COLLEGE OF BUSINESS AND ECONOMICS
MBA FINANCE

IS FINANCIAL INCLUSION A CATALIST FOR POVERTY REDUCTION IN RWANDA?

EVIDENCE FROM THE FIFTH INTEGRATED HOUSEHOLD LIVING CONDITION SURVEY (EICV 5) DATA

A thesis submitted to the school of Business, College of Business and Economics, in partial fulfilment of the requirement for the award of the degree of Master of Business Administration in Finance by the University of Rwanda

Mrs. Inès UMUTONI

Registration Number: 218015748

Supervisor: Dr. Clement Bula Basuayi

JUNE 2021

DECLARATION

I hereby declare that this research study is my original work and has not been presented to any other Institution. No part of this research should be reproduced without the authors' consent or that of the University.

Sign _____   _____

Mrs. Inès UMUTONI   Date

Registration Number: 218015748

Certification

This research project has been submitted for examination with my approval as University Supervisor

Sign _____   _____

Dr. Clement Bula Basuayi   Date

DEDICATION

The thesis is dedicated to my precious husband and sons.

ACKNOWLEGEMENTS

I would like to take the opportunity to acknowledge the support from my thesis supervisor **Dr. Clement Bula Basuayi** for his positive critique and contributions. His effort enabled me to produce this research to the quality it deserves. I also thank all the staff members of University of Rwanda. I am thankful for their skills support which contributed a lot to my project development.

I also thank all the staff members of University of Rwanda. I am thankful for their skills support which contributed a lot to my project development.Let me also extends my deep gratitude to my classmates for their support throughout the entire MBA program. Thank you for being good and friendly classmates.

To my entire family and friends, your moral support during this work and my entire life is truly unmatched. Most importantly, I am truly grateful to God for His grace, mercy, provision, and protection. I thank God for granting me wisdom, knowledge, and strength to push me forward.

To everyone who has contributed to this thesis, thank you and my God bless you!

ABSTRACT

As a pillar tool used for development the role of financial inclusion (FI) on poverty reduction at the household level in Rwanda remain unknown. This study contribution is to assess the role that plays financial inclusion using the fifth Enquête Intégrale sur les Conditions de Vie des ménages /Household and living condition survey (EICV5) data. This is a significant problem for Rwanda as a developing country, even though it has achieved rapid financial development. Primary data collected from 14,580 sampled households in the EICV5 (October 2016 to October 2017) was used to perform descriptive statistics and correlation among used variables. Empirical analysis was also used on two models: Binary Regression Model to determine the effect of FI on the second review of household Ubudehe category and the Multiple Linear Regression Models to determine the impact on FI on Welfare category due to household consumption. The obtained results showed that 54.2 percent of households own a saving account, 65.8 percent of them tried to obtain a loan and that 72.6 percent used telephone to transfer money in or out. In addition, the study showed enough evidence to confirm that in both models, penetration of financial inclusion is a catalyst for poverty alleviation in Rwanda; whereas accessibility, penetration and usage of financial inclusion by households are a catalyst for poverty reduction in Rwanda when residence and gender of household head are factored in the welfare category.

Keywords: Financial Inclusion, Accessibility, Penetration, Usage, Poverty, Rwanda.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CHAPTER ONE

INTRODUCTION

There is no doubt that the poverty is inherent in the lifetime of the inhabitants from the developing countries especially those located the region of Saharan-African Countries. To come over this situation UN (2017) adopted the 17 Sustainable Development Goals (SDGs) with 169 targets to replace millennium development goals (MDGs) that adopted by UN (2000) with 21 targets. In doing so, the UN aims to provide a guideline that can allow each country to use the disposable means and to fight the poverty among inhabitant. Fight poverty as first SDG, could be eradicated by different means that included financial inclusion (FI). However, it was observed that approximately 2 billion adults do not have access to formal financial services worldwide. (WB, Financial Inclusion Insights, 2015).

Despite that studies showed that access to finance is positively correlated with economic growth and employment with consequence of seeing poor people's access to financial services, increasing their economic opportunities and improving their lives (Global Findex, 2019), however, few studies remain unknown on the causal relationship between financial inclusion as catalyst of poverty reduction (UNCTAD, 2014).

Furthermore, previous studies have used specific indicators to measure FI that included (1) financial participation as the affordability, access to and usage of formal financial services and products, (2) financial capability as the ability of financial inclusion to enhance the capability of the individual to effectively participate in the formal financial system and (3) financial wellbeing as the extent to which financial inclusion has expanded the quality in lifetime and wellbeing of the person concerned (AFI, The financial inclusion data working group and the mexican experience, 2012); Chibuzo et al.(2018) However, there are few studies that have used as indicators of FI such as accessibility, penetration/quality and usage and assess the effect of FI on poverty reduction. On top of that it was found that there is not enough review of literature that are addressing the relationship between FI and poverty reduction using Rwandan poverty classification. In addition, there is lack of studies that are using multiple linear regression and logistic regression model to address the relationship between FI and poverty reduction.

This study aims is to fill in the gap by assessing of the effect of financial inclusion on poverty reduction in Rwanda by using EICV5 data. This chapter presents the background of the study,

the problem statement, and the objectives of the study, the research questions and the significance of the study.

1.1. Background of the Study

The UN assembly in 2015 adopted 17 Sustainable Development Goals (SDGs) to action to end of poverty, protect the planet and ensure to all people enjoy peace and prosperity by 2030 (UN, 2 015). Although each country committed to fast-track progress for those furthest behind first, various tools were used by each country to achieve the 17 SDGs that included financial inclusion (FI) (UNCDF, 2020).

FI is a tool that offers access to financial products and services that households, business and vulnerable members of the society need at affordable costs.In spite of quick economic growth and innovation of the world economy, gaps in financial accessibility, penetration and usage stay substantial. McKinsey et Co .(2010) states that there are 2 billion people worldwide who lack the very basic service such as having access to a bank account and the majority of this inhabitant are living in developing countries. McKinsey et Co .(2010) shown that the people without having access to a bank account are called "unbanked" and of these people 46% are from developing countries and 6% are from high-income countries with persistence geographic gap in gender, 42% of women do not have bank accounts, compared to 35% of men. (Chakrabarty, 2013)

UN Capital Development Fund (UNCDF) points out that the root of financial inclusion (FI) started since 1990s through his work which consisted to support microcredit institutions. In 2005, UNCDF made a strategic that focus its interventions on FI more broadly. Such FI include to enable environments of microcredits institutions for a wide range of retail financial service providers and address gaps in the policy, legal and regulatory constraints that was preventing a financial sector from being inclusive. The consultative Group to Assist the Poor (CGAP) in 2007 recognized UNCDF (2005) as a leader of Smart Aid Index and the aim of Smart Aid Index was to measure an organization's effectiveness in supporting FI.

In addition, UNCDF (2005) has been financing models support microfinance institutions, banks, cooperatives, money transfer companies, digital finance innovations and mobile network operators to extend the reach of financial markets where they may not go without our demonstration value. In doing so, UNCDF ensures that suitable financial products-savings, credit, insurance, payments and remittances are available to individuals notably the 'unbanked' at a reasonable cost, and on a sustainable basis.

With financial inclusion has been studied by many researchers as one response for poverty reduction, UNCTAD (2014) states that financial inclusion can contribute to poverty reduction,

economic and social development, and financial stability. The high level of impact financial inclusion has had in developed countries continues to be a motivating factor for its adoption in developing countries in the fight against poverty (UNCTAD, 2014).

The research on the influence of FI on economic development suggest that there is positive relationship between FI development and the growth of business firms (Kings&Levine, 1993) ; (Onuonga, 2014);(Allen et al.,2012); (Nyasha et al.,2014). These studies have focused on attaining a better understanding of how FI can significantly influence a firm's ability to not mobilize investments but also reduce labour costs (Andrianavo et al.,2011); (Fafchamps et al.,2013), and enhancing innovation through a business firms productivity (Levin, 2004); (Dabla-Norris et al.,2010).

Chauvet, L.et Jacobin L. (2016) have identified three avenues through which financial inclusion development directly affects business firms. These avenues include traditional financial intermediation, financial markets, and ensuring products and services availability at reduced transaction costs. Financial inclusion is where individuals and businesses have access to useful and affordable financial products and services that meet their needs that are delivered in a responsible and sustainable way (Nanda, 2016). It is also defined as the availability and equality of opportunities to access financial services. There is this general consensus that lack of financial inclusion of disadvantaged people and the poor in any jurisdiction is the major reason for rising level of poverty and unemployment among underprivileged communities.

The issue of poverty reduction has been a major goal for many international organizations such as the United Nations and the World Bank. According to the most recent estimates of the World Bank, in 2015 (WB, World Development Report, 2015), 10 percent of the world's population or 734 million people lived on less than $1.90 a day. That's down from nearly 36 percent or 1.9 billion people in 1990. Forecasts suggest the number is now below 8 percent.

In Rwanda, the EICV5 showed that 38.2 per cent of the country lived under poverty under which 16 percent lived under extreme poverty. The EICV4 (NISR, 2015) had showed that poverty levels had reduced by 5.8 per cent from 44.9 per cent in 2011 to 39.1 per cent in 2014, which consequently saw some 660,000 people graduate from poverty. Extreme poverty also dropped from 24.1 per cent to 16.3 per cent in the same period.

This study intends to explore the empirical relationship between financial inclusion and poverty reduction in Rwanda as a contribution to the ongoing discuss in relevant studies. It intends to review how financial inclusion can be used to improve the living standard of people (Khan, 2011) says that the pursuit of financial inclusion is not just a policy option but is compulsory; it is about

the various workable strategies to accelerate its rate of reach and deepen the acceptability of such policies and strategies. The remaining part of this study will have the literature review follow on this introduction where we will evaluate existing literature and standpoints on poverty alleviation and financial inclusion. The author intends to identify gaps in literatures that the study will be filling.

The next session will focus on the research design and methodology used with theoretical supports and relevant model. The last segment will present the result analysis while conclusion and recommendation is made at the concluding session.

1.2. Problem statement

UNCTAD (2014) opined that financial inclusion can contribute to poverty reduction, economic and social development, and financial stability. Despite that UNCTAD (2014) on financial inclusion can contribute to poverty reduction, economic and social development, and financial stability, however, there is lack of studies that are using multiple linear regression and logistic regression model to address the relationship between FI and poverty reduction.

In addition, governments are putting in place strategies to alleviate poverty, although, it continues to be a major problem across the world (Ravillon, 2016). In line with SDG 1, to end global poverty, financial inclusion will be key. The 2030 Agenda seeks to guarantee human beings, especially those in vulnerable situations, the same rights, not only to financial services, including micro financing, but also to economic resources, property and new technologies (WB, Financial Inclusion Insights, 2015).

Martinez (2014) stated that FI is particularly important for Sub-Saharan Africa and on average only 24 percent of the population have accounts with formal financial institutions. Of this figure, 55 percent of adults were from East Asia, 35 percent in Eastern Europe, 39 percent in Latin America, and 33 percent in South Asia but few was known on East Africa Community. Rwanda being part of Sub-Saharan Africa and member of East Africa Community, had a target to financially include 90% of adult population by 2020 (FinScope, Financial inclusion in Rwanda, 2016) but Fin Scope (2019) shown that FI was increased. However, the effect of FI on poverty remains unknown.

Furthermore, in Rwanda, the (FinScope, Financial inclusion in Rwanda, 2016) has shown that in 2016 only 11% (0.7 million down from 1.3 million in 2012) are excluded whereas they were only 7% in FinScope 2020 (FinScope, Financial Inclusion in Rwanda, 2020). Levels of financial inclusion vary from 99% in Gasabo district to about 83% in Rusizi district. However, the level

of FI does not present the Gender gap which is likely to exclude women compared male counterparts.

The findings of the Fin Scope Rwanda 2020 survey indicated that the financial landscape in Rwanda continues to change due to sector interventions. Both banking and other formal non-bank sectors recorded significant growth in the number of financially included population, in line to the population growth and effort to reduce population who previously relied only on informal financial mechanisms. The informal sector continues to play a significant role in financial inclusion and increasing product portfolio choices. Mobile money continues to be an enabler for financial inclusion and it is used by both banked and unbanked population.

In addition, Umaru (2018) had used in their study on the effect of FI on poverty reduction, three indicators to measure FI that included (1) financial participation as the affordability, access to and usage of formal financial services and products, (2) financial capability as the ability of financial inclusion to enhance the capability of the individual to effectively participate in the formal financial system and (3) financial wellbeing as the extent to which financial inclusion has expanded the quality in lifetime and wellbeing of the person concerned. However, in this study FI was measured using the following indicators accessibility, penetration/quality and usage. It was also find that few studies addressing the role that plays FI on poverty reduction does not exist in Rwanda, using multiple linear regression and logistic regression model to address the relationship between FI and poverty reduction.

This study seeks to fill this gap by using EICV5 data to empirically analyze the impact of financial inclusion on poverty reduction in Rwanda and investigate the status of financial inclusion in all its three dimensions: access, penetration and usage in Rwanda and its role in reducing levels of poverty in Rwanda. Moreover, the study will be an additional resource for researchers for financial inclusion in Rwanda it will enumerate all reasons of financial exclusion and what can be the role of financial inclusion in poverty reduction.

1.3. Objectives of the Study

The study has two kinds of objectives: general objective and specific objectives.

1.3.1. General Objective

The broad objective of the study is to assess the relationship between financial inclusion and poverty reduction in Rwanda. The general objective intends to see the contribution of financial inclusion to poverty reduction among people who have access, penetration and usage of loans from financial institutions.

1.3.2. Specific objectives

In order to achieve the above general objective, the following specific objectives have been set:
    i. To assess the level of financial inclusion in Rwanda;
   ii. To enumerate and indicate the factors that contribute to financial exclusion;
  iii. To assess the relationship between FI and poverty reduction and draw a suggestion to increase financial inclusion.

1.4. Research Questions

To achieve both general and specific objectives of the study, the following research questions were formulated:

    i. What is the level of financial inclusion in Rwanda considering access, penetration and usage?
   ii. What are the factors contributing to financial exclusion?
  iii. Is there any relationship between FI and poverty reduction?

1.5. Research hypotheses

The research hypothesis is the anticipation of results. In this study, we anticipate the following results:

Ho: Financial Inclusion is not a Catalyst for poverty reduction in Rwanda
H1: Financial Inclusion is a catalyst for poverty reduction in Rwanda

1.6. Justification of the Study

When Rwanda had taken the measures to get involve citizens in FI as part of its Vision 2020 plan in the year 2000, the Rwandan government has set an ambitious goal to double the percent of adults who are financially included by 2017, and to increase that number by another 10% to 90% by 2020 and Rwanda which is seen as a model of fast development in Africa has set a target of 90% financial inclusion by the year 2020. This target was almost

achieved in 2016 where 89% were financially included but only 26% have accounts with commercial banks (FinScope, Financial Inclusion in Rwanda, 2020). Access to financial services in Rwanda is currently driven by two major types of services–Savings and Credit Co-operatives (SACCOs) and mobile phone-based financial services known as mobile money.

In order to achieve this target, the Government of Rwanda has implemented several policies and others are being developed, including the following financial regulations: Payments system bills (e-payments), automated transactions, Insurance, microfinance and pension laws, Loan guarantees from the government to increase access to credit for small businesses, financial education strategy and the Credit reference bureau (CRB). The Commercial initiatives saw the following developments: Increased branch networks, Mobile vans, Internet banking, Agent banking, Mobile banking (m-banking), Loan protection insurance, Private pension (informal groupings) and Children's savings (CGAP, 2015).

