, among others have been implemented by the Rwanda government.

### 2.3 Recent Financial Inclusion Innovation

Hannig and Jansen (2010) states that financial sector is susceptible to market failure and, as a result it is in many countries strictly regulated. Information asymmetry (lack of track records/collateral) poses greater challenge for the low-income customers. On other hand, many financial institutions are inexperienced in low income market and this makes them unwilling to serve them. Similarly, the limited transactions sizes and the overall market makes fixed cost recovery difficult for suppliers.

As a result, financial innovation could dramatically lower the fixed costs of reaching the low-income segment and attract a broader range of new clients. One of such innovation is agency banking. Brazil, an early leader was able to introduce large-scale “banking correspondents” to distribute welfare grants to unbanked adults and this eradicated physical access barrier to financial services. Due to this, there are 95,000 correspondents covering the 5,500 municipalities in Brazil, with more in less than 3 years, opening more than 12 million accounts in remote areas.

Hence, Brazil experience provides a valuable lessons for developing countries, especially Rwanda where hills and disperse settlements cause physical access to banking services.

Another financial innovation tool is Mobile Money, whose penetration in developing countries has almost tripled in the past five years, with sub-Sahara Africa in particular revealing high growth. 73 percent all adults in urban areas have mobile money account in Kenya. Other countries show interesting results too. This shows that both Nigeria and Rwanda could leverage this success story of mobile payments by Kenya although Rwanda has a sizeable adult population using mobile money.

Finally, friendly business policies regarded mobile money should be formulated as they are formed a key complement to innovation, public ownership, market infrastructure, and barriers measures. Thus, if Rwanda and Nigeria are to achieve universal financial inclusion target by 2020, they must craft policies to reduce entry barriers and cost of doing business.

## 2.4 Empirical Evidence

The literature on financial access and inclusion from a microeconomic level were solely based on evidence, and data that were not subject to rigorous statistical tests, but only on descriptive analysis like 65 percent of microfinance (Grameen Bank) customers push above the poverty line. Burgess and Pande (2005) reveal poverty reduction in India is caused partly by state-led expansion of rural bank branches. Further, they argue opening bank branches in rural unbanked locations was correlated with rural poverty reduction in the study areas. On his part, Honohan (2008) examined factors that influence financial access by constructin a financial access composite indicator for 160 countries. In addition, aid and grants, dependency ratio, and population significantly reduce financial access in the world. However, mobile phone penetration

and institutions quality rise financial access significantly. Cross country analysis reveals financial access significantly decreases poverty.

Erlandsson and Lundqvist (2014) examine the association between mobile phone penetration, proxy by subscribers' per capita, economic growth and its impact on financial inclusion in 44 African countries for the period 2000-2011. Using a dynamic System GMM to control for endogeneity, they found that mobile phone penetration is a positive and significant contributor to economic growth in Africa. Furthermore, Brune *et al.* (2011) discovered that in rural Malawi improved financial access by commitment saving account rises the livelihood of poor households since it agricultural input use are accessed with their savings. Similarly, Allen *et al.* (2013) argued for the inclusion of the poor in financial services in Kenya this could improve their welfare tremendously. In applying micro-econometric approach, Efobi *et al.*, (2014) using Global Findex (2011) examined access to and use of banking services in Nigeria. Their findings revealed among others that demographic attributes such as gender, age and education significantly explained banking services in Nigeria. They also found that income and financial innovation (proxy by ICT) significantly affect bank services usage in Nigeria. Individuals dwellings such as urban and rural and the distance of the resident of the respondent to banks were not provided by Gallup World Poll and these were limitations to their study considering the framework they designed and the fact that they intended to use these social factors for robustness checks. They however, conclude that despite the above limitations, the study is worthwhile for policy making in Nigeria and other African countries on issues related to financial access and inclusion.

Recently, Ogunleye (2017) used an unbalanced panel data of 752 microfinance banks in Nigeria during 2011-2014 to test the claim that higher lending to female customers causes improved

repayment rate. The regressions thus supports that view as female had positive impact on repayment and submit that in order to reduce poverty drastically microfinance should specifically target women in Nigeria. However, this study is too narrow, and the data are supply side that is prone to overstatement of account holders. On his part, Fadun (2014) qualitatively found argued that in Nigeria financial access comprise key strategy to reduce poverty and redistribute income. He therefore submitted that all financial inclusion stakeholders should take necessary measures to decrease number of financially excluded adults, so as alleviate poverty and reduce inequality.

In Rwanda, empirical evidence on financial access, inclusion and poverty are scarce. Qualitatively, Howe and Mckay (2007) discovered that inherent households attributes affect poverty persistence, as agriculture policy has differential impacts on the chronic poor. Also, in 2010, Ansoms and Mckay explored how poverty incidence differs across geographical areas in Rwanda. They argued all-cap-fit-all rural policies will harm the impoverished peasant groups and increase poverty levels in Rwanda. Recently, Cho and Kim (2017) through an ordered probit model and marginal effects computations found the determinants of poverty status in Rwanda. To be effective, they submitted that policies should focus on female household, controlling birth rate and reducing regional economic disparity, especially in rural areas and the southern province. In addition, government should institute vocational programmes for non landed farmers, and increase food market access.

In the light of the above discussions, there is the need to examine the extent to which financial inclusion would reduce poverty in Nigeria and Rwanda using micro-level data. In addition, the study will examine the socio-economic factors that determine financial inclusion in these countries. This study differs from previous studies in three ways. Firstly, to the best of my



knowledge, it is the first study to use micro-data from the Global Findex Database (2014) to examine the effect of financial inclusion on poverty reduction in Nigeria and Rwanda. This differentiates it from previous studies that have used mainly aggregate data to study the finance and poverty reduction nexus. Secondly, it uses a quantitative approach to determine the association between financial inclusion and poverty reduction as compared to previous studies that have used strictly qualitative methods (Jones, 2008; & Fadun, 2014). Lastly, a comparative analysis between two economies in two distinct locations of Africa and in particular between Nigeria and Rwanda has not been done before and can offer credible lessons to other countries as it goes beyond only examining the effects of individual attributes on financial inclusion to include the role of financial inclusion and financial innovation on poverty reduction for sustainable development in Sub-Saharan Africa.

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1 Introduction

This chapter discusses the data sources, the models and the econometric techniques employed to analyse the data for the study. It also discusses the dependent and independent variables in detail.

#### 3.2 Data Sources

Due to the various limitations of supply-side data like multiple accounts held by some individuals or firms using accounts, the demand side data was used. Again, individuals who own accounts in other countries they are not from can bloat the extent of financial access in that country since they are not citizens. This clearly does not depict the extent of financial inclusion in such countries since those foreigners are not citizens of the country and will therefore not truly represent the actual held account population. In addition, some countries are not able to provide useful granularity of financial access. This means that supply-side data cannot truly tell the depth of financial access or usage unlike the demand-side data. These weaknesses of the supply side data provide the impetus for this study to rely on the demand-side data. This data is capable of correcting these weaknesses and further strengthening the results thereafter concerning the issue of endogeneity instead of the supply-side data.

The data for this study is therefore sourced from the World Bank micro data on the recent Global Financial Inclusion Findex (Global Findex, 2014) survey carried out by Gallup International. Gallup International, through the Gallup World Poll, has been conducting surveys since 2005. It covers more than 150,000 nationally representative and randomly selected adults over the 2016 calendar year for 148 countries worldwide. Each of the countries have 1,000 observations, same

methodology adopted in collecting the data thereby enabling comparative analysis. Unlike FinScope surveys, Findex collects comparable data on each of the 36 Sub-Saharan African countries surveyed. Thus, the sample size for this study is 1,000 individuals from different households each in Nigeria and Rwanda.

### 3.3 Econometric Model Specification

To address the three objectives of this study, probit model is developed to find out the determinants of financial access, inclusion and financial innovation. We employed the probit model for our estimation because the dependent variables are categorical variables. The dependent variables of financial access, financial inclusion and financial innovation variables have binary responses of Yes (=1) and No (=0) in our Findex (2014) datasets.

Suppose that the probability of an  $i^{\text{th}}$  individual accessing finance or being financially included or using financial innovation means or not depends on the unobserved utility index  $U_i$ , determined by predictive variables,  $X_i$ , in a way that the bigger the value of the index  $U_i$ , the greater the probability of being financially included or accessing finance or using innovation platforms for transactions. We express the index  $U_i$  as

$$U_i = \beta_1 + \beta_2 X_i \tag{1}$$

where  $X_i$  are the individual characteristics such as gender, age, educational level, etc. and  $\beta_1$  and  $\beta_2$ . Let  $Y_i = 1$  if the individual  $i$  is financially included and  $Y_i = 0$  if it does not. Now it is reasonable to assume that for each individual, there is critical or threshold level of the index, call it  $U_i^*$  such that if  $U_i$  exceeds  $U_i^*$ , the individual  $i$  is financially included, otherwise it will not. The margin  $U_i^*$  like  $U_i$ , is unobservable, but if we assume it is normally distributed with the constant mean and variance, it is easy not only to measure the parameters of the index itself in (1) but also to retrieve valuable information about the observed index.

Assume it is normally distributed, the probability that  $U_i^*$  is less than or equal to  $U_i$  can be computed as

$$P_i = \Pr(Y = 1) = \Pr(U_i^* \leq U_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{U_i} e^{-\frac{t^2}{2}} dt \quad (2)$$

$$P_i = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\beta_1 + \beta_2 X_i} e^{-t^2/2} dt \quad (3)$$

where  $t$  is a standardized normal variable, i.e.,  $t \sim N(0,1)$ .

Since  $P_i$  represents the probability the event occurring, here the probability of accessing finance, or financially included or using financial innovation platforms for transaction, it is measured by the area of the standard normal curve  $-\infty$  to  $U_i$ , (Green, 2012).

