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FINANCIAL INCLUSION AND POVERTY REDUCTION IN SUB-SAHARAN AFRICA

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DECLARATION

I do hereby declare that this thesis is the result of my own research and has not been presented by anyone for any academic award in this or any other University. All references used in this work have been accordingly acknowledged.

I bear sole responsibility for any shortcomings.

…… ……

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CERTIFICATION

I hereby certify that this thesis was supervised in accordance with procedures laid down by the University.

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DEDICATION

To

My uncle, Alhaji Iddi Lansah Seidu,

To

His Wife, Hadjia Fauzia Fuseini and

To

Their four lovely children

Suhyuni, Pumaya, Namzooya and Tipaya

I love you all

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LIST OF ACRONYMS/ABREVIATIONS

AfDB	African Development Bank
AFI	Alliance for Financial Inclusion
ATE	Average Treatment Effect
ATT	Average Treatment on the Treated
ATU	Average Treatment on Untreated
CGAP	Consultative Group to Assist the Poor
EAP	East Asia and Pacific
ECA	Europe and Central Asia
FEVDM	Fixed Effect Vector Decomposition Model
FI	Financial Inclusion
FIDWG	Financial Inclusion Data Working Group
GDP	Gross Domestic Product
GFDR	Global Financial Development Report
HPI	Human Poverty Index
IMF	International Monetary Fund
LAC	Latin America & Caribbean
LBFI	Little Book of Financial Inclusion
ME	Marginal Effects
MPI	Multi-dimensional Poverty Index
NGOs	Non-Governmental Organizations
OLS	Ordinary Least Squares
PSM	Propensity Score Matching
SA	South Asia
SSA	Sub-Saharan Africa
UNDP	United Nations Development Programme
WB	World Bank

ABSTRACT

Financial inclusion is believed to favour mainly low-income groups such as the poor. Despite the proposition in theoretical literature that financial inclusion can bring a lot of welfare benefits to the poor, empirical investigation to that effect is rather scant (little). Using 35 countries and almost 35,000 individuals, this study explored determinants as well as the effect of financial inclusion on poverty reduction in Sub-Saharan Africa. We employed Treatment Effects version of the Heckman Sample Selection Model and Propensity Score Matching (PSM) for robustness checks. The results of the probit models show that high education, high income level, age, informal borrowing such as borrowing from employers and money lenders significantly influence financial inclusion. However, the results suggest that females are less likely to be financially included than their male counterparts. The results of the Treatment Effect Model reveals that those who are highly educated, whose relative owns an account, and those who have other sources of funds such as (family/friends, employers and money lenders) are less likely to be poor. However, being a female and borrowing from stores are less likely to reduce poverty. The net wealth benefit derived from financial inclusion (thus use of accounts, savings, withdrawals and access to credit) significantly reduces poverty. Verifying the "Treatment Effects" using the PSM, we find that financial inclusion has a larger welfare benefit for the poor than their non-poor counterparts in all the financial inclusion indicators we used. Since financial inclusion is found to have a significant poverty reducing effect, we recommend that governments of Sub-Saharan African countries should mainstream financial inclusion in their poverty reduction strategies and programmes.

CHAPTER ONE

INTRODUCTION

This Chapter presents the background of the study, the problem statement, and the objectives of the study, the research questions and hypothesis. It also discusses the significance of the study, scope, limitations and organization of the study.

1.1 Background of the Study

Globally, Africa is set to be the world's second fastest growing continent after Asia, with an average annual Gross Domestic Product (GDP) growth rate in excess of 5% over the last decade (AfDB, 2013). Despite the tremendous growth the region has recorded in the last decade, the benefits of such impressive macroeconomic growth are not widely or near evenly spread among the countries in the continent. Majority of Africans still wallow in abject poverty, thus, poor standard of living and livelihood. According to World Bank (2013) report on poverty, 48% of Sub-Saharan African people still live on less than $1.25 per day. As a principle of equity and social justice, growth has to be inclusive to be socially, economically and politically sustainable. One sure way of inclusive development is financial inclusion, an area in which Africa is largely lagging behind other continents (World Bank, 2013, AfDB, 2013). However, research has established that less than one out of every four adults in Africa has access to an individual account at any formal financial institution (Demirgüç-Kunt & Klapper, 2012). In addition, less than a quarter of the adult population in Sub-Saharan Africa owns bank account (Demirgüç-Kunt & Klapper, 2012).

According to the latest World Bank (2013) report on poverty, there are still around 2.5 billion adults in the world who are financially excluded, meaning they have no savings or access to credit and other financial services. The report added that almost 80 percent of them live on less than $2 a day. The report documents that savings and payments are strongly linked to

poverty reduction. It stressed that access to credit, insurance, savings, and payments opens up economic opportunities for the bottom 40 percent to increase their incomes sustainably. The report adds that women in particular can benefit from financial inclusion initiatives, as they are more excluded than men from formal financial services (World Bank, 2013). To this end, the president of the World Bank, Jim Yong Kim, has expressed optimism to achieving universal financial access by 2020. This is a crucial attempt to recognize the important role of financial inclusion for economic growth and alleviation of poverty (World Bank, 2014).

Furthermore, Global Financial Inclusion Findex data for 2012 revealed that only around 50% of adults (people aged 15 and above) in the world have at least one bank account in the formal financial system (Demirgüç-Kunt & Klapper, 2012). However, this percentage of individuals with a bank account varies considerably between developed and developing countries. In developing countries, banking penetration rates are far below the global average. In Sub-Saharan Africa, for instance, the percentage of adults with a bank account is 24.1%, as compared to 33%, for South Asia and 39% for Latin America and the Caribbean (Little Book of Financial Inclusion, 2012). The problem of involuntary financial exclusion requires interventions to address market failures such as asymmetric information, lack of competition in the markets or insufficient infrastructure (Camara, Peña, & Tuesta, 2014). These failures make it difficult for certain population groups, such as low-income groups or those who have traditionally been more vulnerable, such as women, young people or people who live in rural areas, to use formal financial services despite the benefits (Camara *et al.*, 2014).

Financial inclusion (FI) connotes increasing popular access to formal financial services such as a bank account, and/or the use of credit and saving facilities of banks (Efobi, Beecroft, & Osabuohien, 2014). On the other hand, financial exclusion refers to obstacles that hinder access to formal financial services (such as the distance to financial institutions, costs of

financial services, lack of widespread knowledge of available services, integrity of regulatory and institutional infrastructure etc.), despite the exceeding marginal benefits over marginal cost from using these services (Efobi, *et al.*, 2014). According to the African Development Bank (2013), financial inclusion refers to all initiatives that make formal financial services available, accessible and affordable to all segments of the population.

Financial inclusion has several benefits for national development. Literature has shown that communities with access to savings instruments experience increased savings, productive investments as well as consumption and female empowerment (Aportela, 1998; Ashraf, Karlan, & Yin, 2010). It also leads to poverty reduction, decrease in the level of inequality and enhanced private investment (Allen, Demirgüç-Kunt, Klapper, & Martinez Peria, 2012; Beck, Demirguc-Kunt, & Peria, 2007). Financial inclusion enhances the attraction of remittances and eases the transfer of funds from abroad (Demirgüç-Kunt, Córdova, Pería, & Woodruff, 2011).

Again, as it is important to note that the going concern of banks, depend on the extent of financial inclusion since banks require customers' funds for re-investment. Furthermore, banks liquidity also depends on the deposits that they will mobilize from their customers as well as the fees and commissions that they charge for rendering services to those customers. This helps to enhance banks profitability (Efobi *et al.*, 2014). Financial inclusion also facilitates efficient allocation of productive resources, significantly improves the day-to-day management of finances and ensures an all-inclusive financial system can help reduce the growth of informal sources of credit (such as moneylenders) which often tend to be exploitative (Sarma, 2012).

Despite, the important role financial inclusion plays, few empirical studies exist which analyses the determinants of financial inclusion on the microeconomic perspective by

quantifying the impact of different factors on participation in the formal financial system (Allen *et al.,* 2012; Cámara *et al.,* 2014; Efobi *et al.,* 2014; Tuesta *et al.,* 2015). In this study, it is essential to understand which socio-economic factors are encouraging the use of the formal financial system, and to what degree. This will help to deepen our knowledge on economic policies designed to encourage financial inclusion in Sub-Saharan Africa.

For instance, Allen *et al.,* (2012) was the first to apply three indicators of financial inclusion namely account ownership, use of account to save and frequent use of account to estimate the determinants of financial inclusion using over 123 countries from the Global Financial Findex database. The authors find that individual characteristics most vulnerable to financial exclusion are those with lower incomes, females, lower education and those living in rural areas. Cámara *et al.,* (2014) report similar results for Peruvian households, also identifying education and gender as factors relevant to financial inclusion. Efobi *et al.,* (2014) document that individual attributes such as gender, age and education significantly explained banking services in Nigeria. In similar vein, Tuesta *et al.,* (2015) report that in terms of use, a person's level of education, income and age are all important variables which determine whether they have financial products such as accounts, credit and debit cards, formal credit and electronic payments in Argentina.

In recognizing the role financial inclusion plays on poverty reduction, some few empirical studies have been conducted at both micro and macro level to analyse the impact of financial inclusion on poverty reduction. For instance, Jones (2008) conducted a study in Britain on tackling poverty through the use of financial inclusion. He finds that access to credit unions leads to poverty reduction among low income communities in Britain. Also, Fadun (2014) asserts that financial inclusion leads to poverty alleviation and redistribution of income in Nigeria; likewise, Mishra (2012) who documents that the growth in bank accounts is not significantly associated with the reduction in the below poverty-line population across states

in India. Mishra (2012), further argues that poverty reduction strategies in developing inclusive financial systems should be given priority, which is financially and socially sustainable.

From the macroeconomic point of view, studies that examine the relationship between finance and poverty reduction nexus are numerous. For instance, Jalilian and Kirkpatrick (2005) find that the impact of financial development on poverty reduction will be affected, only by any change in income inequality resulting from financial development in developing countries. Honohan (2008), examines the effect of access to finance using over 160 countries worldwide including, Sub-Saharan African (SSA) countries, and finds a correlation but no causal link between access to finance and poverty reduction. Further, Odhiambo (2009) finds that both financial development and economic growth granger-cause poverty reduction in South Africa.

In the light of the above discussions, there is the need to examine the extent to which financial inclusion would reduce poverty in Sub-Saharan Africa using micro-level data. In addition, the study will examines the socio-economic factors that determine financial inclusion in Sub-Saharan Africa. This study differs from previous studies in three ways. Firstly, to the best of our knowledge, it is the first study to use micro-data from the Global Financial Inclusion Findex Database 2012 to examine the effect of financial inclusion on poverty reduction in Sub-Saharan Africa. This differentiates it from previous studies that have used mainly aggregate data to study the finance and poverty reduction nexus. Secondly, it uses a quantitative approach to determine the association between financial inclusion and poverty reduction as compared to previous studies that have used strictly qualitative methods (Jones, 2008; & Fadun, 2014). Lastly, it goes beyond only examining the effects of individual attributes on financial inclusion to include the role of financial inclusion on poverty reduction in Sub-Saharan Africa.

1.2 Statement of the Problem

It is imperative to note that theories and empirical evidence have suggested that financial sector development leads to poverty reduction. Greenwood and Jovanovich (1990) argue that financial intermediaries provide savers with higher returns and lower risk on their investment but that many individuals of lower economic status cannot make use of these financial intermediaries, thereby providing an avenue for growing inequality. The authors further intimated that over time, more people will be able to make use of financial services as such services become available or as more policies are initiated to get the poor or lower income people included, and this will reduce inequality.

Following from the above theory, the poor actually need financial intermediation to enable them reduce the incidence of poverty. As already indicated, one of the surest ways of inclusive development is financial inclusion in which Africa is largely lagging behind. Literature on financial inclusion have largely focused on indices of financial inclusion (Arora, 2010; Chakravarty & Pal, 2012; Gupte, Venkataramani, & Gupta, 2012; Sarma, 2008). All these authors have all constructed indices for financial inclusion and access respectively without examining the impact of those indices on poverty reduction. To the best of our knowledge, the only study that has gone further to establish the link between finance and poverty is Honohan (2008). The author constructed indices for financial access for almost 162 countries and then assessed the impact of the indices on poverty reduction in the sample countries. The finding of this author was inconclusive since he did not find causal link between poverty and financial access. This therefore provides an avenue for further studies in this area.

Aside the indices of financial inclusion and of access, one other issue that has received considerable prominence in the financial inclusion literature is the use of the Global Financial Inclusion Findex 2011 dataset to explore the socio-economic determinants and barriers to

financial inclusion (see Demirguc Kunt & Klapper, 2012, 2013, Allen *et al.*, 2012, Klapper and Singer, 2013, Efobi *et al.*, 2014, Camara *et al.*, 2014 and Tuesta *et al.*, 2015). Some of thses authors only provide the descriptive statistics of the meaurement of financial inclusion without testing for any statistical significance. Others also provide the link between the individual characteristics without examining the impact it has on poverty. These therefore, leave a gap to be filled on the link between financial inclusion and poverty reduction nexus.

One other problem that this study has identified and would deal with is endogeneity bias which often plagues aggregate data. For instance, ratio of deposit to GDP and credit to GDP are often noted of making the financial system deep without delivery access to all (Demirgüç-Kunt & Klapper, 2012). Therefore, the use of these proxies only tell us the depth of the financial system but not the usage aspect of it.This is because it is not everybody who has access to formal financial services who actually use it. Also, micro data has an advantage over macro data because when using macro data it is difficult to distinguish the poor from the rich.

Further, the literature that apporaches financial inclusion through the development of indices used account numbers per 1000 adults as a proxy for penetration (Arora, 2010; Sarma, 2012). The problem with this proxy is that the number of accounts per 1000 adults do not accurately show how widely usage is because one person may have several bank accounts and hence conclusions drawn from this perspective would be misleading in policymaking (Kendall, Mylenko, & Ponce, 2010). Also, foreigners who own account in a particular country will also add up or be included in the total score, to increase the financial inclusion rate, thus, misrepresenting the true picture of financial access and inclusion in that country (Efobi *et al.*, 2014). In this regard, the purpose of achieveing universal financial access will not be met.

In order to counteract these problems, there is the need for us to correct for endogineity bias. However, the use of micro-level data is more appropriate in dealing with this problem. The study therefore employs micro-level data from the global financial inclusion Findex to correct for endogeneity and selectivity bias by dealing with sample selection bias through the use of Treatment Effects version of the Heckman sample selection model and Propensity Score Matching (PSM).

To the best of our knowledge, it is only Imai, Arun, and Annim (2010) who have applied the Treatment Effect Model in finance to examine the relatiosnhip between microfinance and household poverty reduction in India. Their application, is too narrow meaning that there is the need for us to apply it in a broader perspective such as individual/household use of formal financial services. In addition, because the study was carried out in only one country, this current study uses as much as Thirty-five (35) countries with thirty-five thousand (35, 000) individuals involved. This will provide us with more robust findings which can be used for policymaking and implementation in Sub-Saharan Africa and other developing countries concerning the issue of financial inclusion and poverty reduction.

1.3 Research Questions

The study addresses two key research questions on the determinants and the effects of financial inclusion on poverty reduction in Sub-Saharan Africa. These include:

i. What factors account for financial inclusion in Sub-Saharan Africa?
ii. Is there a significant welfare gain arising from improved financial access for the poor?

1.4 Objectives of the Study

The main objective of this study is to use the demand side data specifically the Global Financial Findex Database (Global Findex, 2011), to determine the effects of financial inclusion on poverty reduction in Sub-Saharan Africa. In particular the study seeks to:

i. Identify the factors that influence financial inclusion in Sub-Saharan Africa (SSA).

ii. Examine the effects of financial inclusion on poverty reduction in Sub-Saharan Africa (SSA).

1.5 Hypothesis of the study

i. H_1: Individual attributes such as gender, age, education and income explain the extent of financial inclusion in Sub-Saharan Africa.

ii. $H_{2:}$ Financial inclusion indicators such as ownership of account, frequency of withdrawals, savings and access to formal credit do reduce poverty in Sub-Saharan Africa.