This study will assess the impact of financial inclusion in reducing poverty and therefore will be of relevance to researchers, practitioners and policymakers. It will add to the vast research on financial inclusion, and specifically, the influence of financial inclusion on poverty in Rwanda, it will assess the accessibility, the penetration and the usage of financial system.

Secondly, 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 solve poverty problems instead of the continued use of the traditional modules of growth. Moreover, the findings of this study will be useful for policymaking concerning financial development and financial inclusion in the African continent, development organizations such as the World Bank,2018)

1.7.Scope of the Study

This study used data collected in the EICV5 between October 2016 and October 2017 by the National Institute of Statistics of Rwanda (NISR). Data was collected in the whole country within a sample size of 14,580 households; the unit of analysis in this research is a household.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

Globally, financial inclusion has been acknowledged as a tool to combat the three evils: unemployment, inequality and poverty. In addition to wealth creation and improvement in the welfare of the masses (Demirguc-Kunt et al., 2012)

The role of financial inclusion in the fight against poverty is one of the sustainable development goals; this has made almost all countries across the globe to make financial inclusion a priority with sole objective of mitigating the rate of poverty at both national and global level. It has been argued that high rate of financial inclusion is often contributes with high rate of investment, employment, high income and low poverty rate and that economic growth can only be sustain if a significant number of the population have great access to formal financial services (Umar, 2017) .

Chapter 2 presents the main concepts, the theory and empirical studies on the relationship between financial inclusion and poverty in Rwanda. This section is separated into two main parts, the first part presents an overview of financial inclusion and poverty reduction concepts, as well as the relationship between the two. The second part is conceptual framework and theoretical framework discusses some key theoretical suggestions on the finance and poverty reduction. It also presents empirical literature on the financial inclusion and poverty reduction respectively.

2.2. Financial inclusion and financial exclusion

2.2.1 Financial inclusion (FI)

The concept of financial inclusion is multi-dimensional, therefore there is no unique definition of financial inclusion that scholars have agreed. (WB, Inclusion Matters, 2007) defines FI as a way to ensure to inhabitant access and usage of basic formal financial services such as credit, savings, insurance, payments, and remittance facilities, without this it may lead individuals to informal financial services which can be expensive for them.

Demirguc & all refer financial inclusion as efforts to make financial products and services accessible and affordable to all individuals and businesses, regardless of their personal net worth or company size. In this, view financial inclusion strives to remove the barriers that exclude

people from participating in the financial sector and using these services to improve their lives. It is also called inclusive finance since financial products and services that meet their needs-transactions, payments, savings, credit and insurance-delivered in responsible and sustainable way (WB, Inclusion Matters, 2007).

 (AfDB, 2013) supported the definition and added that the financial inclusion are all creativities that make formal financial services available, accessible and affordable to all segments of the population. (sarma, 2011) Collaborated with the above definitions by indicating that financial inclusion requests an easy access, availability and usage of formal financial systems for all members of the economy.

2.2.2 Financial exclusion

Financial exclusion refers to inadequate access to financial services. Persons who are financially excluded do not have bank accounts and long- and short-term insurance products that are normally held by members of society (Mohd-Sanusi, 2014).

2.2.3. Digital tools of financial inclusion

According to Kagan (2019), financial technology (FinTec) is used to describe new tools that seeks to improve and automate the delivery and use of financial services using specialized software and algorithms that are used on computers and, increasingly, smartphones. When FinTec emerged in the 21st Century, the term was initially applied to the technology employed at the back-end systems of established financial institutions. Since then, however, there has been a shift to more consumer-oriented services and therefore a more consumer-oriented definition. The findings of the Fin Scope Rwanda 2020 survey indicated that the financial landscape in Rwanda continues to change due to sector interventions. Both banking and other formal non-bank sectors recorded significant growth in the number of financially included population, in line to the population growth and effort to reduce population who previously relied only on informal financial mechanisms. The informal sector continues to play a significant role in financial inclusion and increasing product portfolio choices. Mobile money continues to be an enabler for financial inclusion and it is used by both banked and unbanked population.

FinTec now describes a variety of financial activities, such as money transfers, depositing a check with your smartphone, bypassing a bank branch to apply for credit, raising money for a business startup, or managing your investments, generally without the assistance of a person. The main tools used to drive the financial inclusion include:

2.2.3.1 Mobile money

"Mobile banking" was probably invented in Kenya in 2007. Today, sub-Saharan Africa ranks first in the world in terms of money transfers by telephone in a continent where 80% of adults remain excluded from the banking system. In Kenya, 80% of adults have a telephone subscription and only 19% of them have a bank account. International remittances are made from telephone to telephone, in real time. The country has over 24,000 M-Pesa (national money transfer operator) outlets, more than five times the total number of post offices, postal banks, bank branches and ATMs in the country.

The growth of mobile banking creates a unique opportunity to develop banking services. The majority of the African population does not have access to formal banking services. Sub-Saharan Africa has the lowest penetration rate of deposit taking financial institutions in the world, with an average of 16.6%. In rural areas, which represent 60% of the total African population, the network of commercial banks is practically non-existent. Promoting people's access to mobile telephony represents today a tremendous means of accessing financial services and, by the same occasion, of financial inclusion of a large section of the African population still excluded from traditional mechanisms for the financing of the economy. But it is also a wonderful laboratory for observation, experimentation and inspiration for northern countries in which the growing effects of impoverishment and exclusion are strongly felt (GSMA, Mobile Economy Sub-Saharan Africa , 2018).

2.2.3.2 ATM

According to (McDysan, 1998), ATM is an automatic teller machine which is used to save the cost and accessibility of a bank by satisfying customer needs or demand for money anytime, anywhere. Initially the use of ATM was restricted to withdrawing money, checking balance and printing of mini statement but now apart from these some others facilities are also provided like payment for goods and services purchased online, depositing cash, checks, and paychecks at an ATM machine, withdrawing local currency at a foreign bank's ATM machine at a fair exchange rate etc.

2.2.3.3 Internet Banking

The findings of the (FinScope, Financial Inclusion in Rwanda, 2020) survey indicated that 26 percent of adults know about internet banking. Internet banking has been driving banks as the same report shows there has been an increase in the use of the service from 2 to 32 percent from 2016 to 2020.

2.2.3.4 Agency Banking

Agency banking services is when an individual can access banking and financial services through an agent and who has a partnership with a bank. The agent is provided with technology to provide banking services through POS system. According to the (Shilling, 2021), it is observed that in Africa 80 percent of the potential market is in rural areas. In Africa, agency banking can aid in potentially tapping the areas, where bricks and mortar branches cannot be setup.

2.2.4. Financial Inclusion through Financial Digital

Mobile phones have evolved to become one of the most user friendly tools of economic empowerment for poor people in developing countries. Because mobile phones allow instant and safe transactions through new financial products and services such as Mobile Money and Agent Banking, local and national markets have become more inclusive and efficient (Shilling, 2021).

Mobile Money is a money transfer system using accounts that are accessible from mobile phones. Agent Banking is a branchless banking system under which a business owner or employee can process clients' transactions on behalf of a financial institution or a mobile network operator. In Rwanda, 2.3 million people use mobile money. 34% of all Rwandan adults are registered for mobile money and further 10% use someone else's mobile money account. The government of Rwanda has identified technology as a key driver of development and currently new innovative digital products are being rolled out all over the country (Shilling, 2021),.

Shahul (2014) explains that financial inclusion is delivery of banking services of an affordable cost to the vast sections of disadvantaged and low income groups. As banking services are in the nature of public good, it is essential that availability of banking and payment services to the entire population without discrimination is the prime objective of the public policy. The banking industry has shown tremendous growth in volume and complexity during the last few decades. Despite making significant improvements in all the areas relating to financial viability, profitability and competitiveness, there are concerns that banks have not been able to include vast segment of the population, especially the underprivileged sections of the society, into the fold of basic banking services. Internationally efforts are being made to study the causes of

financial exclusion and designing strategies to ensure financial inclusion of the poor and disadvantaged. The reasons may vary from country to country and hence the strategy could also vary but all out efforts are being made as financial inclusion can truly lift the financial condition and standards of life of the poor and the disadvantaged (Shilling, 2021)..

(Bhoomika, 2014) Banks policy aimed at "social" and "development bonding" by providing credit to agriculture and other priority sectors. It may be noted that despite of vast expansion, a large number of group remain excluded from the "opportunities and services" provided by the financial sector. Such excluded groups include small and marginal farmers, women, unorganized sector workers including artisans, self-employed and pensioners.

Kalunda (2014), explains that small scale tea farmers in Kenya have been targeted by financial inclusion initiatives because of their major contribution in the country's economy. The outcome of these initiatives and their impact is not well known. The study aimed to bridge the gap in empirical literature on the impact of formal financial services on small scale tea farmers. The study sought to find out the level of financial inclusion in terms of access and usage and its impact on small scale tea farmers in Nyeri County, Kenya. The relationship between gender and age on the demand and use of financial services was also investigated using the Pearson Chi square method. The findings reveal that the level of inclusion is high and usage in terms of credit access is also high. In terms of financial literacy the farmers are not receiving adequate financial education which is a component of financial inclusion. The relationship between gender and age on the demand and use of financial services under the Pearson's Chi square method yielded inconclusive results. The study recommends that financial counselling and education should be offered to the farmers to enable them to appropriately use the financial products and services offered through financial inclusion initiatives.

Altaf(2014) in his study titled, "Towards Financial Inclusion", explains that financial inclusion is a prerequisite to economic development. This has been echoed by international as well as national bodies. This indicates the depth and importance of financial inclusion in creating inclusive development. This paper concludes that enhanced information technology, business models, broadening of product and services at the lower end markets can serve as important measures to promote financial inclusion.

 (Nwankwo, 2014), this study critically examines the sustainability of financial inclusion to rural dwellers in Nigeria using descriptive study and content analysis. The study observed that the sustainability of financial inclusion to rural dwellers in Nigeria remains the mainstream for economic growth in any country. The implication of this study is that economy cannot grow fast

without proper implementation of financial inclusion to rural areas in Nigeria. The study recommended that the promotion of collaboration between Deposit Money Banks(DMBs), Microfinance Banks (MFBs) and Communication services providers for enhanced intermediation of financial services should be encouraged; there is need to educate rural dwellers on the importance of banking as it would facilitate the success of CBN financial inclusion policy and that since some of the rural dwellers preferred to keep money under their pillows at home.

Vivekanandan (2013), explains that India had experienced a rapid economic growth in the last decade. But the growth was not inclusive. One of the main reasons for poverty in India is that low income and disadvantaged groups are financially excluded. All kinds of financial services are enjoyed by few peoples in the country but still majority of the people lack access to the basic financial services such as savings, credit and insurance. Government has taken many steps such as nationalization of banks, credit to priority sector, opening of Regional Rural Banks (RRBs), Cooperative society, direct benefit transfers etc., during last six decades but still majority of rural households do not have credit from formal source. This article gives the depth knowledge of financial inclusion, product initiatives, policy initiatives, recent initiatives taken by the Reserve Bank of India (RBI) and the future initiatives. It brings out whether the financial inclusion paves a way towards inclusive economic growth of the country.

Shankar (2013), explains that financial inclusion, implying expanding access to financial services to those currently not accessing them, is an important objective in many developing countries. This article analyses if microfinance institutions (MFIs) adequately break down barriers to financial service access in India. Two lines of enquiry were followed: the spread of microfinance penetration in the country was analyzed and field interviews of 103 MFI field officers were conducted. It is found that while MFIs do break down many barriers to financial inclusion, there are limitations in the extent of their outreach to those excluded. First, MFI penetration in the country is skewed and excludes some areas neglected by the banking sector, suggesting a need for policy incentives to encourage expansion to those areas. Second, even in areas in which MFIs operate they are unable to provide operation. To provide greater and more long lasting access to more individuals there is a need for MFIs to consider adopting more flexible operating models and to offer portability of accounts. There is also a case for skill based training to enable greater access to MFI membership.

Nitin (2013) the objective of paper is to examine status of financial inclusion in India and to study its determinants. Panel fixed effects and dynamic panel generalized methods of moments (GMM) methodologies have been applied to study determinants of financial inclusion.

Additionally, Kendall's index of rank concordance has been derived to test for convergence of states in achieving financial inclusion. Branch network has unambiguous beneficial impact on financial inclusion. Both proportion of factories and employee base turn out to be significant determinants of penetration indicators. The findings reveal the importance of a region's socio-economic and environmental setup in shaping banking habit of masses. Using test for convergence it is found that regions tend to maintain their respective level of banking activity, with no support for closing gap. To the best of the author's knowledge, no panel data study has been performed for India based on data for large number of states and a reasonable time span. This study utilizes 29 major states and union territories encompassing 1995 to 2008, which helps to increase degree of freedom and provide reliable results.

Shivani (2013) explained that financial inclusion is the availability of banking services at an affordable cost to disadvantaged and low-income groups. In India, the basic concept of financial inclusion is having a savings or current account with any bank. In reality, it includes loans, insurance services, and much more. The Indian banking system will have to deliver on the plan for financial inclusion, the system, which demonstrated its resilience in the face of the recent global financial crisis, should adopt strong and urgent measures to reach the unbanked segment of society and unlock their savings and investment potentials. The banking sector has also taken a lead role in promoting financial inclusion. In India, the Reserve Bank of India (RBI) has initiated several measures to achieve greater financial inclusion, such as facilitating "no-frills" accounts and "General Credit Cards" for low deposit and credit. Alternate financial institutions, such as microfinance institutions and Self-Help Groups, have also been promoted in some countries.

Dermirguc et al.,(2013)summarized the first global dataset of publicly available indicators that measure how adults in 148 countries save, borrow, make payments, and manage risk. The data are used to benchmark financial inclusion around the world and investigate the significant country and individual-level variation in how adults use formal and informal financial systems to manage their day-to-day finances and plan for the future. While the data show that 50 percent of adults worldwide have an account at a formal financial institution, account penetration varies across countries by economic development and across income groups within countries. Although half of adults around the world remain unbanked, reported barriers to account use such as cost, distance and documentation requirements may be possible to overcome through public and private sector-led initiatives to expand financial inclusion.

Ghatak(2013) explains that despite banking expansion, improvement in financial performance, greater competition and diversification of ownership of banks leading to both enhanced efficiency and systematic resilience in the banking sector, existing banking practices tend to exclude rather than attract vast sections of population. There are a host of factors contributing to financial exclusion. These factors may be both from supply side and demand side. The government and RBI take several measures to encourage the supply of financial services to the excluded sector. But the demand factors of financial inclusion attract very little focus. The main aim of this paper is to identify the various demand side factors of financial inclusion and to build a model for the same. Choosing a sample size of 500 using simple random sampling method, the study concludes that out of the several factors the most important factors Influencing the demand for financial inclusion are Accessibility, Culture, Assets, Literacy and Income. The study will be very useful for the administrative bodies like the government and RBI to frame rules and regulations and also to initiate several measures for boosting the demand factors of financial inclusion.

Arulmurugan (2013), Access to finance by the poor and vulnerable groups is a prerequisite for poverty reduction and social cohesion. More than 150 million poor people have access to collateral – free loans. However, there are still large sections of the world population that are excluded from the financial market. In India half of the poor are financially excluded from the country's main stream of banking sector. Financial inclusion denotes delivery of financial services at an affordable cost to the vast sections of the disadvantaged and low-income groups.