Now to obtain information on  $U_i$ , the utility index, as well as  $\beta_1$  and  $\beta_2$ , we take the inverse of equation (3) and after some mathematical manipulations we get:

$$U_i = F^{-1}(P_i) = F^{-1}(P_i) \quad (4)$$

Expanding equation (4) following the econometric specification of Efobi *et al.*, (2014) and Fungáčová and Weill (2015), gives equation (5) below:

$$P(\text{FinAcc} / \text{Inc} / \text{Inn})_i^k = \beta_0 + \beta_1 \text{Gen}_i + \beta_2 \text{Age}_i + \beta_3 \text{Age}^2_i + \sum_{j=4}^5 \beta_j \text{Edu}_i + \sum_{j=6}^9 \beta_j \text{Inc}_i + \sum_{j=10}^{13} \beta_j \text{Bor}_i + \beta_{14} \text{RelAct}_i + \varepsilon_i \quad (5)$$

Where:

FinAcc means financial access, Fin\_Inc means financial inclusion, Fin\_inn is for financial innovation, Gen. is for gender, age, age square and Edu. means education. Also, borrow is for informal borrowing, Rel-acc. means relative or a family member owns an account. The superscript  $k$  represents financial indicators. Also, subscript  $i$  represents the individuals in each country. The intercept is  $\beta_0$ . The coefficients of the respective parameters range from  $\beta_{1-14}$  while

e is the error term for each individual in the model. For detail definitions and descriptions of all the variables used in model (1) specified above, (see Table 5.11 of the appendix). After the model specification, the parameters in equation (5) were estimated using the maximum likelihood regression method in accordance with other studies (Jabir, 2015).

Additionally, the marginal effects of the explanatory variables on each dependent variable are calculated in order to estimate the impact of these variables on the individual financially access and inclusion possibility:

$$Y = \Phi(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n) \quad (6)$$

$$\text{So, } \frac{\partial y_i}{\partial x_i} = \beta_i \Phi(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n) \quad (7)$$

Thus, to calculate the impacts of  $X_i$  on  $Y$ , all other  $X_j$  values are considered and often at their means or at their medians. The Marginal effects are therefore interpreted as elasticities.

Finally, these econometric models are supplemented by desk study analysis on the influence of financial access, inclusion and innovation on poverty and income inequality reductions across the world.

### 3.4 Determinants of Financial Access, Inclusion and Innovation (Dependent Variables)

Three indicators of financial inclusion (formal account, credit and mobile money) are used in this study to estimate the determinants of financial access and inclusion. They are discussed in detail below.

#### 3.4.1 Formal Ownership of Account

For this study, only formal accounts holders are used. This criterion has been used in other studies (Efobi *et al.*, 2014; Camara *et al.*, 2014; Fungáčová and Weill, 2015). This is a binary dependent variable that takes the value 1 for those with access to financial services and 0

otherwise. Similarly, we expect that if the poor has access to formal financial services the rate of their poverty would reduce. This is because they could use the account to engage in other forms of economic activities such as borrowing, savings and investment. This have a potential to push them out of the poverty bracket and it is the proxy for financial inclusion.

#### 3.4.2 Access to Formal Credit

Furthermore, we used formal access to credit to proxy for financial access. Again, in this case formal accounts holders were sampled. This helps to restrict the definition of financial access and inclusion to having access to formal financial services by the poor. Borrowing has some effect on the poor who are financially included. Thus, it will help to make funds available to the poor who will intend invest those funds thereby getting them out of poverty. This is interpreted with the caveat that interest rates are generally low and that the poor had access to funds for borrowing from formal financial institutions.

#### 3.4.3 Financial Innovation

Recently, mobile money has become an important financial innovation tool in Sub-Saharan Africa as it has increasingly been adopted to extend financial services to those left out by the conventional banking system-women, the poor, the young, and rural dwellers. For this study, the number of persons using mobile money to pay bills is proxy for financial innovation in line with McGregor (2013). It is expected to reduce poverty in both Nigeria and Rwanda

#### 3.4.4 Independent Variables

In this section, detailed explanations are provided on the expectation of the various independent variables specified in the baseline equation above. These include gender, age, education, income quintiles, relative ownership of account and informal borrowing. The details are discussed below.

### 3.4.5 Gender and Age

Gender indicates whether the respondent is a male or female. It is a dummy variable that takes 1 for Female and male is 0. This variable is expected to have a negative relationship because females are less likely to own bank account as compared to their male counterparts (Allen et al, 2012, Efobi et al., 2014). Age and Age2 are both in years (continuous variables). It is expected that financial inclusion will initially have some depth and then decline with age. This shows non-linearity of age captured by the age squared (Fungáčová and Weill 2015).

### 3.4.6 Income Quintiles

The income quintile are indicators of poverty levels in each country. The top income quintile is the excluded category in the regressions). This is to serve as a reference point for comparison and to overcome dummy variable trap. It ranges from the poorest 20% to the richest 20%. Overall, financial inclusion is expected to increase with income (Allen *et al.*, 2012; Fungáčová and Weill 2015).

### 3.4.7 Educational Level

Each of the respondents falls within the three groups of educational levels. Primary or less education is defined as 0-8years of education. Also, a respondent is described as having secondary education if his/her educational level falls between 9-15years and Tertiary or beyond high school as 4 years or more of college or university education (Allen *et al.*, 2012). The likelihood of financial inclusion is expected to increase with respect to individual's level of education. Also, the primary or less education serves as the reference point for secondary and tertiary education. The rate at which individual rates of poverty reduces is in response to the individual's level of education. The higher the educational level the lower the rate of poverty, all other things being equal.

### 3.4.8 Relative Ownership of Account

Account ownership by relative is a barrier to financial inclusion. For the purpose of this study only family member ownership of account is used. Respondents were made to make multiple choices. The level of barrier to financial inclusion shows individual's inability to be financially included. Except the reason provided as —family member has an account as reason not to own an account by a household, the rest of the barriers do not have an effect on account ownership and withdrawals partly due to collinearity of the variables with formal account and frequency of withdrawals. This explains why all these variables are not included in this study. So only relative/family member ownership of accounts is used to measure a barrier to financial inclusion in this study. This means that the likelihood of an individual being financially inclusive will decline with respect to family member's being financially included. Similarly, when a family member is included such an individual is more likely to reduce poverty than those who are not included all other things being equal.

### 3.4.9 Informal Borrowing

Informal borrowing is also considered in this study as a determinant of financial inclusion. This was included to observe the effect of other sources of finance on poverty reduction and how they can influence one's level of financial inclusion. Efobi *et al.*, (2014) considered informal borrowing as a financial discipline composite indicator in their studies. The difference between this study and Efobi *et al.*, (2014) is that this study seeks to investigate the individual variables effects instead of making it a composite indicator. A positive relationship between financial access, inclusion and informal borrowings is expected. However, a negative relationship between poverty and informal borrowing attributes is expected. Also, the net effect is that it increases an individual's ability to be financially included for people who borrow from employer, money



lenders and stores since those people are more likely to issue cheques to their debtors than their counterparts who result to borrowing from family/friends. This explains why those individuals' who borrow from friends/family might be less likely to be financially included. Arguably, the expectation is that having access to informal sources of finance could lessen the financial constraints of individuals and hence will help to reduce the rate of poverty among them.

## CHAPTER FOUR

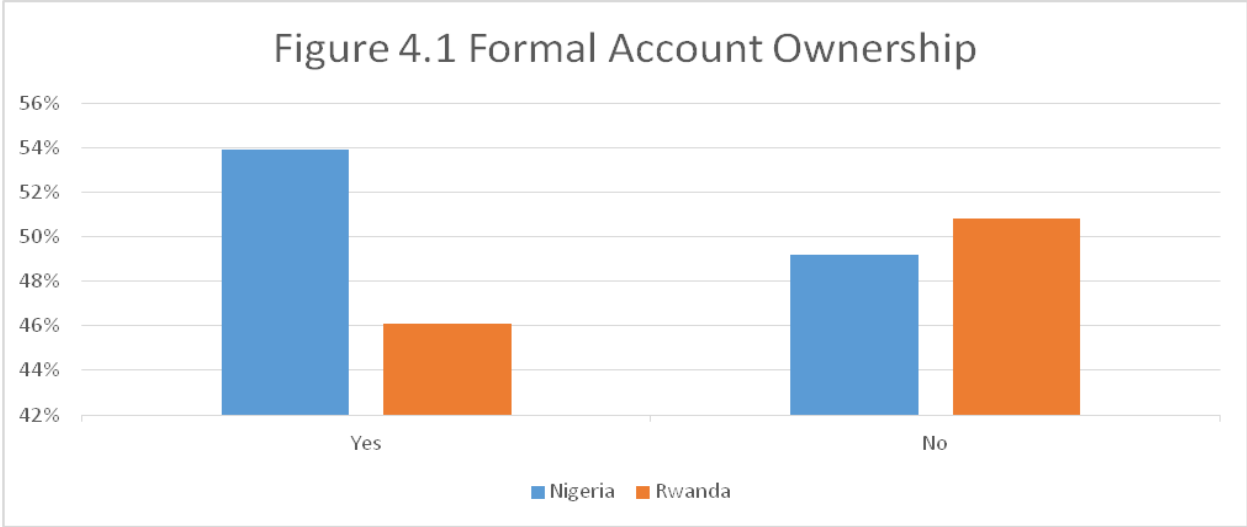
### ANALYSIS AND DISCUSSION OF RESULTS

#### 4.1 Introduction

This chapter presents the results of the study and discusses it in line with the objectives and the hypothesis outlined in chapter one. It presents the descriptive statistics and probit regressions results. In line with the objectives of study on the impact of determinants of financial access, inclusion and innovation, detailed probit regression and marginal effects results are presented on indicators of financial access, inclusion and financial innovation such as formal use of accounts, credit and mobile money usage. Finally, a desk study analysis is carried out in order to assess the current state of financial access, inclusion and innovation around different regions of the world. Thereafter, we proffer policy recommendations on the impact of financial inclusion on reducing poverty and income inequality in both Nigeria and Rwanda.

