

**EFFECT OF FINANCIAL LITERACY ON FINANCIAL ACCESS AND
SAVINGS IN KENYA**

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**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF
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FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE
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DECLARATION

This research project is my original work and has not been presented for a degree or any other award in another university.

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This project has been submitted to the Department of Economic Theory, Kenyatta University, with my approval as university supervisor.

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DEDICATION

This Master's research proposal is dedicated to my loving family

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ABBREVIATIONS/ ACRONYMS

ASCA: Accumulating Savings and Credit Associations

EFIA: Enhancing Financial Inclusion for All

OECD: Organisation for Economic Co-operation and Development

MFI: Micro – Finance Institutions

ROSCA: Rotating Savings and Credit Associations

SACCO's: Savings and Credit Cooperatives

TVET: Technical and Vocational Education and Training Authority

OPERATIONAL DEFINITION OF TERMS

Formal (Registered): Financial institutions that are registered by the government and operate under government supervision. They include government banks, credit only microfinance institutions and development financial institutions (like AFC, NSSF, and ICDC).

Formal (Prudential): Financial bodies regulated by independent bodies. They include commercial banks, microfinance institutions and capital market intermediaries.

Formal Others: (Non Prudential): They include financial services that are subject to non – prudential oversight by the government. They include Post bank, NSSF and NHIF.

Financially Excluded: This is the proportion of a country's population that do not use any financial services.

Financial Literacy: A collection of consumers' or investors' awareness and understanding of financial products and concepts, their ability to identify risks and opportunities in the financial market and make informed decisions on where to seek assistance and make rational decisions that improve their financial status.

Financial Services: It refers to a wide range of products and services provided by banks and non-bank financial organizations. These include asset management, forex broking, merchant banking, among others.

Informal Strand: Financial institutions that are not formally registered by the government. These include financial services providers like Rotating Savings and Credit Associations (ROSCA), Accumulating Savings and Credit Associations (ASCA), groups and money lenders.

ABSTRACT

Financial literacy enhances effective use of financial services, promotes technical progress, promotes economic growth and development and aids in poverty reduction. However, Fin Access survey data shows that 17 per cent of Kenyans are financially excluded as in 2016 while enrolment in primary, secondary, and post-secondary between 2000 and 2016 increased by 66, 259, and 431 per cent respectively. This implies that increased school enrolment has not translated to reduced financial exclusion standards of below five per cent. World Bank further asserts that Kenya is among the top 25 countries in the world with high financial exclusion levels. High exclusion levels hinder development in a country and exposes households to many financial risks. Majority of the financially excluded and informal financial services users are those with low education levels and those with no education at all. There is, therefore, a need to investigate the effects of financial literacy on financial access in the country. The specific objectives of this study were to find the impact of financial literacy on financial access in Kenya and to find the impact of financial literacy on savings in Kenya. The first objective was answered using multinomial logit while the second was answered using a probit model. The study used cross sectional data from FinAccess survey in 2013 and 2016. A variety of diagnostic tests likewald and model specification tests were carried out to ensure robust results. The results for 2013 and 2016 showed that an increase in age by one year increases the probability of accessing formal financial services but decreases the probability of accessing informal financial services compared to the excluded category. At the same time, an increase in income by one per cent increases the probability of accessing the formal financial strand but decreases the one for the informal one. An increase in the respondent's level of education increases the probability of accessing formal financial services but decreases the probability of accessing the informal strand one. An increase in financial literacy and an increase in income were found to increase the probability of savings. Increase in household size and increase in the distance to the nearest mobile money agent decreases the probability of savings. This calls for concerted efforts by the stakeholders, especially the government, to ensure that at least every student gets to a college level. This can be achieved through providing financial support to the students to further post-secondary and tertiary education levels. These institutions also need to be well equipped and offer quality education that guarantees employability and ensures better life for the students. This will ensure inclusion by encouraging formal financial access and mobilization of savings which are vital to economic development

CHAPTER ONE

INTRODUCTION

1.1 Background

In recent years, financial markets have become more and more complex in both developed and developing countries due to financial innovations in savings, loans, and derivative products. In addition, the low income individuals have experienced increasingly complex financial environment because of the ever growing financial services such as microfinance, branchless banking, micro-insurance, and remittance networks. Furthermore, there has been entry of new players in the industry such as mobile banking and mobile money transfer services (Quigley, 2009).

Growth in financial service access and savings (financial inclusion) has been cited as one of the pillars that drive economies towards prosperity. A well-functioning formal financial market ensures private sector development, macroeconomic stability, boosts savings and economic growth, and as a result, creates employment and reduces poverty. Furthermore, it enables better future financial control, facilitates effective use of financial services, and minimizes vulnerability to fraudulent financial schemes. Limited formal financial access, on the other hand, hinders market exchanges, increases risks to consumers, and decreases savings opportunities (Kimenyi & Ndung'u, 2009).

Various supply-side and demand-side factors impact on the extent to which individuals access financial service. Such factors include asymmetrical information, cultural and psychological barriers, monopoly or oligopoly in the financial market, low levels of financial literacy, entry barriers and linguistic or educational barriers (Atkinson & Messy, 2013). Consumer and providers of financial products hold a

greater responsibility for vital financial decisions such as planning for loans, savings and retirement benefits (Miller, 2009). Therefore, it is important that consumers understand the benefits and risks associated with accessing each financial service. This is only possible through financial literacy.

Financial literacy is defined as a collection of consumers' or investors' awareness and understanding of financial products and concepts, their ability to identify risks and opportunities in the financial market and make informed decisions on where to seek assistance and make rational decisions that improve their financial status (OECD, 2005). In addition, financial literacy can also be defined as empowering and enlightening financial products consumers so that they are able to evaluate products and make informed decisions that are relevant to their lives (Braunstein & Welch, 2002). Further, financial literacy can also be defined as a set of skills that provides an entry point to basic financial knowledge.

Financial literacy and basic education should be made relevant and helpful to the peoples' daily lives and development activities (Miller, 2009). Financial literacy is proxied by the level of education, since the level of education is associated with financial knowledge (for example see Kiiza and Paderson, 2002, Rooij, Lusardi, and Alessie, 2007; Bendig, Giesberg, and Steiner, 2009, among others). Based on the existing empirical and theoretical literature review, financial access is categorized into four: formal financial strands, other formal, informal and excluded.

Financial literacy has several benefits. First, it enables decision making in timely payment of bills, prudent debt management, supports economic growth and poverty reduction. Second, it enables better future financial control and minimizes vulnerability to fraudulent financial schemes (Ryan, 2011). If financial service providers have knowledge power over financial service products they are offering

over the consumers, this can weaken the financial market. This kind of information asymmetry to the advantage of financial institutions can be detrimental to the consumer because they don't have the required tools to enable them appreciate their consumer rights and responsibilities, the financial risks they may be exposed to and terms and conditions required to access the financial services involved (Quigley 2009).

Third, it helps customers to access loans they can only afford (Ryan, 2011). Fourth, financial literacy helps households to create budgets, have savings plans, and make proper investment decisions (Greenspan, 2002). Financial literacy, therefore, allows households to derive maximum utility from their financial resources.

Finally, financial literacy enhances the quality of financial services offered by the financial institutions. Financial literate consumers play a vital role in reinforcing competitiveness in the financial institutions by comparing financial services options, negotiating more effectively, and asking the proper required questions. This enables the financial institutions to offer more appropriately priced and transparent services, by comparing options, asking the right questions, and negotiating more effectively (James, 2009).

In the recent years, developing countries have experienced a growing number of financial services consumers who are increasingly being involved in newly developing financial markets. According to Lusardi and Mitchell (2007), financial literacy is widespread in developing countries. In addition, Greenspan, (2002) states that many developing countries experience price bubbles and pyramid schemes which lure many financially illiterate consumers into purchasing these financial products. This means that financial literacy in the developing countries is vital if these newly

developing financial markets are to improve in efficiency, quantity and quality, more so in Kenya, which is the current focus of this study.

Over the past decade Kenya has experience intense financial sector reforms with extensive growth of technological advancements such as mobile banking and automatic teller machines (ATMs) (Shibia & Kieya, 2016). Expanding household formal financial service access is one of Kenya government agenda and deeply anchored in the national development blueprint that is Vision 2030. However, despite the efforts access formal financial remains low. For instance, access to savings, access to credit and access to insurance remains low at 58, 29 and 17 percent, respectively (Shibia & Kieya, 2016).

In addition, According to Fin Access Survey (2013), 33 per cent of Kenyans used formal financial strands, 34 per cent used other formal, 8 per cent informal, and 25 per cent were excluded in 2013. Again, only 55 to 60 percent of the population has access to financial services (Ardic, Heimann, & Mylenko, 2011). The authors further asserted that only 27 percent of households in Kenya has access to a bank account in Kenya. Shibia and Kieya (2016) indicate that about 50 percent of adult population in Kenya demonstrates low levels of financial literacy. It is against this background that this study investigated effect of financial literacy on financial access and savings in Kenya.

1.1.1 Overview of Financial Literacy, Financial Access and Savings in the World

The topic of finance access and savings and financial literacy has been of growing interest throughout the world. Owning an individual account or a joint account in a formal financial institution such as banks, cooperatives, credit union, post office and micro-finance institutions is one key indicator of household access to financial

services (financial inclusion). According to the Global Findex database for 2017, 69 percent of working-age adults have an account at a formal financial institution globally. In addition, the survey indicates that the number of adults without accounts reduced from 2.9 billion in 2011 to 1.7 billion in 2017. However this number is still high. This total of adults without accounts is highly skewed towards women and the poorest population which is based in the rural areas and developing countries.

Figure 1.1 presents an overview of the percentage adults with bank account for different regions in the World. The figure shows that high income economies, East Asia & Pacific and Europe & Central Asia have the highest percent of adults with bank account standing at 89, 55 and 45 percent respectively. Africa and Middle East has the lowest percent of percent of adults with bank account standing at 23 and 15 percent respectively. This could be attributed to the fact that people in this region do not have enough money for them to use an account (Demirguc-Kunt and Klapper, 2012.).

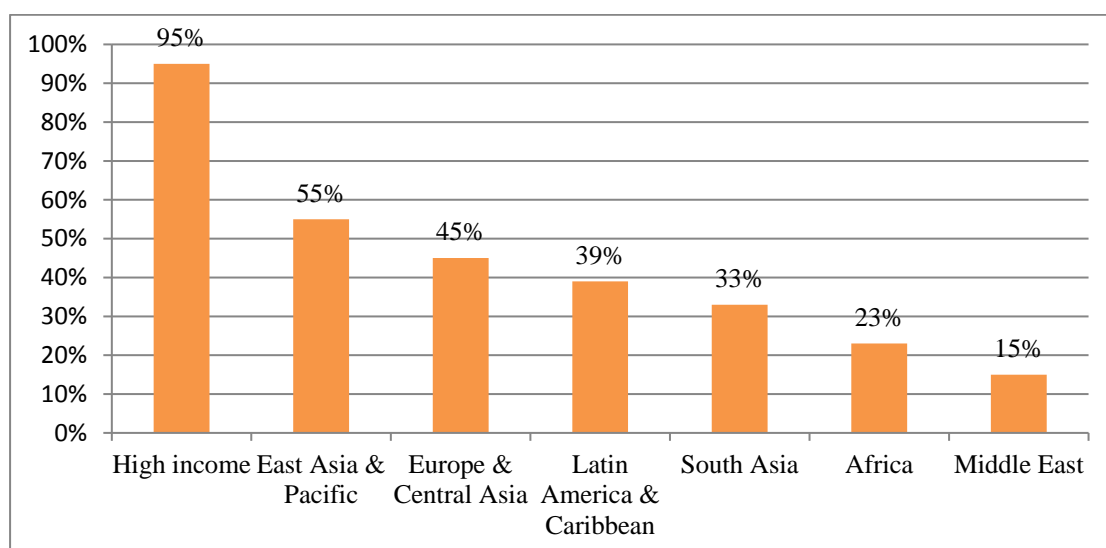


Figure 1.1: Share of adults with bank account in different regions in the World

Data Source: Demirguc-Kunt and Klapper, 2012.