Umar (2013), inclusive growth is much needed to include common people into the orbit of development. Social and economic justice can be provided only with the inclusion of hitherto excluded deprived section of people. Lot of measures were undertaken by the Government of India and Reserve bank of India together to mitigate the problem of financial exclusion. It leads to particularly, development of all sections of people. To achieve this multi-model approach was adapted. Service Area approach, priority sector lending. Differential rate of interest, Lead Bank Scheme, issue of General credit card and Kisan credit card and so on help to overcome financial hassle to get credit from formal institutions. In this direction emergence of Self Help Groups (SHGs) and then SHG- Bank Linkage Programme help extensively to strengthen the poor specially women folk. SHGs play a vital role to improve the socio-economic condition of women folk by developing thrift habit and providing micro finance in times of need and also encouraging micro entrepreneurs. This study highlighted the role of SHGs in financial inclusion. The primary data was collected through random sampling method and it reflects the positive relationship between SHGs membership and financial inclusion. The study shows after the membership to

SHGs there was enormous increase in the number of bank accounts by members to the extent of 82.7 percent from 17.3 percent before membership. With that, the credit availed by the members and annual repayment of the loan also shows positive trend. Thus SHGs help the deprived section of people to enter into formal financial sector and through that social and economic empowerment.

Financial Inclusion can be perceived as a continuum. Opening a bank account though a positive step does not move someone from being excluded to 'included'. In this context, (Reagan&All, 2003) note that the experience of Financial Inclusion is not just about access to products but also the quality of engagement with those products and the need for individuals to develop skills and confidence to make informed decisions.

Priya(2006)finds that rural households face several barriers when they attempt to borrow from banks. Firstly, banks demand collateral which poor people are unable to provide. Secondly, bank transactions tend to be time consuming and expensive. Bribes amounting to 20 per cent of the loan amount are not unheard of. On an average, bank loans take several weeks to be approved. Consequently, the share of informal sources of credit has jumped.

Anderloni et al.,(2007) share the view that the ownership of a bank account is not enough to promote meaningful inclusion, for, an account may be inaccessible due to being overdrawn or may be only used for receipt of money, and may create a case of 'exclusion within inclusion'.

WB (2008) reports that in the absence of inclusive formal financial system, poor individuals and small entrepreneurs have to rely on informal sources to invest in better opportunities because of its timely availability and easy accessibility but at a much greater interest burden. FI can help in removing this impediment. Achieving FI in a country like India, with large and diversified population with significant segments in rural and unorganised sectors requires a high level of penetration by the formal financial system.

Vijay (2018) asserts that FI has to be viewed as a business strategy for growth. FI will result in reduced farmers' indebtedness and better risk management for the farmers. By providing greater access to educational loans to all sections of society, improved FI will mean India becoming more equal opportunity nation, a pre-condition for promoting inclusive growth; and enhanced FI will promote grass root innovations and entrepreneurship.

Suryanarayana (2008) provides empirical evidence to show that the growth process between 1993-94 and 2004- 05, has bypassed the majority and was not inclusive. At the national level, the inclusion coefficient is higher for the rural sector than for the urban. As regards the rural

sector, inclusive coefficient is the lowest in rural Kerala; this is contrary to what one would expect, given the progressive policies pursued in the state. Across states, the extent of inclusion of the deprived in the rural growth process is one of the highest (greater than 90 per cent) in the states of Bihar and Karnataka and the lowest in Kerala.

Sarma et al., (2008)find that the widely held view that NPAs are a result of providing credit to the low income groups, sometimes, in compliance with the directed lending programs such as 'priority sector lending' is not true. If lending to the poor and consequent default on their part is in fact the cause for 'NPA', then higher levels of 'NPA' should be associated with higher levels of Financial Inclusion. The results of the study show the opposite, indicating a higher level of 'NPA' associated with lower level of FI. It clearly shows that, the efforts to include more people into the financial system are not the significant cause for the 'NPA'. Further, highly capitalised banking system, with a high 'CAR,' seems to be less inclusive. This is due to the fact that, a banking system having high 'CAR' tend to be more cautious in lending, negatively affecting FI.

Thyagarajan et al.,(2008) in a recent study found that in some districts, at least more than 85 percent of the no - frills accounts are dormant, primarily due to distance from bank branches, low financial literacy, and poor marketing by banks.

2.2.5 Measurement of financial inclusion

The financial inclusion in most simple term is having an account at financial institutions, the financial institution could be bank, microfinance institutions or other regulated financial institution. Access to financial services can be achieved through offering appropriate financial products for low income individuals in particular and society in general.

The tailored saving products as well as saving institute expansion can enhance saving of low income people. The credit inclusion can be enhanced through designing appropriate products, credit information and low collateral requirements (WB, Measuring financial inclusion around the world, 2014). The technological innovation reduces financial exclusion by reducing the distance, cost barriers and transaction insecurity. It increases the access to financial services.

WB, Measuring financial inclusion around the world.(2014) Study shows that greater financial inclusion accelerates economic growth, intensifies competition, and boosts the demand for labor. Those individuals at the lower end of income distribution can get relatively bigger benefit and hence inclusive growth can be achieved.

 Sarma (2012) proposes that the best way to measure FI is to construct an index based on some identified dimensions such as penetration, availability and usage of financial services. In the

same way, the Financial Inclusion Data Working Group of the Alliance for Financial Inclusion has suggested three dimensions should be used to measure FI that included access, quality and usage. (AFI, The financial inclusion data working group and the mexican experience, 2012) define (1) access as availability of formal financial services in terms of physical proximity and affordability, (2) Quality refers to entails designing and customizing financial services to the satisfaction of consumers and (3) Usage as regularity, frequency and duration of usage of financial services. With regard to AFI, one should have mentioned the cost that should be considered as a fourth dimension of financial inclusion indicators. The argument here is that households and firms are excluded from formal financial institutions and markets purely on the basis of high costs, both pecuniary costs and transaction costs. Abor et al., (2018) model suggests that financial inclusion should be measured in three dimensional (FI3D) that are financial Participation, financial capability, and financial well-Being. Each dimension represents numerous sub-dimensions. .

Abor et al., (2018) explains (1) financial participation as the affordability, access to and usage of formal financial services and products (accounts, credit, deposits, investment, insurance, financial technology, payments), (2) financial capability as the ability of financial inclusion to enhance the capability of the individual to effectively participate in the formal financial system. This implies the ability of the individual to build judicious financial decisions, successfully undertake financial planning and budgeting, and be financially literate and keep up to date with financial innovations and trends and (3) financial wellbeing as the extent to which financial inclusion has expanded the quality in lifetime and wellbeing of the person concerned. Though financial wellbeing financial inclusion will be the drive that induces improvements in financial quality of life, amelioration of suffering, curtailment of over-indebtedness, financial self-reliance, and livelihood sustainability.

Mobile money accounts allow marginalize populations to receive cash transfers after calamities and provide a fast, targeted and cost efficient channel for supporting affected communities (GSMA, Sub-Saharan Africa Mobile Economy , 2014)

2.3. Credit, Savings, insurance, payments and remittance

According to (WB, FInancial Inclusion, 2018), FI means that individuals and businesses have access to useful and affordable financial products and services that meet their needs (transactions, payments, savings, credit and insurance) delivered in a responsible and sustainable way.

Being able to have access to a transaction account is a first step toward broader financial inclusion since a transaction account allows people to store money, and send and receive payments. A

transaction account serves as a gateway to other financial services, which is why ensuring that people worldwide can have access to a transaction account is the focus of the World Bank Group's Universal Financial Access 2020 initiative.

Financial access facilitates day-to-day living, and helps families and businesses plan for everything from long-term goals to unexpected emergencies. As account holders, people are more likely to use other financial services, such as credit and insurance, to start and expand businesses, invest in education or health, manage risk, and weather financial shocks, which can improve the overall quality of their lives.

Great strides have been made toward financial inclusion and 1.2 billion adults worldwide have gotten access to an account since 2011. Today, 69% of adults have an account.Moving from access to account to account usage is the next step for countries where 80% or more of the population have accounts (China, Kenya, India, and Thailand). These countries relied on reforms, private sector innovation, and a push to open low-cost accounts, including mobile and digitally-enabled payments.

However, close to one-third of adults – 1.7 billion – are still unbanked, according to the latest Findex data. About half of unbanked people include women poor households in rural areas or out of the workforce.

The gender gap in account ownership remains stuck at 9 percentage points in developing countries, hindering women from being able to effectively control their financial lives. Countries with high mobile money account ownership have less gender inequality.

- Financial inclusion has been identified as an enabler for 7 of the 17 Sustainable Development Goals.

- The G20 committed to advance financial inclusion worldwide and reaffirmed its commitment to implement the G20 High-Level Principles for Digital Financial Inclusion.

- The World Bank Group considers financial inclusion a key enabler to reduce extreme poverty and boost shared prosperity, and has put forward an ambitious global goal to reach Universal Financial Access (UFA) by 2020.

Since 2010, more than 55 countries have made commitments to financial inclusion, and more than 60 have either launched or are developing a national strategy. When countries take a strategic approach and develop national financial inclusion strategies which bring together

financial regulators, telecommunications, competition and education ministries, our research indicates that when countries institute a national financial inclusion strategy, they increase the pace and impact of reforms.

Countries that have achieved the most progress toward financial inclusion have: Policies delivered at scale, such as universal digital ID (more than 1.2 billion residents covered);Leveraged government payments. (For example, 35% of adults in low income countries receiving a government payment opened their first financial account for this purpose.; Allowed mobile financial services to thrive. (For example, in Sub-Saharan Africa, mobile money account ownership rose from 12% to 21%.);Welcomed new business models, such as leveraging e-commerce data for financial inclusion ;Taking a strategic approach by developing a national financial inclusion strategy (NFIS) which bring together diverse stakeholders including financial regulators, telecommunications, competition and education ministries and Paying attention to consumer protection and financial capability to promote responsible, sustainable financial services.

2.4. Financial inclusion in developing countries

Developed countries having realized that there are complex and multi-dimensional factors that contribute to financial exclusion. Hence, variety of providers, products and technologies that best suits the socio-economic, political, cultural and geographical conditions were introduced accordingly.

However, in developing countries, access to formal financial services by the majority poor population remains limited due to limited available financial services, which includes:

High levels of government debt constrained by access of credit to firms and individuals;

- High inflation which discourages savings;
- Poor physical and institutional infrastructure;
- Inaccessibility by most poor people due to lack of collateral or credit records, as well as
- The lack of national credit, which deter lending.

Financial inclusion or inclusive financing is the delivery of financial services at affordable cost to section of disadvantage and low income segments of society, in contrast to financial exclusion where those services are not affordable or available.

Conversely, financial exclusion refers to a process whereby people encounter difficulties accessing or using financial services and products in the mainstream market that are appropriate to their needs and enable them to live a normal social life in the society in which they belong. Furtherance to this, financial exclusion means the inability of the disadvantaged to access financial services.

Therefore, it is estimated that 2.5 Billion of people working as adults globally have no access to formal financial services delivered by formal institutions. For example, in Sub-Saharan Africa, only 24% if adults have a bank account even though Africa's formal financial sector has grown in recent years. It is argued that as banking services are in the nature of public good; the availability of banking and payment services to the entire population without discrimination is the prime objective of financial inclusion public policy.

In Nigeria for instance, the major reasons for financial exclusion are hard-core poverty and illiteracy which invariably makes financial exclusion both social and financial phenomena. However, access financial resources for increased investment which invariably lead to overall macroeconomic growth and development (ARIKEWUYO, 2013).

2.4.1 Financial inclusion in Rwanda

The findings of the (FinScope, Financial Inclusion in Rwanda, 2020) survey indicated that the financial landscape in Rwanda continues to change due to sector interventions. Both banking and other formal non-bank sectors recorded significant growth in the number of financially included population, in line to the population growth and effort to reduce population who previously relied only on informal financial mechanisms.

According to the Finscope Survey.(2020), in total, 93% (about 7 million adults) in Rwanda are financially included (including both formal and informal financial products/services). Levels of financial inclusion vary from 99% in Gasabo district to about 83% in Rusizi district. Gender gap in financial inclusion is closing with only 8% excluded women compared to 7% amongst male counterparts. As expected, when comparing seniors and youth, youth within the age group of 16 – 24 years are financially excluded at 18% points, significantly higher compared to the national average of 7% exclusion.

2.5. The concept of Poverty

The word poverty coined from the word pauper, a Latin word for poor is a largely used concept worldwide and has been recognized as a global problem. (WB, Attacking Poverty, 2000)

Described poverty as a condition of hunger, no shelter, poor health, no education, not being able to read or write, no jobs, high infant/child mortality and living in constant fear.

Poverty is general scarcity or dearth or the state of one who lacks a certain amount of material possessions or money (Bhagwati et al.,2014). Poverty may also be understood as experienced as social exclusion, inequitable social relationships, a facet of asymmetrical social status, diminished capacity to participate or to develop significant associates with other people in society (Gebremarian et al.,2004)Poverty is one of the core problems of every economy all over the world. Approximately, 1.2 billion people about one-fifth of the world population - live below the extreme poverty line of $1 a day in the late 1990s.

Poverty is being a major issue since the evolution of mankind. Today, it has become a big phenomenon. Poverty has become a multifaceted concept which is influenced by social, political and economic elements. The World Bank forecasts 702.1 million people are living in extreme poverty which is reduced from 1.75 billion people back in 1990. About 347.1 million people are from Saharan-African countries and 231.3 million are living in South Asia. The percentage of the people living in extreme poverty has been reduced from 37.1% to 9.6% falling below 10% for the first time between 1990 to 2015. It is further proposed that it would take 100 years to bring world's poorest to the previous poverty line of $1.25 a day.

Ogunsakin et al., (2017) Categorized poverty into four types. The first was regarded as Absolute abject or chronic. This type of poverty is not just relative to basic needs but also reaches far into the mind of the sufferer. This is most commonly found in Africa where people are bereaved of ideas and are poor even in the state of their mind in addition to lacking access to basic necessities of life such as food, clothes and shelter.

 The second type is the relative poverty. This is described in relation to the standard of living obtainable elsewhere in the world. It entails comparing the standard of living of people in different locations within a society and hence one will be able to determine the comparability based on what is being experienced per time. While a person can be said to be in comfort, same condition might be a state of discomfort for another. This is more prominent in comparing standard of living in developed and developing countries.

The third being disguise poverty involves situation where individuals or groups are exploring the economic benefits of being in poverty as a way of amassing wealth. This is the situation of some states in Nigeria where groups have continued to sabotage the efforts of government at improving the living standards of people because it will end the economic benefits they are enjoying from

the poor conditions of living. This particular type of poverty is often popular where there is a high level of corruption and porosity in the system and it is often terminal.

The last type described by Ogunsakin et al., (2017)is the poverty of the mind, This is a situation where a person or individual is not able to be self-content. The person often feels he or she is undermined and is always unsatisfied with what he or she has.

Poverty is often defined on a family basis rather than an individual basis. Economists often seek to identify the families whose economic position (defined as command over resources) falls below some minimally acceptance level. Similarly, the international standard of extreme poverty is set to the possession of less than 1$ a day Olokoyo et al., (2018).

2.6. Financial inclusion and poverty reduction

Fadun (2014) states that financial inclusion leads to poverty mitigation and restructuring of income in Nigeria.

(Sarma, Index of Financial Inclusion, 2008) also examines the factors that determine financial inclusion in Sub-Saharan Africa and finally, how financial access affects poverty reduction in the region. The study is quantitative in nature and made use of econometric models in the estimations. The findings of the study indicated that, most countries in Sub-Saharan Africa have medium financial economies and over the study period, only four countries fall within the high financial economy namely: - Cabo Verde, the Seychelles, Sao Tome and Principe; and Nigeria. Secondly, the findings suggest that, Gross National Income (GNI) per capita and remittances are the main determinants of financial inclusion in the region, meaning that per capita income is the main factor for determining financial inclusion in Sub-Saharan Africa and that involuntary financial exclusion in the region may be determined greatly by inadequate household income and high-risk profile rather than market failures and weak implementation of contractual agreements. Moreover, the findings also clearly suggest that financial access does not have any meaningful impact on poverty reduction in the region but credit to private sector by domestic banks (financial depth) significantly reduced poverty in Sub-Saharan Africa.