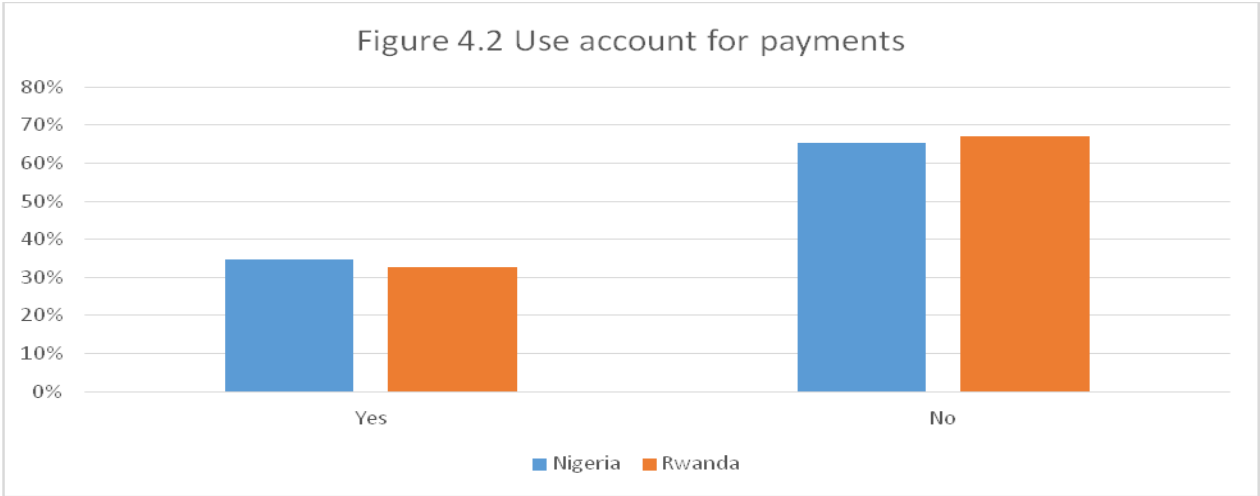
#### 4.2 Summary of Descriptive Statistics

There are 1,000 respondents in Nigeria and Rwanda in the sample. Figure 4.1 shows that Nigeria has more formally financially included population than Rwanda as those who have formal account in financial institutions is 53 % compared to only 48% in Rwanda. These results contradict the findings of Demirguc-Kunt and Klapper (2012) that less than one-quarter of the adult population in Africa have bank account and the rest of them are unbanked. However, this is far below Nigeria and Rwanda financial inclusion target of 70% and 80% by 2020 and 2018 respectively.



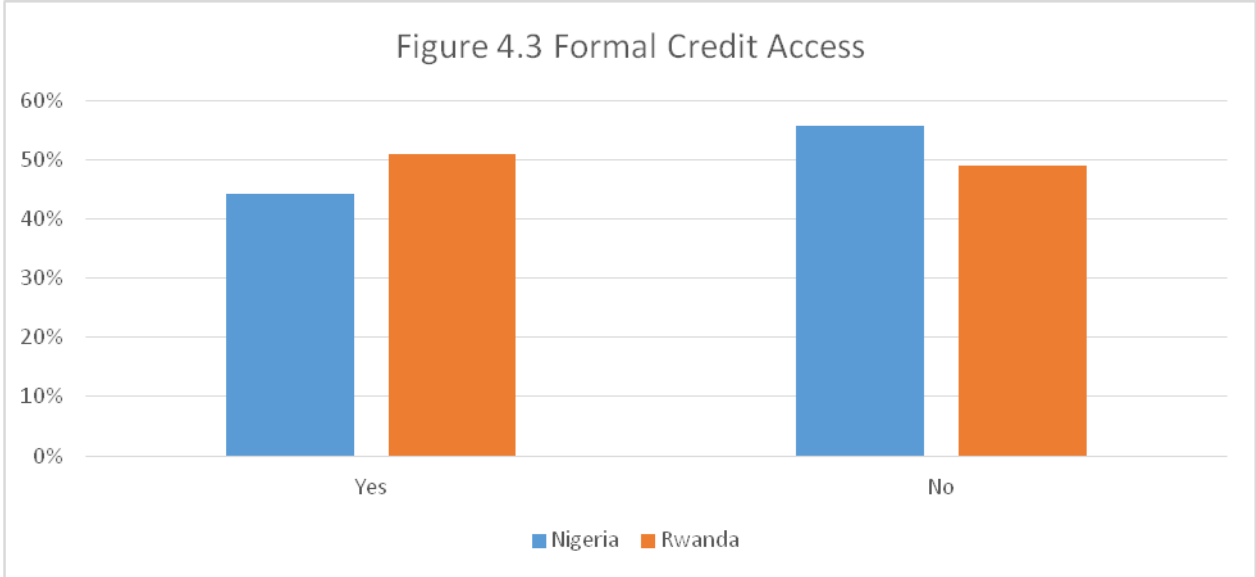
Source: Author (2018)

These results represent an appalling financial exclusion situation. It reveals that majority of the responded in Nigeria are financially excluded compared to 54 percent who are formally financially included in Rwanda. Because respondents are made up of individuals aged 15 years and above this validates the notion that many adults in both Nigeria and Rwanda do not patronize formal financial services. Out of those who own accounts, Figure 4.2 posits that only 34.8% and 32.8% of them use it to transact businesses regularly in Nigeria and Rwanda respectively.



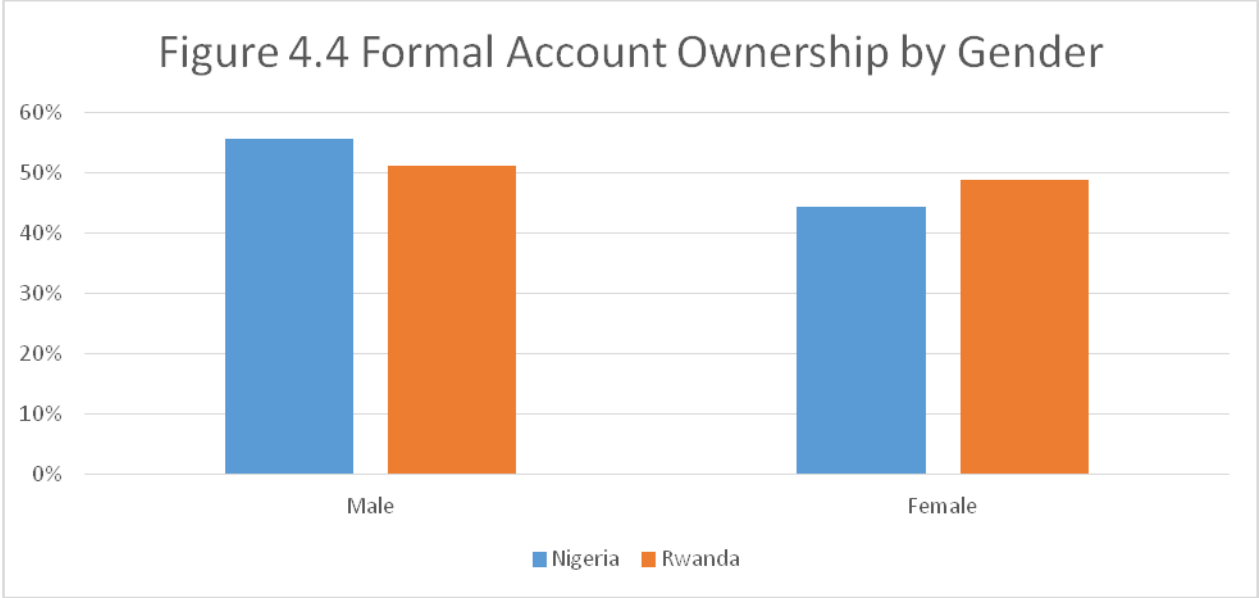
Source: Author (2018)

Despite lower regular usage of formal accounts, 44.3% and 51.0% of the respondents use it to access credit in Nigeria and Rwanda respectively. Relatively, Figure 4.3 indicates that there is greater financial access in Rwanda than in Nigeria. This might be due to the sound government policy in Rwanda to extend at least 15% of bank loans to small and medium enterprises and also the high agricultural subsidies.



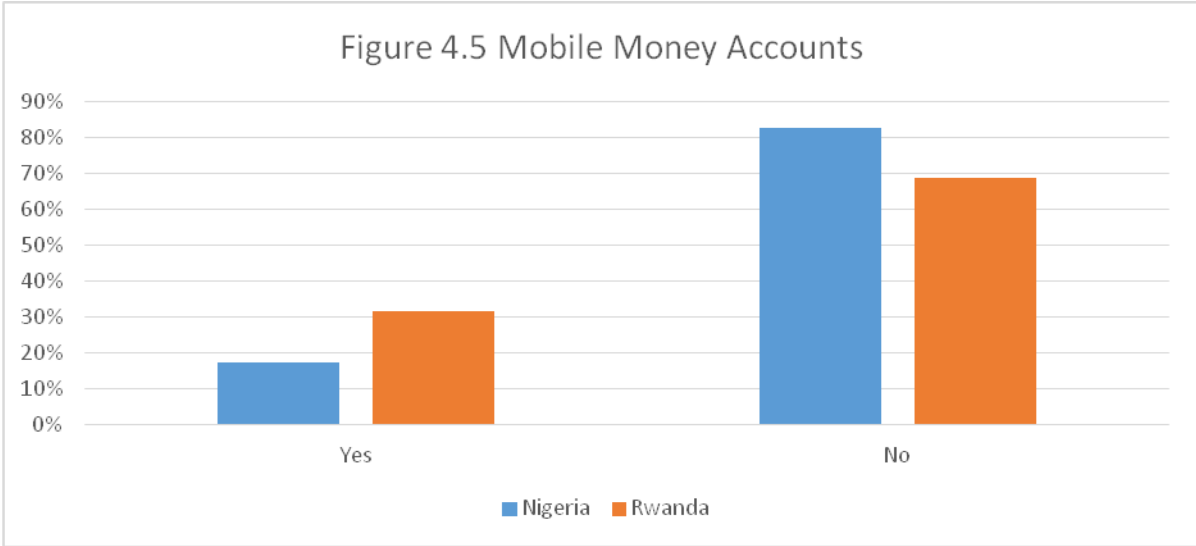
Source: Author (2018)

Out of those with formal account, Figure 4.4 reveals that 55.6% and 51.1% of them are males compared to 44.4% and 48.9% females in Nigeria and Rwanda respectively. This shows that Rwanda has a relatively higher female account ownership and lesser gender disparity in financial inclusion than Nigeria. It indicates that Rwandan women have greater financial access and are more financially included than their counterparts in Nigeria. However, given the greater gender policy pursued by the Rwandan government, this marginal gender financial exclusion disparity between the two countries should be celebrated with caution.