According to The Standard & Poor’s Ratings Services Global Financial Literacy Survey (S&P Global FinLit Survey, 2014) that provided information across countries,

only 33 percent of adults in the world were financially literate. This means that approximately 3.5 billion adults in the world, most of them in developing economies lacked basic financial understanding. This is illustrated in Figure 1.2.

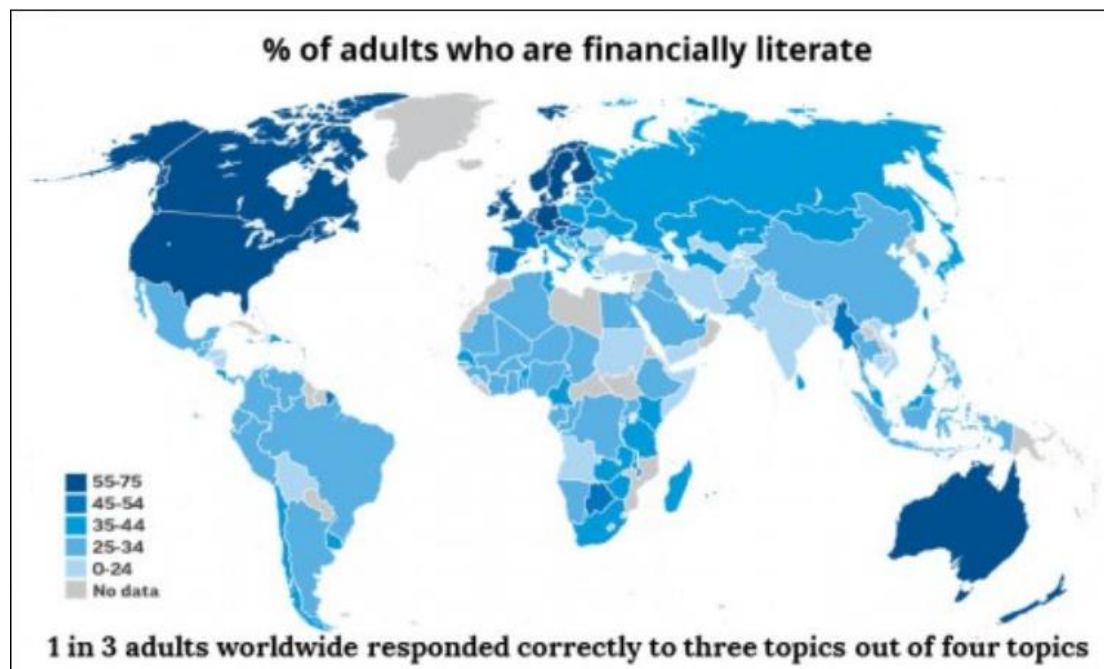


Figure 1.2: Distribution of financial literacy in the world

Source: The Standard & Poor's Ratings Services Global Financial Literacy Survey (2014).

The survey indicates that financial literacy ranges from 71 percent to 13 percent on country-level. Further, the study states that on average 55 percent of working age adults in the major advanced economies are financially literate while in the major emerging economies only an average of 28 percent of adults are financially literate (Klapper, Lusardi & Van Oudheusden, 2015).

Turning to savings, the savings to GDP ratio is highest in East Asia and Pacific followed by Middle East and North Africa. The ratio is lowest to Sub Saharan Africa. The high savings to GDP ratio in Middle East and Asian countries is attributed to current account surplus which these countries have been enjoying. However, the

situation is different in Africa where the countries face persistent current account deficits, leaving a little room for savings (Demirguc-Kunt, Klapper, Singer, Ansar & Hess, 2018). This is presented in Figure 1.3.

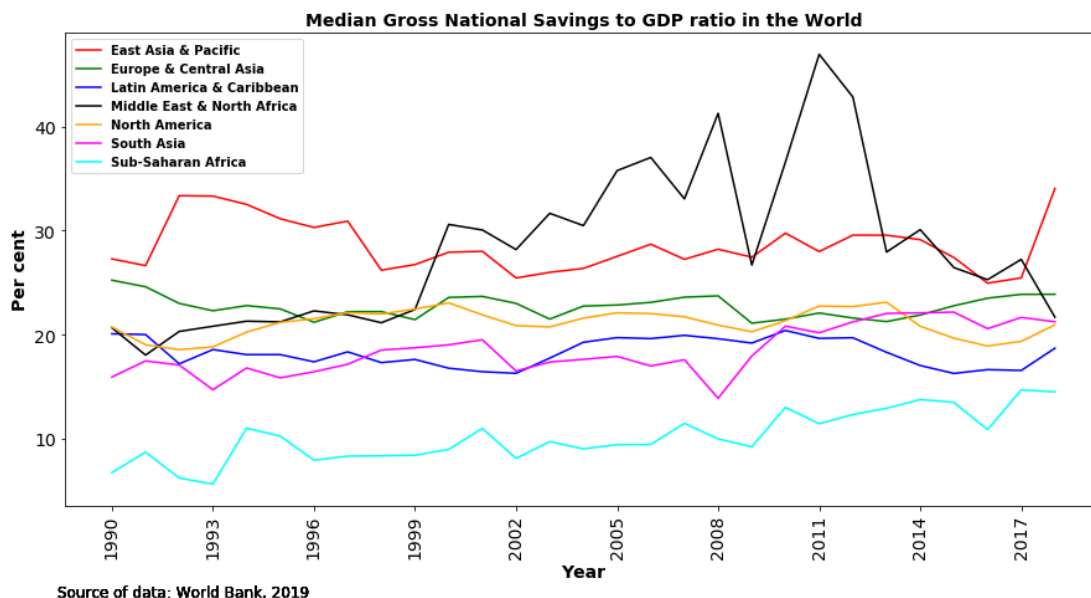


Figure 1.3: Overview of Savings in the world

1.1.2 Overview of Financial Literacy, Financial Access and Savings in Africa

Majority of the low income segments of the population especially in Africa rely on informal financial services, or are totally excluded from any form of financial services. Over the last two decades African countries have experienced positive improvement in access to financial services. More financial services such as credit are provided to enterprises and individuals. In addition, advancement in technology such as mobile banking has contributed to the development of the financial sector. However, despite the improvements African economies still lag behind other developing economies. Overall 23 percent of working adults in Africa had an account in the formal institution. Figure 1.2 presents an overview of the percentage adults with bank account for different regions in Africa.

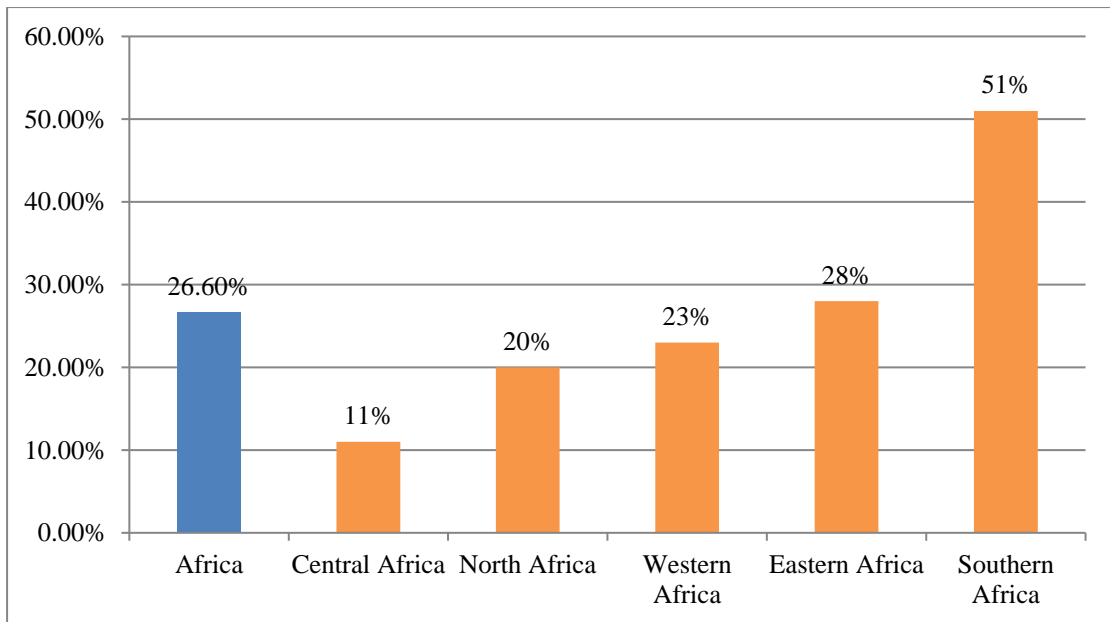
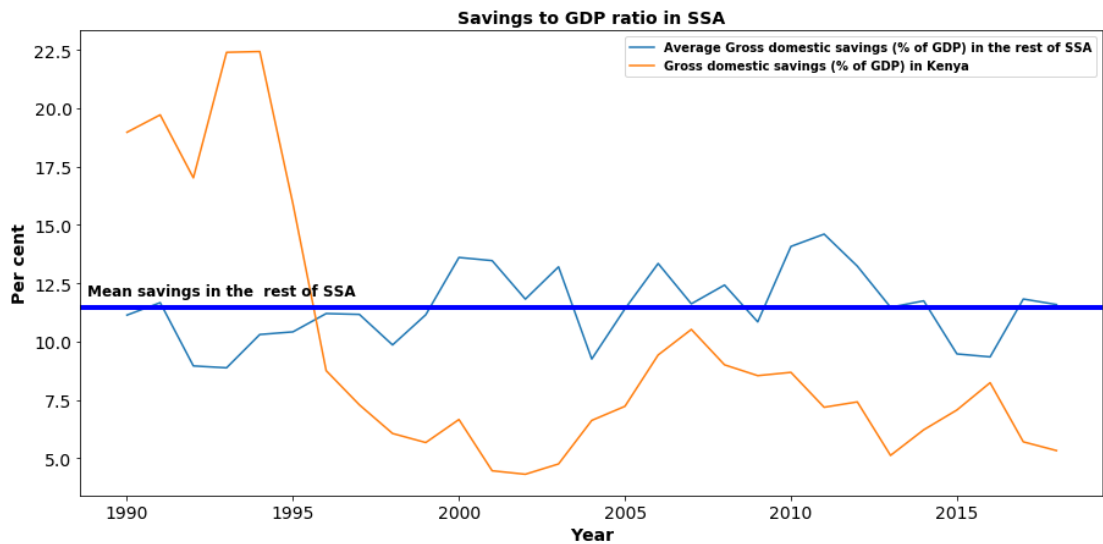


Figure 1.4: Proportion of adults with bank account for different regions in Africa

Data Source: Demirguc-Kunt and Klapper, 2012.

The figure shows that Southern Africa and Eastern Africa have the highest percent of adults with bank account standing at 51 and 28 percent respectively. Central Africa and North Africa has the lowest percent of percent of adults with bank account standing at 23 and 15 percent respectively. This could be attributed to the lack of enough money to use an account and cost to acquire an account (Demirguc-Kunt & Klapper, 2012).

According to Demirguc-Kunt and Klapper, (2012) 40 percent of the adults in Sub-Saharan Africa and 16 percent of the adults in North Africa report having saved or set aside money in the past one year. In addition, 14 percent of the adults which represented 35 percent of savers in Sub-Saharan Africa and 4 percent of the adults which represents 27 percent of the savers in North Africa saved their finances in a formal financial institution in the past year. The low savings rates are further illustrated in Figure 1.3. The figure shows that savings in Sub-Saharan Africa has averaged below 12.5 per cent between 1990 and 2018.