In addition, Jalilian et al.,(2007) discover that the effect of financial growth on poverty decrease will only to some extent be obstructed if variation in income disparity brings about from financial growth in emerging economies. Honohan (2008) studied the effects of access to finance using household survey data from 160 economies globally, which include Sub-Saharan Africa countries and finds a relationship but no fundamental link between access to finance and poverty reduction.

Unfortunately , those who have most difficulty acquiring banking products and services are those who could most benefit from them, based on this it's the reason why we say that financial inclusion is urged to play an important role in reducing poverty and inequality to emphasize the UN's 2030 Agenda for Sustainable Development Goals (SDGs).(source: World Bank and Financial Inclusion Insights).

According to Vishnu (2009) the Reserved Bank of India RBI financial inclusion is the "provision of affordable financial services" to those who are under-attended by formal agencies of the financial system. These financial services include savings, remittance facilities loan, payments, and insurance services". Given the definition of financial inclusion, any means for financial inclusion, to begin with, has to be not just easily accessible but also affordable to the borrowers, who do not have access to the formal financial system. it should also ensure that the borrowers are able to reduce their dependence over time on informal sources of finance, which can work towards permanent or effective inclusion of these borrowers into the formal banking network.

Financial inclusion can contribute to poverty reduction, economic and social development, and financial stability (UNICTAD, 2014). The high level of impact financial inclusion has had in developed countries continues to be a motivating factor for its adoption in developing countries in the fight against poverty. The United Nation estimates that about 3 billion people are still financially excluded population in the world and therefore do not have access to formal financial services. These people do not have bank accounts; they cannot access credit nor get insurance and do not have any means of saving neither can they receive social benefits. However, it is becoming increasingly difficult to financially include people living in rural suburbs due to the unavailability of financial service providers in these locations. Financial inclusion is considered to be one of the sources of poverty reduction, included in the Millennium goals: Eradicate extreme poverty and hunger. This issue is not just related to charity: market opportunities among the poorest are underestimated and should be explored by multinational companies, as there are evidences that multinationals that provide services to the bottom-of-the-pyramid are successfully doing business in developing countries (Phahalad et al.2002).

2.7. Empirical review

The empiric evidence on the finance-growth link starts by a research done by King et al.,(1993). The findings of their work authenticate an absolute link between finance and economic growth. They used a dataset comprising eighty economies from 1960 to 1989, the writers ascertain that

the original stages of financial expansion anticipation alternating growth rate through the thirty year period.

Therefore examining the trend of affiliation between finance and economic growth has been studied by a number of researchers, Demetriades *et al*.,(1996) ; Arestis *et al*., (2012); Rousseaux *et al*.,(1998). Even admitting advancement is varied on its trend, the supply-led hypothesis inclines to be preferred. ascerta Demetriades et al.,(1996)in slight provision for the demand-led hypothesis, admitting a bi-causal link is realised in seven countries from their absolute sample of sixteen. Measure financial progress by containing ; Arestis *et al*.,(2012) both bank based and market based variables. Their findings advance that; countries that support an intermediate centered financial system such as Germany, follow the supply-led hypothesis, at the same time as countries that support a market centred financial system, such as the United States follow the demand-led hypothesis. Rousseaux et *al*., (1998) after effects shows that when finance was not sophisticated, in the advance of accelerated industrialization (1870-1929), finance accord the abstraction to advance growth providing to the supply-led hypothesis.

Beck et al.,(2000) make use of legal backgrounds as influential variables in their work and authenticate that finance has an accelerating influence on absolute factor productivity growth, which aliment through to general GDP growth. Graff (2002) use a dynamic panel analysis and indicates that finance counted for growth over twenty-year period from 1970-1990, nonetheless the writer as well indicates that the supply-led hypothesis is far from abiding and may have been motivated by certain periods in his work. Rioja (2004) add to the existing studies by finding the impacts of finance on growth vary subject to the level of a nation's economic progress. The results from their work suggest that; for low income economies, the impact of financial development on economic growth is mostly through the capital accumulation channel, whilst for middle and high-income economies, it adds abundantly through improved productivity growth. James et al., (2011) Research finance and growth in Africa, one of the world's fastest growing continent. Their results to literature indicate that the relationship between financial development and economic growth may be region specific.

In Africa, the writers' findings suggest that as earnings increase, savings are absolutely mobilized, as bank balance sheet grow. Conversely, these savings are not channeled and offered as loans due to information irregularities and brittle contract execution in Africa, stopping finance from causing growth. Financial development can be aggregate into two, bank based and market based development,

Levine et al.,(1999)Find that bank based financial systems, like those in Germany and Japan have associated growth rate to nations that are serviced mostly by a market based system, for instance the United Kingdom and the United States of America.

Nevertheless, the writers' find that the two structures match one another and countries with superior stock markets are inclined to have better banks. Regardless of this, the broadly captivated empiric confirmation illustrates that there is a positive linkage between financial development and income per capita. Furthermore, if growth is comprehensive to all citizens globally, it may appropriately play a role in reducing poverty and inequality.

Anwar et *al*.,(2016) Investigated the role of financial inclusion in poverty reduction in Indonesia using descriptive statistical method. Reported that financial inclusion has negative effect on poverty reduction but has positive effect on investment, employment and economic growth and indirectly reduce poverty and income inequality.

With financial inclusion, the empirical studies measure financial inclusion using one or more single variable measures such as ownership of bank account or number of accounts per 1000 adults, number of bank branches per 100,000 adults, savings capacity, insurance penetration among others   (Klapper et *al*., 2016). However, the use of single variable to measure FI have been subject of various critics for narrowing the multidimensional nature of financial inclusion.

Chibuzo et al.,(2018) in their study done in Nigeria on "The effect of Financial Inclusion on poverty reduction" with a random sample of 384 respondents by using partial least square and structure equation modelling, find that there is a significant relationship between the financial inclusion and poverty reduction. In addition, for poverty reduction, the result revealed also that micro finance has positive moderate relationship between the variables under studies.

The studies conducted by Chandra et al.,(2016) concluded   that financial inclusion is pro-poor. The authors pointed out that financial inclusion helps low-income households to access basic financial services like savings, credit, and insurance, which, in turn, fosters their financial autonomy and thus amplifies economic growth. They advocated that enhanced financial services not only raises economic growth but also reduces poverty and income inequalities.

2.8. Theoretical framework

2.8.1 Introduction

Access to financial services has the potential to help transform the lives of low-income households through the smoothing of consumption, investment in human or productive capital and the management of vulnerabilities. The study opine that FI is the easy availability of all banking services at an affordable cost, reasonable time & adequate quantity to all needy people and which should also be available in appropriate sense (broader sense); FI includes the easy access of all the people to the minimum basic financial services (narrow sense).

2.8.2 Agency theory

Jensen (2010) opined that the agency theory consists on the code of conduct that the licensed financial institutions are likely willing to use the third parts named agents to act on their behalf by providing financial products at lower costs. In this quality, they provide with borrowers banking services such as opening an account, cash deposits and withdrawals, transfer money among others services. This arrangement between the financial institutions and the retail outlets effectively creates the agency relationship, where the banks are the principals while the retail outlets are the agents.

As the financial institutions adopt the agency theory and engage the various agents, the principal-agent relationship is entered into. The banks have to compensate the agents adequately through the transactional commissions. The financial inclusion is effective through the presence of the agency banking that they perform some services on behalf of principal which involves delegating some decision making authority to agent (Jensen et al., 1976).

2.9. Conceptual framework

Figure 1: Conceptual Framework

**Independent variable (Financial inclusion)
variables**

Dependent

(Poverty status)

```
┌─────────────────────────────────────────────┐
│  ┌─────────────────────────────────────────┐ │
│  │ Accessibility                           │ │
│  │ - Having a saving account               │ │
│  │ - Other formal saving account           │ │
│  │ - Transfer in/out by using mobile       │ │
│  │ money                                   │ │
│  └─────────────────────────────────────────┘ │
│                                               │
│  ┌─────────────────────────────────────────┐ │
│  │ Penetration/quality                     │ │
│  │ - Amount currently on the saving        │ │
│  │ account                                 │ │
│  │ - Amount deposited in the last 12       │ │
│  │ months                                  │ │
│  │ - Total received in last 12 months      │ │
│  │ - Total contributed in last 12 months   │ │
│  └─────────────────────────────────────────┘ │
│                                               │
│  ┌─────────────────────────────────────────┐ │
│  │ Usage                                   │ │
│  │ - Household member tried to request     │ │
│  │ a loan and failed                       │ │
│  │ - Household members owe money           │ │
│  │ - Other loan                            │ │
│  └─────────────────────────────────────────┘ │
└─────────────────────────────────────────────┘
```

Poverty Status
- Welfare category (household consumption) (Y2)
- Ubudehe category (Y1)

Intervening variables
- Gender of HH head
- Residence of HH

2.10. Summary of literature review

This chapter has reviewed literature relevant for the study. It specifically reviewed the theories guiding the study including the relationship between financial inclusion and poverty reduction. There have been many formidable challenges in financial inclusion area such as bringing the gap between the sections of society that are financially excluded within the domain of the formal financial system, providing financial literacy and strengthening accessibility, penetration and usage of formal financial system so as to improvised the financial economic growth. A nation can grow economically and socially if it is weaker section can turn out to be financial independent. This study therefore will be sought to fill this gap because no research so far has been done to explain that association in Rwanda.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This study aims to assess the relationship between FI and poverty reduction. To overcome this objective the researcher opted to use the following points: research design, population of the study, data collection and the models that will be used to assess the relationship between financial inclusion and welfare levels in Rwanda and Ubudehe categories.

3.2. Research Design

The quantitative design was adopted since this study aims to assess the relationship between financial inclusion and poverty reduction. The quantitative design was chosen because both variables FI and poverty reduction were expressed in numbers and there was need to compute the correlation and predict to what extent the FI cause poverty. In this view, our quantitative design used was correlational design.

3.3. Sampling

In this section, with the Integrated Household Living Survey (EICV 5) it was presented the household based on the population, sample, sample size and sample selection of Rwanda.

The EICV5 has three main components: cross-sectional sample of households, VUP Panel Survey receiving VUP benefits and EICV5 Panel Survey. The EICV5 cross-sectional survey is designed to represent the current household-based population of Rwanda. The NISR national master sampling frame was used for selecting the sample villages in each district. This master sample was based on the 2012 Rwanda Census frame. The villages were selected for the Master Sample, stratified by district. Within each district the sample villages were selected systematically with probability proportional to size (PPS), where the measure of size was based on the number of households in each village from the 2012 Census frame. Within each district the villages in the master sampling frame were not explicitly stratified by urban and rural areas. However, the frame of villages within each district was ordered by urban and rural codes, and the systematic selection of the sample villages (with PPS) provides an implicit stratification of the Master Sample by urban and rural areas within each district, with a proportional allocation of the sample villages to each stratum. Similar to the EICV4 cross-sectional survey methodology, a nationally-representative sample of clusters was assigned for the EICV5 data collection each cycle out 10 cycles, so that the sample is geographically representative over time. This process

ensured that the final distribution of the sample clusters to cycles and sub-cycles was geographically representative within each district

The objectives of the EICV5 Panel Survey are to measure the trends in key socioeconomic indicators over time for a nationally representative panel of households. The baseline survey was EICV3, and in EICV4 the panel households which moved or split were tracked and interviewed at their new location. The Panel Survey includes the panel households that remained in the original sample villages, and the split households that were tracked in EICV4. Any panel households that moved or split from this initial sample of panel households in EICV5 were also tracked. However, the additional tracking will be limited to following the original eligible members (13 years or older in EICV3, with relationship being: Household Head, Spouse of household head, son/daughter of household head, or step child/ adopted child of household head) of the EICV3 panel households. The main objective of the VUP Panel Survey is to provide longitudinal data for a nationally representative panel of households that received VUP benefits at the time of the EICV4, in order to obtain reliable estimates of trends in the socioeconomic indicators for these households. The VUP Survey conducted with EICV4 was based on a sample of 2,460 households selected from the VUP administrative frame using a stratified two-stage sample design. However, only the sample households indicated that they were receiving VUP benefits at the time of the EICV4 survey were considered to be the sample for the VUP Panel Survey. If the entire household moved or an eligible member moved, it was necessary to identify their new address so that they can be tracked there. The eligibility criteria for household members to be tracked and the tracking procedures are similar to those used for the EICV5 Panel Survey. Regarding data collection, the NISR collected the data for the EICV5 cross-sectional, VUP panel and EICV5 panel surveys using computer-assisted personal interviewing (CAPI) with computer tablets for the first time using the same questionnaire, including the listing operation.

3.3.1. The population

The sampling frame for the EICV5 cross-sectional survey is based on the NISR master Sample data. The NISR used the 2012 Census frame to select a large Master Sample of 3,960 villages that can be used for the different national household surveys in Rwanda. The primary sampling units (PSUs) for the Master Sample are individual villages, or a combination of small villages, with the number of households tabulated from the 2012 Census data. A new listing of households was conducted in order to update the frame for the EICV5 cross-sectional survey. The sample households in the EICV5 sample villages were selected from the new listing of households

3.3.2. Sample selection

In EICV5 the sample was increased for the districts in Kigali Province because the estimates of the poverty rate for those districts had higher coefficients of variation (CVs) or relative standard errors (RSEs) compared to the other districts. However, one reason why the RSEs for the districts of Kigali Province were higher is that the value of the poverty rate is lower for these districts.

The sample PSUs in each district were allocated to the urban and rural strata proportionately to the number of households in the 2012 Census frame. In the case of districts where the proportional number of sample PSUs was only 1 for the urban stratum, the number of sample PSUs was increased to 2. For the selection of sample villages for EICV5, it was assumed that the Master Sample villages for each district were explicitly stratified by urban and rural areas. A separate subsample of villages was selected within each stratum from the Master Sample.

A stratified multi-stage sample was selected for the EICV5 Cross-Sectional Survey, based on the NISR Master Sample selected from the 2012 Rwanda Census frame.

3.3.3 Sample size

The sample of EICV5 was 1,260 sample villages and 14,580 sample households at the national level. In the urban strata there are 245 sample villages and 2,526 sample households, and in the rural strata there are 1,015 sample villages and 12,054 sample households. The sample size for the EICV5 cross-sectional survey has 30 more sample PSUs and 270 more sample households than the corresponding sample for EICV4.

3.4. Data, validity and reliability

3.4.1.Data

The sample size for the EICV5 cross-sectional survey depends on the level of precision that is required for key indicators at the district level, as well as on resource constraints and logistical considerations. It is very important to ensure good quality control in order to minimize the non-sampling errors. The estimates of the sampling errors for the poverty rate by district from the EICV4 data were examined in order to determine whether it would be necessary to adjust the sample size. For EIVC4 the number of households selected per cluster was 9 for Kigali Province, which is mostly urban, and 12 for the remaining provinces, which are mostly rural. This sampling strategy has been consistent for all the EICV surveys because it is statistically efficient and is

also effective for the EICV logistics of the fieldwork and the workload of the team of enumerators each cycle.