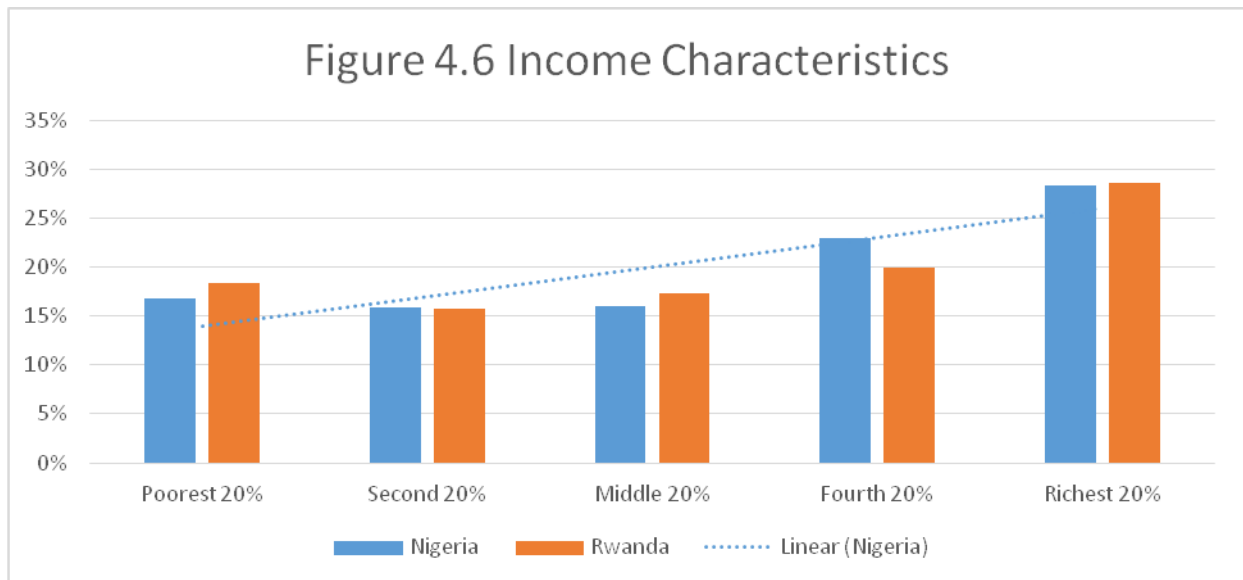
Source: Author (2018)

As a result of the high financial exclusion in these countries, financial innovation tools play a greater role in the poorest population’s daily financial transactions in Sub-Sahara Africa. With regards to financial innovation, Rwanda has as much as twice mobile money accounts as Nigeria. Figure 4.5 also indicates that Nigeria is less financially innovative in terms of mobile money usage compared to Rwanda. However, both countries’ penetration levels are still below the average 54% rate in Sub Saharan Africa.



Source: Author (2018)

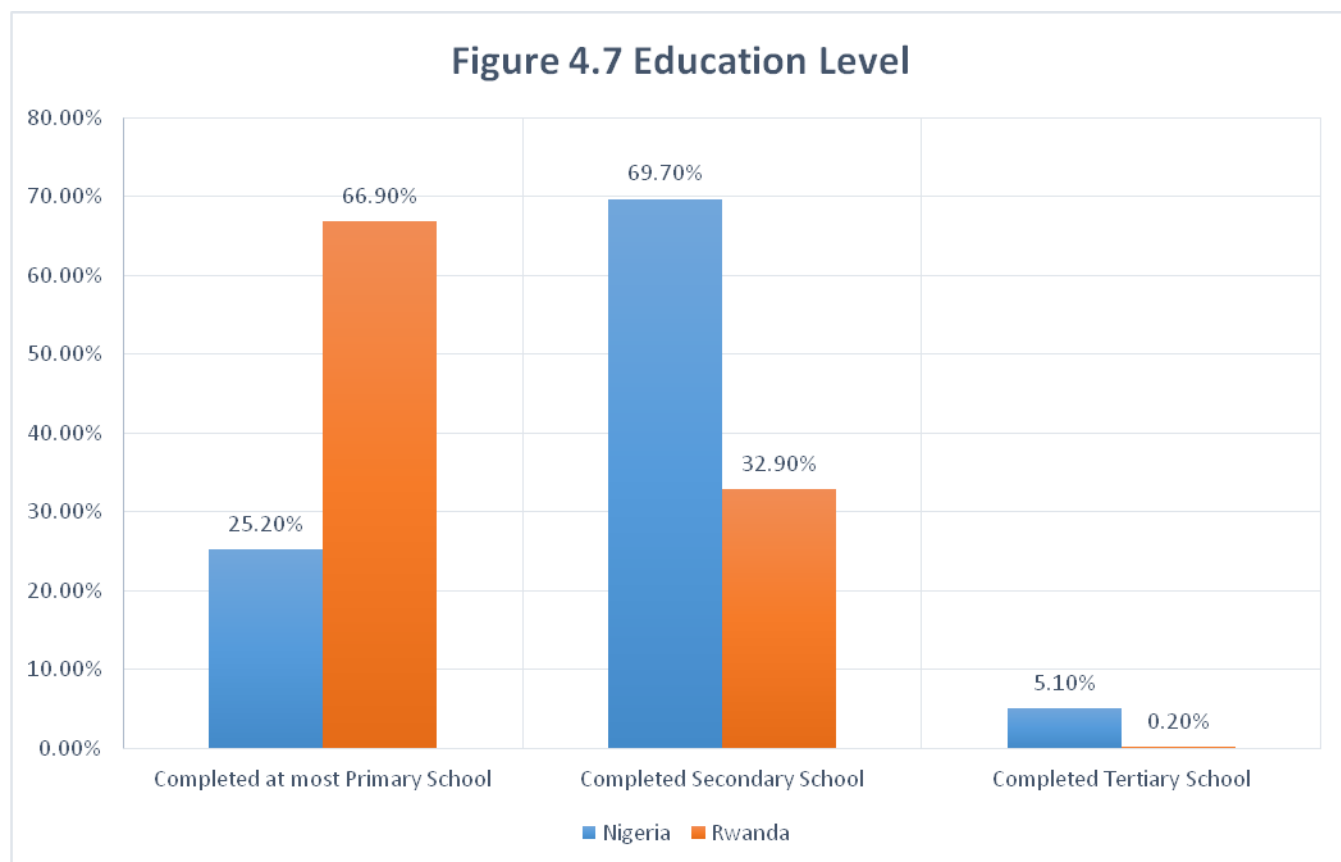
Furthermore, Figure 4.6 succinctly reveals that there is a positive relationship between income levels and financial inclusion of respondents in both countries. This implies that the poorest 20% are more likely to gain financial access and innovation in Rwanda than in Nigeria. Considering the income of individuals, Figure 4.6 posits 16.8% report being within the 20% poorest income quintile category in Nigeria compared to 18.4% in Rwanda. The rest of the individuals are distributed in Nigeria and Rwanda across the other income categories respectively as follows: the second poorest 20% (15.9% and 15.7%), middle income 20% (16.0% and 17.3%), fourth income 20% (23.0% and 20.0%) and richest income 20% (28.3% and 28.6%). This shows that income distribution across the two countries are evenly distributed.



Source: Author (2018)

Additionally, Figure 4.7 reveals some contrasting results for both countries. Most of the financially included individuals in Rwanda have at most primary school certificates as their highest educational attainment. Figure 4.7 also reveals unlike Rwanda, financial inclusion is skewed towards those with at least secondary school certificates in Nigeria. This shows that Nigeria

has higher literary rate than Rwanda but also that the financial inclusion strategies in Rwanda targets not only the most literates but mostly those with primary education, who are often the majority and the poorest 40% of the population.



Source: Author (2018)

Table 4.1 shows the remaining demographic characteristics of the respondents in both Nigerian and Rwanda. The percentage of relatives who own accounts is 23.8% in Rwanda compared to 31.5% in Nigeria implying that if a relative in a family has a bank account, the tendency for other members to own an account would be low. Regarding income from other sources, majority of the respondents borrow from family and friends instead of from stores, money lenders and financial institutions. This suggests that more people prefer to borrow from family and friends than other sources of borrowing such as the formal financial institutions. This may be attributed

to high interest rates charged by financial institutions, hideous documentations challenges and proximity to banks. However, while many people borrow from friends and family members in Rwanda, in Nigeria most borrowing is done through financial institutions. This may be due to the mature financial markets nature and its wider spread in Nigeria than in Rwanda. Similarly, Table 4.2 presents the mean, standard deviation, minimum and maximum values of the ages of the individuals in both Nigeria and Rwanda. The average age of the respondents is 33 years and 34 years respectively in Nigeria and Rwanda implying that the two countries have similar demographic characteristics.