Source of data: World Bank, 2019

Figure 1.5: Savings to GDP ratio in Sub-Saharan Africa.

Generally, savings to GDP ratio in Africa has been low. However, the savings were generally higher between 2000 and 2013. This is associated with the commodity boom in resource rich countries leading to high exports (Berman, Couttenier, Rohner & Thoenig, 2017). The figure also shows that savings in Kenya have been low compared with the rest of Sub-Saharan Africa. This can attributed to high recurrent and development expenditure in the country and the worsening balance of payments, leaving little room for saving (Republic of Kenya, 2016).

1.1.3 Trends in Financial Literacy and Financial Access in Kenya

Although Kenya has witnessed great leap in financial innovations, access to financial services has remained low in the informal sector and majority have been excluded from formal financial services, especially the least educated (Shibia & Kieya, 2016).

Figure 1.6 shows financial access by strands for different years in Kenya.

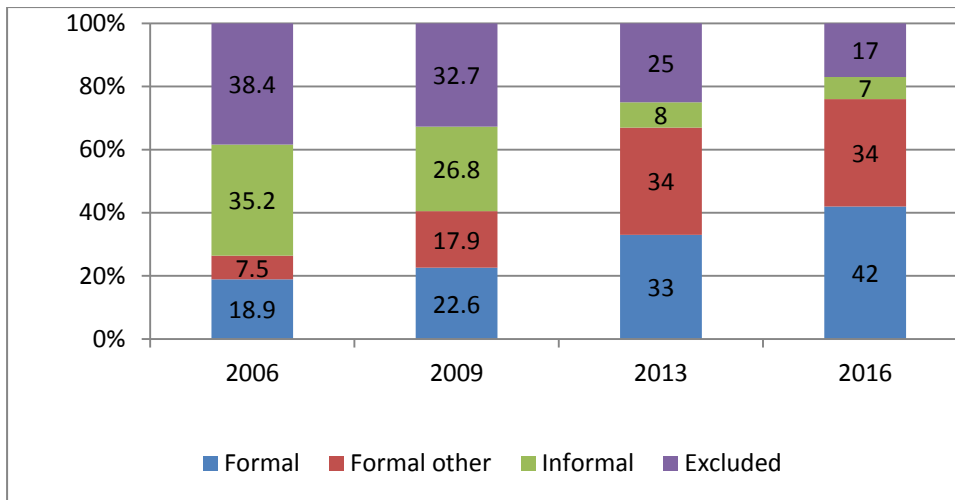


Figure 1.6: Financial Access by Strands from 2006 to 2016

Source: Author's Calculation.

The figure shows that in 2006, 18.9 percent of the population used formal financial services 35.2 per cent used informal and 38 per cent were excluded. The respective figures for 2016 are 42, 7 and 17 per cent, respectively. This reveals that although a large number of people have moved from informal to formal financial access, a large number is still excluded.

Further, the figure shows that 33 per cent of Kenyans used formal financial strands, 34 per cent used other formal, eight per cent informal, and 25 per cent were excluded in 2013. This indicates a consistent rise in the number of people using formal services and a decline in those using informal strands and the excluded ones. Furthermore, the figure shows that in 2016 42 per cent of Kenyans accessed formal financial strands, 33 accesses other formal, 7.2 informal, and 17 per cent are excluded. As Figure 1.3 shows, whereas the percentage of those using formal financial strands increased by ten percent (from 32 per cent to 42 per cent), the percentage of those using informal strands decreased only by 0.6 per cent and those excluded by eight per cent.

Compared to 2006, financial inclusion has more than doubled while financial exclusion has more than halved.

Figure 1.7 combines the financial access by strands for the years 2006, 2009, 2013 and 2016 in one graph. The figure shows that in 2009, those with tertiary education using formal financial access strands, other formal, informal and excluded equals to 70.3, 19.5, 2.2 and 8 per cent respectively in 2009. These figures are 35, 25, 16 and 25 percent for those with secondary education and 13, 17, 36 and 34 percent for those with primary education. Lastly, those with no education used five per cent of the formal access strands, seven per cent other formal, 32 per cent informal and 56 per cent were excluded. This indicates clearly that less educated people are less likely to access formal financial strands and most likely to access informal ones or be excluded.

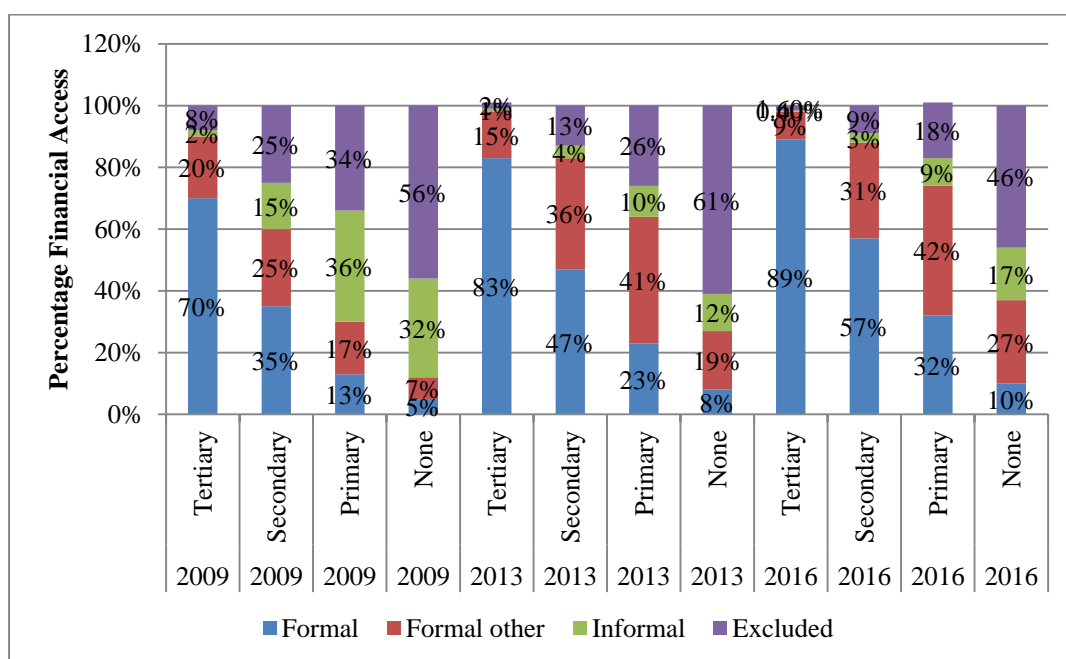


Figure 1.7: Financial Access by Education Level in 2009, 2013 and 2016

Source: Author's Calculation

Figure 1.7 shows that in 2009, those with tertiary education using formal financial access strands, other formal, informal and excluded equals to 70.3, 19.5, 2.2 and 8 per

cent respectively in 2009. These figures are 35, 25, 16 and 25 percent for those with secondary education and 13, 17, 36 and 34 percent for those with primary education. Lastly, those with no education used five per cent of the formal access strands, seven per cent other formal, 32 per cent informal and 56 per cent were excluded. This indicates clearly that less educated people are less likely to access formal financial strands and most likely to access informal ones or be excluded.

In addition, the figure shows that in 2013, 83 percent of those with tertiary education had access to formal financial services, 15 per cent other formal, one per cent informal and two per cent were excluded. 47 per cent of those with secondary education had access to formal financial strands, 36per cent other formal, four per cent informal, and 13 per cent were excluded. 23 per cent of those with primary education accessed formal strands, 41 per cent other formal, ten per cent informal, and 26 per cent were excluded. These statistics are eight percent, 19 per cent, 12 per cent, and 61 per cent respectively for those with no education. This indicates an increase in the number of those with no education who are excluded from access to financial services compared to the 2009 statistics.

Further, the figure shows that the percentage of those with tertiary education who are included in the formal strands increased from 83 per cent in 2013 to 89 per cent in 2016, nine per cent other formal, 0.4 per cent informal and 1.6 per cent were excluded. On the other hand, 57 per cent of those with secondary education used formal strands, 31 per cent other formal, three per cent informal and nine per cent were excluded shows financial access by strands in 2016. At the same time, 32 per cent of primary school respondents used formal strands, 42 per cent other formal, nine per cent informal and 18 per cent were excluded. Lastly, ten per cent of respondents without any education used formal financial strands, 27 per cent used other formal,

17 per cent informal, and 46 per cent were excluded. Just like the other surveys, the level of financial inclusion increases with the level of education. Financial exclusion is highest at low levels of education (primary and no education).

1.1.4 Savings Trends in Kenya

Figure 1.8 shows the graph of savings rate in Kenya as a proportion of GDP.

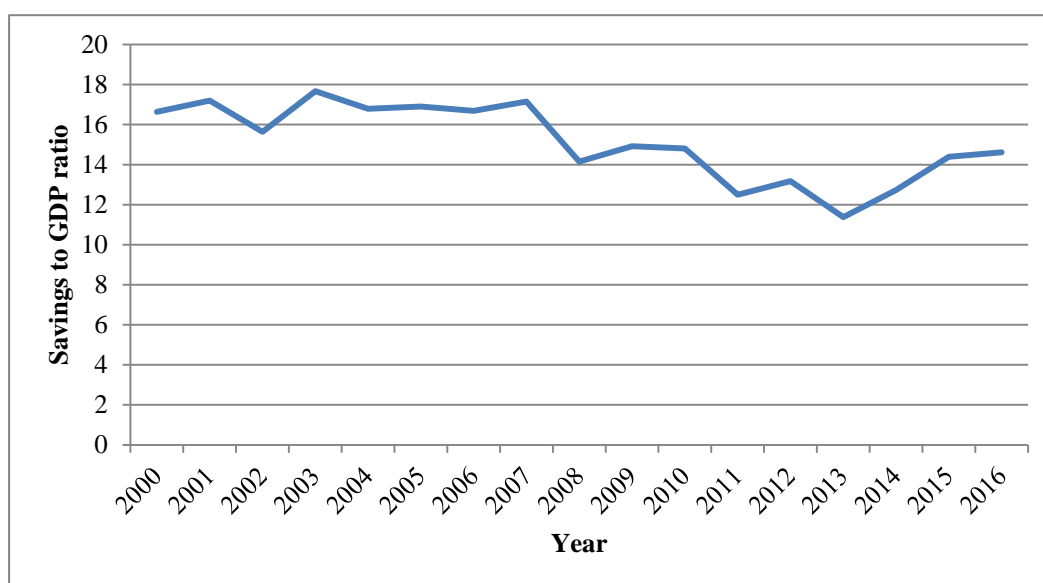


Figure 1.8: Savings to GDP ratio

Source: Kenya Economic Surveys (Various).

Figure 1.8 shows that the savings rate in Kenya declined consistently from 2008 to 2013 before starting to rise. The decline is associated with increased appetite for imported goods, high unemployment and inflation (Republic of Kenya, 2014). The increase in savings rate from 2013 is credited with greater financial inclusion through the use of mobile money. The rise of savings to GDP ratio to 14.62 per cent in 2016 is associated with reduced borrowing following the capping of the interest rates (Republic of Kenya, 2016).

1.1.5 Financial Literacy Trends in Kenya

Financial literacy is proxied by enrolment in primary, secondary and TIVET. Figure 1.6 shows that there has been a consistent increase in primary, secondary and post-

secondary enrolment. Completion rates in primary and secondary schools increased by 43 and 135 percent between 2006 and 2016, respectively¹. At the same time enrolment in tertiary and voluntary institutions (TVET) increased by 185 per cent.