1.6 Significance of the Study

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

Furthermore, the findings of this study are useful for policymaking regarding financial development and financial inclusion in the African continent. Development organizations such as the World Bank, African Development Bank and International Monetary Fund all have their share in the findings of this study. Thus, they will be able to initiate and implement

useful policies that are geared towards poverty alleviation through financial inclusion agenda. Finally, the study adds to the few strands of literature currently available on financial inclusion and poverty reduction nexus.

1.7 Scope of the Study

The study exclusively concentrates on financial inclusion and poverty reduction nexus in Sub-Saharan Africa. It excludes North African countries. This is because North Africa and Middle East are categorized into the same belt in World Economy or Geography. It uses data from 35 countries in the Global Financial Inclusion Database 2012. The Global Findex (2011) is a survey conducted by the Gallup World Poll 2011 on individual level characteristics on financial inclusion across the world for 148 countries including 42 countries from Africa.

1.8 Limitations of the Study

The study is limited to Sub-Saharan Africa. It uses country study cross-sectional data to determine the effect of financial inclusion on poverty reduction. This study has not been able to draw a long-run relationship between financial inclusion and poverty reduction since the data is only one-year data point and does not encompass several periods that would be used to establish causality. Again, the data for SSA from Global Financial Inclusion Findex 2011 did not stratify the individuals into urban and rural thereby making the study to fall short of comparisons between the two (Efobi *et al.*, 2014). Further, the poorest income quintile is used as a proxy for poverty due to lack of data on actual income of the respondents. This means that poverty would only be measured in relative terms and not absolute. These problems do not, mean that the results from the research would be of less use for policymaking and implementation.

1.9 Organization of the Study

Subsequent parts of the study are organized as follows: Chapter two, considers the literature review mainly on the overview of financial system in Africa, concept of financial inclusion and poverty; theoretical and empirical review of the study. Chapter three, discusses in detail the required methodology, comprising source of data, the dependent and independent variables, the treatment effects model and propensity score matching. Chapter four, presents the results and discussions in line with the objectives and hypothesis stated above. It also provides us with existing literature that conforms to or disagree with theory and empirical evidence. Chapter five, is the summary of the key findings of the study, makes policy recommendations, conclusions and points out the gaps for future research.

CHAPTER TWO

LITREATURE REVIEW

2.1 Introduction

The general objective of this chapter is to present the theory and empirical evidence on the effect of financial inclusion on poverty reduction in Sub-Saharan Africa (SSA). This section is divided into two main parts. The first section presents an overview of the financial system in Sub-Saharan Africa, dimensions of financial inclusion and financial inclusion and poverty concepts. The second section discusses some key theoretical propositions on finance and poverty reduction nexus. It also presents empirical literature on determinants of financial inclusion; and financial inclusion and poverty reduction nexus respectively.

2.2 Financial System Overview in Sub-Saharan Africa

Historically, financial systems in Africa generally lag behind those in other developing economies. Despite the fact that many interventionist/protectionist policies were put in place by the World Bank and the International Monetary Fund (IMF) to resuscitate the financial sector within the past decades in SSA. According to the 2012 World Bank development indicators report, an international comparison of private credit to GDP which is a main indicator of financial depth shows a gap between SSA and other developing economies. The report shows that the ratio of private credit to GDP averaged 24% of GDP in Sub-Saharan Africa in 2010 and 39% in North Africa, compared with 77% for all other developing economies, and 172% for high income economies (Demirgüç-Kunt & Klapper, 2012). This shows huge disparity of the ratio of private credit to GDP (Financial depth) between Sub-Saharan Africa and other developing countries thereby lowering the confidence that the public have in the financial sector.

A study by Beck, Maimbo, Faye, and Triki (2011) show that the nonbank segments of Africa's financial systems depict an even lower degree of development than the banking sector. They opine that less than half of African countries have stock markets and only a few of these are liquid. The World Bank Group (2012) reports that with the exception of South Africa, African stock exchanges are small as measured by the ratio of market capitalization to GDP. The report points out that the ratio of market capitalization to GDP is only 38% on average, as compared to 44% in all other developing economies and 62% including high-income economies. In addition, African stock markets are among the most illiquid in the world as measured by the ratio of traded to listed stocks (Beck *et al.*, 2011). The above discussion shows that there is still a gap in the development of the African financial system as compared to other economies. This means that more needs to be done in order to bridge that gap.

In comparing Sub-Saharan Africa to other continents regarding the depth of financial inclusion, Table 2.1 presents the averages of the world, SSA and the rest of the continents around the globe.

Table 2. 1: Depth of Financial Inclusion in SSA verses other Continents

FI Indicators	**SSA**	**World**	**SA**	**EAP**	**ECA**	**LAC**	**MENA**
Account at a Formal Financial Institution	**24.1**	50.5	33.0	54.9	44.9	39.2	17.7
Access to formal account[1]	**3.8**	7.7	6.6	13.2	4.0	6.0	19.1
Use of formal account (Business Purpose)	**5.3**	7.9	4.0	3.2	5.3	5.2	4.7
Mobile Payments (Sending money)	**11.2**	2.2	0.8	1.0	2.5	0.8	1.3
Savings at formal financial institution	**14.2**	22.4	11.1	28.4	7.0	9.5	4.5
Credit from a formal financial Institution	**4.7**	9.0	8.7	8.6	7.7	7.8	5.1
Personal Insurance	**3.2**	17.1	5.5	36.8	4.5	6.8	2.5

Source: Author's compilation from the LBFI (2012).

[1] Access to formal account is measured by 0 deposit/withdrawal per month. This shows that one has an account but it is inactive.

Table 2.1 helps to show how SSA has made strides in terms of indicators of financial inclusion with the rest of other continents in the world using data from Global Findex Database 2011.

In observing from Table 2.1, we noticed that on average 50.5% of the world's adults aged 15 and above has an account at a formal financial institution and this is twice as that of SSA average of 24.1% and a little below East Asia & Pacific (EAP) with an average of 54.9%. However, SSA is below other continents like South Asia (SA) with an average of 33.0%, Europe & Central Asia (ECA) with an average of 44.9%, and Latin America & Caribbean (LAC) with an average of 39.2%.

In terms of access, SSA recorded 3.8% of inactive users of their accounts. This is below the world average of 7.7%. It is also evident from Table 2.1 that SSA has outperformed other continents in terms of active accounts. Again, SSA recorded 5.3% in terms of the use of formal accounts for business purposes. This means that SSA is doing very well than the rest of the other continents except the world average of 7.9%. Mobile payment has gained popularity in SSA than the rest of the world recording 11.2%. This is also far better than the world average of 2.2%. This is not surprising because Africans are more likely to use mobile money options because of cost, documentation and proximity to financial institutions. Further, 14.2% of the respondents in SSA save at a formal financial institution as compared to the world average of 22.4%. However, SSA is doing better than other continents except East Asia and the Pacific.

In terms of formal credit, SSA recorded 4.7% which is the lowest amongst all the continents. This could be attributed to the fact that most of the population are outside the formal banking system. Also their inability to obtain credit could be due to lack of collateral and excessive

interest rates charged by banks. They may also be exposed to other sources of borrowing such as friends/family members, borrowing from store, employers and money lenders.

2.3 The Concept of Financial Inclusion and Exclusion

Financial inclusion is considered as a pathway to poverty reduction and economic growth. Financial services include the provision of wide range of products, namely, savings, loans, insurance, payments, deposits, financial intermediation and financial advisory services. Financial inclusion can help to make financial services more accessible to all including the poor, by ensuring that there is a strong and resilient financial market which is an ingredient for economic growth. Financial inclusion has long been ignored in literature, it is only being given increasing credence in recent times. In this section, we will look at the definitions of financial inclusion and financial exclusion.

2.3.1 Definition of Financial Inclusion

Claessens (2006), defines financial inclusion as the availability of a supply of reasonable quality financial services at reasonable costs, where reasonable quality and reasonable cost have to be defined relative to some objective standard, with costs reflecting all pecuniary and non-pecuniary costs. This therefore suggests that access to financial services comes with some semblance of benefits (savings, credit, credit interest, etc) and cost in the form of bank charges and commissions.

The India Committee on Financial Inclusion, commonly referred to as the Rangarajan Committee (2008), also defines financial inclusion as the process of ensuring access to financial services and timely adequate credit where needed by vulnerable groups such as weaker sections and low income groups at an affordable cost. This definition of financial inclusion is geared towards the vulnerable in society such as the poor or those within the lowest income quintile in the society.

Access to finance has been defined by Demirgüç-Kunt and Levine (2008) as the absence of price and non-price barriers. Diniz, Birochi and Pozzebon (2012) also define financial inclusion as the access to formal financial services at an affordable cost for all members of an economy, favouring mainly low-income groups. They argue that financial inclusion has been identified as the major policy contributor to poverty reduction and economic growth. Gupte et al. (2012) noted that while finance has always been recognized as the life blood of any economic unit, financial inclusion, is a 'quasi-public good'. They document that it is a harbinger that would facilitate fuller participation by vulnerable groups such as weaker sections and low income groups in the financial system.

The World Bank Global Financial Report (2014) defines financial inclusion as the proportion of individuals and firms that use financial services. The report notes that lack of use does not mean lack of access. Some may have access to but do not use certain financial services because of cost, legal barriers, and market failures or because of religious reasons or cultural phenomenon (World Bank, 2014).

For the purpose of this thesis, financial inclusion is defined *as the process of making basic formal financial services available, affordable and can readily be usable by all members of an economy especially the poor*. Such basic formal financial services include ownership of account, savings products, access to basic credit, insurance services and easy withdrawal from bank accounts through point of sales and debit cards. This means that the poor really need financial services in order to overcome their financial predicament and the only way to get it is to make it more accessible and affordable to them at their comfort areas. Thus, financial services should be brought to the door steps of the poor with limited restrictions such as cost, distance, documentation challenges and flexible laws to protect the weak and marginalized in society for accessing formal financial services.

2.3.2 Definition of financial Exclusion

On the other hand, financial exclusion is defined in several ways. One of the early attempts to define financial exclusion was by Leyshon and Thrift (1995) who define it as those processes that serve to prevent certain social groups and individuals from gaining access to the formal financial system. This definition is in line with Carbó, Gardener, and Molyneux (2005) who define financial exclusion as broadly the inability of some societal groups to access the financial system. This social groups are those who are economically less privileged in the society or who actually belong to the class of poorest people. Sinclair (2001), also posits that financial exclusion is the inability to access necessary financial services in an appropriate form. Where appropriate form means barriers to inclusion such as distance, documentation, cost and expenses of owning either a checking account or savings account. He added that exclusion can come about as a result of problems with access, conditions, prices, marketing or self-exclusion in response to negative experiences or perceptions.

2.3.3 Dimensions of Financial Inclusion

The agenda of financial inclusion has deeply influenced the decision of policymakers such as the World Bank, Consultative Group to Assist the Poor (CGAP), African Development Bank International Monetary Fund (IMF) and governments of several SSA countries to ensure the need for inclusiveness of the poor or the vulnerable in the financial sector. The first step towards determining the extent of financial inclusion is to identify the indicators that measure the level of accessibility, usage and quality of financial services in a country. Policymakers need reliable information about the extent of inclusiveness prevalent currently in their respective countries in order to frame policies and action plans to overcome barriers to financial inclusion. The Alliance for Financial Inclusion (2012) views financial inclusion as multi-dimensional. To them, individuals and enterprises are classified into dichotomous divisions: whether included or not.

With the aim of defining a more complete concept of inclusion, the Financial Inclusion Data Working Group (FIDWG) of the Alliance for Financial Inclusion (AFI) agrees on three main dimensions of financial inclusion that provide the underpinning for data collection. These are access, usage and quality. The group documents that the adoption of broader and multidimensional definition of financial inclusion is crucial to correcting the erroneous assumption that inclusion will inevitably be achieved through the offering of enough access points. To them, a more complete understanding of financial inclusion should speak to how frequently clients use products, if the products are effectively meeting their needs and make them better off as a result.

These three dimensions of financial inclusion (access, usage and quality) are broad categories into which indicators can be grouped, without being restrictive. They simply provide a framework to guide policymakers in developing a sufficiently robust measurement strategy that reflects the multi-dimensional nature of financial inclusion. Within this framework, policymakers will still need to design a set of indicators appropriate to their needs and level of resources in their various countries. Table 2.2 shows the classifications of the dimensions of financial inclusion.

The World Bank Report (2012) on financial inclusion strategies provide detailed descriptions on access, usage and quality dimensions of financial inclusion including a fourth dimension which is the impact of firms and household. The detailed discussion is stated below:

Access: the capacity that financial institutions have to provide financial services and products, which is linked to the regulatory market and technology environments. Examining access requires identifying potential barriers that institutions face in providing their services and products or that clients encounter in using them. Access indicators reflect the depth of outreach of financial services such as penetration of bank branches or point of sale (POS)

devices in rural areas (information that can be obtained from supply-side data); or demand-side barriers that customers face to access financial institutions, such as cost or information.

Table 2.2: Measurement of Financial Inclusion

Dimension of Financial Inclusion	**Level of Measurement**
Access	Availability of formal, regulated financial services: Physical proximity and availability.
Usage	Actual usage of financial services and products: regularity, frequency and duration of time used.
Quality	Products are well-tailored to client needs. Appropriate segmentation to develop products for all income levels

Source: Alliance for Financial Inclusion Data Working Group (2011)

Usage: the way in which clients use financial services, such as the regularity and duration of the financial product/service over time (for example, average savings balances, number of transactions per account, number of electronic payments made). In order to use financial products, firms or households must have access to them. However, having access does not mean that everybody will use financial products. Thus, not every firm or individual who does not use financial services should be classified as "excluded" or "unbanked," and likewise every firm or individual that has theoretical access to financial services is not automatically financially included. Usage indicators can be developed from demand-side information, which can also capture financial services provided by informal financial providers.

Quality: the ability of the financial service or product to meet the needs of the consumer. Quality measures reflect the degree in which financial products and services match clients' needs, the range of options available to customers and clients' awareness and understanding of financial products. Indicators of quality proxy for convenience, product-fit, transparency, safety, consumer protection and financial literacy. Hence, quality indicators can be developed with information from both demand- and supply-side surveys. However, to measure quality,

these surveys must contain more complex information, such as detailed product characteristics, terms of the contract, or awareness of consumers.

A fourth dimension to measure financial inclusion is its **impact on firms and households**. Financial inclusion policies would benefit from more rigorous impact evaluations that assess an intervention's effects and cost-effectiveness. Impact evaluations can be complex and challenging to perform, since they require data beyond financial information, and statistical methodologies to convincingly attribute causality rather than correlations. However, these evaluations are needed to understand the influence that deeper financial inclusion has on firms' and households' outcomes, such as businesses' performance or human capital investments. The "Impact Assessment for SME Finance Policies Framework" being developed by the World Bank for the Global Partnership for Financial Inclusion (GPFI) Sub-Group on SME Finance will provide resources for policymakers and regulators in this area.

2.4 Concept of Poverty

Poverty in Sub-Saharan Africa (SSA) is highly pervasive. Several attempts have been made by governments and development organizations such as Non-Governmental Organizations (NGOs), the World Bank (WB), International Monetary Fund (IMF) and governments in SSA to alleviate it by developing poverty reduction strategies (Chakravarty & D'Ambrosio, 2013). According to World Bank (2013) there are currently, 48.5% of the population in Sub-Saharan Africa living on less than $1.25 per day, and 69.9% live on less than $2.00 per day (World Bank, 2013). They stress that with a little over 910 million people living in the region, there are still around 637 million Africans below the poverty line.

There are many people who talk and write about poverty around the world, without actually reaching consensus on the definition of poverty. This has made poverty to assume various definitions. David and Timothy (2002) defines poverty as having lack of resources relative to

needs. Foster (1998) also argues that in order to operationalize the definition of poverty, a threshold should be defined in terms of absolute and relative poverty. To him, in the case of absolute poverty, a group-specific absolute poverty line or threshold (food, clothing, healthcare and shelter) is defined based on the resources needed to maintain basic needs among the group; while relative poverty, refers to a notion of living standard for the income distribution such as mean, median or other quintile that defines the cut off as some percentage of this standard.