**Table 4.1: Descriptive Statistics**

Variable	Measures	Response	Nigeria Percent	Rwanda Percent
Formal Savings	Save at financial Institution	Yes	53.7	45.3
		No	46.3	54.7
Informal Borrowing	Stores	Yes	5.1	5.8
		No	94.9	94.2
	Friends/family	Yes	39.2	48.0
		No	60.8	52.0
	Financial institution	Yes	5.7	2.2
		No	94.3	97.8
Money lender	Yes	2.8	1.7	
	No	97.2	98.3	
Relative has account	Don not have account because family member has	Yes	31.5	23.8
		No	68.5	76.2

**Table 4.2: Descriptive Statistics of Age for Respondents**

Country	Mean	Min	Max	Std. Deviation
Nigeria	33.36	15	99	14.098
Rwanda	34.79	15	94	15.190

*Source:* Author's computation (2017)



### 4.3 Financial Access, Inclusion and Innovation in Nigeria and Rwanda

The objectives of this study are to investigate the determinants of financial access, inclusion, innovation and their impacts on poverty reduction in both Nigeria and Rwanda. The financial access, inclusion and innovation indicators include probability of owning account, access to credit and use of mobile money account. The results from the probit model estimations and the marginal effects for the various determinants for Nigeria and Rwanda are shown in Table 4.3 and Table 4.4 respectively.

**Table 4.3: Nigeria Results of Probit Estimations of the Indicators of Financial Access, Inclusion and Innovation Variables**

Variables	Formal Account (1)		Formal Credit (2)		Mobile Usage (3)	
	Coeff.	dy/dx	Coeff.	dy/dx	Coeff.	dy/dx
Female	-0.0236** (0.0167)	-0.0101** (.0062)	-0.0778** (0.0310)	-0.0039** (0.0019)	-0.0109 (0.0175)	-0.0963 (0.0003)
Age	0.0901*** (0.0033)	0.0311*** (0.0009)	0.0361*** (0.0046)	0.0030*** (0.0007)	0.0801*** (0.0022)	0.0202*** (0.0004)
Age Square	-0.0011*** (0.0000)	-0.0009*** (0.0000)	-0.0000*** (0.0001)	-0.0000*** (0.0000)	-0.0008*** (0.0000)	-0.0004*** (0.0000)
Secondary	0.9111*** (0.0083)	0.3338*** (0.0075)	0.6000*** (0.0307)	0.0404*** (0.0011)	0.4402*** (0.0192)	0.1050*** (0.0043)
Tertiary	2.0381*** (0.0412)	0.3840*** (0.0132)	0.9983*** (0.0431)	0.1422*** (0.0102)	0.9866*** (0.0341)	0.2671*** (0.0113)
Income: Poorest 20%	-0.9189*** (0.0266)	-0.2630*** (0.0051)	-0.5552*** (0.0497)	-0.0351*** (0.0019)	0.8143*** (0.0303)	0.0937*** (0.0032)
Income: Second 20%	-0.7244*** (0.0262)	-0.1224*** (0.0049)	-0.2451*** (0.0444)	-0.0269*** (0.0011)	0.5212*** (0.0218)	0.0777*** (0.0038)
Income: Middle 20%	-0.4822*** (0.0205)	-0.0991*** (0.0051)	-0.4011*** (0.0388)	-0.0159*** (0.0017)	-0.3084*** (0.0226)	-0.0500*** (0.0043)
Income: Fourth 20%	-0.3602*** (0.0211)	-0.0683*** (0.0056)	-0.1432*** (0.0343)	-0.0081*** (0.0018)	-0.1272*** (0.0222)	-0.0235*** (0.0042)
Relative owns an Account	-0.0060 (0.0209)	-0.0022 (0.0077)	-1.0555*** (0.0660)	-0.0382*** (0.0034)	0.5051*** (0.0225)	0.1406*** (0.0061)
Stores	0.0321 (0.0201)	0.0091 (0.0078)	0.0615 (0.0400)	0.0041 (0.0033)	-0.1449*** (0.0331)	-0.0299*** (0.0066)
Family or friends	-0.0044 (0.0198)	-0.0017 (0.0045)	-0.1222*** (0.0381)	-0.0089*** (0.0006)	-0.0519*** (0.0212)	-0.0186*** (0.0023)
Employers	0.1331*** (0.0381)	0.0411*** (0.0110)	0.1700*** (0.0620)	0.0144*** (0.0051)	0.3248*** (0.0373)	0.0566*** (0.0095)

Money Lenders	0.1494*** (0.0370)	0.0327*** (0.0110)	.5017*** (0.0364)	0.0336*** (0.0061)	0.0301 (0.0004)	0.0071 (0.0011)
Constant	-2.8199*** (0.0611)	-	-2.8409*** (0.0836)	-	-2.6199*** (0.0771)	-
Observations	1000	1000	1000	1000	1000	1000
Significance	4441.02	6410.76	1715.08	1715.08	3562.28	3562.28
Log likelihood	-15997.81	-15997.81	-5389.89	-5389.89	-13009.83	-13009.83
Pseudo R <sup>2</sup>	0.2216	0.2216	0.2437	0.2437	0.2411	0.2411

Note: Standard errors are in parentheses, 1%, 5% and 10% significance levels denote \*\*\*, \*\*, and \* respectively, dy/dx depicts the marginal effects.

To examine the demographic and socio-economic factors that influence financial access, inclusion and financial innovation in Nigeria and Rwanda, the probit models presented in Table 4.3 and Table 4.4 were estimated in line with Allen *et al.*, (2012) and Jabir (2015). According to Allen *et al.*, (2012) the cross-sectional nature of the data, only allows for interpreting the results in a correlational manner instead of establishing significant relationship. To examine the determinants of financial access and inclusion impact on poverty reduction, the marginal effects (ME) were computed for each financial indicator for both countries. In both tables, the first column shows formal account as an indicator for financial inclusion with the base line probit model coefficients and the robust standard errors in parenthesis. The ME is in column two (2) and its robust standard errors in parenthesis as well. Similarly, access to credit which measures financial access is in column three (3) with the ME in column four (4), financial innovation which measures usage of mobile money is in column five (5) with its ME in column six (6).

Consequently, the results from Table 4.3 and Table 4.4 are discussed below with the independent variables being female dummy, age, age square, secondary education, tertiary

education, income quintiles, relative ownership of an account, borrowing from stores, family/friends, employers and money lenders.

**Table 4.4: Rwanda Results of Probit Estimations of the Indicators of Financial Access, Inclusion and Innovation Variables**

Variables	Formal Account (1)		Formal Credit (2)		Mobile Usage (3)	
	Coeff.	dy/dx	Coeff.	dy/dx	Coeff.	dy/dx
Female	-0.0337** (0.0161)	-0.0094** (.0045)	-0.0136 (0.0177)	-0.0027 (0.0035)	-0.0288 (0.0222)	-0.1102 (0.0023)
Age	0.0731*** (0.0027)	0.0204*** (0.0008)	0.0622*** (0.0031)	0.0125*** (0.0006)	0.0700*** (0.0042)	0.0072*** (0.0004)
Age Square	-0.0007*** (0.0000)	-0.0002*** (0.0000)	-0.0006*** (0.0000)	-0.0001*** (0.0000)	-0.0007*** (0.0001)	-0.0001*** (0.0000)
Secondary	0.8475*** (0.0181)	0.2434*** (0.0051)	0.5026*** (0.0196)	0.1048*** (0.0042)	0.3428*** (0.0247)	0.0368*** (0.0027)
Tertiary	1.3389*** (0.0359)	0.4846*** (0.0128)	0.8266*** (0.0360)	0.2374*** (0.0130)	0.4621*** (0.0443)	0.0663*** (0.0083)
Income: Poorest 20%	-0.7181*** (0.0268)	-0.1638*** (0.0049)	-0.6118*** (0.0303)	-0.0290*** (0.0038)	0.5014*** (0.0374)	0.0955*** (0.0024)
Income: Second 20%	-0.6445*** (0.0260)	-0.1490*** (0.0049)	-0.4410*** (0.0283)	-0.0752*** (0.0040)	0.3915*** (0.0352)	0.0332*** (0.0025)
Income: Middle 20%	-0.3891*** (0.0241)	-0.0973*** (0.0054)	-0.2842*** (0.0263)	-0.0515*** (0.0043)	-0.3433*** (0.0335)	-0.0299*** (0.0025)
Income: Fourth 20%	-0.2624*** (0.0230)	-0.0683*** (0.0056)	-0.1371*** (0.0245)	-0.0262*** (0.0045)	-0.1981*** (0.0306)	-0.0186*** (0.0026)
Relative owns an Account	-0.0059 (0.0230)	-0.0016 (0.0064)	-0.4999*** (0.0225)	-0.1220*** (0.0064)	0.2955*** (0.0338)	0.2256*** (0.0024)
Stores	0.0227 (0.0229)	0.0064 (0.0065)	0.1397*** (0.0238)	0.0297*** (0.0054)	0.5358*** (0.0268)	0.0751*** (0.0048)
Family or friends	-0.0037 (0.0184)	-0.0010 (0.0051)	-0.0651*** (0.0201)	-0.0133*** (0.0042)	-0.0810*** (0.0244)	-0.0086*** (0.0027)
Employers	0.1080*** (0.0368)	0.0313*** (0.0111)	0.2487*** (0.0373)	0.0566*** (0.0095)	0.3191*** (0.0415)	0.0415*** (0.0066)
Money Lenders	0.1292*** (0.0370)	0.0378*** (0.0113)	0.0294 (0.0401)	0.0060 (0.0083)	0.5297** (0.0407)	0.0796*** (0.0083)
Constant	-2.4095*** (0.0578)	-	-2.4822*** (0.0650)	-	-2.9890*** (0.0867)	-
Observations	1000	1000	1000	1000	1000	1000
Significance	6410.76	6410.76	3562.28	3562.28	1992.70	1992.70
Log likelihood	-15997.81	-15997.81	-13009.83	-13009.83	-7726.71	-7726.71
Pseudo R <sup>2</sup>	0.1669	0.1669	0.1204	0.1204	0.1142	0.1142

Note: Standard errors are in parentheses, 1%, 5% and 10% significance levels denote \*\*\*, \*\*, and \* respectively, dy/dx depicts the marginal effects.