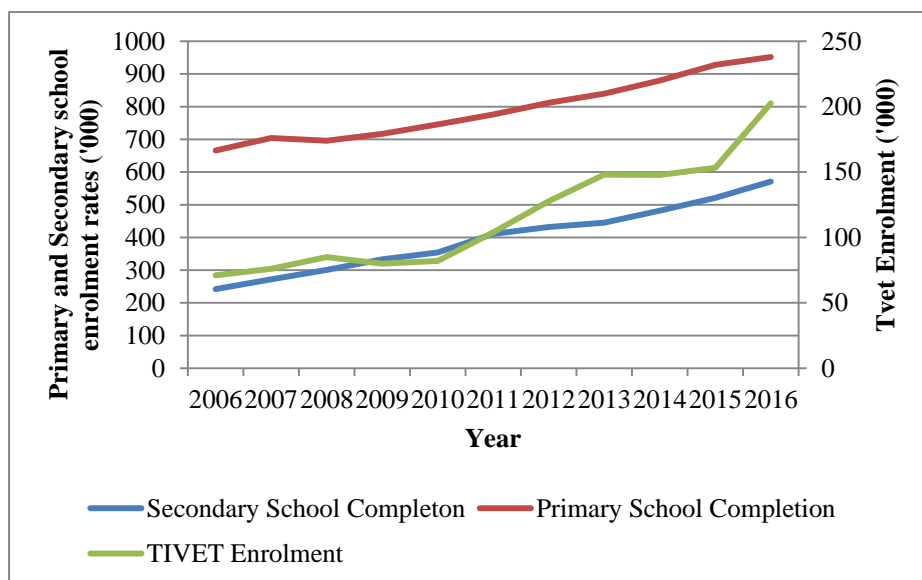


Figure 1.6 Completion rates in primary and secondary schools, and enrolment rates in Technical Training Institutes (TVET)

Source: Kenya Economic Surveys (Various).

Increase in completion and enrolment rates has been attributed to free primary and subsidized secondary education, increasing education demand beyond basic education, change of government policy and political prioritization, increased education funding and growth of the private sector provision (Nicholai, Prizzon, & Hine, 2014).

It is clear that there is a general increase in the demand for formal and formal other, but a decrease in the informal and excluded. This can be attributed to the introduction of new technologically advanced financial services such as mobile banking and mobile money transfer (Quigley, 2009). However, although enrolment and completion rates in secondary, TVET and universities have been rising over the years (implying

¹ Data for KCPE and KCSE completion rates are available in Kenya Economic surveys from 2006. Completion rates data for tertiary and voluntary education is not available.

increase in financial literacy), financial exclusion is still high. At the same time savings rate have remained low, stagnating between 2000 and 2006, and declining from 2008 to 2013 (Republic of Kenya, Various Years). This study, therefore, sought to determine the effect of financial literacy on savings in Kenya.

1.2 Statement of the Problem

Over the past decade Kenya has experience intense financial sector reforms with extensive growth of technological advancements such as mobile banking and automatic teller machines (ATMs). Growth in financial service access and savings (financial inclusion) has been cited as one of the pillars that are expected to drive the economy towards a prosperous ten per cent growth rate as envisioned in the vision 2030. In addition, expanding household formal financial service access is one of Kenya government agenda and deeply anchored in the national development blueprint that is Vision 2030. Greater financial inclusion is expected to increase household's access to financial services, boost savings and investments, and lead to the realization of the country's development agenda.

However, despite the efforts, access formal financial services remains low. For instance, access to savings, access to credit and access to insurance remains low at 58, 29 and 17 percent, respectively (Shibia & Kieya, 2016). In addition, According to Fin Access Survey (2013), 33 per cent of the country's population accessed financial services from formally regulated financial institutions, eight per cent from informal ones, 26 per cent were financially excluded, and 33 per cent from other sources. Furthermore, according to FinAccess survey of 2016, 17 per cent of Kenyans access informal financial services while seven per cent are excluded.

A high level of financial literacy is associated with formal financial sector and has several benefits. However, although financial literacy, as proxied by enrolment in

primary, secondary and TIVET and universities have been rising over the years (implying increase in financial literacy), financial exclusion is still high. At the same time savings rate have remained low, stagnating between 2000 and 2006, and declining from 2008 to 2013

Most of the empirical literature reviewed investigated the determinant of financial inclusion and financial literacy (Martinez, Hildago & Tuesta, 2013; Manu, 2015; Mishi, Vacu & Chipote, 2012; Bendig, Giesberg, & Steiner, 2009). Also, to the knowledge of this study, most of the studies in Kenya were not carried out using the most recent data. Shibia (2012) and Wachira and Kihui (2012) used 2009 Fin Access National survey data while Shibia and Kieya (2016) used 2009 and 2013 Fin Access National survey data. In addition, the studies reviewed failed to discuss the effect of financial literacy on savings. The current study investigated the effect of financial literacy on financial access and savings in Kenya using the Fin Access National survey data most recent data of 2013 and 2016.

1.3 Research Questions

- i. What is the effect of financial literacy on financial access in Kenya?
- ii. What is the effect of financial literacy on savings in Kenya?

1.4 Research Objectives

1.4.1 General Objective

The main objective of this study is to find out the effect of financial literacy on financial access and savings in Kenya.

1.4.2 Specific objectives

The specific objectives are

- i. To determine the effect of financial literacy on financial access in Kenya.
- ii. To establish the effect of financial literacy on savings in Kenya.

1.5 Significance of the Study

An analysis of the effect of financial literacy on financial access will be useful to the governments, policymakers, banking sector, and donors, since it will provide sufficient evidence on whether financial literacy is increasing financial access and saving in the country. This will influence policy and decision making that is focussed on reducing financial exclusion especially to those with low financial literacy segment of the population. The study will reveal other factors that affect households' decision in choosing a financial strand and provide suggestions on what can be done to ensure many people access formal financial services.

1.6 Scope of the Study

This study was conducted using secondary data collected in two household surveys done by Fin Access in 2013 and 2016. This decision is informed by the fact that it is the most recent data and it provided good comparison between the effects of financial literacy on financial access and savings in 2013 and 2016.

1.7 Organization of the Study

This project is organized into five sections. The foregoing chapter introduced the study by explaining the importance of financial education. It then discussed the trends of financial literacy and financial access in the country. It summarized by explaining the research gap and the research objectives. Chapter two gives the theoretical and empirical literature and Chapter three discusses the methodology to be used to achieve the study's objectives. Chapter four presents the empirical findings while chapter five presents the summary, conclusion and policy implications.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviews the theoretical and empirical literature on financial literacy and financial access. The chapter then concludes by giving a review of the empirical literature related to the study.

2.2 Theoretical Literature

2.2.1 High Cost View

This theory is associated with Cole *et al.*, (2011) who assert that many low income customers avoid formal financial institutions due to the high fixed costs associated with them. The theory argues that rational consumers will, therefore, prefer cheaper informal financial services to the formal ones or may simply decide to be excluded from the financial services. Cole further argues that in emerging markets, savings, credit and insurance market do perform well. However, the benefits associated with these formal markets may be less than the fixed transactions costs associated with them. This theory explains why some individuals choose to be excluded from formal financial services but it does not highlight the role of financial literacy in financial inclusion. Therefore, this theory was not adopted in this study.

2.2.2 Behavioral and Institutional Analysis Theory

This theory was developed by Simpson and Buckland (2009). It explores the behavioral economics and institutional analysis behavior that explain financial access. On the one hand, the theory argues that customers behave irrationally thus hurting their behavior. For instance, utility maximizing consumers are expected to avoid risky financial services and high cost loans providers. However, some consumers will still borrow at high interest rates from the informal financial institutions. On the other

hand, institutional analysis side of the theory argues that consumers are rational and focus on the demand and the supply side. Demand side factors include increasing wealth and income disparity which leads to increasing number of the non banked people while the supply side factors include financial liberalization which has changed the way the banks operate. For example, banks may open up in some areas and close in the less profitable ones. Institutional analysis argues that consumers are rational but change of institutional environment affects customer's behavior and constrains their access to financial services. This theory explains how individual and institution behavior affects individual financial access and savings. However, the theory also does not explain how financial literacy affects financial inclusion. Therefore, this theory was not applied in this study.

2.2.3 Credit Rationing in Markets with Imperfect information

This theory was developed by Stiglitz and Weiss (1981). It argues that banks limit credit because of adverse selection problems and due to the problems associated with incentives even in circumstances where the borrower is ready to pay higher interest rates. Imperfect information between the lender and the borrower (principal and the agent), therefore, act as the hindrance to a proper functioning credit market. Naturally, it is expected that market demand and supply for loanable funds should always equate. However, this does not happen because of existence of short and long run disequilibrium.

Change in interest rates will make borrowers change their behaviour. A high interest rate is usually associated with low repayment probability. The theory asserts that increasing the interest rates by the banks would lead to increase in the risks associated with the loans and this would discourage safe loan borrowers from taking loans or encourage those taking to invest in risky projects. Credit rationing theory therefore

sees financial exclusion problem from the supply perspectives and is limited to credit markets. This theory highlights how limitation to accessing credit affects individual financial inclusion but fails to explain how financial literacy affects financial inclusion. Therefore, this theory was not be applied in this study.

2.2.4 Radom Choice Utility Theory

The theory was developed by McFadden 1974. The theory posits that individual choice can be explained by random factors. This theory assumes that individual choice is discrete. This means that choice is all or nothing. In addition, it assumes that attraction or utility towards a goods or services varies across individuals as a random variable. The theory argues that an individual tends to choose the alternative with the highest utility among discrete sets of alternatives. In addition, the theory asserts that utility of an alternative highly depends on characteristics of that alternative and the characteristics of an individual such cost of the product, age and gender of an individual, individual knowledge of the product and the occasion the product is intended for. Further, the theory states that product and individual attributes can be classified as either observed or unobserved. Observed ones are represented in the utility function by explanatory variables while the unobserved ones are represent as random variables hence giving rise to the term random utility theory. This theory highlights how financial literacy affects individual choice to financial access and savings and identifies the characteristics that affect access. Therefore, this study was adopted as the theoretical basis for this theory.

2.3 Empirical Literature Review

2.3.1 Empirical Literature for the rest of the world

Kiiza and Paderson (2002) examined how different factors affect households' financial savings mobilization in Uganda. These factors included degree of household

access to financial institution, work experience, region, educational level of the household head, financial institutions density in an area, and the level of information available to the households. The study used logistic regression. Coefficients of education, work experience, information available to the household and region (rural or urban) were found to be highly significant. The limitation of this study is that it was undertaken in 2002, and therefore, may not reflect the actual situation in Uganda. There is, therefore, need to carry out an updated study as there have been a lot of financial and economic changes since 2002.

Courchane and Zorn (2005) conducted a study to investigate consumer literacy and credit worthiness in Wisconsin (USA). The study used recursive model. The study used primary data from a survey conducted in 1999 for Freddie Mac and from Experian. Some of the variables the study used were household incomes, behaviours, credit information, education and aged the study established that behaviour which is influenced by knowledge had a direct positive relationship with credit outcomes. The study argued that lack of knowledge about key personal finance issues contributes to these mistakes, calling for knowledge acquisition to counter it. The limitation of this study is that it was carried out in 2005 and therefore it may not reflect the current actual situation in Wisconsin.

Rooij, Lusardi, and Alessie (2007) examined the relationship between financial literacy and stock market participation in Dutch. The study found that low financial literacy and little investment in stocks are highly correlated. Data was sourced from the 2005 DNB Household Survey (DHS) which contained a sample of 2000 households. The results show that financial literacy increases with education level and more women display low levels of financial literacy compared to men (34.5 per cent and 15.9 per cent of the first and lowest quartile of literacy distribution). Only 23.8

per cent of the sample owned stocks and the ownership of the stocks increased with the education levels. Financial literacy was also found to be highest among the middle aged, moderately high among the young and declines with age (61 years and above). This study did not consider access to financial services, which is widely used in literature as a measure of financial inclusion compared to stock market participation.