Poverty measurement is based on a comparison of resources to needs. Foster (1998) posits that a person or family is identified as poor if its resources fall short of the poverty threshold (absolute or relative as defined earlier). Based on the idea of poverty threshold, Foster (1998) observes that there are several indices of poverty. These indices of poverty include the head-count ratio which provides important information on poverty (namely, the frequency of poverty among the population) but ignores other relevant information on the depth and distribution of poverty. Another important kind of "partial index" in which Foster (1998) proposes is based on the sum of the income gaps of poor families. These "gap indices" add a second dimension of "depth" to poverty evaluations. A third, dimension he proposes includes indices of inequality among the poor such as the Gini coefficient.

2.3.1 Measurement of Poverty

There are several measurements of poverty, prominent among them are the poverty headcount which is measured by the number of people or headcount, H, whose incomes fall below the absolute poverty line/threshold. World Bank (2008) subscribes to the absolute nature of poverty and defines extreme poverty as living on less than US $1.25 per day Purchasing Power Parity (PPP), and moderate poverty as less than $2 a day. The headcount ratio on the other hand measures the fraction of the population below the poverty line. The Human Poverty Index (HPI) compiled by UNDP in 2006 is another measure of poverty. It

measures poverty in three areas of deprivation. These include life, basic education and economic provision. The 2006 UNDP report states that there is an evidence of poverty in life when one dies below age forty (40). In respect of basic education, the report measures the fraction of adults who are illiterate and finally for the economic provision, it measures the fraction of people without access to safe water and fraction of children underweight. Another measure of poverty is the Multi-dimensional Poverty Index (MPI) which revolves around the three measurement of poverty just like the Human Poverty Index (HPI). The difference is that while HPI concentrates on aggregate level data, MPI concentrates on individual level data thereby making it directly concentrated on poverty measurement. The three levels it concentrates on include Health, education and living standards. Another measure used as proxy for poverty is per capita consumption used by (Odhiambo, 2009; Quartey, 2005). This measure is consistent with the World Bank definition of poverty as "the inability to attain a minimal standard of living" measured in terms of basic consumption needs (World Bank, 1990).

2.3.2 Measurement of Inequality

Inequality is concerned with the distribution of income. There are two main types of measurement of inequality. These are size/personal distribution of income and functional distribution of income (distributive factor share of income). Functional distribution measures the share of income accruing to various factors of production namely labour, land, capital and entrepreneurship. That of size/personal distribution of income deals with total income of individuals or households irrespective of sources. It is the most common measure used for inequality, and it typically arranges individuals/households by ascending order of income and divides total population into distinct groups. Examples are quintiles and deciles shares of income, Lorenz curve and Gini coefficient. Other examples include Theil index, Atkinson index.

2.4 Theoretical Argument on Finance, Poverty and Inequality

There is no exact theory that explains financial inclusion and poverty reduction nexus in the literature. However, Studies such as Bagehot (1873), Schumpeter (1911), Goldsmith (1969), Cameron (1967), McKinnon (1973) and Shaw (1973) have all stressed on the importance of financial development on growth as well as poverty reduction. They argue that a well-functioning financial sector if it is properly developed could lead to economic growth and financial development. For instance, through efficient financial intermediation a conducive environment is created which brings lenders and borrowers of funds together and thereby reduces the search and the transaction cost associated with finance.

In his seminal study, Schumpeter (1911) forcefully argues that well-functioning financial intermediaries promote technological innovation from unproductive to productive sectors by identifying and funding those entrepreneurs with the best chances of successfully implementing innovative products and production processes. He further states that the financial intermediaries play five key roles namely mobilizing savings, evaluating projects, managing risk, monitoring managers and facilitating transactions. Schumpeter's work has been supported by King and Levine (1993) in their work "Finance and Growth, Schumpeter Might be Right". The authors find that higher levels of financial development are positively associated with faster rates of economic growth, physical capital accumulation and economic efficiency improvements. They stress that the predetermined component of financial development is a good predictor of long-run growth over the next 10 to 30 years. Their results support Schumpeter (1911) argument on the role of finance in economic growth and innovation.

McKinnon (1973) and Shaw (1973), took a neo–liberal stand on the role of money in the development process. The authors argue that financially repressive policies in the form of nominal interest rate ceilings, controlled credit allocation and high reserve requirements were

not only inefficient, but also the source of economic instability that reduced the volume of financial savings, the rate of real economic growth and the real size of the financial system relative to the non–financial sector in developing countries. Financial repression in this context is defined to entail artificially low deposit and loan rates that give rise to excess demand for loans and to non–price credit rationing (McKinnon, 1973; and Shaw, 1973). The McKinnon–Shaw model advocates for financial liberalization to accelerate economic development and economic growth. They contend that financial liberalization would improve the rate of economic growth through increased efficiency in financial intermediation subject to financial discipline (Acheampong, 2007). This implies that strong and resilient financial liberalization will lead to financial inclusion which could have an effect on poverty reduction.

Greenwood and Jovanovich (1990) support the existence of an inverted U-shaped relationship between income inequality and financial development; that is, financial development leads to greater inequality to begin with, but which falls back again as financial development continues. This theory is based on the idea that financial intermediaries provide savers with higher returns and lower risks, but that poor individuals initially cannot afford to make use of these financial intermediaries which results in growing inequality. It is assumed, however, that more and more poor people will be able to afford to use these intermediaries over time, offsetting the initial increase in inequality.

Ravallion (1997) tests the growth elasticity argument and induced-growth argument and added to theory and empirics. The two arguments he advanced were brought together to examine how initial household income distribution influences progress in reducing poverty. By invoking the Gini index, his results indicate that higher inequality tends to entail a lower rate of poverty reduction at any given positive rate of growth. He sums it up by indicating that initial distribution does not affect how much the poor share in rising average incomes.

2.5 Empirical Evidence

This section is grouped into two parts. The first is focused on the factors that influence financial inclusion. It is mainly based on micro level data. The second part considers finance and poverty nexus. It is focused on macro and some other micro level issues.

2.5.1 Determinants of Financial Inclusion

This section discusses the determinants of financial inclusion evidence in the financial inclusion literature. The discussion is done along the influential papers that look at financial inclusion overall and in particular its determinants.

Demirguc-Kunt and Klapper (2012) provide the first analysis of the Findex Data, a new set of indicators that measure how adults in 148 economies spanning across over 150,000 individuals save, borrow, make payments and manage risk. The data shows that 50 percent of adults worldwide have an account at a formal financial institution, though account penetration varies widely across regions, income groups and individual characteristics. In addition, they argue that 22% of adults report having saved at financial institution in the past 12 months and 9% report having taken a new loan from a bank, credit union or microfinance institution in the past year. Demirgut-Kunt and Klapper (2012) observe that although half of adults around the world remain unbanked, at least 35% of them report barriers to account use that might be addressed by public policy. Among the most commonly reported barriers were high cost, physical distance and lack of proper documentation. This earlier studies on the data only provides mere description of the situation without testing for strong statistical significance.

In estimating several probit models for 123 countries for both individual and country specific characteristics, Allen *et al.*, (2012) find that greater ownership and use of accounts is associated with a better enabling environment for accessing financial services such as lower

account costs and greater proximity to financial intermediaries. The authors document that policies targeted to promote inclusion such as requiring banks to offer basic or low-fee accounts, exempting some depositors from onerous documentation requirements, allowing correspondent banking, and using bank accounts to make government payments are especially effective among those most likely to be excluded. Finally, the authors study the factors associated with perceived barriers to account ownership among those who are financially excluded and report that these individuals report lower barriers in countries with lower costs of accounts and greater penetration of financial service providers. The weakness of their study is their failure to account for continental or regional dynamics, hence conclusions drawn from it may not be applicable to all. This is because legal or regulatory institutions in these countries or economic zones differs from one another.

In examining an overview of financial inclusion in Africa using descriptive statistics Demirgüç-Kunt and Klapper (2012), report that less than a quarter of adults in Africa have an account with a formal financial institution and that many adults in Africa use informal methods to save and borrow. Thus, 23% of adult Africans have accounts at a formal financial institution and about 77% remained unbanked (do not have bank account at a formal financial institution). Similarly, they observe that majority of small and medium enterprises in Africa are unbanked and access to finance is a major obstacle. As compared with other developing economies, the authors report that high-growth small and medium enterprises in Africa are less likely to use formal financing, which suggests formal financial systems are not serving the needs of enterprises with growth opportunities. Their study only provides descriptions of the problem without testing for statistical significance.

Anson, Berthaud, Klapper and Singer (2013) study financial inclusion and the role of the post office. By controlling for both individual and country fixed effects for 60 countries, they document that post offices are relatively more likely than traditional financial institutions to

provide accounts to individuals who are most likely to be from financially vulnerable groups, such as the poor, less educated, and those out of the labour force. The authors also posit that post offices can boost account ownership by acting as cash merchants for transactional financial services, such as electronic payments and remittance and that partnerships between the post office and other financial institutions coincide with a higher bank account penetration.

Demirgüç-Kunt, Klapper, and Singer (2013) study financial inclusion and legal discrimination among women from developing countries. The results from their probit models and ordinary least squares (OLS) regressions document that individual characteristics such as income, education, employment status, rural residency, age and gender remain significantly related to usage of financial services. The authors also find that legal discrimination against women and gender norms may explain some of the cross- country variation in access to finance by women. They observe that in countries where women face legal restrictions in their ability to work, head a household, choose where to live and receive inheritance, women are less likely to own an account, relative to men, as well as to save and borrow. Their results also confirm that manifestations of gender norms, such as the level of violence against women and the incidence of early marriage for women, contribute to explaining the variation in the use of financial services between men and women, after controlling for other individual and country characteristics.

Demirguc-Kunt, Klapper, and Randall (2013) examine Islamic finance and financial inclusion among Muslims adults in 65 countries. Their results show that Muslims are significantly less likely to own a formal account or save at a formal financial institution than non-Muslims after controlling for certain individual and country level characteristics. In addition, the study finds no evidence that Muslims are less likely than non-Muslims to report formal or informal borrowing.

Aterido, Beck, and Iacovone (2013) assess gender differences in the use of finance by household and enterprises in Sub-Saharan Africa using multivariate regressions. Their results revealed some evidence about the existence of an unconditional gender gap, once they control for firms and household characteristics. They find no additional evidence of a conditional gender gap either for enterprises or individuals. Again, after controlling for an array of characteristics such as size, industry, ownership type, foreign participation, export status, and age, enterprises with female ownership participation in Sub-Saharan Africa use as much external financing as enterprises without female ownership participation and female individuals are as likely to use formal financial services as male individuals. They conclude that women are disadvantaged in participation in the labour force and education, which has repercussions for their participation in the modern market economy, including the formal financial sector. They argue that policies to expand access to financial services by women have to be addressed if women are to reap the benefit of financial services as much as men. By the same token, however, these findings suggest the need for more innovative ways for banks to reach out to female customers that do not qualify for formal banking services based on traditional characteristics.

In assessing the role of informality in financial inclusion in Africa, Klapper and Singer (2013) find similar claims made by Demirguc-Kunt and Klapper (2012) that less than a quarter of the adult population in Africa have formal account, and many Africans use informal methods in saving and borrowing. When the authors applied probit regressions models on three indicators of financial inclusion such as account ownership, savings and credit, their results also confirm earlier studies with regard to account ownership, using univariate analysis and show that women, poorer and less educated individuals, those living in rural areas and of middle age are more unlikely to have an account. Their results also reveal that employment status is a significant determinant of account ownership. They show

that adults employed by an employer are more likely to own an account than those who are self-employed and at the same time those unemployed or out of the labour force are less likely than the self-employed to have an account.

In addition, with respect to credit, the multinomial regressions document that income, age, education and employment status are statistically significantly related to the log-odds ratio of using formal credit as compared to not using any credit. Klapper and Singer (2013) also show evidence that for formal savings, there is no statistically significant relationship between gender and formal credit despite the documented significant differences by gender in the univariate setting. This is attributed to the fact that, there is low level of formal credit in Africa and the fact that gender differences manifest themselves indirectly through income, education and employment status. However, gender is significantly negatively related to the log-odds ratio of using only informal credit, compared to using no credit. They also revealed that informal credit has no statistically significant relationship with income, suggesting that credit from informal sources, such as family and friends, the main source of credit in Africa and across developing countries, is equally accessible to all.

Anzoategui, Demirgüç-Kunt, and Martínez Pería (2014) examine the role of remittances in financial inclusion in El Salvador using household level survey data. The authors measured three indicators of financial inclusion namely number of deposit accounts, loans requested and loans received from financial institutions by a household. They find that remittances have a positive impact on financial inclusion by promoting the use of deposit accounts. However, they find that remittances do not have a robust impact in the demand for and use of credit facilities in financial institutions. They concluded that when credit constraints are relaxed remittances might reduce the need for external financing from financial institutions.

In examining factors that determine financial inclusion in Peru, Camara *et al.*, (2014) confirm earlier findings that more vulnerable groups of people such as women, individuals living in rural areas and young people are those with the greatest difficulties in accessing the formal financial system. They revealed that in terms of financial products, loans and mortgages appear to be better drivers of financial inclusion than saving products. This confirms the fact that financial inclusion factors goes beyond only having access to formal accounts and savings to encompass access to loans and mortgages. On the aspect of the enterprises, Camara *et al.*, (2014) underscore that formality and education stand out as significant factors for financial inclusion. They argue that for individuals excluded from the financial system, factors such as age, gender, education and income level seem to affect perception of the barriers to financial inclusion. On the aspect of policy, the authors observe that identification of individual characteristics that could affect financial inclusion provides useful empirical evidence for designing policies that promote more inclusive financial systems.

In applying micro-econometric approach, Efobi *et al.*, (2014) examine access to and use of banking services by individuals in Nigeria using the financial inclusion data from Global Findex 2011. Their findings revealed among others that individual's attributes such as gender, age and education significantly explained banking services in Nigeria. They also find that income and ICT inclination are significant in explaining the use of bank services in Nigeria. Individuals dwellings such as urban and rural and the distance of the resident of the respondent to banks were not provided by Gallup World Poll and these were limitations to their study considering the framework they designed and the fact that they intended to use these social factors for robustness checks. They however, conclude that despite the above limitations, the study is worthwhile for policy making in Nigeria and other African countries on issues related to financial access and inclusion.

Fungáčová and Weill (2014) underscore the need for understanding financial inclusion in China relative to other BRICS countries using the Global Findex Data. They find that high level of financial inclusion in China is manifested by greater use of formal account and savings than in other BRICS countries. They also reveal that the use of formal credit is however, less frequent in China than other BRICS countries. This confirms earlier findings by Klapper and Singer (2013) and Demirguc-Kunt and Klapper (2013) who find that informal sources of credit like family and friends are rampant in Africa and other developing countries respectively. Fungáčová and Weill (2014) find that borrowing through family or friends is the most common way of obtaining credit in all BRICS countries but other channels of borrowing are not very commonly used by individuals in China. The authors also find that higher income, better education, being a man and being older are associated with greater use of formal account and credit in China.

Using a sample of 44 African countries within the period 2000-2011, Erlandsson and Lundqvist (2014) assess the relationship between mobile phone penetration, measured as the number of mobile phone subscribers' per capita, economic growth and its impact on financial inclusion. The authors used a dynamic panel data model and employed a System GMM estimator to address issues of endogeneity. The results from their analysis suggest that mobile phone penetration is a positive and significant contributor to economic growth in Africa, and a part of the positive effect is channelized through financial inclusion, when measured as deposit accounts.

2.5.1 Finance and Poverty Reduction

Not much study has been done on the direct effect of financial inclusion on poverty reduction in both developed and developing countries at both the macro level and micro level. Few of the studies are based on the linkages between, financial access and poverty, financial

development and poverty, finance, growth and poverty reduction and microfinance and poverty.