We first provided the analysis of the income quintiles of individuals as a key determinant of poverty and financial exclusion. The results from both tables indicate that formal account ownership, formal access to credit and financial innovation are associated with income. The income quintile dummies for the various indicators of financial inclusion show negative and significant relationship among all the indicators. As the model depicts however, the lowest and middle quintiles show positive and significant relationship with financial innovation. The coefficients for the poorest income quintiles are very large among all the indicators. This means that individuals within the poorest income quintile are unlikely to be financially included than those in the richest income quintile in both countries. As a result, the poorest 40% uses mobile money account to carry out most of their transactions.

However, using the marginal effects of the various income quintiles for the financial indicators, the results indicate that the likelihood of owning a formal account among those in the lowest income quintile in Nigeria is 26.3% lower than the highest/richest income quintile compare to only 16.4% in Rwanda. This result is not surprising considering the large inequality between the two extreme quintiles in Nigeria unlike Rwanda where income inequality is fairly small (income cap is smaller in Rwanda too). Likewise, the likelihood of access to formal credit with those in the lowest income quintile is 3.5% lower than those in the highest income quintile in Nigeria compared to only 2.9% disparity in Rwanda. Also, the likelihood of using mobile money to pay bills by the lowest income quintile in Rwanda is 9.5% while in Nigeria it is 9.3% higher than the richest 20%. Comparatively, Rwanda has greater number of mobile money account ownership and usage (of 31.5%) than Nigeria, mainly promoted by the government as a mechanism to

increase financial inclusion in order to leave no one behind in the development process. However, despite this feat in the adoption of financial innovation in the two countries, they lag far behind Kenya and south Africa in the subregion.

Further, the results show that in Nigeria those within the second income quintile are 12.2% less likely to own an account compared to 14.9 % less likely to own an account at a formal financial institution than those in the richest income quintile in Rwanda. We also find that those individuals are less likely to save and to borrow from a formal financial institution than those in the richest income quintile. In looking at those in the middle-income quintile, they are less likely to own an account, save and borrow than those in the richest income quintile. Finally, those who are in the fourth income quintile are also less likely to own an account, use mobile money to pay bills, save and borrow from a formal financial institution than the richest. These results reveal that clients may be increasingly turning to mobile phones in Rwanda than in Nigeria to meet their private financial needs since conventional banking services penetration is relatively low in Rwanda.

These findings are in line with Allen *et al.*, (2012); Demirgüç-Kunt and Klapper (2013); and Fungáčová and Weill (2014) who find that financial inclusion is dependent on the level of income of the individual. Also, Efobi *et al.*, (2014) find positive relationships between financial inclusion indicators and income in Nigeria using the Findex dataset. The two countries have striking different: while the poorest 40% use more mobile money in Rwanda, the probability of the same group using it is much lower. This may be due to the fact that formal financial inclusion in Nigeria is exceptionally higher than Rwanda due to the wider spread of the traditional financial institutions. Thus, if financial inclusion is to be successful as a tool for poverty reduction in Rwanda, more efforts should be put to increase mobile money outreach to the

poorest quintiles of the population. For Nigeria, there is need to expand on the traditional financial institutions to the rural areas in order to increase financial access among the poorest 40% who constitute the majority of the population.

Another important determinant of financial access, inclusion and innovation considered is education. The dummy variables for education positively correlates with all the indicators used in this study. The coefficients are larger for both secondary and tertiary education. The ME shows that the individual who has secondary education is 33.4% more likely to own an account than someone who has primary or less education in Nigeria than 24.3% only in Rwanda. However, there is 48.46% more likelihood for those with tertiary education in Rwanda to own an account in a financial institution compared to only 38.4% likelihood in Nigeria. It is thus evident from the results that education plays a critical role in financial inclusion when using access to credit as a dependent variable. The results suggest a positive and significant relationship for secondary and tertiary education implying that the level of an individual's education has an influence on his/her ability to access finance to carry daily transactions. This is particularly true given that most organizations now pay their staff salaries through financial intermediaries, mainly banks.

However, the story is a bit different in terms of mobile money usage in both countries as the poor are forced to use more mobile money to pay bills than the non-poor due to being excludable by the formal financial institutions. Similarly, the ME shows positive and significant signs for education in terms of access to credit. This means that education positively correlates with account ownership, access to credit and mobile money usage as indicators of financial access, inclusion and innovation. This result is consistent with Efobi *et al.*, (2014) who document a significant and positive relationship between education and use of banks services and bank

account for savings in Nigeria. Furthermore, this finding is in line with Fungáčová and Weill (2014) who find a positive relationship between education and financial inclusion indicators such as formal account and credit in China. However, their studies could not establish any significant relationship for formal savings because a sizeable proportion of people in China find it prudent to save irrespective of their educational level.

Further, the female dummy was also considered as a determinant. This was to enable us to test whether being female affects the likelihood of being financially included in both Nigeria and Rwanda. The results from Table 4.3 and Table 4.4 thus suggest that females are less likely to be financially included, since all the financial access, inclusion and innovation indicators show a priori sign of negative. That is the female dummy negatively correlates with all the financial inclusion indicators we examined. However, the ME shows that there is 11% probability of females using mobile money for payment in Rwanda compared to just 9.6% likelihood in Nigeria using male as a reference point. The negative coefficient of the female dummy is not surprising because generally income stream of females is slimmer than their male counterparts. Also, females have greater burden emanating from home expenditure than their male counterparts in Africa, suggesting their inability to open bank account (Efobi *et al.*, 2014). In addition, males have access to formal jobs than their females' counterparts suggesting why females are less likely to open bank account, save, get access to credit and make frequent visit to the bank as well. Furthermore, Demirguc-Kunt, Klapper and Singer (2013) argue that legal discrimination against females and gender norms could explain some of the variations in female access to finance. This finding is consistent with Allen *et al.*, (2012); Efobi *et al.*, (2014); and Fungáčová and Weill (2014) who find evidence that females are less likely to be financially included than their male counterparts.

The ages of the individuals were also considered. The results show that in both countries, the impact of age is identical for the three financial indicators. It shows age and age2 significantly influence access to finance and inclusion. The nonlinear relation between age and financial variables implies that older people use more financial services than the rest up to a certain age. They posit that older people might be unwilling to use financial services as they are not used to these services. Further, Modigliani's life cycle hypothesis predicts that the amount individuals save changes over time since they have to build up their assets at the initial stages of their working life to spend during retirement, but this finding is at odds with Allen *et al.*, (2012) who document that the discrete decision to have formal savings (conditional on having formal account) is not associated with age.

Although financial innovation tries to close the unbanked gap in both countries, a major barrier to financial access and inclusion captured in the model is relative owns an account. This was used because the other barriers to financial access and inclusion such as documentation, religious reasons, distance, lack of money and lack of trust were found to be highly correlated with account ownership, access to credit and mobile money usage in both Nigeria and Rwanda. From Table 4.3 and Table 4.4, the impact of a relative owning formal account is significant for all the financial inclusion indicators. The coefficients are negative and significant for both account ownership. However, it is positive and significant for mobile money usage. This can be interpreted to mean that individuals whose relatives own an account in a household are less likely to also own an account but are more likely to use mobile money to pay their bills in both countries.

Comparatively, the MEs show that there is 23% more likelihood for individuals in Rwanda to use mobile money when relative has it than those whose relatives do not have but only 14%



likelihood in Nigeria. This shows that unlike formal account ownership by a relative which prevents account ownership, relatives' mobile money ownership accelerates mobile money usage making such a person becoming financially included. This would strengthen that persons' inclusion into the formal financial system.

The last determinant considered was informal borrowing measured by four variables such as borrowing from stores, family/friends, employers and private money lenders. The results from Table 4.3 and Table 4.4 indicate that borrowing from a store is not significant for formal account holders and access to credit. It however, shows a positive sign implying that such individuals are more likely to be financially included. Also, the results indicate that a person who borrows from a store is more likely to borrow from a financial institution hence being financially included.

The results further indicate that individuals who borrow from friends/family are less likely to own an account at a formal financial institution in Rwanda than in Nigeria. Borrowing from employers suggests a positive and significant relationship with all the financial inclusion indicators. This means that those who borrow from their employers are 4.1% and 3.1% more likely to have a formal account, 1.4% and 5.7% more likely to take formal bank loans as well in Nigeria and Rwanda respectively. What this means is that individuals who borrow from their employers are highly financially included in Rwanda than in Nigeria This is because an individual needs to possess an account in which he/she receives the monthly salary. However, from the results above, individuals are more likely to be financially included in Rwanda than in Nigeria. additionally, there is 5.7% more likelihood of accessing credit from employers in Rwanda than only 1.4% in Nigeria.

Finally, from Table 4.3 and Table 4.4 above, private money lenders coefficients show positive and significant relations among the financial inclusion variables namely formal account and

access to credit. This means that individuals who borrow money from private money lenders are more likely to be financially included than their counterparts who borrow from other sources. Particularly, the MEs show that those who borrow from money lenders are 3.8% more likely to have formal account in Rwanda than just 3.3% in Nigeria. From this, we can deduce that those who borrow from money lenders are more likely to have loans with formal financial institutions and this will further enhance their level of financial inclusion because of the welfare gains he/she gets from having account such as credit. These variables do not affect usage of money since the system extend little and insignificant informal loans to account owners. In a nutshell, more emphasis should be placed on financial innovation mechanisms in Rwanda but more emphasis on financial institutions spread in Nigeria if financial inclusion is to serve as a successful tool for alleviating poverty

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

Financial access, inclusion and poverty reduction linkages remain one of the most under-researched areas in sustainable development field. Due to the large unbanked population, financial innovation tools such as mobile money, agent banking, and internet banking is gradually closing this gap. But very few empirical studies exist on the linkages between finance and poverty. Most of these studies as pointed out in the literature review focused on the macro level and relatively few on financial inclusion and poverty reduction linkages. This study investigates the determinants of financial access and inclusion as well as the role of mobile money in bridging the wide financial exclusion caused by the formal financial institutions. This chapter starts with the summary of key findings of the study which was based on the objectives of this study. The chapter also outlines the conclusions, as well as recommendations of the study. The last part of this chapter suggests the possible areas for future research.