Bendig, Giesberg, and Steiner (2009) investigated household demand for formal financial services in rural Ghana with specific focus on credit, savings, and insurance using household survey data conducted in Brakwa and Benin village in Central Region of Ghana in 2008. Some of the variables used in the study included household size, household head gender, education, assets, land size, and employment status. The study used a multivariate probit model. Results indicated that poor households are less likely to participate in formal financial compared to those that are better off. Furthermore, use of financial services was found to be dependent on other factors other than household's social economic status, such as risk assessment and past exposure to shocks. Household size, household head gender, education, assets, shocks, remittances and employment status were found to be highly significant while age and land size were not significant. The study used the number of years of schooling of the head and did not consider how probability changes across different learning institutions. Again, the study only considered a sample of two villages in the whole country, and therefore, is not a good representative of the whole country situation.

Osei-Assibey, (2009) examined the factors that determines the supply and demand for financial services in Ghana. The study applied Access Possibility Frontier model. To explain self-exclusion the study referred to non-market factors such as socio-cultural, religion, and financial literacy. The study modelled household educational

endowment as a proxy for the level of financial literacy. This study found that education was positive and robustly significant in explaining why individuals exclude themselves from financial services. The limitation of this study is that it was carried out a decade ago and therefore it may not reflect the current actual situation in Ghana. Mishi, Vacu and Chipote (2012) studied the role of financial literacy in optimizing financial inclusion in South African rural areas. The study used East Cape Province as the sample and used household survey data collected by Southern Africa Labour Development Research Unit (SALDRU). Quantile and OLS regression were used for analysis to achieve the study's objectives. Increase in financial literacy was found to increase financial inclusion. The main factors found to hinder inclusion were poor infrastructure, illiteracy, lack of awareness, ease of access to informal credit, and social exclusion, among others. This study did not use multinomial probit or logit regressions, which are suitable for such studies (Greene, 2012).

Martinez, Hildago and Tuesta (2013) investigated the demand factors that influence financial inclusion in Mexico. The study used National Inclusion Survey data collected in 2013. The most important variables identified are income level, gender, education, geographical variables and variables related to preference for informal financial market strands. The study further revealed that those with primary education level had a probability of being financially excluded of 10 per cent while those with secondary education, their probability were four per cent. The limitation of this study is that it only considered primary and secondary education levels and not the tertiary category. This could provide biased results.

Manu (2015) studied the determinants of financial inclusion and financial literacy in India. The study further investigated the degree of awareness of people on various financial services and products using both primary and secondary data. Primary data

was collected from Kanuur District, Kerala. The study used multivariate tests like F and hypothesis tests to answer its objectives. Independent variables used to proxy financial inclusion were borrowings, savings, financial services used, credit refusal and refusal of financial services by the respondents. The study found a strong relationship between the categorical variables and financial inclusion. Similar to Mishri, Vacu and Chipote (2012), this study also did not estimate empirically how the independent variables are related with financial inclusion.

Using a sample of 25 Mandals (villages) from Krishna district, Raja (2015) investigated the level of financial literacy and financial inclusion in Krishna district. A score index of 1 to 10 was used, where one indicated the highest score and 10 the lowest. Results showed that financial literacy is a key factor for financial inclusion. 80 per cent of the Mandal villages respondents did not know about technological banking services as they were illiterate. 11 out of the 25 villages sampled ranked below 5 due to limited financial education, little understanding of banking services and little programs awareness. This study was limited by the use of descriptive statistics and not a model to find the impact of financial literacy on financial access, and use of one district Mandals as the sample.

2.3.2 Empirical Literature for Kenya

Shibia (2012) studied the effects of financial literacy on financial access in Kenya. The study employed 2009 Fin Access National survey which contained a sample of 6329 representatives. The control variables used included age, education, income, region (urban or rural), distance to financial institution and gender. Using a multinomial probit regression, the study established that financial education strongly predicts formal financial access in Kenya. The other control variables were also found

to be important in explaining financial access in the country. The present study updates the findings of this study by using the most recent 2013 and 2016 data.

Wachira and Kihiu (2012) investigated the effects of financial literacy on financial access in Kenya. Data was extracted from the 2009 Kenya FinAccess national survey. Multinomial logit regression revealed that financial literacy is not a major determinant of financial access in Kenya. Instead, it was found to depend on income, distance to financial institutions, gender, household size, marital status and education level. The probability of a financially illiterate person remaining financially excluded was found to be high. Nevertheless, the study never justified the use of multinomial logit to multinomial probit. Results also conflicted theory which states that financial literacy is a major determinant of financial access.

Shibia and Kieya (2016) studied how individual's level of financial literacy affects their choices of a financial strand in Kenya. Cross sectional survey data from FinAccess study covering for 2009 and 2013 was used in this study. The study employed multinomial probit regression to achieve its objectives. Results revealed that financial literacy is positively related with the level of education. Control variables like age, income, gender and education were found to be significant in explaining access to different financial strands.

2.4 Overview of the Literature

Different theories have diverse explanations on why people can remain financially excluded or only access informal financial services. Some theories argue that this is due to credit rationing by the principal (lender), others argue that it is due to behavior inherent in borrowers, others attribute it to high cost of formal financial institutions while others argue that it is due consumer's choice (Cole *et al.*, 2011; Simpson and Buckland, 2009; Stiglitz and Weiss, 1981; McFadden, 1974). This research was

primarily based on financial random utility theory as it explains how financial literacy affects financial access in Kenya.

Most of the studies reviewed agree that financial literacy and access to financial services are highly correlated (Shibia, 2012; Raja, 2015; Mishi, Vacu & Chipote, 2012; Shibia & Kieya, 2016; Wachira & Kihui, 2012). Majority of study used cross sectional data and employed multinomial probit or logit to find out how financial literacy affects financial access (Shibia, 2012; Raja, 2015; Shibia & Kieya, 2016; Wachira & Kihui, 2012). Others used descriptive statistics which is not the best in evaluating the effect of financial literacy on financial access. Gender, income, information available to households, education, age and availability and distance to financial institutions variables are considered in these studies. Income, gender and education were found to be significant in most studies. Earlier studies done in Kenya used 2009 and 2013 household survey data collected by FinAccess. The current study updated the existing studies on effect of financial literacy on financial access and savings in Kenya by using the most recent FinAccess household survey data of 2013 and 2016 data and using a Multinomial logit.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the research design, theoretical framework, the econometric model, measurement of variables and data analysis techniques employed to achieve the study's objectives. Furthermore, the study provides the model diagnostics which were carried out to ensure robust results.

3.2 Research Design

This study adopted an exploratory research design which is defined as research into a hypothetical or theoretical idea. Exploratory research is where a researcher observes a phenomenon and seeks to explore more about it (Reiter, 2017). Exploratory research aims at understanding the cause and effect relationships among variables and hence was suitable for this study. This research used cross sectional survey data from FinAccess study covering the periods 2013 and 2016. These surveys contain a sample of 6449 and 10,008 for 2013 and 2016 respectively. In 2016, 8665 households were interviewed and a success rate of 87 per cent was achieved. Data was collected for financial literacy, which is the main variable of interest. More data was also collected for control variables which include savings, region, income, age, distance to financial institutions, gender and education.

3.3 Theoretical Framework

This study adopts the utility random model developed by McFadden (1984) and advanced by Greene (2002). A random utility model was used to model the interpretation of data on individual choices. Specifically, a discrete choice model is used to model the individual's demand for financial services. It is assumed that the individual makes a choice that maximizes their utility (Greene, 2012). Every

individual n faces M alternatives and makes a choice i if the utility derived from that choice is greater than the one derived from choice j . The utility provided by each choice is unobservable but the characteristics associated with each choice are observable. Let x_{nj} be the observable characteristics of individual n and z_{nj} be the unobservable characteristics of individual n . u_{nj} is the utility individual n obtains from choice j and u_j is the utility of choice j . The model is then expressed as follows:

$$u_{nj} = u_j(x_{nj}, z_{nj}) \quad (3.1)$$

An individual faced with two or more choices will choose the one that maximizes his utility. The observed choice chosen by the individual reveals which option gives him the highest utility, but the utilities are unobservable. Therefore, the observed indicator equals one if the utility obtained from that category chosen is greater than utility derived from choosing alternative categories.

In this case, the three choices are the three financial strands: formal, informal and excluded. The three formal strands, that is formal registered, formal prudential and formal non prudential were treated as formal strand. Every respondent was placed in a single category. Where a respondent uses different categories, the most formal strand is considered.

The individual will choose alternative A (choose one financial strand) to alternative B (chooses one financial strand) if:

$$U_A > U_B \text{ (Utility of A is greater than utility of B)} \quad (3.2)$$

$$V_A(x_{nj}, \delta) + \varepsilon_{nA} > V_B(x_{nj}, \delta) + \varepsilon_{nB} \quad (3.3)$$

Where,

$V_A(x_{nj}, \delta) + \varepsilon_{nA} = U_A \Rightarrow$ utility derived from alternative A,

$V_B(x_{nj}, \delta) + \varepsilon_{nB} = U_B \Rightarrow$ utility derived from alternative B,

δ is a vector of unknown parameters and

ε_{nA} and ε_{nB} are error terms for alternatives A and B respectively.

Subtracting the right hand side of equation (3.3) from the left side one, we get:

$$V_A(x_{nj}, \delta) - V_B(x_{nj}, \delta) + (\varepsilon_{nA} - \varepsilon_{nB}) > 0 \quad (3.4)$$

$$C_i^* = g(x_n, \delta) + \mu_i \quad (3.5)$$

Where,

$g(x_n, \delta) = V_A(x_{nj}, \delta) - V_B(x_{nj}, \delta)$ is a vector of observable characteristics,

$\mu_i = (\varepsilon_{nA} - \varepsilon_{nB})$ captures the unobservable characteristics and,

$C_i^* = g(x_n, \delta) + \mu_i$ is a latent variable which captures both the observed and the unobserved characteristics (A latent variable is one which is not intrinsically measurable such as permanent income, intelligence, or financial strand. However, they are related to measurable variables like age, education, income, among others (Kmenta, 1986). In this study, the latent variable will take the value of 1 for the financial strand an individual is placed, and zero otherwise. The formal financial strand was used as the base category.

3.4 Empirical Model

The financial seeking behaviour of an individual was modelled using multinomial model which was derived from the theoretical framework. It has also been used widely in literature (for example see Kihui & Wachira, 2012; Shibia, 2012, Shibia & Kieya, 2016 among others). The model assumes that the errors are identically and independently distributed across alternatives and individuals. Unlike the linear probability method, this model also assumes that the probability lies between 0 and one. The empirical model to be estimated is specified as follows:

$$C_i^* = \beta_0 + \beta_1 Reg_j + \beta_2 Inc_j + \beta_3 Age_j + \beta_4 Dist_j + \beta_5 Gender_j + \beta_6 Educ_j + \varepsilon_{i,t} \quad (3.6)$$

Where:

The explanatory variables capture the observable characteristics,

C_i^* Represents financial access strand which can be formal, informal or excluded,

Reg_j Represents region,

Inc_j Represents income,

$Dist_j$ Represents distance to financial institutions and

$Educ_j$ Represents education

The model specification below was used to estimate the effect of financial literacy on savings.

$$S = \delta_0 + \delta_1 Reg + \delta_2 Inc + \delta_3 Age + \delta_4 Dist + \delta_5 Gender + \delta_6 Educ + \delta_7 WorkExp + \delta_8 Nchild + \epsilon_{i,t} \quad (3.7)$$

Where:

S Represents Savings

Reg Represents region

Inc Represents income

$Dist$ Represents distance to financial institutions

$Educ$ Represents education

$WorkExp$ Represents work experience and

$Nchild$ Represents the number of children

The coefficients of equations (3.6) just give the direction of relationship between C_i^* and the independent variable. To interpret the estimated model, the marginal effects are calculated, mostly at the mean of the regressors. The marginal effects for probit and logit, say for the independent variable x_j are $\Phi(x'\beta)\beta_j$ and $\Lambda(1 - \Lambda)\beta_j$ respectively (Greene, 2012). Equations 3.6 and 3.7 are then estimated by maximizing the log likelihood function. Income earners were used as an instrument.