For instance Jalilian & Kirkpatrick (2002, 2005) assess the impact of financial development on poverty reduction in both developed and developing countries using data by Dollar and Kraay (2002). They find that financial sector development policy contributes to poverty reduction after controlling for key macro-economic variables such as inflation rate, share of trade and public spending. They also find that the impact of financial development on poverty reduction will be affected, only by any change in income inequality resulting from financial development. However, they were not able to clearly state their measurement of the financial development. One can deduce from their measure of financial sector development using income growth and improved supply of access of financial services to the poor as an element of financial inclusion. Again, they used the Gini concentration ratio to proxy for inequality, which clearly shows some semblance of poverty reduction measure.

By applying OLS, Uni root test and Granger-causality, Quartey (2005) assesses the effect of financial development on savings mobilization and poverty reduction in Ghana using time series data spanning from 1970-2001 and finds that even though financial sector development does not Granger-cause savings mobilization in Ghana, it induces poverty reduction. Again, he finds that savings do Granger-cause poverty reduction in Ghana. He contends that the effect of financial development on poverty in Ghana is positive but insignificant. He uses M2 as a percentage of GDP and domestic credit to the private sector as a measure of financial development. Broad money supply has deposit as its component which signifies the level of financial deepening in Ghana hence financial inclusion. He uses per capita consumption as a measure of poverty reduction signalling the effect of poverty reduction when it is Granger causal with financial development. One of the key strengths of his multivariate test is that he

was able to establish the short run and long run effects of both of his models. However, he did not test for possible non-linearity and interactive effects in his model.

Jones (2008) study the effect of poverty reduction on fianancial inclusion using British Credit Unions as a case study. The results from his review show that credit unions in Britain are effective in reaching financially excluded people in Britain. His results suggest that credit uions help the very poor to become financial included in the formal financial sector. However, since he did not use quantitaive data, it is difficult for us to establsih any correlation or causal relationship between poverty reduction and financial inclusion in Britain.

While controlling for certain characteristics such as depth of private banking credit, inflation rate and others, Honohan (2008) examines the effect of access to finance using over 160 countries worldwide including SSA and finds a correlation but not causal link between access to finance and poverty reduction. His results are somewhat consistent with Rewilak (2013) who finds that financial development may alleviate poverty but not universally. His model is likely to suffer from endogeneity bias since he did not control for possible simultaneity biases.

Odhiambo (2009), examines the role of finance, growth and poverty nexus in South Africa, using trivariate Granger-Causality Model (TGCM) and finds that both financial development and economic growth Granger-cause poverty reduction in South Africa. He again notes that economic growth Granger-causes financial development hence leads in the process of poverty reduction in South Africa. He uses the vector error-correction model to differentiate between the short and long run causal relationship he wanted to establish. He measures the level of financial development using the ratio of broad money to GDP as others have done suggesting that there is financial deepening which will lead to financial inclusion hence

poverty reduction. However, he did not control for any macroeconomic consequences that might endanger the model. His findings are consistent with Odhiambo (2010) who finds a distinct causal flow from both financial development and savings to poverty reduction in Kenya by the same methodology as in the case of South Africa.

Akhter and Daly (2009), examine the role of financial development on poverty reduction in 54 developing countries using Fixed Effect Vector Decomposition Model (FEVD) and find that financial development is conducive for poverty reduction but the instability accompanying financial development is detrimental to the poor. They also posit that there is a positive relationship between financial development and financial instability in those countries. One of the weaknesses of their model is that they do not consider simultaneity bias in the model which can lead to endogeneity problems.

Imai et al. (2010) look at the impact of microfinance institutions (MFIs) on poverty reduction in India using cross-sectional data and find that loans for productive purposes were more important for poverty reduction in rural than in urban areas. They also establish that living in urban areas, and simple access to MFIs, have larger average poverty-reducing effects than the access to loans from MFIs for productive purposes. Their results suggest that the presence of microfinance institutions enables the rural poor to have access to financial services such as loans which could help in reducing their poverty level when applied appropriately. Access is an important component of financial inclusion so the influence of MFIs through access to the rural poor is an indicator of financial inclusion. Imai, Gaiha, Thapa, and Annim (2012) once again examine the effect of microfinance institutions on poverty reduction in Latin America and the Caribbean using cross-sectional and panel data and find that microfinance institutions significantly reduce poverty at the macro level.

By using penal least squares (PLS) and GMM Swamy (2014) study financial inclusion, gender dimension and economic impact on poor households in India using cross-sectional and time series data. The study reveals that in general, women participation has increased household income by 16.23% on average in India. He also finds that gender matters in the impact of financial inclusion programmes for the poor. He notice that income growth (CAGR) net of inflation effect was 8.40% for women as against 3.97% for men, indicating that the gender participating poor undoubtedly affects the outcomes of financial inclusion programmes. His results therefore suggest that financial inclusion is important in poverty reduction for poor households in India.

CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1 Introduction

This chapter discusses the source of data, the models and the econometric techniques employed to analyse the data for the study. It also discusses the dependent and independent variables into details.

3.2 Data

Financial inclusion has two major sources of data. The supply-side and the demand-side data. The supply-side data is a data provided by regulators of financial institutions such as the central banks across countries. However, the demand side-data involves interviews with the end-users of financial products such as individuals, households and firms. This demand side data provides us with useful information on why people use or do not use financial services unlike the supply-side data that does not. As a result of this, the supply-side data is saddled with some weaknesses like multiple accounts held by some individuals or firms using accounts. Again, individuals who own accounts in other countries they are not from can bloat the extent of financial access in that country since they are not citizens. This clearly does not depict the extent of financial inclusion in such countries since those foreigners are not citizens of the country and will therefore not truly represent the actual held account population. In addition, some countries are not able to provide useful granularity of financial access. This means that supply-side data cannot truly tell the depth of financial access or usage unlike the demand-side data. These weaknesses of the supply side data provides the impetus for this study to rely on the demand-side data. This data is capable of correcting these weaknesses and further strengthening the results thereafter concerning the issue of endogeneity instead of the supply-side data.

The data for this study is therefore sourced from the World Bank micro data on the Global Financial Inclusion Findex (Global Findex, 2012) survey carried out by Gallup International. Gallup International, through the Gallup World Poll, has been conducting surveys since 2005. The indicators were constructed using survey data from interviews with more than 150,000 nationally representative and randomly selected adults over the 2011 calendar year for 148 countries worldwide. The data for this study is extracted for 35 countries out of the 36 Sub-Saharan African countries that are available at the Global Financial Findex database[2]. Each of the countries have 1,000 observations. Thus, the pooled sample size for this study is 35,000 individuals from different households across Sub-Saharan Africa.

3.3 Econometric Model Specification

To address the two objectives set out at the beginning of this study, two econometric models are used. The first model is probit specified to find out the determinants of financial inclusion. The second model employed is the treatment effect model to examine the effect of financial inclusion on poverty reduction. Also, propensity score matching is used as a check for robustness on the effect of financial inclusion on poverty reduction. We employed the probit model for our estimation because the dependent variables are categorical variables. Also, the Heckman Sample selection model requires the use of the probit model instead of the logit model (Heckman, 1979). However, the propensity score matching techniques requires the use of logit model to estimate the individual characteristics that gives rise to poverty reduction.

[2] Data for Zimbabwe on income is missing; hence, it is not relevant for the study since income quintiles are very important in this study.

3.3.1 Determinants of Financial Inclusion

To estimate the determinants of the financial inclusion indicators, we employed the probit model specified in equation one below. The econometric specification of Efobi *et al*., (2014) and Fungáčová and Weill (2015), were followed in developing this econometric model below[3]:

$$\Pr(\text{Fin.\_inclusion}_i^k) = \alpha_0 + \alpha_1 \text{Gen}_i + \alpha_2 \text{Age}_i + \alpha_3 \text{Age}^2{}_i + \sum_{j=4}^{5} \alpha_j \text{Edu}_i + \sum_{j=6}^{9} \alpha_j \text{Income}_i + \sum_{j=10}^{13} \alpha_j \text{Inf\_borrow}_i + \alpha_{14} \text{Rel\_acc}_i + \varepsilon_i \quad (1)$$

Fin._Inclusion means financial inclusion indicators, Gen- is for gender, age, age square and Edu. means education. Also, Inf_borrow is for informal borrowing. Rel_acc. means relative or a family member owns an account. The superscript "k" represent financial inclusion indicators. Also subscript "i" represents the individuals at each country. The intercept is α_0. The coefficients of the respective parameters ranges from α_1 *to* α_{14}. While ε_i is the error term for each individual in the model. For detail definitions and descriptions of all the variables used in model (1) specified above, (see Table 5.11 of the appendix).

3.4 Determinants of Financial Inclusion (Dependent Variables)

Four indicators of financial inclusion (formal account, savings, withdrawals and credit) are used in this study to estimate the determinants of financial inclusion. However, they are used as treatment indicators in both the Treatment Effect Model and Propensity Score Matching (PSM) methods to estimate the effect of financial inclusion on poverty reduction. They are discussed in details below.

[3] The empirical model is builds on Allen et al., (2012) and Efobi et al., (2014) on household behaviour towards financial services.

3.4.1 Formal Ownership of Account

To estimate the use of account, as an indicator of financial inclusion, the question on the global financial findex 2011 is: *Do you, either by yourself or together with someone else, currently have an account at a bank, credit union, cooperative, post office, or microfinance institution?* An account can be used to save money, to make or receive payments, to receive wages and remittances, and to borrow money from a formal financial institution. For the purpose of this study, only formal accounts holders are used. This criteria has been used in other studies[4]. This is a binary dependent variable that takes the value 1 for those with access to formal financial services and 0 otherwise. Similarly, because it is used as a treatment variable in the PSM and Treatment Effect Model, we expect that if the poor has access to formal financial services the rate of their poverty would reduce. This is because they could use the account to engage in other forms of economic activities such as borrowing, savings and investment. This have a potential to push them out of the poverty bracket.

3.4.2 Formal Savings

Apart from the ownership of account, the next point of interest is the use of the account to save. The use of an account to save is not part of ownership of an account because it is not every one who owns a formal account who actually saves. This particular information is provided in the following question*: In the past 12 months, have you saved or set aside any money?* The interest here is on only formal account holders. Thus, the proportion of individuals who own formal accounts and use it for savings in a formal financial institution. It takes the binary form 1 for yes if the individual saves or has set aside any money in the past

[4] Beck et al., (2007), Allen et al., (2012), Demirguc-Kunt and Klapper (2013), Klapper and Singer (2013), Efobi et al., (2014), Camara et al., (2014), Fungáčová and Weill (2015).

12 months and 0 otherwise. This measure has been used in other studies.[5] Again, the expectation is that that the poor who saves money in their accounts should have a reducing poverty rate. This is because savings can help the poor to accumulate capital to undertake investment on any business venture.

3.4.3 Frequency of Withdrawals

Another important indicator of financial inclusion considered is the frequency of withdrawals from the account. The usage of accounts is considered because it is initiated by the accounts holders unlike the deposits where other people such as individuals, employers, government could deposit money into the respondent's accounts (Allen *et al.*, 2012). In the questionnaire, accounts holders were asked this question. *In a typical month, how many times is money taken out of your personal account(s)? This includes cash withdrawals, electronic payments or purchases, cheques, or any other time that money was removed from your account(s) by yourself or others. Respondents were asked if they operate (A) Zero withdrawals, (B) 1-2 times, (C) 3-5times, or (D) 6 or more times.* The frequency of withdrawal is defined as a dummy that takes the value 1 if money is withdrawn for at least 3-5 times in a typical month and 0 otherwise (Allen *et al.,* 2012). Higher income individuals are more likely to do more withdrawals than lower income individuals in a typical month. Thus, the frequency of withdrawal signals a declining poverty. We therefore, expect a negative relationship between an increase in frequency of withdrawals and poverty. The reason is that the poor who now withdraws frequently is assumed to have had an improved welfare and thus will signal a decline in poverty all other things being equal.

[5] See all those listed in foot note 4.

3.4.4 Access to Formal Credit

Furthermore, we used formal access to credit to proxy for financial inclusion. This information was obtained from the following question: *In the past 12 months have you borrowed any money from a bank, credit union, microfinance institution or another financial institution?* It takes the value of 1 if the individual answered yes and 0 otherwise. Again, in this case formal accounts holders were sampled. This helps to restrict the definition of financial inclusion to having access to formal financial services by the poor. Borrowing has some effect on the poor who are financially included. Thus, it will help to make funds available to the poor who will intend invest those funds thereby getting them out of poverty. This is interpreted with the caveat that interest rates are generally low and that the poor had access to funds for borrowing from formal financial institutions.

3.4.5 Dependent Variable for Poverty Reduction (Poorest Income Quintile)

In estimating the treatment effect model and propensity score matching, the income distribution is used. The poorest income quintile is used to proxy for poverty. This is because the data available only provides the income quintiles of those interviewed. Also, there is no complete information on the actual income of those interviewed at the Global Financial Inclusion Findex database requiring the use of income quintiles. This has been used in similar studies to measure income of the poor.[6] The within-country income quintiles, as captured by the Global Financial Inclusion Findex dababase 2012, is used in this study.

[6] See Dollar and Kraay (2002) and Donaldson (2008). Dollar and Kraay define the poor as the lowest quintile in terms of income. They compile dataset from four different standard sources to produce 953 observations from 137 different countries or territories during 1950-99 to measure the income of the poor and growth.

3.4.6 Independent Variables

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

3.4.7 Gender and Age

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

3.4.8 Income Quintiles

The income quintile variables are indicators of within-country relative income, based on the income of the respondents in a country. There are five of such dummies. These variables are defined in Table 5.11 of the appendix. The top income quintile is the excluded category in the regressions). This is to serve as a reference point for comparison and to overcome dummy variable trap. It ranges from the poorest 20% to the richest 20%.[7] Overall, financial inclusion is expected to increase with income (Allen *et al.*, 2012; Fungáčová and Weill 2015).

[7] We use these quintiles because we did not have complete data on the actual income of the individuals. Further the Gallup World Poll (GWP) only provides imputes within-country (relative) income quintiles for all observations, but does not published the imputed absolute income levels. In 2011, income data were imputed for 14% of income observations worldwide. Gallup uses published data on individual's characteristics as well as

3.4.9 Educational Level

Each of the respondents falls within the three groups of educational levels. Primary or less education is defined as 0-8years of education. Also, a respondent is described as having secondary education if his/her educational level falls between 9-15years and Tertiary or beyond high school as 4 years or more of college or university education (Allen *et al.*, 2012). The likelihood of financial inclusion is expected to increase with respect to individual's level of education. Also, the primary or less education serves as the reference point for secondary and tertiary education. The rate at which individual rates of poverty reduces is in response to the individual's level of education. The higher the educational level the lower the rate of poverty, all other things being equal. Detailed variable description can be seen in Table 5.11 of the appendix.

3.4.10 Relative Ownership of Account

Account ownership by relative is a barrier to financial inclusion. This is obtained from the following question: *Please tell me whether each of the following was a reason why you, personally, DO NOT have an account at a bank, credit union or other financial institution (a) too far (b) lack of documentation (c) lack of trust (d) lack of money (e) family member has.* For the purpose of this study only family member ownership of account is used. Respondents were made to make multiple choices. The level of barrier to financial inclusion shows individual's inability to be financially included. Except the reason provided as "family member has an account" as reason not to own an account by a household, the rest of the barriers do not have an effect on account ownership and withdrawals partly due to collinearity of the variables with formal account and frequency of withdrawals. This explains

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proprietary data on each household member to impute income. For detail information see www.gallup.com and Allen et al., (2012).

why all these variables are not included in this study. So only relative/family member ownership of accounts is used to measure a barrier to financial inclusion in this study. This means that the likelihood of an individual being financially inclusive will decline with respect to family member's being financially included. Similarly, when a family member is included such an individual is more likely to reduce poverty than those who are not included all other things being equal.