3.4.2. Reliability and Validity

To ensure the reliability and validity of the secondary data from EICV5, the researcher had have to pay attention to evaluate: theoretical or conceptual model that was used, variables and hypotheses posited, operational definitions of variables and measures employed, population, sample frame, sampling design and sample obtained, data collection strategy and response rate obtained, quality control measures employed, data coding, data entry and data analysis procedures, factors which could have affected the study, such current events. Furthermore, the researcher took care of verifying data by making sure that we had have an accurate copy of data. This verification included to check that we had have proper documentation, correct number of variables, correct coding scheme and can reproduce the original summary statistics.

3.5.Data source

The study will use data from the EICV5 Cross-Sectional Survey designed to represent the current household-based population in each of the 30 districts of Rwanda.

3.6. Description of Variables

Table 1: Independent variables

Dimension	Variable	Description	Data Type
Accessibility (X_1)	Having saving account	At least one member of the household has a saving account (Yes/No)	Yes=1 No=0
	Other formal saving account	At least one member of the household has any other formal saving account	Yes=1 No=0
	Transfer in/out by using mobile money	At least one member of the HH transferred in or out using mobile money	Yes=1 No=0
Penetration/quality (X_2)	Amount currently on the saving account	Amount of money currently on the saving account (in Rwandan Francs)	Numeric
	Amount deposited in the last 12 months	Amount of money deposited on the saving account in the last 12 months (in Rwandan Francs)	Numeric
	Total received in last 12 months	Amount of money received on the saving account in the last 12 months (in Rwandan Francs)	Numeric
	Total contributed in last 12 months	Amount of money contributed on the saving account in the last 12 months (in Rwandan Francs)	Numeric

Usage	Household member tried to obtain a loan and failed	At least one member of the household has tried to obtain a loan	Yes=1 No=0
(X_3)	Household members owe money	At least one member of the household owe money	Yes=1 No=0
	Other loan	At least one member of the household has tried to obtain another type of loan (Yes/No)	Yes=1 No=0
Intervening variables	Gender	Gender of loan receiver	Male=1; Female=0
	Residence	Residence of loan receiver	Urban=1; Rural=0

Table 2: Dependent variables

Dimension	Variable	Description
Poverty status	Welfare (Y_1)	Welfare evaluated depending on the level of household consumption.
(Y)	Ubudehe category (Y_2)	Welfare category of a household among: Severely poor, moderately poor and non-poor. 1=Non-poor 0=Poor

3.7. Data processing and analysis

Data processing was done by to ensure the high quality of data to facilitate analysis by using STATA, according to the objective of the research descriptive statistics, correlation and multiple regression model were used.

3.7.1.Correlation matrix

We used correlation to measure strength of linear association, r, the coefficient of correlation as the used statistical technique. Between two continuous variables, relationship is measured between -1 and +1.

- If r = 1 or – 1; it means a correlation is a perfect linear relationship (A correlation coefficient of 1 means that for each positive increase in one variable, there is a positive increase of a fixed proportion in the other variable. Or otherwise, a correlation coefficient of -1 would mean that for each positive increase in one variable, there is a negative decrease of in the other variable).

- If r = 0 means no linear relationship between the two variables (Zero means that for every increase whether positively or negatively, there isn't no increase either positive or negative. The two variables are just not related).

- Using the observed data, it is normally known as Pearson's correlation coefficient. Using the ranks of the data instead of the observed data it is recognized as Spearman's rank correlation.

3.7.2. Multicollinearity

In addition, we checked for multicollinearity among independent variables. Multicollinearity is the occurrence of high intercorrelations among two or more independent variables in a multiple regression model. Multicollinearity can lead to skewed or misleading results when determining how well each independent variable can be used most effectively to predict or understand the dependent variable in a statistical model.

To detect it, the variance inflation factors (VIF) measure how much the variance of the estimated coefficients are increased over the case of no correlation among the X variables.

- If no two X variables are correlated, then all the VIFs will be 1;
- If VIF for one of the variables is around or greater than 5, there is collinearity associated with that variable;
- The easy solution is: If there are two or more variables that will have a VIF around or greater than 5, one of these variables must be removed from the removed model.

3.7.3.Linearity

We performing regression, we also checked for linear relationship between the response variable and the predictors. For multiple regression, the most straightforward thing to do is to plot the standardized residuals against each of the predictor variables in the regression model.

- If there is a clear nonlinear pattern, there is a problem of nonlinearity,
- Otherwise, we should see for each of the plots just a random scatter of points.

3.7.4. Normality

A test of normality in statistics and probability theory was used to quantify if our certain sample was generated from a population with a normal distribution via a process that produces independent and identically-distributed values.

Normality tests can be based on the 3-rd and 4-th central moments (skewness and kurtosis), on regressions/correlations stemming from P-P and Q-Q plots or on distances defined using the empirical cumulative distribution functions. For this end. the Shapiro-Wilk test for normality was useful.

3.7.5. Heteroscedasticity/Homoscedasticity

It was important to check for heteroscedasticity. If the error variance is not constant, the data are said to be heteroscedastic. Since ordinary least-squares regression assumes constant error variance, heteroscedasticity causes the OLS estimates to be inefficient. Models that take into account the changing variance can make more efficient use of the data. Also, heteroscedasticity can make the OLS forecast error variance inaccurate since the predicted forecast variance is based on the average variance instead of the variability at the end of the series.

3.7.6. Multicollinearity

In statistics, multicollinearity (also collinearity) is a phenomenon in which one predictor variable in a multiple regression model can be linearly predicted from the others with a substantial degree of accuracy. In this situation, the coefficient estimates of the multiple regression may change erratically in response to small changes in the model or the data.

A value between 1 and 5 indicates moderate correlation between a given explanatory variable and other explanatory variables in the model, but this is often not severe enough to require attention.

3.7.7. Model 1: Binary Logistic Regression model for Ubudehe category

> **Sub hypothesis: Is Ubudehe a Catalyst of poverty reduction?**

This method is used to model categorical responses or variables in terms of possibly one or several explanatory variables. Logistic models have different forms such as; when there are only two possible outcome: binary response variables for dependent variables; multi-category versions that handle ordinal response and nominal response variables (Agresti, 2009). Under this study, Binary logistic regression models were used because the dependent variable has more than two categories when the independent variables were either continuous or categorical variables. Two categories were created in order to estimate the probabilities using income status for each household as dependent variable. We recorded as 1 if household is non-poor (combining

Ubudehe categories 3 and 4), and 0 if household is in poor category (combining Ubudehe categories 1 and 2).

The logistic regression model describes how the probability (poor/ non-poor) of a definite category depends on independent variables. A linear regression model is used for the logit transformation of the probability (it is the log of the odds).

The model which describes the probability of occurrence of an event is given in equation 1.

$$P_i = \frac{\exp(\beta_0 + \beta_1\chi_{1i} + \cdots + \beta_k\chi_{ki})}{1 + \exp(\beta_0 + \beta_1\chi_{1i} + \cdots + \beta_k\chi_{ki})}$$ *Equation 1: Binary Logistic Regression, Ubudehe categories*

In short, equation 1 can also equally be expressed as $P_i = \dfrac{Exp(\beta_i\chi_{ki})}{1 + Exp(\beta_i\chi_{ki})}$

From equation 1 we can estimate the odds ratios which are the exponential function of betas. It is the Odds ratio for having characteristics i versus not having it.

$$Exp(\beta_i\chi_{ki}) = \frac{P_i}{1 - P_i}$$ *Equation 2: Odds ration estimation*

Where β_i are regression coefficients and $i = 1, 2, 3, 4, 5, \ldots, k$

β_0 = Intercept

p_i = Probability of success of an event

$\chi_{ki} = k^{th}$ Variables on ith category

3.1.1.1.The maximum likelihood

Supposing that we have k independent observations y_1, y_k and that the ith observation can be treated as a recognition of a random variable Y_i that takes the values 0; 1……; n_i. If the n_i observations in each group are independent, and they all have the same probability π_i of having the attribute of interest, then the distribution of Y_i is binomial with parameters π_i and n_i, which we write $Y_i \sim B(n_i, \pi_i)$.

The probability distribution function of Y_i (Poor Category / Non-poor Category) is given by:

$$\Pr\{Yi = yi\} = \binom{ni}{yi} \pi_i^{y_i} (1 - \pi_i)^{n_i - y_i}.$$ *Equation 3: Probability distribution function*

Suppose further that the logit of the basic probability π_i is a linear function of the predictors.

$$\log it(\pi_i) = X_i' \beta$$ *Equation 4: Linear Function of the predictors*

Where X_i a vector of covariates and β is a vector of regression coefficients; thus, β_j represents the change in the logit of the probability associated with a unit change in the jth predictor holding all other predictors constant. With the exponentiation of equation 4 we find that the odds for the ith unit are given by

$$\frac{\pi_i}{1 - \pi_i} = \exp\{X_i' \beta\}$$ *Equation 5: Odds ratios - Likelihood function*

The likelihood function for n independent binomial observations being a product of densities given by equation 1. Taking logs we find that, except for a constant involving the combinatorial terms, the log-likelihood function is $\log L(\beta) = \sum \{y_i \log(\pi_i) + (n_i - y_i) \log(1 - \pi_i)\}$

Where π_i depends on the covariates X_i and a vector of P parameters β through the logit transformation of equation 1.

3.1.1.2. Model specification

The logistic model for k independent variables $(x_1, x_2, x_3, x_4, x_5, \ldots, x_k)$ is given as:

$$\log it(yi) = \log\left(\frac{p_i}{1 - p_i}\right) = \beta_0 + \beta_1 \chi_{1i} + \cdots + \beta_k \chi_{ki}, \text{ where } \chi_1 \cdots \chi_k \text{ are predictor variables.}$$

Predictors includes household's Accessibility, penetration and usage of financial services. Also, the model was regressed a second time introducing two intervening variables: Residence of the household and Gender of the household's head.

And P_i is the probability that the household is in non-poor or poor category. Then, *pi* is defined as the success or probability of being in non-poor category or being in poor category corresponding to the i^t observation. $\log\left(\frac{p_i}{1 - p_i}\right)$ *Is* the log odds ratio and $\left(\frac{p_i}{1 - p_i}\right)$ is the odds

ratio. The coefficients $\beta's$ are the parameters in the model. From the above equation, the probability p_i can be expressed as follows:

3.1.1.3. Model interpretation (Logistic Model)

The population proportion represents the probability P(yi=1), and P(yi=2) and this probability varies according to the values of the independent variables.

For the continuous variable (penetration in our study for instance), the parameters β_i indicate if the curve goes up or goes downward as χ_i increase. For $\beta > 0$, P(yi=1) increase as χ increases, $\beta < 0$, P(yi=1) decrease as χ increase and if $\beta = 0$ P(yi=1) does not changes.

The parameter β_0 is a constant term (or intercept) representing the nominal value of the log odds ratio. Thus, it is the value of the log-odds ratio when $\chi_1 = \chi_2 = \cdots \chi_k = 0$. Each of the parameters $\beta_i (i = 1, 2, \cdots, k)$ represents the change in the log-odds ratio per unit increase in the value of χ_i.

These can be modified to obtain values that represent the rate of change of the odds ratio $\dfrac{p_i}{1 - p_i}$ by taking log inverse of each of the $\beta_i's$. Thus $\exp(\beta_i), i = 1, 12\cdots, k$ represents the rate of change of the successes probability (p_i) corresponding to the ith observation over the probability of failure $(1 - p_i)$ corresponding to the ith observation. This means that:

Firstly, when $\exp(\beta_i) = a > 1$ then a unit change in χ_i would make the event (success) a times as likely to occur as its non-occurrence (failure).

Secondly, when $\exp(\beta_i) = 1$ then there exist 50% chances of the event occurring with a one unit change in the independent variable χ_i.

Lastly, when $\exp(\beta_i) < 1$ then one unit change in *Xi* leads to an event being less likely to occurs.A logistic regression model permits us to establish a relationship between a binary outcome variable and a group of explanatory variables. It models the logit-transformed (because logistic regression coefficients are reported as log odds) probability as a linear relationship with the predictor variables. Log odds are converted to normal odds using exponential function. The interpretation of the trend of relationship is thus interpreted between variables by looking at the signs of the regression or B coefficients. If the B coefficient is positive, then the relationship of this variable with the dependent variable is positive; if the B coefficient is negative, it means that

relationship is negative. Obviously, if the B coefficient is equal to 0 then there is no existence of any relationship between the explanatory variables and the dependent variable.

3.7.8.Model 2. Multiple Linear Regression model for Welfare category

Sub-Hypothesis: Is welfare category a catalyst of poverty reduction?

Secondly, to study the relationship between FI and poverty status in Rwanda, multiple linear regression model analysis will be performed. This is because poverty status is a categorical variable, which has an inherent ordering, that can't be accounted for using simple logit procedure, therefore ordered logit or multinomial logit which take into account such ordering has to be applied.

3.1.1.4. Model specification

The logistic regression model describes how the probability of a definite category depends on independent variables. A linear regression model is used for the logit transformation of the probability (it is the log of the odds).

Model 1: Multiple linear regression for Ubudehe category

$$Y_1 = ß_0 + ß_1x_1 + ß_2x_2 + ß_3x_3 + ß_4x_4 + ß_5x_5 + \mathcal{E}$$ *Equation 6: Multiple Linear Regression, Ubudehe categories*

Where by:

Y1: Ubudehe category

Y2: Welfare categories (evaluated in terms of household consumption)

X1= Accessibility

X2= Penetration/quality

X3= usage

X4= Gender

X5= Residence

ß0, ß1, ß2 … ß5: are the coefficients that are to be estimated for Equation 1 (Y1)***Model 2. Multiple linear Regression for Welfare categories***

$$Y_2 = \alpha_0 + \alpha_1x_1 + \alpha_2x_2 + \alpha_3x_3 + \alpha_4x_4 + \alpha_5x_5 + \mathcal{E}$$

 Equation 7: Multiple Linear Regression, Welfare categories

Whereby:

Y_2: Welfare categories (evaluated in terms of household consumption)

X_1= Accessibility

X_2= Penetration/quality

X_3= usage

X4= Gender

X5= Residence

$\alpha_0, \alpha_1, \alpha_2, ... \alpha_8$: are the coefficients that are to be estimated for Equation 2(Y_2)

ε: Error term

3.1.1.5. Interpretation of the regression

There was also a need to have information on the confidence to give in the accuracy of the coefficients as the truth guidance. To know this, it was important to check and report the p-values, which gave the confidence level right. As statistically known, if a coefficient has a p-value less than 0.05 is usually considered to be statistically significant.

Table 3: Expected influence of the used variables to total income

Variables	Expected signs	Expected impact
Accessibility	+	The higher the Accessibility of HH on financial services, the higher is the Annual Household Consumption
Penetration	+	The higher the Penetration of HH on financial services, the higher is the Annual Household Consumption
Usage	+	The higher the Usage of HH on financial services, the higher is the Annual Household Consumption
Intervening variable: Gender of HH head	+	High expectation of HH consumption if reference variable = Male
Intervening variable: Residence of HH	+	High expectation of HH consumption if reference variable = Urban

The following was also done. If the beta coefficient was found to be significant, the sign of the beta was examined. If the beta coefficient is positive, the interpretation is that for every 1-unit increase in the predictor variable, the outcome variable would also increase by the beta coefficient value. If the beta coefficient is negative, the interpretation is that for every 1-unit increase in the predictor variable, the outcome variable would decrease by the beta coefficient value.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1. Introduction

This chapter presents the index of Financial Inclusion in Rwanda, data description, analysis and discussed findings of the study based on scientific methods and procedures. The chapter acts on the EICV5 done in Rwanda and provides detailed results and empirical findings in the form of tables to show the estimated results for the relationship between financial inclusion and poverty reduction in Rwanda. The chapter further analyses and discusses the extent to which financial inclusion can Lower poverty in Rwandan economy. Findings are presented in appropriate forms using tables. For all results, discussions are made based on theoretical and empirical views.