3.5 Definition and Measurement of Variables

Table 3.1 Definition of Measurement Variables

Variable	Definition
Financial Access	This is an indicator of the financial strand an individual belongs to. It was measured using three categories/ strands: formal, informal and excluded measured as a categorical variable from one, two and three respectively
Age	It measures how old an individual is. It was measured as a continuous variable in years for those aged above 18 years
Income	It is the annual total payment or wage an individual receives. It was measured in Kenya Shillings
Region	Refers to the respondents' residence: whether rural or urban. It was measured as a dummy, 1 if urban and zero if rural
Proximity to financial Institutions	It was measured as a categorical variable. One if it is less than thirty minutes walking, two if 30 minutes to one hour, three if two to three hours, four if five to six hours, and five if more than six hours
Gender or Sex	It was measured as a dummy variable, one if male and zero if female
Education	This is the highest level of learning attained. Education level proxied financial literacy in this study. It was measured as a categorical variable: one if none, two if primary, three if secondary and four if tertiary
Savings	It was measured by subtracting individual spending from the income. It was measured as a binary variable 0 for no saving and 1 for has saving. When an individual spending were equal or exceeded income, the saving was coded as 0 and when income exceeded spending saving was coded as 1
Work Experience	Measured as a continuous variable. It was measured as a total years of work experience
Number of children	Measured as a continuous variable ranging from 0 - 6

3.6 Data Type and Source

This study used secondary 2013 and 2016 cross sectional Fin Access household survey data collected Central Bank of Kenya, Kenya National Bureau of Statistics and FSD Kenya in Kenya. The data is for those aged 18 years and above. The sample contains 6449 and 10, 008 for the two periods respectively. The data is available on the official websites of the above mentioned organization.

3.7 Data Analysis

The first objective of this study was to find out the effect of financial literacy on financial access in Kenya. This objective was answered using the multinomial logit

model. It is expected that financial literacy and financial access are positively related. The second objective was to find out the effect of financial literacy on savings in Kenya. This objective too was answered using a multinomial logit. Additional explanatory variables to be added to this model include work experience and the number of children. Equations (3.6) and (3.7) will be used. A positive relationship is expected between the two. Since the estimated parameters cannot be used to make inferences, the study will focus on marginal effects based on the three strands.

3.8 Model Diagnostics

To ensure validity of the results, this study employed a variety of diagnostic test.

3.8.1 Hosmer-Lemeshow Goodness of fit test

This test is similar to the Pearson chi-squared goodness-of-fit test. It was used to test the goodness of fit by comparing the fitted probability of different subgroups with the actual values of the dependent variables. The null hypothesis is that groups are equal.

3.8.2 Model specification test

A specification test was used to check whether the model used was well specified (Greene, 2012). A link test was used to check if the model is well specified. For a well fitted model, the coefficient of \hat{h} should be significant while the coefficient of \hat{h}_s should not.

3.8.3 Multicollinearity Test

Multicollinearity among the independent variables was tested using pairwise correlation (Gujarati, 2004; Greene, 2012). A pairwise correlation of above 80 percent indicates presence of multicollinearity, the estimated variances and covariance are large and t ratios are insignificant. Nevertheless, the estimates are still linear and best linear unbiased estimators (BLUE). Multicollinearity problem is corrected by dropping the correlated variables, logarithmic transformation of the variables,

increasing sample size, and percentage transformation or through first differencing (Gujarati, 2004; Greene, 2012).

3.8.4 Likelihood test

This test was used to test the goodness-of-fit between the models. Likelihood test is uses the likelihood of the hierarchically nested models being compared to assess their fit. The log of the likelihood is always negative with values closer to zero indicating a better fitting model.

3.8.5 Wald test

This test was used to find out the significance of the explanatory variables in a study model. The test states that if the parameters for given explanatory variables are zero, then the variables is insignificant for the model estimation and they can be removed from the model and if the parameters are not zero the variables should be included in the model.

CHAPTER FOUR

EMPRICAL FINDINGS

4.1 Introduction

This chapter discusses the characteristics of the data using a summary of descriptive statistics, model estimation and the findings. The study findings are presented in accordance with the research objectives.

4.2 Descriptive Statistics

This study used descriptive statistics to capture the basic characteristics of the data. The data came from FinAcess survey undertaken in 2013 and 2016 across all the counties. Table 4.1 gives the summary of the continuous data while Table 4.2 shows the summary of the categorical data. The sample for 2013 and 2016 is 5980 and 8182 individuals, respectively.

Table

Table 4.1 Descriptive statistics of the continuous variables

	2013				2016			
Variable	Min	Max	Mean	Std	Min	Max	Mean	Std
Age (Years)	16	97	36.52	15.54	16	100	36.66	15.91
Income (KSh)	0	450,000	7163.2	17396.75	0	15,200,00	16707	186940
Household size	1	24	4.45	2.56	1	20	4.38	2.48

Source: Author's calculation

Table 4.1 shows that the minimum and maximum values for age of the respondents in 2013 and 2016 were 16 and 97, and 16 and 100, respectively. The mean age was 36.52 for 2013 and 36.66 for 2016. This indicates that most respondents are below 40 years of age. The minimum income for both 2013 and 2016 is KSh zero per month,

but the maximum is KSh 450, 000 and KSh 15, 200, 000 per month. There were four observations values of income whose values were equal to or above one million, with the maximum value being 15, 200, 000. To avoid biased results, these values were treated as outliers and dropped. The maximum value of income was 687, 000 after the removing the outliers. This is comparable with the maximum of KSh 450,000 for 2013. The size of the household ranged from one to 24 in 2013 and one to 20 in 2016. The mean of the household size was also close: 4.45 and 4.38 in 2013 and 2016, respectively. The standard deviation of the household size was 2.56 and 2.48 in the two years, respectively. The means of age and household size were below their respective standard deviations. However, the standard deviation of income in both cases is greater than the means. This suggests presence of outliers in the data series. To solve this problem, the study used the log of income (See for example Greene, 2012; Enders, 2012, among others)

Table 4.2 Descriptive statistics of the categorical variables

	2013		2016	
Financial access category	Frequency	Per cent	Frequency	Per cent
Formal	3795	63.47	5,922	72.40
Excluded	1662	27.80	1,623	19.84
Informal	522	8.73	635	7.76
Total	5979	100	8,180	100.00
Has savings category				
Yes	3718	62.18	5,857	71.60
No	2261	37.82	2,323	28.40
Total	5979	100	8,180	100.00
Gender Category				
Female	3,541	59.22	4,912	60.05
Male	2,438	40.78	3,268	39.95
Total	5,979	100.00	8,180	100.00
Region Category				
Rural	3,877	64.84	4,483	54.80
Urban	2,102	35.16	3,697	45.20
Total	5,979	100.00	8,180	100.00
Education Category				
	2013		2016	
	Frequency	Per cent	Frequency	Per cent

Table 4.2 continued.....				
Primary	2,911	48.69	3,688	45.09
Secondary	1,649	27.58	2,388	29.19
None	950	15.89	1,286	15.72
Tertiary	469	7.84	818	10.00
Total	5,979	100.00	8,180	100.00
Distance Category				
Mobile Mon	4,572	76.47	6,434	78.66
Bank/Post Bank	611	10.22	485	5.93
Don't Know	468	7.83	494	6.04
Bank Agent	121	2.02	108	1.32
SACCO	119	1.99	106	1.30
ROSCA/ASCA	72	1.20	444	5.43
MFI	14	0.23	21	0.26
Others	2	0.03	88	1.08
Total	5,979	100.00	8,180	100.00
Bank Distance Category				
Under 10 min	3,138	58.76	4,889	61.10
About 30 min	1,604	30.04	2,010	25.12
About 2 hours	431	8.07	637	7.96
About 3 hours	99	1.85	228	2.85
About 6 hours	31	0.58	41	0.51
About 4 hours	29	0.54	100	1.25
About 5 hours	8	0.15	96	1.20
Total	5,340	100.00	8,001	100.00
Mobile Money Distance Category				
Under 10 min	3,138	58.76	6,754	83.56
About 30 min	1,604	30.04	906	11.21
About 2 hours	431	8.07	249	3.08
About 3 hours	99	1.85	74	0.92
About 6hours	31	0.58	20	0.25
About 4 hours	29	0.54	52	0.64
About 5 hours	8	0.15	28	0.35
Total	5,340	100.00	8,083	100.00

Source: Author's Calculation

Table 4.2 shows that 59 per cent of the respondents were females in 2013, while the equivalent figure for 2016 was 60 per cent. This indicates that females are more likely to be interviewed than males. It also presents a good picture of distribution of people by gender in the country. People in the rural areas represent majority of those interviewed in the two years: this figure is 65 and 54 per cent for 2013 and 2016, respectively. There were five strands of financial access in the FinAccess studies.

These are formal prudential, formal non-prudential and formal registered, informal and excluded. All the three categories of formal access were treated as formal access strand. The percentage of people accessing formal finance increased from 62 to 72 per cent. At the same time, the excluded category also declined from 28 to 20 per cent. There was slight decrease in those accessing informal finance: the proportion fell from nine to eight per cent in the two years. In addition, proportion of the people who reported to have saved increased by nine per cent up to 72 per cent in 2016. Increase in financial access and savings can be associated with the increase in mobile money transfer and mobile money banking (FinAccess, 2016).

Table 4.2 further reveals little variations in the proportions of those interviewed with different education levels. For instance, the per cent of the respondents with primary education in 2013 were 48 percent, while the figure for 2016 was 45 per cent. Similarly, the values for secondary education were 28 and 29 per cent, while the tertiary values were eight and 10 per cent, representing a two per cent increase. This can be attributed to free primary and subsidized secondary education, increasing education demand beyond basic education, change of government policy and political prioritization, increased education funding and growth of the private sector provision. The proportion of those with no education remained constant at 16 per cent in the two surveys. Education was used to proxy financial literacy. Another important finding from the descriptive statistics is that 76 and 79 per cent of the respondents reported that the financial services closest to them were mobile money in the two years, respectively.

Ten per cent reported that a bank or post bank was nearest to their residence: this figure declined to six per cent in 2016, further indicating the increasing extent of mobile money penetration. Whereas the previous studies used the distance to the

nearest bank branch to proxy the time to reach the nearest financial institutions/financial service provider, (for example see Shibia, 2012; Shibia & Kieyah, 2016) the current study used the distance to the nearest mobile money agent to proxy the time to reach the nearest financial institutions/financial service provider. 58 per cent of the respondents said they took less than 10 minutes to reach the nearest banking services provider while 30 per cent said they took about 30 minutes in 2013. These figures changed to 61 and 25 per cent respectively, in 2016. The percentage of people taking less than ten minutes to access the nearest mobile money services provider increased from 59 per cent in 2013 to reach 84 per cent in 2016. At the same time, the proportion of those taking about 30 minutes declined from 30 minutes per cent to 11 per cent. This further indicates the growth of mobile money. As expected, the share of those taking two hours or more to access the mobile money services was only two per cent. This is an indication of growing mobile money's penetration in the country. As in line with the previous studies, this study used distance to the nearest mobile money agent and not the distance to the nearest bank (in minutes). This is because of the increased penetration of the mobile banking which has reduced the time taken to get to the nearest bank in many parts of the country.