3.4.11 Informal Borrowing

Informal borrowing is also considered in this study as a determinant of financial inclusion. We included it to observe the effect of other sources of finance on poverty reduction and how they can influence one's level of financial inclusion. This is based on the answers to the following questions (yes =1 and no =0). *Have you borrowed money from a store in the past 12 months, borrowed money from a family/ friend in the past 12 months, borrowed money from employer in the past 12 months and finally borrowed money from private money lender in the past 12 months?* Efobi *et al.,* (2014) considered informal borrowing as a financial discipline composite indicator in their studies and argue that individuals' ability to manage his or her immediate sources of finance without necessarily seeking for external debt enables him to be financially included. The difference between this study and Efobi *et al.,* (2014) is that this study seeks to investigate the individual variables effects instead of making it a composite indicator. A positive relationship between financial inclusion and informal borrowings is expected. However, we expect a negative relationship between poverty and informal borrowing attributes. Also the net effect is that it increases an individual's ability to be financially included for people who borrow from employer, money lenders and stores since those people are more likely to issue cheques to their debtors than their counterparts who result to borrowing from family/friends. This explains why those individuals' who

borrow from friends/family might be less likely to be financially included. Arguably, the expectation is that having access to informal sources of finance could lessen the financial constraints of individuals and hence will help to reduce the rate of poverty among them.

3.5 Financial Inclusion and Poverty Reduction

We estimate the second objective of this study, which is the effect of financial inclusion on poverty reduction by using the Treatment Effect Model of the Heckman sample selection procedure which is able to overcome sample selection bias and endogineity problems. Since we want to see how financial inclusion is able to reduce poverty, some financial inclusion providers may concentrate into providing services to people who are rich, belong to certain class or city. One way to over it is to use sample selection procedure which is capable of overcoming sample selection bias according to Heckman (1979) and the use of Propensity Score Matching (Dehejia and Wahba).

3.5.1 Treatment Effects Model

We employ the Treatment Effect Model to test for the effect of financial inclusion on poverty reduction in our second objective. The main hypothesis of the study is that financial inclusion reduces poverty among low income people in Sub-Saharan Africa. The study uses cross-sectional data across SSA countries to compare the income quintile of the poorest 20% who are financially included and those who are not included, as long as access to finance is randomly distributed across the population. However, statistical comparison cannot be made on the average of the poorest income quintile for those with access to finance and those without because of sample selection bias. According to Imai *et al.,* (2010) the sample selection bias may arise from two key problems. First, self-selection where the individual based on observable and unobservable individual characteristics such as age, gender, income etc. may not take part in financial inclusion activities. The second is endogenous programme

placement where those who implement financial inclusion programmes may decide to select a particular group of people with certain characteristics such as (higher poverty rates, good credit records, rich etc.) depending on the programme criteria. The study therefore employs the treatment effect version of the Heckman sample selection model[8] (Heckman, 1979). This model estimates the effect of an endogenous binary treatment. This compensates for sample selection bias associated with access to formal financial services by the poor. The model is estimated in two stages. In the first stage, the indicators of financial inclusion are estimated by a probit model. In the second stage we estimate the poorest income quintile by the various individual characteristics and a dummy indicating whether an individual is financially included or not. This is done after controlling for inverse Mill's ratio which caters for sample selection bias. The instruments employed as proxies for indicator of inclusion are formal ownership of account, savings, credit and frequency of withdrawals. These are used as treated variables in the second stage of the Treatment Effect Model.

The merit of the Treatment Effects Model is that sample selection bias is clearly estimated by using the results of the probit model. According to Imai *et al.*, (2010), the Treatment Effect Model has three weaknesses. First, strong assumptions are being imposed on the distributions of error terms both in the first and second stages. Second, the results are sensitive to the choice of explanatory variables and instruments, and finally valid instruments are rarely found in non-experimental data. In general, the probit model is what is used in estimating the treatment effect model.

[8] Heckman (1979) proposed a two-stage estimation procedure using the inverse Mills ratio to take account of the selection bias. In a first step, a regression for observing a positive outcome of the dependent variable is modeled with a probit model. The inverse Mills ratio must be generated from the estimation of a probit model, a logit cannot be used. The probit model assumes that the error term follows a standard normal distribution. The estimated parameters are used to calculate the inverse Mills ratio, which is then included as an additional explanatory variable in the OLS estimation.

Following Greene (2012) and Imai *et al*., (2010) the selection mechanism for the probit model can explicitly be specified as:

$$H^{*}{}_{i} = \gamma X_{i} + \mu_{i} \quad (2a)$$

And $H^{*}_{i}=1$ If $H^{*}_{i}= \gamma X_{i}+\mu_{i} > 0$,

$H^{*}_{i}= 0$, if $H^{*}_{i}= \gamma X_{i}+\mu_{i} \leq 0$

$\Pr\{H_i = 1|X_i\} = \Phi(\gamma X_i)$, Again, $\Pr\{H_i = 0|X_i\} = 1 - \Phi(\gamma X_i)$

And

$H_i^* = 1$ if $H_i^* = \gamma X_i + \mu_i > 0$ is the selection equation. (2b)

H_i^* is a latent variable which measures the four indicators of financial inclusion (account, withdrawals, savings and credit). X_i is the vector of individual attributes and the instrument for participating equation for the financial inclusion. These are female, age, education, loans from stores, family/friends, employers and money lenders and relative ownership of account. γ are the parameters for the vector equation and μ_i is the normal error term. Φ denotes the standard normal cumulative distribution function.

In the second stage, the linear outcome regression model is specified as:

$$W_i = \beta' R_i + \theta H_i + \varepsilon_i \quad (3)$$

Where (μ_i, ε_i) bivariate normal $[0, 0, 1, \sigma_{\varepsilon}, \rho]$,

Poverty is proxied by the 20% poorest income quintile. This is represented by the W_i in the model (3) above. This is because the data does not provide other composite measures of poverty such as Multidimensional Poverty Index (MPI), Gini concentration ratio, poverty gap, square poverty gap etc. The poorest income quintile has been used in several studies (see

Dollar & Karry 2002; Lopez, 2003 & Beck *et al.*, 2004), to measure the income of the poor. R_i is the vector of individual characteristics excluding the instrument of participating in financial inclusion equation by the poor. θ is the average net wealth benefit of participating in financial inclusion. This represents the coefficients of the treatment indicators of financial inclusion.

Following Imai *et al.*, (2010), and using the formula for the joint density of bivariate normally distributed variables, the expected 20% poorest income quintile for those who are financial included is expressed as:

$$\mathrm{E}[W_i|\mathrm{H_i}=1] = \beta'\mathrm{R_i} + \theta + \mathrm{E}[\varepsilon_i|\mathrm{H_i}=1] = \beta'\mathrm{R_i} + \theta + \rho\sigma_\varepsilon\left[\frac{\emptyset(\gamma' X_i)}{\Phi(\gamma' X_i)}\right] \quad (4)$$

Where ∅ is the standard normal density function. The ratio of ∅ to Φ is the inverse Mill's ratio[9]. The inverse Mills ratio helps us to determine whether the model is to be estimated by OLS or maximum likelihood estimation.

The expected total poverty gap for non-poor is specified as:

$$\mathrm{E}[\mathrm{W_i}|\mathrm{H_i}=0] = \beta'\mathrm{R_i} + \mathrm{E}[\varepsilon_i|\mathrm{H_i}=0] = \beta'\mathrm{R_i} - \rho\sigma_\varepsilon\left[\frac{\emptyset(\gamma' X_i)}{1-\Phi(\gamma' X_i)}\right] \quad (5)$$

Therefore the expected effect of poverty reduction associated with the poor who are financially included is expressed as (Greene, 2012, & Imai *et al.*, 2010):

$$\mathrm{E}[\mathrm{W_i}|\mathrm{H_i}=1] - \mathrm{E}[|\mathrm{H_i}=0] = \theta + \rho\sigma\varepsilon\left[\frac{\emptyset(\gamma' X_i)}{\Phi(\gamma' X_i)[1-\Phi(\gamma' X_i)]}\right] \quad (6)$$

[9] The inverse Mill's ratio is obtained through the estimation of the second stage of the Heckman's sample selection model. The use of inverse Mills ratio is often motivated by truncated normal distribution.

According to Imai *et al.*, (2010) if ρ is positive (negative), the coefficient estimate θ of using OLS is biased upward (downward) and the sample selection term will correct this problem. Since σ_ε is positive, the sign and significance of the estimate of $\rho\sigma_\varepsilon$will show whether any selection bias exists. To estimate parameters of this model, the likelihood function given by Maddala (1983) is used where the bivariate normal function is reduced to the univariate function and the correlation ρ.

3.5.2 Propensity Score Matching

The above regression approach estimates the correct treatment effect if the "selection on observables" hypothesis is true, namely, if all variables correlated both with the treatment and outcome variables are observed and included in the model. It is also assumed that the true model is a linear and additive one. As an alternative methodology and robustness check, matching propensity scores are employed (Rosenbaum & Rubin, 1983) to compare financially included and excluded individuals which are ex-ante very close in terms of all the observable characteristics. While the propensity score matching procedure also relies on the "selection on observables" assumption, it does not depend on the assumption of functional forms. Compared to the regression approach, it has the additional advantage of restricting inference to the sample of the poor who are financially included and the control group who are not included but are actually comparable in their observable characteristics.

If it is assumed that there are no significant differences in unobservable variables between the matched groups of households/individuals, the observed differential in obtaining financing can be attributed to the effect of having received the treatment – in this case being the poor who are financially excluded households/individuals. Following Dehejia and Wahba (2002), we matched the households/individuals based on the nearest-neighbour with the replacement propensity score methodology and compare the probability of the poorest income quintile in

the two groups. Propensity scores, defined in this case as the probability of being a financially included households/individuals, given a set of observable covariates, are estimated by means of a logit model.

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents the results of the study and discusses it in line with the objectives and the hypothesis outlined in chapter one. It presents the descriptive statistics and regressions. In line with one of the objectives of study, on the factors that influence financial inclusion, detailed results are presented on indicators of financial inclusion such as formal use of accounts, savings, withdrawals and credit. Treatment Effect Model of the Heckman Sample selection model (Heckman, 1979), which estimates the effect of endogenous binary treatment is used for the second objective of the study. Also, robustness checks are carried out using Propensity Score Matching (PSM) technique for the poverty reduction.

4.2 Summary of Descriptive Statistics

The summary statistics of the variables are presented in Table 4.3 and Table 4.4. There are 35,000 respondents comprising 48.7% females and 50.8% males. The results show that majority of the individuals 50.8% report having primary education as their highest level of educational attainment, 44.0% report having secondary education as their highest level of education and 4.7% report having tertiary level of education. Considering the income distribution of the individuals, 20.4% report being within the 20% poorest income quintile category. The rest of the individuals are distributed across the other income categories as follows: the second poorest 20% (19.1%), middle income 20% (19.5%), fourth income 20% (20.6%) and richest income 20% (20.4%). This shows that income distribution in SSA Africa is evenly distributed. In relation to financial inclusion indicators, 23.8% report owning an account at a formal financial institution in SSA and the remaining 76.2% are unbanked confirming the findings of Demirguc-Kunt and Klapper (2012) that less than one-quarter of

the adult population in Africa have bank account and the rest of them are unbanked. This results, represents an appalling financial inclusion situation. Considering the fact that respondents are made up of individual's aged 15 years and above, which validates the assertion that many adults in Sub-Saharan Africa do not patronize financial services (Efobi *et al.*, 2014). Out of those who own accounts, 15% of them use it to save, 6.8% of them use it to access credit and about 4.3% withdraw from their account three or more times in a typical month.

The percentage of relatives who own accounts is 14.1% implying that if a relative in a family has a bank account in SSA, the tendency for other members to own an account would be low. Regarding income from other sources, 14.4% borrow from the store, 27.4% borrow from family and friends, 4.6% borrow from money lenders and 4.6% borrow from their employers. This suggests that more people prefer to borrow from family and friends in SSA than other sources of borrowing such as the formal financial institutions. This may be attributed to high interest rates charged by financial institutions, hideous documentations challenges and proximity to banks. Similarly, Table 4.2 presents the mean, minimum and maximum values of the ages of the individuals in SSA. The average age of the respondents is 34 years with minimum and maximum ages of 15 and 99 respectively. The results are shown in Tables 4.3 and 4.4 respectively.

Table 4.3: Descriptive Statistics

Variable	Measures	Response	Percent	Frequency
Formal Account	Have a bank account	Yes	23.8	8336
		No	76.2	26651
Formal Savings	Save at financial Institution	Yes	15.0	5253
		No	85.0	29734
Withdrawals	3 or more withdrawals in a month	Yes	4.3	1519
		No	95.7	33468
Formal Credit	Borrow money in a financial institution in the past 12 months	Yes	6.8	2392
		No	93.2	32595
Gender	Male	Male	50.8	17782
	Female	Female	48.7	17035
Educational Status	Primary	Completed Primary	50.8	17794
	Secondary	Completed Secondary	44.0	15407
	Tertiary	Completed Tertiary	4.7	1644
Income Characteristics	Income quintile	Poorest 20%	20.4	7132
		Second 20%	19.1	6684
		Middle 20%	19.5	6816
		Fourth 20%	20.6	7222
		Richest 20%	20.4	7144
Informal Borrowing	Stores	Yes	14.4	5049
		No	85.2	29832
	Friends/family	Yes	27.4	9588
		No	72.3	25304
	Employer	Yes	4.6	1620
		No	92.2	32271
	Money lender	Yes	4.6	1607
		No	92.2	32279
Relative has account	Don not have account because family member has one	Yes	14.1	4925
		No	64.7	22660

Source: Author's estimate from Findex Dataset (2012)

Table 4.4: Descriptive Statistics of Age for Respondents

Variable	Mean	Min	Max	Obs
Age	34.23	15	99	34987

Source: Author's estimate from Findex Dataset (2012

4.3 Determinants of Financial Inclusion

The first objective of this study is to examine the determinants of financial inclusion specified in the first model in chapter three above. The financial inclusion indicators include probability of owning formal account, frequency of withdrawals, formal savings and access to formal credit. The results from the probit model estimations and marginal effects for the various determinants of financial inclusion are presented in Table 4.5.