4.2. Data analysis

In this part, we analyzed data normality, heteroscedasticity as well as descriptive statistics.

4.2.1. Normality

From the figure below, we see that the residuals only deviate slightly, therefore, we don't need to worry about transforming the response variable as regression is robust to departures from normality.

Figure 2: Normality
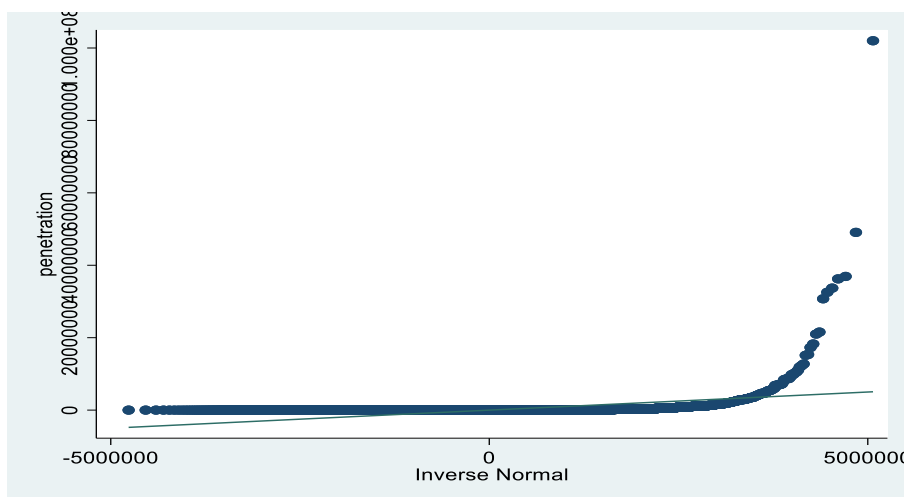
4.2.2. Homoscedasticity/Heteroscedasticity

We tested the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. Also, a large chi-square

would indicate that heteroscedasticity was present. We found the chi-square value very small, indicating heteroscedasticity being not a problem.

Table 4: Heteroscedasticity/Homoscedasticity

Fitting full model:						
Heteroskedastic linear regression ML estimation		Number of obs =			13,201	
		Wald chi2(3) =			171.88	
Log likelihood = -9441.658		Prob > chi2 =			0	

UBUDEHE category	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
accessibility	0.0807676	0.0089001	9.07	0	0.0633238	0.0982114
penetration	2.80E-08	3.36E-09	8.33	0	2.14E-08	3.46E-08
usage	0.0177558	0.009229	1.92	0.054	-0.0003328	0.0358443
_cons	0.3892647	0.0090152	43.18	0	0.3715952	0.4069342

The results in the table show the regression analysis inherent to the aspects that influence the effectiveness of financial inclusion on poverty reduction. As depicted in the table, it is indicated that accessibility and usage have a great contribution and strong relationship as they bear a shallow std with a strong correlation.

4.2.3. Correlation among variables

The table shows that a positive relationship exists between these variables. To sum up, each independent variable has positive relationship with the two dependent variables.

Table 5: Correlation Matrix of used variables

	HH consumption	UBUDEHE category	Accessibility	Penetration	Usage
Household consumption	1.0000				
UBUDEHE category	0.2007**	1.0000			
	0.0000				
Accessibility	0.2054**	0.0860**	1.0000		
	0.0000	0.0000			
Penetration	0.4736**	0.0784**	0.0844**	1.0000	
	0.0000	0.0000	0.0000		
Usage	0.0198*	0.0235**	0.0838**	0.0047	1.0000
	0.0170	0.0000	0.0000	0.5733	

*** Correlation is significant at the 0.01 level (2-tailed)*

Table 5 shows that there is a very weak positive and statistically significant correlation between Household consumption and ubudehe category(r=0.2007, p<0.01), very weak positive and statistically significant correlation between Household consumption and accessibility(r=0.2054, p<0.01), a weak positive and statistically significant correlation penetration (r=0.4736, p<0.01), …..

However, it is important to note that correlations may or may not always indicate causal relations. Reversely, causal relations from some variable to another variable may or may not result in a correlation between the two variables.

4.2.4. Descriptive statistics for variables

Table 6 provides a summary of descriptive statistics of households variables used in this research. The table shows the frequencies and percentages of categorical variables in households.

The study shows that out of the 14,580 households, only 25.5 percent were females and the majority were of them were between 21 and 40 years old (45.6%) followed by those between 41 and 60 years old (36%). As per the level of education, 79.9 percent attained primary school.

The research shows that 54.2 percent of the 14,580 households own a saving bank account while 45.8 percent of households don't have any. The results shows that, of the 9,586 household (65.8 percent of the sample) that tried to obtain a loan, 9,155 (95.5) managed to get it while 431 failed. The main reasons reported of their loan request denial being insufficient collateral (32.3%) and insufficient income (22.7%), unclear loan purpose (15.8%), credit history on loan record (3.2%) and other reasons sharing 26 percent.

In addition, 72.8 percent of households' owed money to a financial institution while 27.2 percent didn't. Furthermore, money transfer is mainly done using mobile phones (72.6%) compared to any other method used (27.4%).

Table 6: Descriptive statistics

Characteristics	Freq.	Percentage	Cum.
Gender			
Females	3,724	25.5	25.5
Males	10,856	74.5	100
Total	14,580	100	
Age			
<=20	113	0.8	0.8
21-40	6,647	45.6	46.4
41-60	5,259	36.0	82.4
61 =<	2,561	17.6	100
Total	14,580	100	
Education			
Primary and below	8,936	79.9	79.9
Post primary & Secondary	1,667	14.9	94.9
University	571	5.1	100
Don't know	4	0	
Total	14,580	100	
Have saving account			
Yes	7,899	54.2	54.2
No	6,681	45.8	100
Total	14,580	100	
Did household tried to obtain a loan			
Yes	9,586	65.8	65.8
No	4,994	34.3	100
Total	14,580	100	
Did household tried to obtain a loan but failed			
Yes	431	4.5	4.5
No	9,155	95.5	100
Total	9,586	100	
Reason why loan was denied			
Insufficient income	98	22.7	22.7
Insufficient collateral	139	32.3	55.0
Problems related to debts history	14	3.2	58.2
Unclear purpose of the loan	68	15.8	74.0
Other reasons	112	26.0	100
Total	431	100	
Other loan			
Yes	3,963	27.2	27.2
No	10,617	72.8	100
Total	14,580	100	
Money Transfer in/out by using telephone			
Other	2,900	27.4	27.4
Mobile	7,681	72.6	100
Ubudehe Category			
Category 1	2,318	15.9	15.9
Category 2	4,879	33.5	49.4
Category 3	5,973	41.0	90.3
Category 4	31	0.2	90.5
Not found on list	1,379	9.5	100
Total	14,580	100	
Welfare Category			
Severely poor	1,906	13.1	13.1
Moderately poor	2,931	20.1	33.2
Characteristics	Freq.	Percentage	Cum.
Non poor	9,743	66.8	100
Total	14,580	100	
Penetration		**RwF**	

Amount currently on the savings account	14,580	67,370
Amount deposited in last 12 months	14,580	46,712
Total received in last 12 months	14,580	34,652
Total contributed in last 12 month	14,580	4,086

Interestingly, Table 6 also shows the Ubudehe (as per the second review and classification of households) and Welfare categories among our sample.

Out of 14,580 visited households,

- 15.9 percent of them were in Category 1: made up of the very poor, those without a house but also unable to afford rent, and those who cannot afford food and other basic needs.
- 33.5 percent in Category 2: those with a dwelling of their own, or are able to rent one but rarely get full time jobs.
- 41 percent in Category 3: has those with jobs and farmers who go beyond subsistence farming to produce surplus which can be sold. It includes businessmen who can employ up to a dozen people.
- And only 0.2 percent in Category 4: has those who own large-scale businesses, individuals working with international organizations and industries as well as public servants.

In addition, welfare categories (computed from consumption data) showed 13.1 percent being severely poor, 20.1 percent as moderately poor whereas 66.8 percent were non poor.

Finally, descriptive statistics illustrates the average amount of the amount owned on saving account per household (Rwf 67,370), the average amount deposited in the last 12 months per household (Rwf 46,712), the total amount received in the last 12 months (Rwf 34,652) as well as the total contribution in the last 12 months (Rwf 4,086).

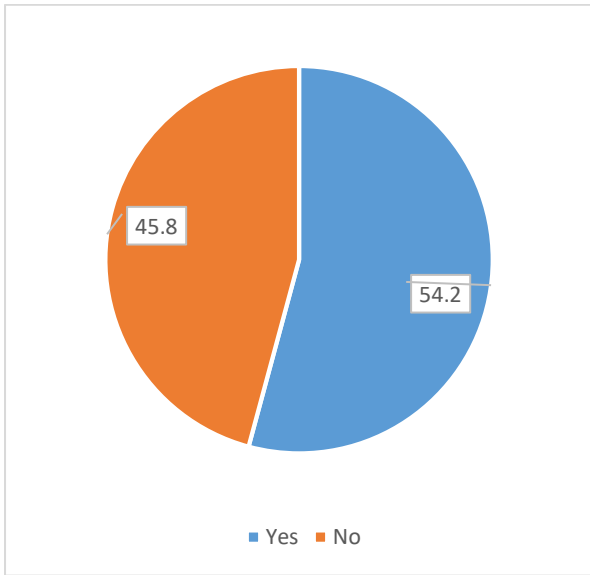**Figure 3: Percentage Households owning a saving account**

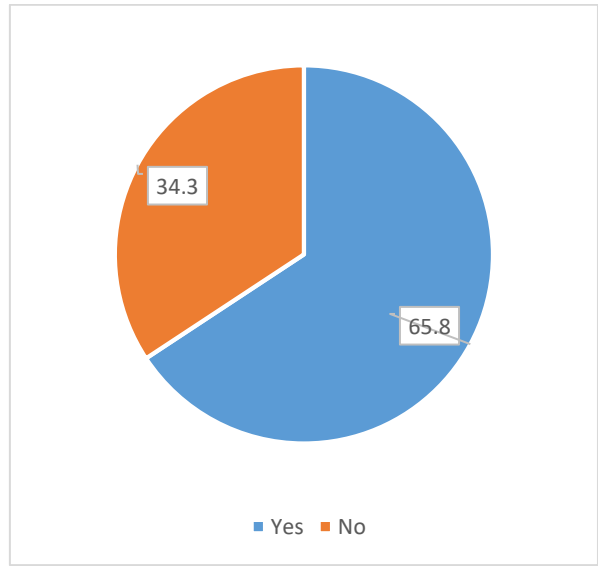**Figure 5: Percentage Households that tried to obtain a loan**

Figure 4: Percentage HHs that failed to obtain a loan (out of those who tried)
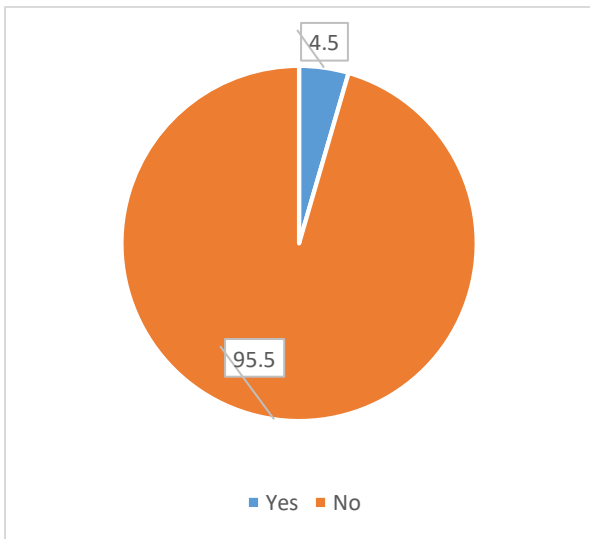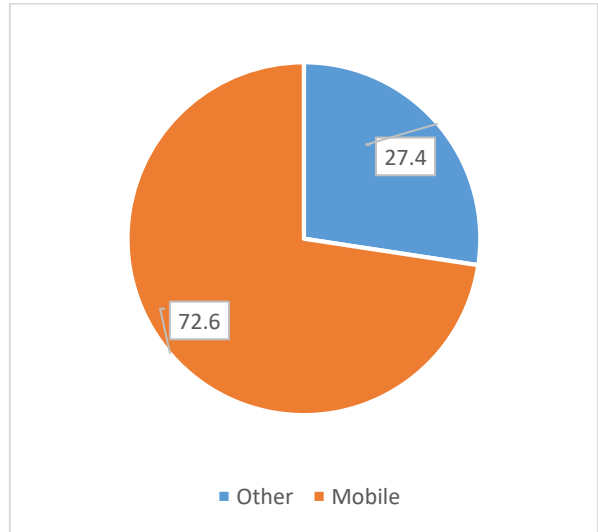

Figure 6: HHs that transferred in/out Money using telephone

The main reasons of not obtaining a loan being insufficient collateral 36.9 %. For the question regarding if there is other way rather than financial institution and formal saving group where household can send and receive money by using mobile phone, the findings displays that that 27.4 % of household had used money transfer either out or transfer in by using mobile phone.

Figure 7: Percentage distribution of Ubudehe categories within the sampled HHs
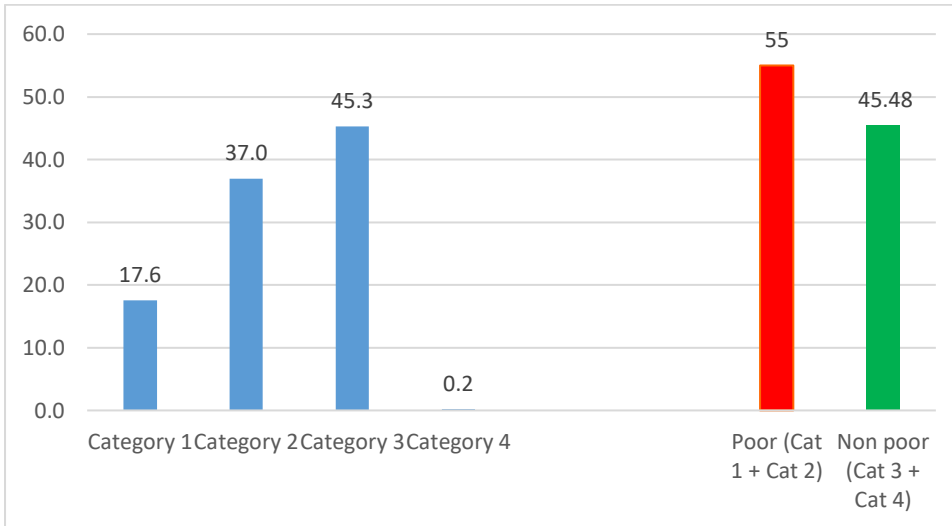
Figure 7 shows Ubudehe category of the sampled 14,580 households. Out of them, 55 percent of sampled households were poor whereas 45 percent were non-poor. Figure 8 shows the welfare categories of the same households due to household consumption.