4.3 Effect of Financial Literacy on Financial Access in Kenya

As mentioned in Chapter three, this study used multinomial logit to achieve its objectives. The excluded category was used as the base outcome. Since the direct coefficients of the multinomial logit are not directly interpretable, the study calculated the marginal effects. Table 4.3 shows the coefficients of the estimated model while Table 4.4 shows the marginal effects.

Table 4.3 Estimated coefficients of the multinomial logit model

Variable	2013		2016	
	Formal access	Informal access	Formal access	Informal access
Age	0.0173*** (0.0029)	0.0011 (0.0039)	0.0290*** (0.0022)	0.0096*** (0.0032)
Income	0.5704*** (0.0357)	0.1804*** (0.0513)	0.6349*** (0.0275)	0.2623*** (0.0400)
Gender_male	-0.3997*** (0.0868157)	-0.8981*** (0.1395)	-0.3337*** (0.0683)	-0.9248*** (0.1139)
Region_urban	0.1965** (0.1004)	0.0351 (0.1541)	0.2284*** (0.0712)	-0.0958 (0.1116)
Education: primary	1.2089*** (0.1329)	0.5722*** (0.1842)	1.5180*** (0.0902)	0.3846*** (0.1220)
Education: Secondary	1.8992*** (0.1539)	0.3389 (0.2290)	2.1675*** (0.1105)	0.0927 (0.1685)
Education: Tertiary	3.1121*** (0.3397)	-0.0524 (0.6788)	4.1155*** (0.3490)	.3112 (0.6102)
MobileMoney_distance: About thirty minutes	-0.0834 (0.0960)	0.322** (0.1410)	-0.3828*** (0.0958)	0.1498 (0.1328)
MobileMoney_distance: About two hours	-0.2888** (0.1489)	0.3559* (0.1410)	-0.6915*** (0.1674)	0.2547 (0.1995)
MobileMoney_distance: About three hours	-0.9148*** (0.2569)	-1.0120** (0.4927)	-0.7116** (0.2881)	0.0236 (0.3517)
MobileMoney_distance: About four hours	-0.9148** (0.4632)	-0.6022 (0.7810)	-1.1138*** (0.3635)	-0.1262 (0.3999)
MobileMoney_distance: About five hours	13.68187 (695.9639)	0.0157 (1285.067)	-1.3011*** (0.4818)	-0.1621 (0.5381)
MobileMoney_distance: Six hours and above	-1.9007*** (0.5239)	-0.5686 (0,6461)	0.9991 (0.6446)	1.0593 (0.7861)

Source: Author's calculation

Notes: Standard errors are in brackets. ***, ** and * represent significance at one, five and ten per cent level of significance respectively.

The reference categories are rural area for the region variable, excluded category for the education category is those with no education for financial literacy (the level of education was used as a proxy for financial literacy), less than ten minutes for the

mobile money distance and female for the gender variable. The Analysis assumes a discrete choice approach and given that the estimated coefficients in such model approach cannot be used to draw inference except for their signs, the study focuses on the marginal effects to explore changes in probabilities.

Table 4.4 Estimated marginal effects of the multinomial logit model

Variable	2013		2016	
	Formal access	Informal access	Formal access	Informal access
Age	0.0028*** (0.0004)	-0.0008*** (0.0003)	0.0039*** (0.0003)	-0.0007*** (0.0002)
Income	0.0870*** (0.0048)	-0.0162*** (0.0034)	0.0828*** (0.0033)	-0.0110*** (0.0023)
Gender_male	-0.0239* (0.0148)	-0.0448*** (0.0083)	-0.01225 (0.0092)	-0.0426*** (0.0057)
Region_urban	0.0313** (0.0148)	-0.0077 (0.0101)	0.0383*** (0.0094)	-0.0164*** (0.0063)
Education: primary	0.2224*** (0.0266)	-0.0156 (0.0178)	0.2791*** (0.0164)	-0.0536*** (0.0116)
Education: Secondary	0.3522*** (0.0280)	-0.0689** (0.0183)	0.3853*** (0.0174)	-0.0974*** (0.0119)
Education: Tertiary	0.4812*** (0.0308)	-0.1098*** (0.0187)	0.5147*** (0.0176)	-0.1285*** (0.0117)
MobileMoney_distance: About thirty minutes	-0.0318** (0.0147)	0.0295** (0.0099)	-0.0679*** (0.0142)	0.0297*** (0.0096)
MobileMoney_distance: About two hours	-0.0710*** (0.0240)	0.0460*** (0.0173)	-0.1278*** (0.0273)	0.0580*** (0.0187)
MobileMoney_distance: About three hours	-0.1285*** (0.0474)	-0.0247 (.0226)	-0.1177** (0.0479)	0.0368 (0.0299)
MobileMoney_distance: About four hours	-0.1411 (0.0867)	-0.0018 (0.0497)	-0.1824*** (0.0636)	0.0442 (0.0371)
MobileMoney_distance: About five hours	0.0497*** (0.0088)	-0.0747*** (0.0056)	-0.2150** (0.0843)	0.0503 (0.0515)
MobileMoney_distance: Six hours and above	-0.3343*** (0.0961)	0.0378 (0.0617)	0.0765 (0.0645)	0.0198 (0.0499)
Wald test (Ho: the explanatory variables are not significant (=0))	chi2(13) = 543.93 Prob> chi2 = 0.0000	chi2(13) = 61.14 Prob> chi2 = 0.0000	chi2 (13) = 1137.67 Prob> chi2 = 0.0000	chi2(13) = 113.62 Prob> chi2 = 0.0000
Likelihood ratio test	LR chi2(26) = 915.46 Prob> chi2 = 0.0000		LR chi2(26) = 2091.03 Prob> chi2 = 0.0000	

Source: Author's calculation

Note: Standard errors are in brackets. ***, ** and * represent significance at one, five and ten per cent level of significance respectively.

The marginal effects of primary, secondary and tertiary education in all the categories in the two years have positive effects on formal financial access. This means that being in a given education category increases the probability of accessing formal financial services compared to the base category (the financial excluded category). These results are not an isolated case. Shibia (2012), Mahdzan and Tabiani (2013), Martines, Hidago and Tuesta (2013), Shibia and Kieyah (2016) found similar results. Notably, those in the tertiary education category have the highest probability of accessing formal financial services compared with the excluded category. Those with primary education have the least probability. These results therefore imply that increase in education level and formal financial services are positively related. The marginal effect of having either primary, secondary or tertiary education on informal financial access was negative and significant in the two models, except in 2013 where the marginal effect was negative but insignificant for primary education. Shibia (2012) found a similar relationship for secondary and tertiary education but Shibia and Kieyah (2016) found a negative and significant for tertiary education only. According to Mahdzan and Tabiani (2013) lack of financial literacy will lead to self-exclusion. In addition, lack of unawareness of the financial products offered by formal financial services sector causes an individual to miss the opportunities to save and benefit from these financial products and they will not demand them.

For 2013, a one year increase in age increased the probability of accessing formal financial services by 0.0028, but decreased the probability of accessing informal financial services by 0.0008 compared to the excluded category. Similar results apply for 2016 survey: a one year increase in age increased the probability of accessing the

formal financial services by 0.0039 and reduced the probability of accessing informal financial services by 0.0007, compared to the base category. The results for formal strand are consistent with Delvin, 2005; Simpson and Buckland 2009; Shibia 2012; Shibia and Kieyah 2016. However, Shibia and Kieyah, (2016) found a positive relationship between age and informal financial access, but this study has found a negative relationship. Delvin (2005) states that older people are inclined to participate in the financial market more than the younger ones. This can be attributed to the fact that young people may lack sufficient knowledge to successfully navigate their financial decisions

The marginal effect of increase in income in the formal financial strand is positive for both 2013 and 2016. However, this effect was negative for the informal strand. An increase in income increases the probability of accessing formal financial strand but decreases the probability for accessing the informal strand, relative to the base category. Shibia (2012) and Wachira and Kihiu (2012) found similar results. Shibia and Kieyah (2012) found a similar relationship for both formal and informal strands. This could have been attributed to the fact that low income earners have insufficient or variable income and does not allow them to participate in the formal financial system (Martines, Hidago & Tuesta, 2013).

The marginal effect of gender on formal financial strand is negative and weakly significant for 2013 survey, but the one for informal sector is negative and highly significant. The marginal effect of gender on formal financial strand is negative and insignificant for 2016, but negative and highly significant for the informal sector. These results imply that being male decreases the probability of accessing informal financial services, compared with the excluded category (which is the base category).

Shibia (2012) and attributes this observation to women's capability of creating strong social ties and dominating the informal financial sector.

Both results for 2013 and 2016 suggest that being in the urban center increases the probability of accessing the formal financial services, compared to the base outcome. This is associated with the large number of formal financial institutions in the urban centers. However, the marginal effect of urban areas region with respect to the informal strand is insignificant for 2013 sample, but is negative and significant for 2016. Shibia (2012) found similar results.

For the 2013 sample analysis, financial access distance proximity as proxied by distance to the nearest mobile banking financial providers reveal that the probability of accessing formal financial services is less likely compared to those who take about ten minutes, in comparison with the base category. However, the marginal effect of about four hours is negative but insignificant. The same results apply for 2016, but the marginal effect of six hours and more is positive and insignificant. Shibia and Kieyah (2016) found similar results, although the study used financial literacy index to proxy financial literacy.

In both 2013 and 2016 samples, the marginal effect for about thirty minutes and about two hours are positive and significant. However, the marginal effect of about five hours is positive and significant for the 2013 survey sample. The negative and significant marginal effects imply that those who spend either thirty minutes, two hours or three hours are more likely to access to access informal financial services compared to those who spend about ten minutes, in relation to the base category.

The Wald test rejects the hypothesis that the coefficients are not significant. At the same time, likelihood ratio test confirms that the model with the fitted variables is

better than the model with the intercept only. This implies a good fit. In both cases, the probability is less than 0.01. Therefore, we strongly reject both null hypotheses.

4.3.1 Multinomial Logit Post estimation tests

Several tests were carried out to ensure robust results. These include the confusion matrix which evaluates the classification accuracy, the test of combining the dependent variables, test of independent variables and the test of irrelevance of independent variables. These tests are described below.

4.3.1.1 Confusion Matrix

A confusion matrix shows the number of observations that were correctly classified and those misclassified by the model. Table 4.7 presents the confusion matrix. The short coming of the matrix is that data had to be cleaned for all the missing values to ensure equal lengths of actual and predicted observations. After dropping all the missing values, the number of observations fell from 5939 to 4367 for 2013 and from 8180 to 7965 for 2016. The results for 2013 survey show that 73 per cent of the categories were predicted correctly while the rest were misclassified. Similar values for 2016 are 75 and 25 per cent, respectively. This means the data predicts more accurately for 2016 compared to 2013.

Table 4.6 Confusion Matrix 2013 survey

		Predicted categories			
		Excluded	Formal	Informal	Total
Actual Category	Excluded	231	682	0	427
	Formal	158	2910	0	3723
	Informal	63	323	0	0
	Total	452	3915	0	4467
		Accuracy 71.93 %			

Source: author's calculations.

Table 4.7 Confusion Matrix for 2016 survey

Actual Category	Predicted categories				
		Excluded	Formal	Informal	Total
Excluded		448	1077	0	1525
Formal		273	5559	0	5832
Informal		138	470	0	680
Total		859	7106	0	7965
Accuracy 75.42 %					

Source: author's calculations.

4.3.1.2 Test of independent variables

This test was carried out to find out whether each of the independent variable has a significant effect on the dependent variable, financial access. The results for 2013 suggest that all coefficients apart from those of urban region, mobile distance of four or five hours are significant in affecting financial access in access. However, only mobile distance of five hours is not significant in 2016 sample.