Table 4.5: Results of Probit Estimations of the Indicators of Financial Inclusion Variables

	Formal Account (1)		Frequency of Withdrawals (2)		Formal Savings (3)		Formal Credit (4)	
Variables of Models	Coefficient	dy/dx	Coefficient	dy/dx	Coefficient	dy/dx	Coefficient	dy/dx
Female	-0.0337**	-0.0094**	-0.0559**	-0.0033**	-0.0136	-0.0027	-0.0288	-0.0030
	(0.0161)	(.0045)	(0.0262)	(0.0015)	(0.0177)	(0.0035)	(0.0222)	(0.0023)
Age	0.0731***	0.0204***	0.0361***	0.0021***	0.0622***	0.0125***	0.0700***	0.0072***
	(0.0027)	(0.0008)	(0.0046)	(0.0003)	(0.0031)	(0.0006)	(0.0042)	(0.0004)
Age Square	-0.0007***	-0.0002***	-0.0003***	-0.0000***	-0.0006***	-0.0001***	-0.0007***	-0.0001***
	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)
Secondary	0.8475***	0.2434***	0.5320***	0.0343***	0.5026***	0.1048***	0.3428***	0.0368***
	(0.0181)	(0.0051)	(0.0307)	(0.0022)	(0.0196)	(0.0042)	(0.0247)	(0.0027)
Tertiary	1.3389***	0.4846***	0.9836***	0.1315***	0.8266***	0.2374***	0.4621***	0.0663***
	(0.0359)	(0.0128)	(0.0473)	(0.0105)	(0.0360)	(0.0130)	(0.0443)	(0.0083)
Income: Poorest 20%	-0.7181***	-0.1638***	-0.5855***	-0.0254***	-0.6118***	-0.0990***	-0.5014***	-0.0409***
	(0.0268)	(0.0049)	(0.0469)	(0.0016)	(0.0303)	(0.0038)	(0.0374)	(0.0024)
Income: Second 20%	-0.6445***	-0.1490***	-0.5425***	-0.0236***	-0.4410***	-0.0752***	-0.3915***	-0.0332***
	(0.0260)	(0.0049)	(0.0445)	(0.0015)	(0.0283)	(0.0040)	(0.0352)	(0.0025)
Income: Middle 20%	-0.3891***	-0.0973***	-0.3017***	-0.0149***	-0.2842***	-0.0515***	-0.3433***	-0.0299***
	(0.0241)	(0.0054)	(0.0382)	(0.0016)	(0.0263)	(0.0043)	(0.0335)	(0.0025)
Income: Fourth 20%	-0.2624***	-0.0683***	-0.1432***	-0.0078***	-0.1371***	-0.0262***	-0.1981***	-0.0186***
	(0.0230)	(0.0056)	(0.0343)	(0.0017)	(0.0245)	(0.0045)	(0.0306)	(0.0026)
Relative owns an account	-0.0059	-0.0016	-1.0354***	-0.0329***	0.4999***	0.1220***	-0.2955***	-0.0256***
	(0.0230)	(0.0064)	(0.0691)	(0.0013)	(0.0225)	(0.0064)	(0.0338)	(0.0024)
Stores	0.0227	0.0064	0.0565	0.0035	-0.1397***	-0.0297***	0.5358***	0.0751***
	(0.0229)	(0.0065)	(0.0371)	(0.0024)	(0.0238)	(0.0054)	(0.0268)	(0.0048)
Family or friends	-0.0037	-0.0010	0.1251***	0.0078***	0.0651***	0.0133***	0.0810***	0.0086***
	(0.0184)	(0.0051)	(0.0280)	(0.0018)	(0 .0201)	(0.0042)	(0.0244)	(0.0027)
Employers	0.1080***	0.0313***	0.1709***	0.0117***	0.2487***	0.0566***	0.3191***	0.0415***
	(0.0368)	(0.0111)	(0.0528)	(0 .0042)	(0.0373)	(0.0095)	(0.0415)	(0.0066)
Money Lenders	0.1292***	0.0378***	.3018***	0.0232***	0.0294	0.0060	0.5297***	0.0796***
	(0.0370)	(0.0113)	(0.0499)	(0.0049)	(0.0401)	(0.0083)	(0.0407)	(0.0083)
Constant	-2.4095***	-	-2.5810***	-	-2.4822***	-	-2.9890***	-
	(0.0578)		(0.0953)		(0.0650)		(0.0867)	
Observations	34987	34987	34987	34987	34987	34987	34987	34987
No of Countries	35	35	35	35	35	35	35	35
Joint Significance	6410.76	6410.76	1715.08	1715.08	3562.28	3562.28	1992.70	1992.70
Log likelihood	-15997.81	-15997.81	-5389.89	-5389.89	-13009.83	-13009.83	-7726.71	-7726.71
Pseudo R2	0.1669	0.1669	0.1373	0.1373	0.1204	0.1204	0.1142	0.1142

Note: Each of the column represents the estimation of results of a regression of financial inclusion indicator on a set of individual characteristics. These financial inclusion indicators are as follows. Formal account refers to adults reported to currently have an account at a formal financial institution. Savings refers to adults to have set aside money for the past 12 months using a formal financial institution. Withdrawals refers to adults reported to have taken money out of their personal account(s) 3 or more times in a typical month. Finally credit refers to adults reported to have borrowed money from a financial institution in the last 12 months. The exact definitions of the data sources and variables are presented in Table 5.11 in appendix 1. Standard errors are in parentheses and are clustered at the country level ***, **, and * denote significance level at the 1%, 5% and 10% level, respectively. The dy/dx represents the marginal effects of the various indicators of financial inclusion variables.

To examine the factors that influence financial inclusion in SSA, the probit models presented in Table 4.5 are estimated in line with Allen *et al.*, (2012) and discussed. According to Allen

et al., (2012) the cross sectional nature of the data, only allows for interpreting the results in a correlational manner instead of establishing significant relationship. In Table 4.5 the first column shows formal account as an indicator for financial inclusion with the base line probit model coefficient with the robust standard errors in parenthesis and a marginal effects (ME) and its robust standard errors in parenthesis as well. Similarly, frequency of withdrawals is in column three (3) with the ME in column four (4), formal savings in column five (5) with the ME in column six (6) and access to formal credit in column seven (7) with the ME in column eight (8). The results from Table 4.5 are discussed below.

The independent variables considered in this study include female dummy, age, age square, secondary education, tertiary education, income quintiles, and relative ownership of an account, borrowing from stores, family/friends, employers and money lenders.

We first provided the analysis of the **income quintiles** of individuals as a determinant of financial inclusion in SSA. The results from Table 4.5 indicates that formal account, frequency of withdrawals, formal savings and formal credit are associated with income. The income quintile dummies for the various indicators of financial inclusion show negative but significant relationship among all the financial inclusion indicators. The coefficients for the poorest income quintiles are very large among all the financial inclusion indicators. This means that individuals within the poorest income quintile are less likely to be financially included than those in the richest income quintile.

For instance using the marginal effects of the various income quintiles for the inclusion indicators, the results indicate that the likelihood of owning a formal account among those in the lowest income quintile is 16.4 percentage points lower than those in the highest/richest income quintile. Likewise the likelihood of frequency of withdrawals with those in the lowest

income quintile is 2.5 percentage point lower than those in the highest income quintile. That of formal savings and credit is 9.9 percentage point and 4.1 percentage point respectively lower than the reference point.

Further, we find that those within the second income quintile are 14.9 percentage point less likely to own an account at a formal financial institution than those in the richest income quintile. We also find that they are less likely to withdraw frequently, save and to borrow from a formal financial institution than those in the richest income quintile. In looking at those in the middle income quintile, they are less likely to own an account, withdraw frequently, save and borrow than those in the richest income quintile. Finally, those who are in the fourth income quintile are also less likely to own an account, withdraw frequently, save and borrow from a formal financial institution than the richest.

These findings are in line with Allen *et al*., (2012); Demirgüc-Kunt and Klapper (2013); and Fungáčová and Weill (2014) who find that financial inclusion is dependent on the level of income of the individual. Also, Efobi *et al*., (2014) find positive relationships between financial inclusion indicators and income in Nigeria using the Findex dataset.

Another important determinant of financial inclusion considered is **education**. The dummy variables for education positively correlates with all the financial inclusion indicators used in this study. The coefficients are larger for both secondary and tertiary education. For instance the ME shows that the individual who has secondary education is 24.3 percentage points more likely to own an account than someone who has primary or less education. Further, that of tertiary education is 48.46 percentage point more likely to own an account than primary or less education and secondary school graduates. It is also evident from the results that education plays a critical role in financial inclusion when using frequency of withdrawals as a

dependent variable. The results suggest a positive and significant relationship for secondary and tertiary education suggesting that the level of an individual's education has an influence on his/her withdrawal pattern.

Then again, the story is not different from that of formal savings and credit. Higher education connotes the use of account for savings and credit. This indicates positive and significant coefficients shown in Table 4.5. Similarly, the ME shows positive and significant signs for education in terms of savings and access to credit. This means that education positively correlates with savings and access to credit as indicators of financial inclusion. Thus ones level of education has the tendency to increase his level of savings and also the demand for credit in a formal financial institution. This finding is in line with Fungáčová and Weill (2014) who find a positive relationship between education and financial inclusion indicators such as formal account and credit in China. However, their studies could not establish any significant relationship for formal savings because a sizeable proportion of people in China find it prudent to save irrespective of their educational level. Furthermore, the result is also consistent with Efobi *et al.*, (2014) who document a significant and positive relationship between education and use of banks services and bank account for savings in Nigeria.

Further, the **female** dummy was also considered as a determinant of financial inclusion. This was to enable us to test whether being female affects the likelihood of being financially included. The results from Table 4.5 thus suggests that females are less likely to be financially included, since all the financial inclusion indicators show a prior sign of negative. That is the female dummy negatively correlates with all the financial inclusion indicators we examined. However, the female dummy indicates a negative and significant relationship for two of the inclusion indicators formal account and frequency of withdrawals.

The negative coefficient of the female dummy is not surprising because generally income stream of females are slimmer than their male counterparts. Also, females have greater burden emanating from home expenditure than their male counterparts in SSA, suggesting their inability to open bank account (Efobi *et al.*, 2014). In addition, males have access to formal jobs than their females' counterparts suggesting why females are less likely to open bank account, save, get access to credit and make frequent visit to the bank as well. Furthermore, Demirguc-Kunt, Klapper and Singer (2013) argue that legal discrimination against women and gender norms may explain some of the cross-country variations in access to finance for women. They posit that in countries were women face legal restrictions in their ability to work, head a household and choose where to live, and receive inheritance women are less likely to own an account relative to their male counterparts. This finding is consistent with Allen *et al*., (2012); Efobi *et al.*, (2014); and Fungáčová and Weill (2014) who find evidence that females are less likely to be financially included than their male counterparts.

The **ages** of the individuals were also considered. The results from Table 4.5 show that the impact of age is identical for the four financial inclusion indicators. It shows significant effects for *Age* and *Age square*, which are respectively positive and negative. Hence there is a nonlinear relation between age and financial inclusion. This means that older people use more formal financial services than the rest of the population does, but this obtains only up to a certain age. Why do the findings suggest less usage after a certain age? According to Fungáčová and Weill (2014) this observation is interpreted in terms of a "generational effect", which may be derived from the demand side or the supply side. They posit that older individuals might be more reluctant to use formal financial services as they are not used to using them. Further, Modigliani's "life cycle" hypothesis predicts that the amount individuals save changes over time since they have to build up their assets at the initial stages of their

working life in order to spend during retirement. This finding is at odds with Allen *et al*., (2012) who document that the discrete decision to have formal savings (conditional on having formal account) is not associated with age, whereas this study finds the relationship to be positive and significant for age and negative and significant for age square for savings. This shows that individuals save during their working life in order to spend when they get older.

Alternatively, financial institutions might put less effort into attracting older clients since they are no longer active workers and will earn less to engage in financial market activities. Allen *et al.,* (2012) document nonlinear relation between formal account and withdrawal but not savings and Fungáčová and Weill (2014) also document a similar nonlinear relation between age and formal account, savings and credit respectively for China and finally, Efobi *et al.,* (2014) find non-linear relationship between age and frequency of withdrawal and not the use of bank services and use of bank account to save respectively in Nigeria.

One other variable measured was barrier to financial inclusion captured as **relative owns an account** in the model. This was used because the other barriers for financial inclusion such as documentation, distance, lack of money and lack of trust were found to be highly correlated with account ownership and frequency of withdrawals respectively. From Table 4.5 the impact of a relative owning formal account is significant for only three of the financial inclusion indicators, which are frequency of withdrawals, formal savings and formal credit. The coefficients are negative and significant for both frequency of withdrawals and formal credit. However, it is positive and significant for savings. The coefficient of formal account with regard to this barrier is not significant but it has the expected sign. This can be interpreted to mean that individuals whose relatives own an account in a household are less likely to also own an account.

Furthermore, the savings coefficient shows positive and significant relationship, suggesting that an individual whose relative owns an account is 12.2 percentage point more likely to give money to a household member to save for him/her than those who do not have. This will further prevent such a person from becoming financially included. This is because such a person can always free-ride when it comes to payment of bank charges. Besides, such individual are less likely to own a personal account, withdraw frequently and less likely to access credit as well. This would strengthen that persons' exclusion from the formal financial system.

The last determinant considered was **informal borrowing** measured by four variables. They include borrowing from stores, family/friends, employers and private money lenders. The results from Table 4.5 indicates that borrowing from a store is not significant for formal account holders and frequency of withdrawals. It however, shows a positive sign implying that such individuals are more likely to be financially included. It shows negative and positive significance for formal savings and access to credit respectively. This means that if one borrows from a store, that person is less likely to save money in a formal financial institution. Also, the results indicate that a person who borrows from a store is more likely to borrow from a financial institution hence being financially included.

The results further indicate that individuals who borrow from friends/family are less likely to own an account at a formal financial institution. However, the results show that individuals who borrow from friends/family are more likely to withdraw frequently, do formal savings and also borrow at the same time from a formal financial institution. The results are surprising because one would have except that individuals who borrow from family/friends would have possess an account at a formal financial institution that will enable him or her to

withdraw frequently, save and also borrow from formal financial institution as the results suggest.

Borrowing from employers suggests a positive and significant relationship with all the financial inclusion indicators in Table 4.5. This means that those who borrow from their employers are 3.1 percentage points more likely to have a formal account, 1.2 percentage points more likely to make frequent withdrawals, 5.7 percentage points more likely to save with the bank and 4.2 percentage points more likely to take formal bank loans as well. What this means is that individuals who borrow from their employers are highly financially included. This is because such an individual needs to possess an account in which he/she receives the monthly salary. Such an account can be used for frequent withdrawals, maintain savings and access bank loans as well.

Finally, from Table 4.5, private money lenders coefficients show positive and significant relations among three of the financial inclusion variables namely formal account, frequency of withdrawals and access to credit. This means that individuals who borrow money from private money lenders are more likely to be financially included than their counterparts who borrow from other sources. However, such an individual is more likely to save as well, since the coefficient show positive sign but not significant. The marginal effects show that those who borrow from money lenders are 3.8 percentage points more likely to have formal account, 2.3 percentage points more likely to withdraw, 0.6 percentage point more likely to save and 8.0 percentage point more likely to borrow from a formal financial institution. From this, we can deduce that those who borrow from money lenders are more likely to have loans with formal financial institutions and this will further enhance their level of financial inclusion because of the welfare gains he/she gets from having account such as credit.

4.4 Financial inclusion and Poverty Reduction

In this section two set of results are presented. The first section presents results on the Treatment Effect Model and the second section presents results on the Propensity Score Matching (PSM) technique.

4.4.1 Treatment Effect Models Results

The treatment effect is estimated in order to achieve the second objective of the study. Our second objective was to investigate the effect of financial inclusion on poverty reduction. We use the treatment effect model to carry out that objective. The treatment effect is estimated in two stages. Thus, stage one produces the probit results for the determinants of financial inclusion and stage 2 produces the treatment effects results. Table 5.14 appendix II shows the probit estimates of the financial inclusion indicators (account, withdrawals, savings and credit) which provides the basis for the estimation of the treatment effect model. Table 4.6 shows the results of the treatment effects models. The dependent variable is poorest income quintile. The financial inclusion indicators are used as the treatment conditions. Here, the aim is to establish the need for being financially included as a means of reducing the poverty levels of the poor. The results are presented separately for the various financial inclusion indicators that are used as the treatment variables. They are indicated as formal account in column 1, frequency of withdrawals for column 2, formal savings in column 3 and access to formal credit in column 4 respectively.

Table 4.6: The Results of the Treatment Effect Model for Poverty Reduction in SSA

Variables	Formal Account	Frequency Withdrawals	Formal Savings	Formal Credit
Female	0.0138***	0.0245***	0.0210***	0.0232***
	(0.0044)	(0.0042)	(0.0043)	(0.0042)
Age	0.0145***	0.0126***	0.0137***	0.0128***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Age Square	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Secondary education	-0.0201***	-0.1043***	-0.0766***	-0.1061***
	(0.0056)	(0.0046)	(0.0048)	(0.0045)
Tertiary education	0.0007	-0.1623***	-0.1046***	-0.1797***
	(0.0127)	(0.0110)	(0.0114)	(0.0106)
Relative has account	-0.0346***	-0.0574***	0.0121*	-0.0507***
	(0.0066)	(0.0064)	(0.0067)	(0.0064)
Stores (Loans)	0.0091	0.0076	0.0209**	0.0331***
	(0.0065)	(0.0063)	(0.0064)	(0.0065)
Family/Friend (loans)	-0.0052	0.0015	0.0007	-0.0001
	(0.0051)	(0.0049)	(0.0050)	(0.0049)
Employers (loans)	-0.0058	-0.0162	0.0057	-0.0020
	(0.0108)	(0.0104)	(0.0107)	(0.0105)
Money lenders (loans)	-0.0295***	-0.0353***	-0.0440***	-0.0140
	(0.0109)	(0.0105)	(0.0107)	(0.0107)
Financial inclusion indicators	-0.4218***	-0.3413***	-0.3986***	-0.3268***
	(0.0132)	(0.0236)	(0.0146)	(0.0187)
Inverse Mills ratio	0.1880***	0.1204***	0.1681***	0.1234***
	(0.0072)	(0.0103)	(0.0075)	(0.0085)
Constant	-3.0863***	-3.2307***	-3.1165***	-3.6059***
	(0.0525)	(0.0942)	(0.0606)	(0.0850)
No of Observations	34987	34987	34987	34987
Wald chi2(6)	10435.92	10319.58	10419.54	10353.18
Log likelihood	-33458.26	-22782.71	-30364.58	-25075.38

Note: The Dependent Variable is Poorest Income Quintile. It is denoted by 1 for those who are financially included and 0 otherwise. The treatment dependent variables are formal account 1 and 0 otherwise, withdraws 3 or more times in a month 1 and 0 otherwise, formal savings last 12months 1 and 0 otherwise and formal credit 1 and 0 otherwise. Standard errors are in parentheses and are clustered at the country level ***, **, and * denote significant at the 1%, 5% and 10% level, respectively.