#### 5.2 Summary of key Findings

Based on the findings on descriptive statistics presented in Tables 4.1 and 4.2, we find that 53.9% and 49.2% of adult population aged 15 years and above had formal account in Nigeria and Rwanda respectively. Although these results are above the 23.8% of SSA, they are far below the 70% banked population targets set by both countries to be achieved in 2020. As a result, 34.8% and 32.8% of the population respectively use mobile money to pay bills in Nigeria and Rwanda. This also is far below the 52% mobile money usage in Kenya. The explanation is that

some of the individuals in the latter group perform banking-type operations within the informal sector or do not have access to financial services at all.

Out of those who have formal account, our results show that 53.7% use the account to save in Nigeria compared to 45.3% of them use the account to save in Rwanda, and only 44.3% to 54.7% use it to access credit from a formal financial institution in Nigeria and Rwanda respectively. The results also show that more males are financially included than females in both countries, although Nigeria has more financially included population. We find that in Nigeria more respondents have tertiary education (69.7%) while 66.9% of respondents in Rwanda have primary or no education as their highest form of education. Our findings also show that 34.1% compared to 32.7% belong to the poorest 40% income quintile, which was our main dependent variable of interest in determining the effect of financial access and inclusion on poverty reduction in Nigeria and Rwanda respectively. On informal borrowing, a good number of the respondents (39% and 48%) borrow from family and friends. The average age is also found to be 33 years and 34 years for Nigeria and Rwanda respectively, with a slightly higher age variability in Rwanda.

The main objective of this study was to investigate the determinants of financial access and inclusion as well as financial innovation in Nigeria and Rwanda in order to attain sustainable development and leave no one behind. We estimated three probit models specified in equation (8) of chapter three on all the indicators of financial inclusion namely, formal account ownership, access to credit and usage of mobile money. Our results show that females are less likely to be financially included than their male counterparts, with Rwanda having the highest formal financial exclusion. The possible explanations offered were that in general females have lower incomes streams than their male counterparts in these countries because they have greater

burden coming from households than male counterparts (Efobi *et al.*, 2014). Besides, males have formal jobs than their female counterparts. This makes females less likely to open and maintain formal accounts in banks. Additionally, we find that the level of financial inclusion among individuals increases with age and declines when such an individual becomes older indicated by the age square. Comparatively, age has a slightly higher positive impact on the probability of owning a mobile money account in Rwanda than in Nigeria. This maybe because the government and the NGOs might be using these intermediaries as means of paying social securities to the poorest and most vulnerable in the society, but such transfers are almost non-existent in Nigeria. Also, education of individuals is an important determinant of financial inclusion. Our results indicate that the highly educated are more likely to be financially included than the less educated. Interestingly, our findings show that higher income individuals are more likely to be financially included than lower income individuals in Nigeria relative to Rwanda. Our findings also show that when an individual's family member owns an account such a person is 0.2% less likely to own an account in both countries but 12.2 % more likely to access credit in Nigeria than 3.8% only in Rwanda. Also, there is higher likelihood of mobile money usage to pay bills such as light bills, water rates and even taxes in Rwanda (22.6%) than in Nigeria (3.3%). On the issue of informal borrowing, we find strong positive and significant relationship between borrowing from employers and private money lenders in all the indicators of financial inclusion examined. We noticed that individuals who borrow from their employers are 5.7% more likely to access finance than the rest of the other forms of borrowing in Rwanda compared to a mere 1.4% likelihood in Nigeria. The results suggest that individuals who are less financially constrained are less likely to be poor. Thus, those who have access to other forms of loans either than formal financial institutions such as (family/friends, money lenders and

employers) are less likely to be poor than those who do not have. Finally, the results show that financial innovation tools such as mobile money could greatly reduce financially excludable especially among the poorest in these countries if well harnessed, and it is pointed as one of the key strategies leading to the drastic poverty reduction in Rwanda over the past decade by the government.

### 5.3 Conclusions

Undoubtedly for sustainable development to be attained without leaving no one behind, financial access and inclusion has been considered as one of the ways of reducing poverty in developing world through inclusive growth and economic development. However, little is known about the extent to which financial access helps to reduce poverty in the finance literature especially on household level data. Particularly, poverty in Sub-Saharan Africa is highly pervasive. Financial inclusion is noted to be one of the surest ways of inclusive growth. However, Sub-Saharan Africa is largely lagging in terms of financial inclusion and poverty reduction strategies.

In an attempt to search for possible answers to factors that determine financial access and inclusion in Nigeria and Rwanda and how financial innovation can help reduce poverty among the less privilege in society, this current study was conducted by using data from World Bank Findex (2014). This enables us to close the research gap and adds to the few strands of literature already existing in the area in other parts of the world and to make possible recommendations for policymaking and implementation.

The results of the study suggest that females are less likely to access finance and to be financially included than their male counterparts. However, Rwanda has more financially included women, almost half of the respondents than Nigeria. This is because females are noted to have low income streams and do not have formal jobs as compared to their males' counterparts. The

results also suggest that age, education and income levels of individuals significantly influence their level of financial access and inclusion. Comparatively, financial access is more successful in reducing poverty in Rwanda and almost with higher penetration to the no or primary educated individuals whereas the converse is the case in Nigeria. Relatively to Rwanda, financial exclusion is still very high among the poorest quintile and those with no education in Nigeria. These findings are consistent with Allen *et al.*, (2012), Camara *et al.*, (2014), Efobi *et al.*, (2014) and Jabir (2015) who all find that individual characteristics significantly influence financial access and inclusion. The study results also suggest that when a relative owns an account in a household, others in that household are less likely to own an account but are more likely to save in a formal financial institution. We also find that having access to other forms of borrowing such as friends/family will make the individual less likely to be financially included. However, Rwandans who borrow from employer, money lenders and stores are more likely to own an account than their Nigerian counterparts. On the other hand, Nigerians are more likely to borrow from financial institutions than informal sources due their easy accessibility than in Rwanda. While regression results reveals average income, class does not affect one's chance of adopting mobile services, these services and technologies offer significant opportunities to the poorest in both countries. The benefits are however greater in Rwanda than in Nigeria. Also, we noticed a negative relationship between the determinants and poverty as shown by the MEs. In conclusion, this study makes some great original contribution to the financial inclusion literature by being the first to use the global Findex 2014 dataset to assess the association between financial access, inclusion and poverty reduction nexus in both countries. This study adds to the existing literature on other Sub-Sahara Africa countries like Ghana (Jabir, 2015). In addition, to the knowledge of the author, this is the first comparative analysis on financial access and inclusion on these

countries. The study has been able to move away from the usual indices to determinants of financial inclusion and barriers to add more impetus to the debate on the relationship between finance and poverty reduction. Similarly, the other contribution the study has made is the bridging of the cyclical notion of the use of macro-economic indicators to proxy for financial inclusion which is often plagued with endogeneity problems. Also, since macro data do not truly represent the individual account population held by people in a country because of foreigners and multiple accounts ownership, the study finds it appropriate to rely on the micro-level data to be able to correct for this problem. Again, sample selection bias problem has also been overcome, because of the rigorous methodologies employed in this study.

These results also indicate that people are increasingly turning to mobile money to meet their daily financial needs more in Rwanda relative to Nigeria due to the fewer traditional banking services (McGregor, 2013). However, these results show that Nigeria and Rwanda lagged in their sustainable development goal of 70% and 80% financial inclusive growth targets by 2020 and 2018 respectively. None the less they could both encourage the use and adoption of more financial innovation tools such as agent banking, and unit banking in addition to mobile money banking to cater for the formally excluded who are normally the poorest 20% income quintile for financial access and inclusion to truly aid in poverty and inequality reductions in both countries as it is done in Kenya and South Africa.

#### 5.4 Recommendations

The following recommendations for both policymaking and for future research are made based on the empirical findings above:

- i. Nigeria and Rwanda governments battling with poverty can use financial inclusion as a tool for reducing the level of poverty in their respective countries. This can be done if



they are able to increase financial literacy rates and encourage higher education in their countries since this is noted to be one of the key drivers of financial access, inclusion and poverty reduction.

- ii. They can also encourage the poor especially women to form self-help-groups in their communities so that financial institutions can extend financial services to them. Through this, the rate of women participation in financial inclusion will rise and this would reduce their poverty and increase their level of financial inclusion.
- iii. The Governments should try to provide the enabling business and political environment for financial institutions to thrive. They should strengthen their central banks and make them more independent. This will help the central banks to come out with monetary and regulatory policies that will guide financial institutions to provide low rate financial products for the poor, the marginalized, start-ups businesses and small and medium enterprises that are dropped of the formal financial system across the countries.
- iv. Banks must also be encouraged to open more branches in deprived areas in both countries. This could be done effectively, if governments are able to give tax incentives to financial institutions which agree to open branches in less developed areas. This would help to attract more foreign direct investors into these areas especially as these countries have much favourable laws and environment to support businesses.
- v. There is need for need for increased investment by private, public and eve development partners in financial innovation mechanisms. This will reduce the barriers already preventing some segments of the population from being banked. Finally, the governments should formulate business friendly policies bearing in mind market failure to regulate the emerging financial inclusion sector.