Figure 8:: Percentage distribution of Welfare categories within the sampled HHs
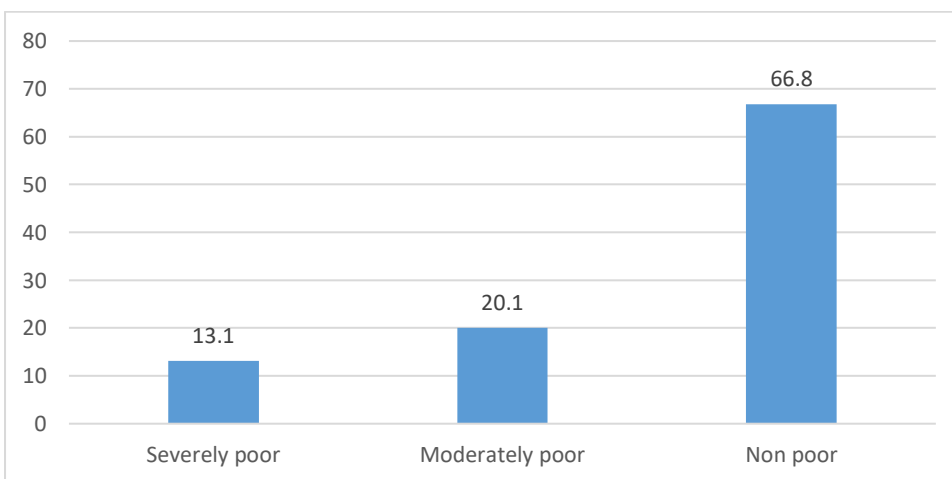
4.2.5. Measuring intervening variable of the study

The study sought to assess whether Residence of HH and gender are the factors that influence the financial inclusion of the households. The following table depicts the relevant regression analysis.

Table 7: Categorical characteristics of the intervening variables

Characteristics	Freq.	Percentage	Cum.
Residence			
Rural	12,054	82.67	82.67
Urban	2,526	17.33	100
Total	14,580	100	
Gender (HH head)			
Female	3,724	25.54	25.54
Male	10,856	74.46	100
Total	14,580	100	

Table 7 shows that out of the 14,480 households, 82.7 percent of them are rural residents while 13.3 percent are from the urban area. In addition, the majority of household's heads were males (74.5%).Normally, high rate of financial services depends on the civilization of households justified by the effective quality of life, the literacy of people and the environment where they live that reflects the accessibility of services. As the majority of households involved by the study live in rural areas, and the data show a moderate financial inclusion of house-holds it is noted that there have been effective inclusion and usage of financial services among the population of this study.

4.3. Empirical analysis

The factors influencing household poverty reduction were assessed through:

1. Binary Logistic Regression Model for Ubudehe Category
2. Binary Logistic Regression Model for Ubudehe Category with intervening variables
3. Multiple Linear Regression Model for Welfare Category
4. Multiple Linear Regression Model for Welfare Category with intervening variables

4.3.1. Binary Logistic Regression Model for Ubudehe Category (Y_1)

The first equation was regressed without any intervening variables.

Table 8: Binary Logistic Regression Model for Ubudehe Category (Y1)

Ubudehe category	Odds Ratio	Std. Err.	Z	P>z	[95% Conf.	Interval]
Accessibility	0.98	0.05	-0.54	0.591	0.8891	1.0693
Penetration	1.30	0.01	23.19	0.000	1.2708	1.3283
Usage	1.01	0.05	0.32	0.749	0.9287	1.1083
Constant	0.06	0.01	-23.7	0.000	0.0503	0.0795

Table 9: Multicollinearity of Y1 without intervening variables

Ubudehe category	VIF	1/VIF
Accessibility	1.01	0.986923
Usage	1.01	0.992846
Penetration	1.01	0.994009
Mean VIF	1.01	

The performed test indicates that all VIF are below 5, therefore, multicollinearity is not a problem in our regression model.

The regression model 1 is specified as follows:

Ubudehe category (Y_1) = 0.06 + 0.098 (Accessibility) + 1.30 (Penetration) + 1.01 (Usage)

Table 8 shows that households with financial accessibility are 0.98 more times to be non-poor compared to household with no financial accessibility. In addition, financial penetration increases by 1.30 more times for a non-poor household than a poor household. Finally, households with financial usage are 1.01 more times likely to be a non-poor household than household without financial usage to be in the non-poor category. To summarize, model 1 shows us that only penetration is statistically significant as its p-value is under five percent.

FI measured by penetration affect poverty reduction. However, the results of this study corroborate with the results in the study done by (Anwar&All, 2016) Investigated the role of financial inclusion in poverty reduction in Indonesia using descriptive statistical method. Reported that financial inclusion has negative effect on poverty reduction but has positive effect on investment, employment and economic growth and indirectly reduce poverty and income inequality.

In addition, the first equation was regressed with intervening variables (Gender and Residence of household head).

Table 10: Binary Logistic Regression Model for Ubudehe with intervening variables

Ubudehe category	Odds Ratio	Std. Err.	Z	P>z	[95% Conf.	Interval]
Accessibility	0.96	0.05	-0.93	0.355	0.8708	1.0509
Penetration	1.24	0.01	18.4	0.000	1.2139	1.2713
Usage	1.03	0.05	0.53	0.595	0.9356	1.1231
Residence	1.64	0.10	8.15	0.000	1.4588	1.8526
Sex	2.35	0.12	17	0.000	2.1280	2.5908
constant	0.05	0.01	-24.72	0.000	0.0380	0.0615

Table 11: Multicollinearity of Y1 with intervening variables

Ubudehe	VIF	1/VIF
Residence	1.06	0.942778
Accessibility	1.04	0.960708
Usage	1.03	0.970168
Penetration	1.02	0.977576
Sex	1.01	0.992107
Mean VIF	1.03	

The performed test indicates that all VIF are below 5, therefore, multicollinearity is not a problem in our regression model.

The regression model is specified as follows:

Ubudehe category (Y_1) = 0.05 + 0.096 (Accessibility) + 1.4 (Penetration) + 1.03 (Usage) + 1.64 (Residence) + 2.35 (Gender of HH head)

Table 10 shows that households with financial accessibility are 0.96 more times to be non-poor compared to household with no financial accessibility. In addition, financial penetration increases by 1.24 more times for a non-poor household than a poor household. Finally, households with financial usage are 1.03 more times likely to be a non-poor household than household without financial usage to be in the non-poor category.

Moreover, all other factors equal to zero, a household headed by a male has 2.35 more times likely to be a non-poor household than a household headed by a female. Also, a household resident in urban area has 1.64 more times likely to be a non-poor household than a rural resident household.

To summarize, model 1 with intervening variables shows us that only penetration, residence and gender of HH head are statistically significant at 95 percent of confidence level.

4.3.2. Regression Results Model 2 of Welfare Categories (Y_2)

Moreover, the second equation was regressed with and without any intervening variables.

Table 12: Multiple Linear Regression Model for Welfare Category

Household consumption	Coef.	Std. Err.	T	P>t	[95% Conf.	Interval]	Sig
Accessibility	828,817.6	35,956.01	23.05	0.000	758,000.000	899,000.000	***
Penetration	0.9	0.014	63.92	0.000	0.841	0.895	***
Usage	19,068.6	37,153.49	0.51	0.608	-53,800.000	91,894.099	
Constant	794,680.1	36,047.07	22.05	0.000	724,000.000	865,000.000	***

*** *p<0.01, ** p<0.05, * p<0.1*

Table 13: Multicollinearity of Y2 without intervening variables

Consumption	VIF	1/VIF
Residence	3.13	0.31933
Accessibility	2.74	0.364675
Usage	1.35	0.74015
Mean VIF	1.87	

The performed test indicates that all VIF are below 5, therefore, multicollinearity is not a problem in our regression model.

The regression model is specified as follows:

The estimate Welfare category $(Y_2) = 794,680.1 + 828,817.6$ (Accessibility) $+ 0.9$ (Penetration) $+ 19,068.6$ (Usage)

All the explanatory variables except "Usage" were significant as at 99 percent confidence level (p-value is less than 1%), also significant at 95 and 90 percent confidence level. We can therefore confirm that there was enough evidence to reject the null hypothesis that financial inclusion is not a Catalyst for poverty reduction in Rwanda. Thus, confirming that accessibility and penetration of financial inclusion are associated with categories of Ubudehe.

All the coefficients are positively correlated with household consumption, indicate that the three explanatory variables influence positively on the level of Welfare category. Holding all explanatory variables zero, a household in a severely poor category without any financial

- Intercept is positively correlated with the level of household consumption and is statistically significant at 99, 95 and 90 percent confidence level. Holding all other factors constant, a non-poor household consumes 794,680.1 Rwandan Francs in a period of 12 months;

- Accessibility is positively correlated with the level of household; meaning that the higher the accessibility, the higher the level of household consumption in a year; also, accessibility is statistically significant at 99, 95 and 90 percent level of confidence. Holding all other factors constant, a non-poor HH consumption would be (794,680.1+ 828,817.6) Rwandan Francs per 12 months;

- Penetration is positively correlated with the level of household; meaning that the higher the penetration, the higher the level of household consumption in a year; also, penetration is statistically significant at 99, 95 and 90 percent confidence level. Consumption of a non-poor HH will increase by 90 Rwandan Francs as penetration increases by 100 units holding Accessibility, usage and other factors constant;

- Usage is positively correlated with the level of household; however, not statistically significant at 99, 95 and 90 percent confidence level, therefore would not add significantly on the annual household consumption. Holding other factors constant, a non-poor HH consumption would only be (794,680.1 + 19,068.6) Rwandan Francs per 12 months;

In addition, the first equation was regressed with intervening variables (Gender and Residence of household's head).

Table 14: Multiple Linear Regression Model for Welfare Category with intervening variables

Household consumption	Coef.	Std. Err.	T	P>t	[95% Conf.	Interval]	Sig
Accessibility	602,462.7	34,707.945	17.36	0.000	534,430.7	670,494.70	***
Penetration	0.8	0.013	61.28	0.000	0.78	0.83	***
Usage	186,222.1	35,810.473	5.20	0.000	116,029.00	256,415.20	***
Residence	1,695,814.0	45,311.751	37.42	0.000	1,606,997.00	1,784,631.00	***
Gender HH head	393,047.64	38,232.234	10.28	0.000	318,107.50	467,987.60	***
Constant	244,313.58	43,651.798	5.60	0.000	158,750.00	329,876.60	***

*** p<0.01, ** p<0.05, * p<0.1*

Table 15: Multicollinearity of Y2 with intervening variables

Consumption	VIF	1/VIF
Residence	1.07	0.937489
Accessibility	1.04	0.958221
Usage	1.03	0.967951
Penetration	1.03	0.974775
Sex	1.01	0.991776
Mean VIF	1.04	

The performed test indicates that all VIF are below 5, therefore, multicollinearity is not a problem in our regression model.

The regression model is specified as follows:

Welfare category (Y_2) = 244,313.5+ 602,462.7 (Accessibility) + 0.08 (Penetration) + 186,222.1 (Usage) + 1,695,814.0 (Residence) + 393,047.6 (Gender of HH head).

All the explanatory variables were significant as their respective p-values were less than 5%. Therefore, there was enough evidence to reject the null hypothesis that financial inclusion is not a Catalyst for poverty reduction in Rwanda. Thus, confirming that accessibility, penetration of financial inclusion with gender and residence intervention are associated with categories of Welfare.

All the coefficients are positively correlated with household consumption, indicate that the three explanatory variables and the two intervening variables influence positively on the level of Welfare category.

- Accessibility is positively correlated with the level of household; meaning that the higher the accessibility, the higher the level of household consumption in a year; also, accessibility is statistically significant at 99, 95 and 90 percent level of confidence. Holding all other factors constant, a non-poor HH consumption would be (244,313.5 + 602,462.7);

- Penetration is positively correlated with the level of household; meaning that the higher the penetration, the higher the level of household consumption in a year; also, penetration is statistically significant at 99, 95 and 90 percent level of confidence. A non-poor HH Consumption will increase by 80 Rwandan Francs as penetration increases by 100 units holding Accessibility, usage and other factors constant;

- Usage is positively correlated with the level of household; meaning that the higher the Usage, the higher the level of household consumption in a year; also, usage becomes statistically significant at 99, 95 and 90 percent level of confidence when intervening variables (Gender and Residence of HH head) are introduced in the model. Holding other factors constant, a non-poor HH consumption would be (244,313.5 + 186,222.1);

- Holding all other factors constant, a household in urban area, a non-poor HH consumes (244,313.5 + 1,695,814.0) Rwandan Francs in 12 months;

- Holding all other factors constant, a non-poor household headed by a male, consumes (244,313.5 + 393,047.6) Rwandan Francs in 12 months;

CHAPTER FIVE

SUMMARY, CONCLUSIONS & STUDY SUGGESTIONS

5.1. Introduction

This last chapter begins with the summary of key findings of the study which was tackled on the objectives of this study. The chapter also provides the conclusions, and suggestions of the study. The last part of this chapter proposes future research directions.

5.2. Summary

This section offers a summary of very important outcomes on the financial inclusion and finally the relationship between financial inclusion and poverty reduction in Rwanda.

To measure financial inclusion, three variables were used such as accessibility, penetration and usage. The following measure was used to measure poverty reduction based on the EICV5, Ubudehe level and household welfare. The summary on the three objectives that were developed are indicated in the following

5.2.1. Objective 1: To assess the level of financial inclusion in Rwanda

The univariate analysis shows that out of the used sample of 14,580 households, the majority of them (54.2%) own a saving account. However, it is important to note that out mentioned sample, 65.8 percent of households had at least one member who had tried to obtain a loan in the last 12 months, in which 95.5 percent got a loan, compared to the result obtained from EFInA (2018) access to finance in Nigeria, whereby in 36.9 million (38.3% of the adult population) have access to bank account.

5.2.2. Objective 2: To enumerate and indicate the factors that contribute to financial exclusion

The most reported reasons were: insufficient collateral declared by 23.3% of sampled households, followed by household member insufficient income (22.7%), unclear loan purpose (15.8%), credit history on loan record (3.2%) and other reasons sharing 26 percent this resonate to what Norman, et, al. (2016) mentioned that in Zimbabwe (11%)has no habit of savings, (22%) have poor literacy ,(13%) have low disposal and affordability.

5.2.3. The third objective was to assess the relationship between FI and poverty reduction

Correlation analysis between the variables was done and moreover, binary regression analysis and multiple regression analysis were performed using the mentioned variables(which) as independent variables with and without intervening variables (residence of the household and gender of the household's head) to better understand factors influencing the reduction of household poverty in Rwanda Relationship between independent variables and the two dependent variables. The highest positive correlation was observed between household consumption and penetration (0.5), suggesting the amount of money currently on the saving account, or the amount of money contributed, deposited or received on the saving account in the last 12 months contributed positively on the household welfare depending on the level of household consumption. Moreover, the following correlation in order is between HH consumption and one intervening variable –residence of household- (0.3) suggesting an existing slight difference welfare of households depending on their residence (between rural and urban household). As well as between HH consumption and accessibility (0.2) showing the importance of owning a bank account or any other formal saving account to transfer in or out money using mobile money technology on household's welfare category.

Binary Logistic Model was performed to study the effect of FI on the level of household Ubudehe level of poverty. Only Penetration was statistically significant as its p-value is under five percent in both models (with or without intervening variables). Moreover, all other factors equal to zero, a household headed by a male has 2.35 more times likely to be a non-poor household than a household headed by a female. Also, a household resident in urban area has 1.64 more times likely to be a non-poor household than a rural resident household.