The main variable of interest in the independent variables are the treatment conditions. These are formal account, withdrawals, savings and access to credit. In addition, the control variables used are female dummy, age, age-square, a relative owns an account, loans from stores, family/friends, employers and money lenders. The inverse mills ratio was also used.

The results from Table 4.6 show that the **female dummy** indicates lower coefficients for poorest income quintile for all the models estimated. It is positive and significant at 1% level for all the models estimated. This means that females are more likely to be poor than their male counterparts. This is partly due to the fact that males have access to formal jobs and earn higher incomes than their females counterparts in SSA who often are engaged in menial jobs or petty trading. Also, females have greater burden coming from household than their male counterparts, all other things being equal. This finding corroborates with Imai *et al.*, (2010), who document that females are more likely to be poor than their males counterparts in India.

Also, the coefficient for **age** is positive and significant at 1% level for all the financial inclusion treatment indicators. This means that individuals are more likely to be poor during their younger ages and but they become richer with increasing age, as indicated by the age square. This result is consistent with Imai *et al.*, (2010) who find age positive and significant and age-square to be negative for access to microfinance in India as a means of poverty reduction among microfinance clients.

Secondary education shows negative and significant coefficients for all the financial inclusion indicators shown in Table 4.6. This can be explained to mean that individuals with secondary education are less likely to be poor than those with primary or less education. Also *tertiary education* coefficients show positive and but not significant for formal account but negative and significant for all the other financial inclusion treatment indicators. This suggests that individuals with tertiary education are less likely to be poor than those with primary or less education as well as those with secondary education. This demonstrates that education plays a critical role in SSA when it comes to poverty reduction. Thus, the highly

educated individuals are more likely to be financially included and are therefore less likely to be poor.

The variables that are controlling for other sources of financial services namely loans from stores, friends/family, employers and money lenders were also discussed. Loans from money lenders show the correct sign for all the financial inclusion indicators. It is significant at 1% level for formal accounts, withdrawal and savings but not access to credit. This implies that borrowing from money lenders is more likely to make individuals financially included and hence more likely to reduce poverty. Besides, loans from employers show the expected sign for three of the financial inclusion indicators except formal savings. It is however, not significant implying that additional source of income from employers makes the individual less financially constrained and therefore less likely to be poor. However, such a rate of reducing poverty is not statistically significant. This finding is consistent with Imai *et al*., (2010) who find that households that have access to other sources of financial services such as (loans from formal banks, money lenders, family and relatives) are less financially constrained and therefore less likely to be poor.

However, loans from stores show positive and significant coefficients for formal savings and formal credit. This indicates that individuals who took loans from stores are more likely to be poorer than the rest of their counterparts who took loans from other sources such as friends/family, money lenders and employers.

The net wealth benefit for all the financial inclusion treatment variables namely, formal account, frequency of withdrawals, formal savings and access to formal credit are statistically significant at 1% level. It shows the expected sign of negative. This suggests that individuals who are financially included are less likely to be poor. This is why the results show negative

and significant relationship among all the financial inclusion treatment variables and poorest income quintile as a dependent variable in all the models we presented in Table 4.4. This can therefore be interpreted to mean that the poor in SSA who have formal accounts, withdraw frequently, save and have access to credit would reduce their level of poverty. The results is not surprising because from theory we know that access to finance, savings and credit significantly reduces ones level of poverty. In addition, the Inverse Mills Ratio coefficient is positive and significant at 1% level for all the models we estimated indicating the presence of selectivity bias. This means that it was not possible to estimate the results of the models as shown in Table 4.6 using OLS estimator (Imai, *et al*., 2010).

4.4.2 The Propensity Score Matching Results

Another alternative way of examining the effect of financial inclusion on poverty reduction is the use of Propensity Score Matching (PSM) technique. This study employs PSM to check for robustness whether indeed the results established by the Treatment Effect Model are similar or can be compared to the results from the PSM. The nearest neighbour matching was used to estimate the results for comparison. Tables 4.7 presents the summary statistics of the mean poverty difference before matching, Table 4.8 presents the logistic regression of the PSM and Table 4.9 presents the poverty reduction effects or welfare benefit of financial inclusion between the poor and non-poor after matching. Besides this, the covariates of the variables and the diagnostic test are also presented in Tables 5.12 and 5.13 respectively on appendix II.

For instance, in Table 4.7, the mean difference between the poor and non-poor for account holders is 23.82%, those who withdraw frequently is 3.53%, that of those who have formal savings is 10.77% and finally for access to formal credit is 4.29%. These are all significant at 1 percent level shown by the t-stats in the last column of Table 4.7. The differences in the

means for poverty reduction might not just be for the financial inclusion indicators but other observable individual characteristics which cannot be varied by the mean difference between poverty and financial inclusion indicators.

Table 4.7: Summary statistics of Mean Poverty difference before Matching

Variable	Group	Observation	Mean	Std. Err	T-test
Account	Non-Poor	27868	0.2711	0.0027	t = 28.9585
	Poor	7132	0.1094	0.0037	
	Combined	35000	0.2382	0.0023	
	Difference		0 .1618	0.0056	
Withdrawals	Non-Poor	27868	0.0506	0.0013	t = 13.0915
	Poor	7132	0.0153	0.0015	
	Combined	35000	0.0434	0.0011	
	Difference		0.0353	0.0027	
Savings	Non-Poor	27868	0.1720	0.0023	t = 22.8857
	Poor	7132	0.0644	0.0029	
	Combined	35000	0.1501	0.0019	
	Difference		0.1077	0.0047	
Credit	Non-Poor	27868	0.0771	0.0016	t = 12.8312
	Poor	7132	0.0342	0.0022	
	Combined	35000	0.0683	0.0013	
	Difference		0.0429	0.0033	

In order to address the observable individual characteristics which cannot be varied by the mean difference between poverty and financial inclusion indicators, logistic regression of the PSM shown in Table 4.8 is used to estimate those characteristics that might have an influence on poverty reduction. The results of the logistic regression in Table 4.8 shows that the female dummy is not significant. We also notice that older individuals are less likely to be poor than the aged population. This is because the aged are less likely to engage in economic activities than those in the working class who are more likely to receive regular income.

The results further show that those individuals who are educated are less likely to be poor than the rest of the population who have primary or less education. This can be seen by the negative and significant relationships shown by the coefficients of secondary and tertiary education variables in Table 4.8. This results is in tandem with the treatment effect results shown by three of the models in Table 4.6 for the financial inclusion indicators such as frequency of withdrawals, savings and access to formal credit.

Table 4.8: PSM Logistic Regression Results

Variable	Coefficient	Std. Err.	P>|z|
Female	0.0273	0.0273	0.310
Age	-0.0136***	0.0040	0.001
Age Square	0.0002***	0.0000	0.000
Secondary	-0.9395***	0.0302	0.000
Tertiary	-1.8571***	0.1107	0.000
Relatives	-0.3090***	0.0441	0.000
Stores	0.0291	0.0408	0.477
Family/Friend	-0.0620*	0.0317	0.051
Employer	-0.1689**	0.0734	0.021
Money Lender	-0.3303***	0.0748	0.000
Constant	-0.7156***	0.0798	0.000
Observations	34987		
Joint Significance	1682.18		
Prob > chi2	0.0000		
Log likelihood	-16850.11		
Pseudo R2	0.0475		

The dependent variable is poorest income quintile measured as 1 if the respondent falls within the 20% poorest income quintile and 0 otherwise. Also, standard errors are in parentheses and are clustered at the country level ***, **, and * denote significant at the 1%, 5% and 10% level, respectively.

Also, the results show negative and significant relationship for relative ownership of account as a barrier to financial inclusion. This can be interpreted to mean that when a relative has an account in a household, the tendency for others in that household to use the account to save,

secure a loan and make frequent withdrawals are high. This can help in reducing the poverty of such a household.

Also from Table 4.8, we notice that borrowing from stores by individuals do not reduce poverty. This is because the coefficient of store as an independent variable shows positive and insignificant relationship with the dependent variable poorest income quintile. This finding corroborates with that of the treatment effect model for all the financial inclusion indicators presented in Table 4.6. Besides, borrowing from the stores, borrowing from friends/family, employer and money lenders show negative and significant relationships with the dependent variable. This means that when individuals have other sources of finance from family/friends, employers and money lenders they are less likely to be financially constrained and hence reduce their poverty level (Imai *et al*., 2010).

In examining how financial inclusion reduces poverty between the poor and non-poor individuals, we estimated the average treatment effects shown in Table 4.9. The results indicate poverty reduction effects between the poor and the non-poor individuals. Focusing on the ATT which is the Average Treatment on the Treated, it is noted that the poor reduces their poverty by 11.33% than the non-poor, with the reduction being statistically significant for formal account holders. Also, that of frequency of withdrawal is 4.1% reduction in poverty for individuals who frequently withdrew from their account. This shows that being financially included helps to better the welfare of such a poor person, and he/she therefore withdraws frequently. The difference is statistically significant. Furthermore, in examining savings and that of access to credit using the ATT, the results show that individuals who are poor reduced their poverty status by 7.56% and 1.83% respectively. This finding is somewhat consistent with the treatment effect model presented in Table 4.6. The difference between the two models is that the PSM is able to carefully select with replacement, the actual group of

people who are poor and deal with them as compared to the treatment effect. Table 4.9 show the results of average treatment effect on the treated.

Table 4.9: Results of Poverty reducing Effects after Matching

Variable	Sample	Treated	Controls	Difference	S.E	T-stats
Account	Unmatched	0.1094	0.2710	-0.1617	0.0056	-28.94
	ATT	0.1058	0.2191	-0.1133	0.0115	-9.83
	ATU	0.2467	0.1355	-0.1111	0.0090	-12.38
	ATE			-0.1116	0.0080	-13.88
Withdrawals	Unmatched	0.0153	0.0506	-0.0353	0.0027	-13.09
	ATT	0.0151	0.0560	-0.0409	0.0075	-5.47
	ATU	0.0419	0.0257	-0.0162	0.0048	-3.36
	ATE			-0.0212	0.0044	-4.80
Savings	Unmatched	0.0645	0.1720	-0.1076	0.0047	-22.87
	ATT	0.0619	0.1375	-0.0756	0.0093	-8.10
	ATU	0.1556	0.0828	-0.0728	0.0067	-10.86
	ATE			-0.0733	0.0061	-12.03
Credit	Unmatched	0.0342	0.0771	-0.0429	0.0033	-12.83
	ATT	0.0332	0.0515	-0.0183	0.0063	-2.89
	ATU	0.0693	0.0306	-0.0387	0.0037	-10.53
	ATE			-0.0346	0.0035	-9.84

We further conducted a balance test between the covariates to ascertain if the level of heterogeneity between the treated (poor individuals) and the control (non-poor individuals) is eliminated after matching (see Table 5.12 in appendix II). Both the standard bias before and after matching indicates that the PSM using nearest neighbour algorithm eliminates most of the bias between the treated and the control groups. Indeed, we did not observe any significant difference in means of all the covariates included in the model after matching. The proportion of bias for matching for most of the variables is at least 27.8 percent. The Pseudo R^2 value after matching was also significantly reduced from 4.7% to 0.7% respectively suggesting that the overall results from the matching has satisfactorily created a balance between the covariates of the treated and control groups (Sianesi, 2004 and Abdul- Malik, 2014).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Financial inclusion and poverty reduction linkages remain one of the under-researched areas in access to finance. Very few empirical studies exist on the linkages between finance and poverty. Most of these studies as pointed out in the literature review focused on the macro level and relatively few on financial inclusion and poverty reduction linkages. This chapter starts with the summary of key findings of the study which was based on the objectives of this study. The chapter also outlines the conclusions, as well as recommendations of the study. The last part of this chapter suggests the possible areas for future research.

The data for this study was gleaned from the Global Financial Inclusion Findex Database 2012 cited as Demirguc-Kunt and Klapper (2012). Thirty-five (35) sub-Saharan Africa countries were selected for this study. The study employs treatment effect version of the Heckman (1979) sample selection model and PSM to estimate the financial inclusion and poverty reduction linkages and key to these methodologies are their abilities to control for sample selection bias and address the problem of endogeneity. The research questions addressed in this study include:

1. What factors account for financial inclusion in Sub-Saharan Africa?
2. Is there a significant welfare gain arising from improved financial access for the poor?

5.2 Summary of key Findings

This section presents summary of key findings on the descriptive statistics, the determinants of financial inclusion and finally the effects of financial inclusion on poverty reduction.

Based on the findings on descriptive statistics presented in Tables 4.3 and 4.4, we find that 23.8% of adult population aged 15 years and above had formal account. This means that the

rest of the population, amounting to 76.2%, remained unbanked or does not have formal account. The explanation is that some of the individuals in the latter group perform banking-type operations within the informal sector or do not have access to financial services at all. The result is in line with Demirguc-Kunt and Klapper (2012) who find that less than a quarter of the adult population in Africa do not have bank account. Out of those who have formal account, our results show that 15% of them use the account to save, 4.3% of them use it to withdraw 3 or more times in a typical monthly and 6.8% use it to access credit from a formal financial institution. The results also show that 50.8% of the respondents were males while 48.7% were females. We find that 50.8% of the respondents had primary education, 44% had secondary education and only 4.7% had tertiary education as their highest form of education. Our findings also show that 20.4% belongs to the poorest income quintile, which was our main dependent variable of interest in determining the effect of financial inclusion on poverty reduction. On informal borrowing, a good number of the respondents (27.4%) borrow from family and friends. The average age is also found to be 34 years.

The first objective of this study was to investigate the determinants of financial inclusion in SSA. We estimated four probit models specified in equation (1) of chapter three above on all the indicators of financial inclusion namely, formal account ownership, savings, withdrawals and access to credit. Our results show that females are less likely to be financially included than their male counterparts. We find this in all the probit regressions we estimated for the four financial inclusion indicators. The possible explanations offered were that in general females have lower incomes streams than their male counterparts in SSA because they have greater burden coming from households than male counterparts (Efobi *et al.*, 2014). Besides, males have formal jobs than their female counterparts. This makes females less likely to open and maintain formal accounts in banks in SSA. We also find that the level of financial

inclusion among individuals in SSA increases with age and declines when such an individual becomes older indicated by the age square. Also, education of individuals in SSA is an important determinant of financial inclusion. Our results indicate that the highly educated are more likely to be financially included than the less educated in all the financial inclusion indicators we examined.

Interestingly, our findings show that higher income individuals are more likely to be financially included than lower income individuals. We noticed that those who are in the 20% poorest income quintile are 16.4 percentage points less likely to own an account at a formal financial institution than those in the fourth income quintile which is 6.8 percentage points. Our findings also show that when an individual's family member owns an account such a person is 0.6 percentage points less likely to own an account and 12.2 percentage points better off to save at a formal financial institution. On the issue of informal borrowing, we find strong positive and significant relationship between borrowing from employers and private money lenders in all the indicators of financial inclusion we examined. We noticed that individuals who borrow from their employers are 3.1 percentage point more likely to own an account than the rest of the other forms of borrowing except borrowing from a private money lender which is 3.8 percentage point better off to own an account.