## 5.5 Future Research

So far, no research has focus on the poverty reduction trend in developing countries due to lack of time series data. But with the availability of data on financial inclusion on developing world from Global Financial Inclusion Findex Database beginning from 2011, future research should examine the impact of financial access and inclusion on poverty reduction using the pseudo panel data. Equally, similar comparative analysis can be done between any two of the 148 countries survey. Also, more analysis is needed on macro-economic factors that affect the individuals' financial inclusion in the formal financial system in SSA. Therefore, future researchers can try to intersperse macro-economic variables with the individual level data to determine how they affect the individuals' level of financial inclusion. Finally, the endogeneity problem inherent in financial inclusion selectivity can be looked at using Treatment Effects, PSM with difference-in-difference and instrumental variables estimators. Thus, future researchers can use the individual level data to construct financial inclusion index for countries and use it to examine its impact on poverty.

## References

- Aguera P. (2015). Finance for All: Promoting Financial Inclusion in Central Africa, ECCAS Regional Conference, Brazzaville, Congo
- Atkinson, A. B (1970). On the Measurement of Inequality. *Journal of Economic Theory*, 2: 244–73.
- Stuart, E. and Samman, E. (2017). Defining ‘leave no one behind’, ODI
- Finscope (2009) brochures for South Africa, Mozambique, and Zambia. See [www.finscope.co.za](http://www.finscope.co.za).
- Jabir, M. I. (2015). Financial Inclusion and Poverty Reduction in Sub-Saharan Africa. An unpublished MPHIL Finance thesis at University of Ghana.
- Allen, F., Demirgüç-Kunt, A., Klapper, L. F., & Martinez Peria, M. S. (2012). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *World Bank Policy Research Working Paper*(6290).
- Arora, R. U. (2010). Measuring Financial Access. Griffith University, Discussion Paper in Economics,(7), 1-21.
- Brune, L., X. Gine, J. Goldberg, D. Yang. 2011. Commitments to Save: A Field Experiment in Rural Malawi. *World Bank Policy Research Working Paper No. 5748*. Washington, DC.
- Burgess, R. and R. Pande. 2005. Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment. *American Economic Review*. 95(3): pp. 780–795.
- Central Bank of Nigeria (2012): “National Financial Inclusion Strategy” Summary Report.
- Camara, N., Peña, X., & Tuesta, D. (2014). Factors that Matter for Financial Inclusion: Evidence from Peru. *The International Journal of Finance* (forthcoming).
- Chakravarty, S. R., & Pal, R. (2012). Measuring financial inclusion: An Axiomatic approach.
- Dollar, D., & Kraay, A. (2002). Growth is Good for the Poor. *Journal of economic growth*, 7(3), 195-225.
- Demirguc-Kunt, A., & Klapper, L. (2012). Measuring financial inclusion: The global findex database. *World Bank Policy Research Working Paper* 6025.
- Demirgüç-Kunt, A., Klapper, L. F., & Singer, D. (2013). Financial inclusion and legal discrimination against women: evidence from developing countries. *World Bank Policy Research Working Paper* (6416).
- Asli Demirguc-Kunt, Leora Klapper, Dorothe Singer, and Peter Van Oudheusden (2015). The Global Findex Database 2014 Measuring Financial Inclusion around the World, *World Bank Policy Research Working Paper* 7255.
- Efobi, U., Beecroft, I., & Osabuohien, E. (2014). Access to and use of bank services in Nigeria: Micro-econometric evidence. *Review of Development Finance*.

- Erlandsson, F., & Lundqvist, M. (2014). The Diffusion of Mobile Phones and its Impact on Financial Inclusion and Economic Growth in Africa. Unpublished Master's Thesis, Lund University, School of Economics and Management.
- EFinA (2010): Access to Financial Services in Nigeria 2010, Survey
- EFinA Access to Financial Services in Nigeria (A2F) 2016 Survey
- Fadun, S. O. (2014). Financial Inclusion, Tool for Poverty Alleviation and Income Redistribution in Developing Countries: Evidences from Nigeria.
- Foster, J. E. (1998). Absolute versus relative poverty. *American Economic Review*, 335-341.
- Fungáčová Z., & Weill, L., (2015). Understanding financial inclusion in China. *China Economic Review* (34) 196-206.
- McGregor, R. T (2013). Mobile Banking: Increasing Access to Financial Services, Master of Public Policy unpublished thesis in Georgetown University
- Green W. H. (2012). *Econometric Analysis* (7th Edi). Upper Saddle River, NJ: Prentice-Hall.
- Goldsmith, R. W. (1969). *Financial structure and development* (Vol. 1): Yale university press New Haven.
- Gupte, R., Venkataramani, B., & Gupta, D. (2012). Computation of financial inclusion index for India. *Procedia-Social and Behavioral Sciences*, 37, 133-149.
- Honohan, P. (2008). Cross-country variation in household access to financial services. *Journal of Banking & Finance*, 32(11), 2493-2500.
- Jones, P. A. (2008). From tackling poverty to achieving financial inclusion—The changing role of British credit unions in low income communities. *The Journal of Socio-Economics*, 37(6), 2141-2154.
- Republic of Rwanda (2009). Building an inclusive financial sector in rwanda support programme the implementation of the National Microfinance Strategy
- Ogunleye, S (2017). Financial Inclusion and the Role of Women in Nigeria, *African Dev. Review*, 2(29), 249-258.
- Kanbur, R (2006). Three Conundrums in Measuring Poverty with a Changing Population, Cornell University [www.people.cornell.edu/pages/sk145](http://www.people.cornell.edu/pages/sk145)
- Schumpeter, J.A. (1911). *The Theory of Economic Development*, New York: Oxford University Press.
- Sarma, M. (2008). *Index of financial inclusion: Indian Council for Research on International Economics Relations*.
- Sarma, M. (2012). *Index of Financial Inclusion—A measure of financial sector inclusiveness: Hochschule fuer Technik und Wirtschaft, Berlin*.
- Shaw, E. (1973). *Financial Deepening in Economic Development*. New York: Oxford University Press.
- Tuesta, D., Sorensen, G., Haring, A., Camara N. (2015) Financial inclusion and its determinants: the case of Argentina. Working Paper No 15/03.
- World Bank. (2012). *Financial Inclusion Strategies Reference Framework*. Washington DC: World Bank.
- World Bank (2013). *End Extreme Poverty 2030 Promote Shared Prosperity. Annual Report* Washington DC: World Bank.
- World Bank (2014). *Global Financial Development Report*. Washington DC: World Bank.
- World Bank (2016). *Global Financial Development Report*. Washington DC: World Bank.

## Appendices

**Table 3.1 Variables Description**

<b>Variables</b>	<b>Description</b>
Formal Account Ownership	=1 if respondent currently has an account in a formal financial institution, 0 if otherwise
Formal Credit	=1 if respondents borrow money in the past 12 months in a formal financial institution, 0 if otherwise
Mobile Usage	=1 if respondent transacts in mobile money, 0 if otherwise
Female	=1 if female, 0 if otherwise
Age	Age in years
Age Square	Square of age in years
Primary Education	=1 if completed at least primary school, and 0 if otherwise
Secondary Education	=1 if completed at least secondary school, and 0 if otherwise
Tertiary Education	=1 if respondent achieved education beyond secondary education, 0 if otherwise
Income: Poorest 20%	=1 if respondent falls in the lowest income quintile, 0 if otherwise
Income: Second 20%	=1 if respondent falls in the second lowest income quintile, 0 if otherwise
Income: Middle 20%	=1 if respondent falls in the middle income quintile, 0 if otherwise
Income: Fourth 20%	=1 if respondent falls in the fourth highest income quintile, 0 if otherwise
Income: Richest 20%	=1 if respondents falls in the richest income quintile, 0 if otherwise
Relative has an Account	=1 if relative having account is a barrier to account ownership, 0 if otherwise
Borrowed from Stores	=1 if respondent borrows from stores, 0 if otherwise
Borrowed from Friends/Family	=1 if respondent borrows from family/friends, 0 if otherwise
Borrowed from Employers	=1 if respondent borrows from employers, 0 if otherwise
Borrowed from Money Lenders	=1 if respondent borrows from private money lenders, 0 if otherwise

**Table 4.1: Descriptive Statistics**

Variable	Measures	Response	Nigeria Percent	Rwanda Percent
Formal Account	Have a bank account	Yes	53.9	49.2

		No	46.1	50.8
Formal Savings	Save at financial Institution	Yes	53.7	45.3
		No	46.3	54.7
Formal Credit	Borrow money in a financial institution in the past 12 Months	Yes	44.3	51.0
		No	55.7	49.0
Financial Innovation	Have a mobile money account	Yes	17.3	31.5
		No	82.7	68.5
Gender	Male	Male	55.6	51.1
		Female	44.4	48.9
Educational Status	Primary	Completed Primary	25.2	66.9
		Completed	69.7	32.9
		Secondary	5.1	0.2
Income Characteristics	Income quintile	Completed Tertiary		
		Poorest 20%	16.8	18.4
		Second 20%	15.9	15.7
		Middle 20%	16.0	17.3
		Fourth 20%	23.0	20.0
Informal Borrowing	Stores	Richest 20%	28.3	28.6
		Yes	5.1	5.8
		No	94.9	94.2
	Friends/family	Yes	39.2	48.0
		No	60.8	52.0
	Financial institution	Yes	5.7	2.2
		No	94.3	97.8
	Money lender	Yes	2.8	1.7
		No	97.2	98.3
	Relative has account	Don not have account because family member has One	Yes	31.5
No			68.5	76.2
Account Usage	Use account for payment	Yes	34.8	32.8
		No	65.2	67.2

Source: Author's computation (2017)

**Table 4.2: Descriptive Statistics of Age for Respondents**

Country	Mean	Min	Max	Std. Deviation
Nigeria	33.36	15	99	14.098
Rwanda	34.79	15	94	15.190

*Source:* Author's computation (2017)

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