Multiple Linear Regression was performed to assess how financial inclusion that was measured by accessibility, penetration and usage influencing poverty reduction that was measured by household annual consumption (welfare category) in Rwanda. The first model showed enough evidence to confirm that only penetration financial services are associated with categories of Ubudehe. All the coefficients were positive, indicate that the three explanatory variables influence positively (although not significantly for Accessibility and Usage) the level of households Ubudehe category. The second model regressed accessibility, penetration and usage against household welfare which was evaluated depending on the level of household consumption. The model showed enough evidence to confirm that accessibility, penetration and usage of financial inclusion are associated with the level of household welfare in Rwanda. All the coefficients were positive, indicate that the three explanatory variables influence positively

household welfare category. The same results were observed when intervening variables (residence and gender) were introduced in the model. This contradict with what Takeshi (2019) found that in India financial inclusion and deepening have statistically significant negative relationships with the poverty ratio for public sector banks, but not for private sector banks. In addition, the coefficients of the interaction term between financial inclusion and deepening are estimated to be negative and statistically significant in most cases of public sector banks. Considering the positive impacts of financial inclusion and deepening on poverty reduction, this result implies that promoting breadth and depth of public sector banks could have a synergistic effect on poverty reduction in India.

5.3. Conclusion & Policy Implication

The objectives of the study were to assess the level of financial inclusion and the reasons behind financial exclusion, as well as the relationship between financial inclusion and poverty reduction in Rwanda. Primary data collected from 14,580 households from 4 provinces and the city of Kigali were used in this research. Different findings from descriptive statistics, binary logistic and multiple regression analyses were identified, to assess the factors influencing the level of households UBUDEHE categories and Welfare levels.

The results of the study revealed that

- Penetration was more correlated with household consumption, suggesting that the amount of money currently on the saving account, or the higher the amount of money contributed, deposited or received on the saving account in the last 12 months the higher the household welfare because of the level of household consumption. Most Rwanda's rural poor are smallholder farmers ;appropriate financial services to manage their money and their income in order to improve their consumption, resilience and business development should be designed.

- Accessibility on financial services is high, with 54.2 percent of sampled households holding a saving account and 83 percent owning any other formal saving account. In addition, 72.6 percent transferred money in or out by using mobile banking. The government should encourage financial institutions to continue to take advantage of all the financial inclusion policies of the government in mobilizing funds from the informal sector into the banking system and this can be best done by increasing the number of customers within the financial system.

- Usage is high if considering those who tried to obtain a loan (65.8%). The study also assessed the reasons of not obtaining a loan. The results showed that most reported reasons were: insufficient collateral declared by 21.2% of sampled households, followed

by household member insufficient income (21.2%), unclear loan purpose (14.3%), credit history on loan record (2.6%) and other reasons sharing 25 percent. The cost of using financial services including interest on loans should also be minimized especially the agricultural sector as this indirectly increases the cost of purchasing food items and hence higher cost of living and lower living standards.

The obtained results from the Binary Logistic Model and Multiple Linear Regression showed that penetration is a very important catalyst of poverty alleviation. In addition, accessibility and usage can be very useful to enhance the level of household consumption if gender of household head and residence of the household are considered as factors in financial inclusion.

5.4. Suggestions for further studies

The findings helped us to draw new policies to understand factors influencing poverty reduction through financial inclusion. We can thus suggest that researchers continue to explore:

-The obtained results from the Binary Logistic Model and Multiple Linear Regression showed that penetration is a very important catalyst of poverty alleviation and not usage and accessibility. Therefore, this study suggests that policy makers should pay particular attention to increase households' capability as far as accessibility and usage are concerned;

- With regard to the minimization of financial exclusion, policy makers should emphasize on policies alleviating eligibility conditions to access on formal financial services for those who have insufficient collateral;

- Using secondary data presented some limitations, thus a suggestion for the next researcher in the area to collect primary data for better analysis.

REFERENCES

Abor,G.; Sharma, S., Henriques, I.,. (2018). Financial Incusion and Economic growth:. *what do we know?*, Vol 3,7-8.

AfDB. (2013). *Financial Inclusion in Africa.* Tunis: Thouraya Triki Issa Faye.

AFI. (2012). *The financial inclusion data working group and the mexican experience.* Malaysia: Alliance for financial inclusion,Vol4,103-111

AFI. (2014). *Rwanda's financial inclusion success strory.* Malaysia: Alliance for financial inclusion.

Agresti,U. (2009). *Statistical Methods for the Social Sciences, 4th Edition.* Florida: University of Florida.

Allenl, F.; Wandera, D.; Naku, C.; and Afrane,P. (2012). *The Foundations of Financial Inclusion:understandig ownership and use of formal accounts.* washington DC: world bank .

Altaf, N. (2014). *Towards FInancial Inclusion.* semantic scholar.,Bulletin of economic Reserch,Vol 2,77-92

Anderloni, F. (2007). *Access to Bank Accounts and Payment Services.* SpringerEditor: Anderloni L. Braga M.D. Carluccio E.ISBN: 9783540464976.

Andrianavo, F. (2011). *Financial Inclusion and Growth:Evidence from African Countries.* washington DC: International monetary fund.

Anwar, I.; Yanarella, E.J., Bartilow, H. (2016). The Role of Financial Inclusion to Poverty Reduction in Indonesia. *IOSR Journal of Business and Management (IOSR-JBM)*, Vol 6, 37-39. DOI

Arestis,Y. (2012). Financial Development and Economic Growth: Assessing the Evidence. *The economic journal*, 783-799. DOI

Arikewuyo, K. (2013). Financial exclusion in Nigeria.

Arulmurugan, T. (2013). Financial Inclusion in India. *A theoritical assessment*, volume 9 39–46.DOI

Ayana,J,;Martinez. (2014). *International remittances and financial inclusion in Sub-Saharan Africa.* Washington DC: World Bank Group.

Beck&Al. (2014). *Financial Inclusion and Inclusive Growth - World Bank.* Washington DC: World bank.

Beck, R,; Sirus,J,M,; Martin,.(2000). Finance and the Sources of Growth. *Journal of financial economics*, Vol7, 261-300.DOI

Bhagwati,P,; Yuklet,S,; Chuus, Y. (2014). *Why Growth Matters: How Economic Growth in IndiaIndia Reduced Poverty and the Lessons for Other Developing Countries.* New york: Publicaffairs.

Bhoomika,L. (2014). Financial Inclusion And Rural Development. *Journal of commerce*, Vol1-7 DOI

CGAP, D. (2015). *National Survey Report.* Washington DC: Intermedia.

Chakrabarty,R. (2013). Financial inclusion in India –. *Journey so far and way*,Vol 1-5. DOI

Chandran, A.; Aga, D. A., Noorderhaven, N., & Vallejo, B. (2016). Financial inclusion and inclusive growth:a cross-province analysis in indonesia. *SSRN Electronic journal*, Vol 1-12. DOI

Chauvet, J. (2016). Financial Inclusion and firm performance. *Financial Inclusion, Bank Concentration and*, Vol 5-6. DOI

Chibuzo, P.D. (2018). The effects of financial inclusion on poverty reduction: The moderating effects of microfinance. *International Journal of Multidisciplinary Research and Development*, Vol 3,188-198. DOI

Dabla-Norris Barasa, F.; Jelagat, T. (2010). *Firm Productivity,innovation and Financial Development.* washington DC: International monetary fund.

Demetriades. (1996). Does Financial Development cause Economic Growth?Time Series evidence From 16 countries. *Journal of Development Economics*, Vol 2, 387-411. DOI

Demirguc, F.R.:Gerard, M.H. (2013). Measuring Financial Inclusion Explaining Cariation Across and Within Countries. *brooking papers on economic activity*, Vol3, 279-340. DOI

Demirguc, K. T. (2012). *Measuring Financial Inclusion:The Global Findex Database.* Washington DC: World Bank.

Fadun, U.(2014). *Financial Inclusion,Tool for Poverty Alleviation and Income Redistribution inDevelopping countries:Evidences from Nigeria.* california: Academic Research International.

Fafchamps, T.. (2013). *Local Financial Development and Firm Performance.*

FinScope, K.(2016). *Financial inclusion in Rwanda.* kigali: Access to Finance Rwanda.

FinScope, K(2020). *Financial Inclusion in Rwanda.* Kigali: Access to Finance Rwanda.

Gebremarian&All. (2004). *The role of small business in economic growth and poverty.* virginia: west virginia university.

Ghatak, U. (2013). *Demand Side Factors Affecting Financial Inclusion.* Bangalore: Christ University Institute of Management.

Global Findex, W. (2019). *Global findex database, globalfindex. Retrieved 2019-12-06.* Washington DC: Wolrd Bank.

Graff, R. (2002). Causal Links Between Financial Activity and Economic Growth: Empirical Evidence from a Cross–Country Analysis, 1970–1990. *Bulletin of Economic Reaserch*, pages 119-133.

GSMA. (2014). *Sub-Saharan Africa Mobile Economy* . Washington DC: GSMA Intelligence.

GSMA. (2018). *Mobile Economy Sub-Saharan Africa 2018.* Washington DC: GSMA Intelligence.

Honohan. (2008). Cross-Country Variation in Household Access to Finance Services. *Journal of banking and finance*, Vol3, 2493-2500.

Jalilian&All. (2007). Does Financial Development Contribute to Poverty Reduction. *The journal of development studies volume* , Vol 2,636-656. DOI

James&All. (2011). Finance and growth in Africa: The broken link. *Economic letters*, pages 263-265.

Jensen. (2010). Value Maximization, Stakeholder Theory, and the Corporate Objective Function. *journal of applied corporate finance*, 4, 32-42. DOI

Jensen&All. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of financial economics volume 3,issue4* , Vol 4,305-360. DOI

Kagan, J. (2019). *Financial technology and automated investing -Fintech.* Washington DC: World bank.

Kalunda, M. (2014). *Financila inclusion-Impact in Small Scale Tea Famrers in Nyeri County, Kenya.* Nyeri: World Journal of Social Sciences.

Khan, P. (2011). *Financial inclusion and financial stability: are they two sides of the same coin?* New Delhi: Reserve Bank of India.

King, L. (1993). Finance and Growth:. *Schumpeter Might Be Right*, Vol3, 17-37. DOI

Kings, L. (1993). Finance and Growth. *Schumpeter must be right*, Vol6, 717-737. DOI

Klapper. F,; Labuschagne, C.; Brent, A.C. l. (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation*, Vol3, 1-30. DOI

Levin, R. (2004). Denying Foreign Banking Entry:Implication for Bank interest margin. *mplication for Bank interest margin*, Vol 4,6-9. DOI

Levine, L.; Brent, A.C., (1999). Bank-based and market-based financial systems:Cross-Country Comparisons. *Finance, Development Research Group*, pages 70.

McDysan. (1998). *ATM theory and applications.* New York : Mcgraw hill companies.

McKinsey&Co. (2010). *Global Financial Inclusion Fall 2010:Achieving full financial inclusion at the intersection of social benefit and economic sustainable.* washington DC: Tony Goland.

Mohd-Sanusi, Z. (2014). *Money Laundering Risk Assessment by Investment Bankers.* Bangkok: Universiti Teknologi MARA.

Nanda,S. (2016). Financial Inclusion and Human Development: . *A Cross-country Evidence Managment of labour studies*, Vol 4, 127-153. DOI

NISR. (2015). *EICV4.* Kigali: NISR.

Nitin, O. (2013). *Financial Inclusion and its determinants:evidence from India.* New delhi: Journal of Financial Economic Policy 5(1).71-77, DOI

Nwankwo. (2014). *Sustainability of Financial Incusion to Rural Dwellers in Nigeria:Problems and Way Forward.* Nigeria: Research journal of finance and accounting.

Nyasha, T.C. (2014). Bank Based Financial Development and Economic growth. *Journal of Financial Economic Policy 6(2)*, 112-132.

Ogunsakin , Z.M. (2017). Financial Inclusion as an Effective Policy Tool of Poverty Alleviation:A case Study of EKITI State. *IOSR Journal of Economics and Finance (IOSR-JEF)*, pages 1-10.

Olokoyo, B. (2018). *Financial Inclusion as a Catalyst for Porverty Reduction In Nigeria.* Ogun: International Journal of Scientific Research and Management (IJSRM) .

Onuonga, S.(2014). Financial Development and Economic Growth in Kenya: An Empirical Analysis 1980–2011. *International Journal of Economics and Finance*, 1-80.

Prahalad, H.j.. (2002). *Serving The World's Poor,Profitably.* Havard: Havard Business review.

Priya, N. (2006). *Improving Access to Finance for India's Rural Poor.* Washington DC: World Bank.

Ravillon,Y. (2016). Global Poverty and Poverty Reduction Strategies. *journal of economic inequality*, 227-248. DOI

Reagan, L.. (2003). *Beyond Bank Accounts:Full Financial Inclusion.* London: Institute for Public Policy Research.

Rioja,R (2004). Finance and the Sources of Growth at Various Stages of Economic Development. *economic inquiry*, vol 5,127-140. DOI

Rousseaux.Z.D. (1998). Financial Intermediation and Economic Performance: Historical Evidence from Five Industrialized Countries. *Journal of money credit and banking*, Vol 9,57-78. DOI

Sarma, N. (2008). *Index of Financial Inclusion.* New delhi: semantic scholar.

Sarma,N. (2011). Fnancial inclusion and development. *journal of interantional development*, Vol3,613-766. DOI

Sarma, N. (2012). *Index of financial Inclusion.* Berlin: competence centre on money,trade,finance and dvelopment.

Sarma, G. (2008). Financial Inclusion and Development:. *A Cross Country Analysis*, 8-21.

Shahul, K. (2014). Financial Inclusion-Issue in measuement and Analysis. *interantional journal of current researchand academic review* , Vol 4,116-124. DOI

Shankar, K. (2013). Financial Inclusion in India:. *Do Microfinance Institutions Adress Access Barriers?*, Vol 3, 60-74. DOI

Shilling, M. (2021, January). *2021 banking and capital markets outlook:Strengthening resilience, accelerating transformation.* Kansas: Deloitte.

Shivani, M. (2013). A study on banking penetration in financial inclusion "with special reference to Tamilnadou". *volume -5,issue-1*, Vol 6, 37-44. DOI

Suryanarayana, T. (2008). *What is Exclusive About :Inclusive Growth.* India: SSRN.

Thyagarajan, T.C. (2008). *Cost-Benefit and Usage Behaviour Analysis of No Frills Account:A Study Report on Cuddalore District.* India: center for micro finance.

Umar, S. (2017). *Financial inclusion, economic growth, and poverty alleviation:.* Nagoya: Nagoya University.

UMAR, Y.; Harvey, G.M. (2013). *The Role of SHGS in Financial Inclusion -A case study.* New delhi: international journal of scientific and research publication.

UNCDF. (2020). *Financial Inclusion and the SDGs.*

UNCTAD. (2014). *Word Investment report 2014.* Geneva: United Nations Conference on trade and development.

UNICTAD. (2014). *Empretec annual report.* Washington DC: United Nations Conference on Trade and development.

Vijay, O. (2018). Debt and Vulnerability:. *Indebtedness,Institutiona and Smallholder Agricutlure in South India*, Vol 7,1286-1307. DOI

Vishnu, K. (2009). *Financial Inclusion In India.* New delhi: Atlantic Int'L University.

Vivekanandan, T. (2013). *Financial Inclusion in India a Path towards Inclusive Economic Growth.* New delhi: SSRN.

WB. (2000). *Attacking Poverty.* New york: World Bank oxford university press.

WB. (2007). *Inclusion Matters.* Washington: The foundation of shared prosperity.

WB. (2008). *Finance for ALL.* Washington DC: World Bank.

WB. (2014). *Measuring financial inclusion around the world.* Washington DC: The global findex database.

WB. (2015). *Financial Inclusion Insights.* Washington DC: World Bank.

WB. (2015). *World Development Report.* Washington DC: World Bank.

WB. (2018). *FInancial Inclusion.* Washington DC: World Bank.