The last objective of the study was to examine the effect of financial inclusion on poverty reduction in SSA. This was the main objective of the study. Both the Treatment Effect Model and the Propensity Score Matching (PSM) were used to estimate and check for the robustness of the results. The Treatment Effect Model results showed that females are more likely to be poor than their male counterparts partly due to their inability to be financially included. Also, the results showed that those who are highly educated are better off than the less educated. The results suggest that individuals who are less financially constrained are less likely to be

poor. Thus, those who have access to other forms of loans either than formal financial institutions such as (family/friends, money lenders and employers) are less likely to be poor than those who do not have. Furthermore, the age of an individual influences their poverty status. The treatment effect results show that those who are younger are more likely to be poor than the older population.

Finally, the net wealth benefit of financial inclusion indicates significant and negative relationship with the dependent variable for all the financial inclusion indicators. This means that those who are financially included are less likely to be poor than those who are not included. In short financial inclusion helps to reduce the poverty of the poor at a significant margin. For instance, those who own formal account are 42.2% better in terms of poverty reduction than those who did not own account. Furthermore, those who frequently withdraw money are 34.1% less likely to be poor. Also, those who use their account to save are 39.9% less likely to be poor and those who use their account to access credit are 32.7% less likely to be poor.

In using the PSM model, for the robustness checks we focus on average treatment effect on the treated (ATT) after matching. For instance, our results show that the likelihood of reducing poverty among the poor who own an account is 11.33% than their non-poor counterparts. Furthermore, the poor persons who use their account to withdraw frequently are 4.1% more likely to reduce their poverty than their non-poor counterparts. The poor's ability to now withdraw frequently after matching could be attributed to the fact that their welfare had increased as a result of being included in the formal financial sector. The poor who save are 7.56% more likely to reduce their poverty than their non-poor counterparts and finally, those who use their account to access credit are 1.83% more likely to reduce their poverty than the non-poor. We noticed that after matching, the poverty reduction impact for credit is

low for the poor compared to the effect of the other financial inclusion variables. What might account for this perhaps is the higher interest rates charged by financial institutions or the fact that most individuals in SSA love to save than to borrow from a formal financial institution indicated by the descriptive statistics. This finding is consistent with the treatment effect model results outlined in Table 4.6.

5.3 Conclusions

Undoubtedly, financial inclusion has been considered as one of the ways of reducing poverty aside the traditional theories of growth and economic development. However, little is known about the extent to which financial access helps to reduce poverty in the finance literature especially on household level data. Poverty in Sub-Saharan Africa is highly pervasive. One way of reducing poverty is through inclusive growth. Financial inclusion is noted to be one of the surest ways of inclusive growth. However, Sub-Saharan Africa is largely lagging behind in terms of financial inclusion and poverty reduction strategies.

In an attempt to search for possible answers to factors that determine financial inclusion in SSA and how financial inclusion can help reduce poverty among the less privilege in society, this current study was conducted by using data on 35 countries and 35,000 individuals in SSA. This is to enable us add to the few strands of literature already existing in the area and to make possible recommendations for policymaking and implementation.

The results of the study suggests that females are less likely to be financially included than their male counterparts. This is because females are noted to have low income stream and do not have formal jobs as compared to their males counterparts in SSA. The results also suggest that age, education and income levels of individuals significantly influence their level of financial inclusion in all the indicators of financial inclusion we examined. These findings are

consistent with Allen *et al.*, (2012), Camara *et al.*, (2014) and Efobi *et al*., (2014) who all find that individual characteristics significantly influence financial inclusion. The study results also suggests that when a relative owns an account in a household, others in that household are less likely to own an account but are more likely to save in a formal financial institution. We also find that having access to other forms of borrowing such as friends/family will make the individual less likely to be financially included. We observed that in all our financial inclusion indicators we estimated. However, individuals who borrow from employer, money lenders and stores are more likely to own an account.

The net wealth benefit of participating in financial inclusion significantly reduces the level of poverty in SSA; we noticed a negative relationship between the treatment variables and the dependent variable in all the treatment effects models we estimated. The PSM results when used to check for robustness produced similar findings with the treatment effect model for all the variables used except the results given by age and age square respectively. The PSM results show that the individuals' poverty reduces as he or she advances in age and becomes poorer when he/she no longer engages in economically active service. However, the treatment effect results show that individuals become poorer when they are younger and become richer when they grow older in SSA. Is the case true for the former or later? This particular finding is inconclusive and needs to be investigated further.

In conclusion, this study makes some great original contribution to the financial inclusion literature by being the first to use the global financial inclusion findex 2011 dataset to examine the link between financial inclusion and poverty reduction nexus. The study has been able to move away from the usual indices, determinants of financial inclusion and barriers to add more impetus to the debate on the relationship between finance and poverty reduction. Similarly, the other contribution the study has made is the bridging of the cyclical

notion of the use of macro-economic indicators to proxy for financial inclusion which is often plagued with endogeneity problems has been overcome in this study. Also, since macro data do not truly represent the individual account population held by people in a country because of foreigners and multiple accounts ownership, the study finds it appropriate to rely on the micro-level data to be able to correct for this problem. Again, sample selection bias problem has also been overcome, because of the rigorous methodologies employed in this study.

5.4 Recommendations

Based on the empirical findings above, the study makes the following recommendations for both policymaking and for future research.

First, in terms of policymaking, financial institutions in Sub-Saharan African countries might adopt the findings of this study so that they can make financial services more accessible to the less privileged or the marginalised in society. They can do this by providing low-fee-accounts and financial products that can meet the needs or demands of the poor, the marginalised and small scale businesses in SSA. They can also encourage the poor especially women to form self-help-groups in their communities so that financial institutions can extend financial services to them. Through this, the rate of women participation in financial inclusion will rise and this would reduce their poverty and increase their level of financial inclusion.

Second, governments of Sub-Saharan African countries battling with poverty can use financial inclusion as a tool for reducing the level of poverty in their respective countries. This can be done if they are able to increase financial literacy rates and encourage higher education in their countries since this is noted to be one of the drivers of both financial inclusion and poverty reduction. Governments in SSA should try to provide the enabling

business and political environment for financial institutions to thrive. They have to strengthen their central banks and make them more independent. This will help the central banks to come out with monetary and regulatory policies that will guide financial institutions to provide low rate financial products for the poor, the marginalised, start-ups businesses and small and medium enterprises that are left out of the formal financial system across the Sub-Saharan African region. Banks must also be encouraged to open more branches in deprived areas in SSA. This could be done effectively, if governments in SSA are able to give tax incentives to financial institutions which agree to open branches in less developed areas. This would help to attract more foreign direct investors into these areas especially countries that have such favourable laws and environment to support them.

Third, the Bretton Woods institutions such as the International Monetary Fund (IMF) and World Bank should try to make financial inclusion a tool in reducing poverty across Sub-Saharan Africa. This is because SSA is one of the poorest continents in the world. So if financial inclusion is encouraged greater number of the poor in SSA can get access to formal financial services and this will help them reduce their poverty status. Also, the African Development Bank can lead this crusade in SSA. The African development bank can help to provide the needed technical support in developing the financial sector of SSA countries.

5.5 Future Research

On the basis of the findings above, the following have been recommended for future research in this area: First, more analysis is needed on macro-economic factors that affect the individual's financial inclusion in the formal financial system in SSA. Therefore, future researchers can try to intersperse macro-economic variables with the individual level data to determine how they affect the individual's level of financial inclusion. Second, it would be worthwhile to extend the current analysis of dealing with endogeneity problem inherent in

financial inclusion selectivity by looking at other methods such as combining PSM with difference-in-difference and instrumental variables estimators. Third, future researchers can use the individual level data to construct financial inclusion index for countries and use it to examine its impact on poverty. Furthermore, the Global Financial Inclusion Findex Database will be providing future data so researchers can conduct a pseudo panel study on this area as at when more data points are made available and such a study can add more impetus to our findings.

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APPENDIX I

Table 5.10: List of SSA Countries

Angola	Congo Republic	Mauritius	Swaziland
Benin	Gabon	Mozambique	Tanzania
Bostwana	Ghana	Niger	Togo
Burkina Faso	Guinea	Nigeria	Uganda
Burundi	Kenya	Rwanda	Zambia
Cameroon	Lesotho	Senegal	
Central African Republic	Liberia	Sierra Leone	
Chad	Malawi	Somalia	
Comoros	Mali	South Africa	
Congo, Democratic Republic	Mauritania	Sudan	

Source: Global Findex Data, (2012)

Table 5.11: Data description and sources for individual-level variables

Variables	Description
Account Ownership (0/1) conditional on account holders	Respondent reported to currently have, possibly together with someone else, a bank account at a formal financial institution – a bank, credit union, cooperative, post office or microfinance institution. This include having a debit card.
Savings (0/1) Conditional on formal account holders	Respondent reported to have save money or set aside money in the past 12 months using an account at a bank, credit union, cooperative or microfinance institution.
Access to Credit (0/1) Conditional on formal account holders	Respondent reported to have borrowed money in the past 12 months from a formal financial institution such as bank, credit union, microfinance, or from employer, family and friends, a store and private money lender.
Frequency of Withdrawals (0/1) Conditional on formal account holders	Respondent reported to have withdrawn money 3 or more times in typical month from a formal financial institution.
Female	Dummy that takes the value 1 if the respondent is a female and o otherwise.
Age	Age in years
Age Square	Age in years square
Income: Poorest 20% (0/1)	Dummy that takes the value 1 if the respondent falls in the lowest income quintile and 0 otherwise. Income quintiles are based on the incomes of the respondents in a country.
Income: Second 20% (0/1)	Dummy that takes the value 1 if the respondent falls in the second lowest income quintile and 0 otherwise. Income quintiles are based on the incomes of the respondents in a country.
Income: Middle 20% (0/1)	Dummy that takes the value 1 if the respondent falls in the middle income quintile and 0 otherwise. Income quintiles are based on the incomes of the respondents in a country
Income: Fourth 20% (0/1)	Dummy that takes the value 1 if the respondent falls in the fourth highest income quintile and 0 otherwise. Income quintiles are based on the incomes of the respondents in a country
Income: Richest 20% (0/1)	Dummy that takes the value 1 if the respondent falls in the richest income quintile and 0 otherwise. Income quintiles are based on the incomes of the respondents in a country.
Education: Primary (0/1)	Dummy that takes the value of 1 if the respondent completed elementary education or less (Up to 8 years of education) and 0 otherwise.
Education: Secondary (0/1)	Dummy that takes the value of 1 if the respondent completed secondary education or less (9-15 years of education) and 0 otherwise.
Education: Tertiary (0/1)	Dummy that takes the value of 1 if the respondent completed beyond higher school and 0 otherwise.
Relative has an account (0/1)	Dummy that takes the value of 1 if the respondent answered yes that a relative having an account is a barrier to him/her and 0 otherwise.
Borrow money from family/friend	Dummy variable that takes the value 1 if the respondent borrows from a family/friend and 0 otherwise.
Borrow money from store	Dummy that takes the value 1 if the respondent borrows from the store and 0 otherwise.
Borrow from employer	Dummy that takes the value 1 if the respondent borrows from the employer and 0 otherwise.
Borrow from private moneylender	Dummy that takes the value 1 if the respondent borrows from a private moneylender and 0 otherwise.

Source: **Author's Compilation from Global Findex (2012), Allen *et al.*, (2012)**

APPENDIX II

Table 5.12: Covariate Balancing Analysis

Variable	Unmatched Matched	Mean		%bias	%reduct |bias|	t-test	
		Treated	Control			t	p>|t|
Female	U	0.51522	0.48596	5.9	56.0	4.41	0.000
	M	0.51745	0.53032	-2.6		-1.46	0.144
Age	U	36.12	33.74	15.4	88.8	12.06	0.000
	M	33.107	32.84	1.7		1.15	0.251
Age square	U	1576.6	1346.7	17.1	89.2	13.60	0.000
	M	1273.3	1248.4	1.8		1.40	0.161
Secondary	U	0.2764	0.48266	-43.5	94.5	-31.75	0.000
	M	0.30181	0.31318	-2.4		-1.40	0.163
Tertiary	U	0.01248	0.05597	-24.1	75.3	-15.52	0.000
	M	0.01075	0.0000	5.9		8.31	0.000
Relatives	U	0.10349	0.15017	-14.1	94.5	-10.13	0.000
	M	0.09691	0.09436	0.8		0.49	0.623
Stores	U	0.13168	0.14744	-4.5	27.8	-3.38	0.001
	M	0.13041	0.11904	3.3		1.95	0.051
Family/friend	U	0.25649	0.27847	-5.0	74.1	-3.71	0.000
	M	0.26005	0.26575	-1.3		-0.73	0.463
Employer	U	0.03464	0.04925	-7.3	46.5	-5.24	0.000
	M	0.02571	0.01789	3.9		3.04	0.002
Money Lender	U	0.03281	0.04925	-8.3	48.1	-5.92	0.000
	M	0.02477	0.03331	-4.3		-2.88	0.004

Source: Author's estimation from Findex Dataset, (2012)

Table 5.13: Diagnostics test to evaluate the Quality of Matching

						Common Support	
Sample	Pseudo R^2	LR Chi2	p>chi2	Mean Bias	MedBias	Off-Support	On-Support
Raw	0.047	1678.93	0.000	14.5	11.2	2,780	25,076
Matched	0.007	118.01	0.000	2.8	2.5	713	6,418

Source: Author's estimation from Findex Dataset, (2012)

Table 5. 14 : Probit Results of the treatment effects models

	Accounts	Withdrawals	Savings	Credit
Female	-0.0396**	-0.0631**	-0.0191	-0.0330
	(0.0159)	(0.0259)	(0.0175)	(0.0220)
Age	0.0740***	0.0384***	0.0639***	0.0717***
	(0.0027)	(0.0045)	(0.0031)	(0.0042)
Age Square	-0.0007***	-0.0004***	-0.0007***	-0.0008***
	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Secondary	0.9553***	0.6333***	0.6044***	0.4325***
	(0.0176)	(0.0297)	(0.0190)	(0.0238)
Tertiary	1.5639***	1.1799***	1.0215***	0.6443***
	(0.0348)	(0.0453)	(0.0347)	(0.0425)
Relative has account	0.0454**	-0.9848***	0.5208***	-0.2669***
	(0.0226)	(0.0683)	(0.0224)	(0.0336)
Store	0.0242	0.0610*	0.1391***	0.5309***
	(0.0226)	(0.0365)	(0.0236)	(0.0266)
Family/friend	0.0022	0.1286***	0.0692***	0.0824***
	(0.0182)	(0.0276)	(0.0199)	(0.0242)
Employer	0.1231***	0.1871***	0.2554***	0.3276***
	(0.0363)	(0.0521)	(0.0371)	(0.0413)
Money Lender	0.1436***	0.3050***	0.0453	0.5323***
	(0.0366)	(0.0494)	(0.0397)	(0.0405)
Constant	-2.8579***	-2.9512***	-2.8339***	-3.3340***
	(0.0553)	(0.0914)	(0.0622)	(0.0838)
No. Observations	34987	34987	34987	34987
Log Likelihood	-16497.22	-5521.64	-13278.26	-7847.74
Joint Significance	5411.95	1451.59	3025.42	1750.64
Pseudo R^2	0.1409	0.1162	0.1023	0.1003

Note: Each of the column represents the estimation of results of a regression of financial inclusion indicator on a set of individual characteristics. These financial inclusion indicators are as follows. Formal account refers to adults reported to currently have an account at a formal financial institution. Savings refers to adults to have set aside money for the past 12 months using a formal financial institution. Withdrawals refers to adults reported to have taken money out of their personal account(s) 3 or more times in a typical month. Finally credit refers to adults reported to have borrowed money from a financial institution in the last 12 months. The exact definitions of the data sources and variables are presented in Table 3.2 in the appendix 1. Standard errors are in parentheses and are clustered at the country level ***, **, and * denote significance level at the 1%, 5% and 10% level, respectively.