Table 4.5 Test of independent variables

Variable	2013		2016	
	Chi	Prob>chi2	Chi	Prob>chi2
Age	43.094	0.000	197.122	0.000
Income	296.270	0.000	627.650	0.000
Gender_male	47.398	0.000	73.224	0.000
Region_urban	4.499	0.105	17.295	0.000
Education_primary	83.919	0.000	313.121	0.000
Education_secondary	174.769	0.000	496.915	0.000
Education_tertiary	174.084	0.000	470.514	0.000
Mobile_bank_dist_2hrs	12.118	0.002	27.502	0.000
Mobile_bank_dist_3hrs	13.526	0.001	7.242	0.027
Mobile_bank_dist_30min	10.015	0.007	10.710	0.005
Mobile_bank_dist_4hrs	3.914	0.141	8.245	0.016
Mobile_bank_dist_5hrs	3.854	0.246	3.099	0.212
Mobile_bank_dist_6hrs and more	15.999	0.000	25.967	0.000

Source: author's calculation

4.3.1.3 Test for combining the dependent variables

This test was done to find out if different categories of financial access can be combined. The results of the two samples reveal that all the three categories are independent and should not be combined.

Table 4.9 Test for combining the dependent variables

Category	2013		2016	
	Chi	Prob>chi2	Chi	Prob>chi2
Excluded and formal	760.390	0.000	1719.429	0.000
Excluded and informal	80.295	0.000	124.500	0.000
Formal and informal	319.927	0.000	677.181	0.000

Source: author's calculation

4.3.1.4 Test of irrelevance of independent variables

Multinomial and conditional logit models assume independence of irrelevance assumption ((IAA). This assumption requires that if an extra category is included or excluded, the relative risks attributed with each of the regressor are not affected. This is a rather strong assumption that needs to be tested. The null hypothesis is that joint outcomes are independent of other alternatives. Results for both years suggest that the IAA assumption is not violated.

Table 4.10Test of irrelevance of independent variables

Category	2013		2016	
	Chi	Prob>chi2	Chi	Prob>chi2
Excluded	14.551	0.410	11.714	0.629
Informal	13.506	0.410	9.852	0.773
Formal	15.336	0.356	6.584	0.950

Source: author's calculation

4.4 Effect of financial literacy on Savings in Kenya

The second objective of the study was to find out the effect of financial literacy in Kenya. To answer this objective, the study used a probit model. Savings was treated as a discrete variable where zero equals no savings and one if an individual had savings (The FinAcess survey collected data for savings as a discrete variable). The estimated coefficient can only be interpreted in terms of the relationship. However, to interpret the probabilities, the marginal effects were computed. The results of the estimated coefficients and the marginal effects are presented in Table 4.5.

Table 4.11 Estimated coefficients and Marginal effect of the probit model

Variable	2013		2016	
	Coefficient (standard error)	Marginal effect (standard error)	Coefficient (standard error)	Marginal effect (standard error)
Age	0.0055*** (0.0015)	0.0018*** (0.0005)	0.0074*** (0.0011)	0.0021*** (0.0003)
Income	0.2104*** (0.0179)	0.0678*** (0.0053)	0.1719*** (0.0125)	0.0510*** (0.0036)
Household Size	-0.0210** (0.0084)	-0.0068** (0.0027)	-1.0270*** (0.0065)	-0.0080*** (0.0019)
Gender_male	-0.2062*** (0.0432)	-0.0667*** (0.0140)	-0.2849*** (0.0331)	-0.0854*** (0.0099)
Region_urban	-0.0562 (0.0491)	-0.0181 (0.0158)	-0.0902*** (0.0346)	-0.0267*** (0.0102)
Education: Primary	0.4984*** (0.0725)	0.1836*** (0.0273)	0.8267*** (0.0472)	0.2990*** (0.0171)
Education: Secondary	0.6938*** (0.0799)	0.2474*** (0.0292)	1.0383*** (0.0549)	0.3600*** (0.0186)
Education: Tertiary	1.1427*** (0.1174)	0.3651*** (0.0335)	1.3130*** (0.0787)	0.4245*** (0.0214)
MobileMoney_ distance: About thirty min	-0.0477 (0.0485)	-0.0154 (0.0157)	-0.0197 (0.0505)	-.00059 (0.0151)
MobileMoney_ distance: About two hours	-0.1957** (0.0776)	-0.0650** (0.0265)	-0.2346*** (0.0878)	-0.0737** (0.0290)
MobileMoney_ distance: About three hours	-0.2918* (0.1493)	-0.0987* (0.0528)	-0.2005 (0.1531)	-0.0625 (0.0500)
MobileMoney_ distance: About four hours	-0.5967** (0.2677)	-0.2095** (0.0983)	-0.3559* (0.1882)	-0.1147* (0.0648)
MobileMoney_ distance: About five hours	0.4083* (0.6808)	0.1150 (0.1649)	-0.6814*** (0.2585)	-0.2304** (0.0934)
MobileMoney_ distance: Six hours and above	-0.5778** (0.2469)	-0.2025** (0.0907)	-0.2986 (0.2971)	-0.0952 (0.1006)

Source: Author's calculation

Note: Standard errors are in brackets. ***, ** and * represent significance at one, five and ten per cent level of significance respectively.

The marginal effects of all levels of education on saving were positive and significant. For instance, those with primary education had a probability of 0.18 higher of saving compared to with those who had no education in 2013. The similar values for secondary and tertiary education were 0.25 and 0.37 respectively. The marginal effect for 2016 the primary, secondary and tertiary education were 0.30, 0.36 and 0.42, respectively. Therefore, the probability of accessing savings increases with the level of education for the two years. Tabiani and Mahzdan (2013) and also found a positive relationship between education level and the level of savings while Martinez, Hildago and Tuesta (2013) found a positive relationship between financial inclusion and financial access. Tabiani and Mahzdan (2013) argue that this is because people with higher education level, implying higher financial knowledge, are more likely to plan themselves better for retirement by planning on their money.

The marginal effects of age and income on savings were positive and significant for the two years. This implies increases in age and income of the individuals increases the probability of having a positive saving. Tabiani and Mahzdan (2013) found similar results. As expected, increase in household size and savings were negatively related. In 2013 and 2016, increase in household size by one reduces the probability of savings by 0.007 and 0.008, respectively. These results contradict with those of Tabiani and Mahzdan (2013) who found a positive and significant relationship between the two variables.

Results for both 2013 and 2016 suggested that males have a lower probability of savings compared to women. The marginal effect of urban region was negative and significant in 2016 survey but insignificant in 2013 survey. Previous studies that have

relationship between region and financial access have found conflicting results: the sign of the region depends on where one is likely to access financial services from. For instance, Shibia (2012) found a positive relationship between urban region and financial access, while Shibia and Kieyah (2016) found a negative and significant relationship between urban region and knowledge on interest on savings and loans.

With the exception of marginal effect of about five hours for 2013 which was positive and insignificant, all the other marginal effects of distance to the nearest mobile banking services were negative. However, not all of them were significant. It was expected that increase in distance to the nearest mobile bank decreases the probability of savings. Results for both 2013 and 2016 suggest that those who take about two hours and four hours were less likely to access mobile banking services compared with those who take about ten minutes. Other marginal effects of mobile banking services that were negative and significant in 2013 study were for those who take about three hours and six hours. The only other marginal effect that was significant for 2016 is about five hours, though it was weakly significant (at 10 per cent).

4.4.1 Probit Post estimation tests

Similar to the previous section, this section discusses the tests that were done to ensure sound results. These include the confusion matrix, Hosmer-Lemeshow Goodness of fit test and the specification test.

4.4.1.1 Confusion Matrix

The confusion matrix reveals that 71.22 and 74.34 per cent of the observations in the 2013 and 2016 surveys, respectively, are correctly classified. The model therefore misclassifies 29 and 26 per cent of the observations. Nevertheless, the model performs poorly in classifying those with no savings, where 1074 and 1646 people have no savings but are classified as having savings.

Table 4.12: Confusion matrix for 2013 sample

Actual Values \ Predicted Values	Has Savings	Has no Savings	Total
Has Savings	5382	1646	7028
Has no Savings	398	539	937
Total	5780	2185	7965
Classification accuracy	74.34		

Source: author's calculation

Table 4.13: Confusion matrix for 2016 sample

Actual Values \ Predicted Values	Has savings	Has no Savings	Total
Has Savings	2832	1074	3906
Has no Savings	183	278	461
Total	3015	1352	4367
Classification accuracy	71.22		

Source: author's calculation

4.4.1.2 Hosmer-Lemeshow Goodness of fit test

This test is similar to the Pearson chi-squared goodness-of-fit test. It tests the goodness of fit by comparing the fitted probability of different subgroups with the actual values of the dependent variables. The null hypothesis is that any two groups are equal. The results are presented in Table 4.7

Table 4.14 Hosmer-Lemeshow Goodness of fit test

Label	Value_2013	Value_2016
Number of observations	4367	7965
Number of Covariates pattern	4244	7663
Pearson Chi2	4228.26	7655.91
Prob> chi2	0.5003	0.4724

Source: author's calculation

Since the probability values of the two models are less than 0.05 (five per cent critical value) we do not reject the null hypothesis: The model is well specified; it fits well.

4.4.1.3 Specification Test

When building the regression model, the study assumed that the probit model is the best to model the relationship between the probability of an individual saving and financial literacy. In addition, the study assumed that all the relevant variables that affect the individual's decision to save had been included. Violating of these assumptions can lead to specification test (Greene, 2012). This study used the link test to test for models misspecification.

Table 4.15 Specification Test

Label	Probability_2013	Probability_2016
Hat	0.0000	0.0000
Hat_squared	0.2300	0.1920
Constant	0.8780	0.937

Source: author's calculation

As expected, the probability of *hat* is less than 0.05 while that of *hat_squared* has a value of 0.23 (insignificant). Therefore, the model is well specified and there are no omitted values.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Summary

This study was motivated by the fact that financial literacy, as proxied by enrolment in primary, secondary and TIVET and universities have been rising over the years (implying increase in financial literacy) but financial exclusion is still high. This is taking into account the fact that increase in financial literacy is supposed to increase financial inclusion. In addition, financial literacy enables better decision making processes like timely payment of bills, ensures prudent debt management, poverty reduction and supports economic growth. The objective of this study therefore was to find out the effects of financial literacy on financial access and savings in Kenya. The specific objectives of the research were to find out the effect of financial literacy on financial access in Kenya and also establish the effect of financial literacy on savings in Kenya.

This study is unique compared to the previous studies done in Kenya since it used cross sectional data from two surveys where it did the comparison between the findings: FinAccess 2013 and FinAccess 2016. Notably, no other study touching on the current topic has used the FinAccess 2016 data. The study adopted an exploratory research design to achieve its objectives using a cross sectional FinAccess survey data of 2013 and 2016. Data was obtained from Central Bank of Kenya, Kenya National Bureau of Statistics and FSD Kenya in Kenya. This study used multinomial logit to achieve its objectives. The excluded category was used as the base outcome. Since the direct coefficients of the multinomial logit are not directly interpretable, the study calculated the marginal effects.

In the first objective, the study found that being in a given education category increases the probability of accessing formal financial services. The study also found that the marginal effect of primary, secondary or tertiary education on informal financial access was negative and significant in both 2013 and 2016. This means increase in education level reduces the probability of accessing informal financial services. Results for 2013 data suggest that a one year age increase increases the probability of accessing formal financial services but decreases the probability of accessing informal financial services compared to the excluded category. Similar results apply for 2016 survey: a one year age increase increases the probability of accessing the formal financial services but reduces the probability of accessing informal financial services, compared to the base category.

In addition, the study found that an increase in income increases the probability of accessing formal financial strand but decreases the probability for accessing the informal strand, relative to the base category. The marginal effect of gender on formal financial strand was negative and weakly significant for 2013 survey, but the one for informal sector was negative and highly significant. The marginal effect of gender on formal financial strand is negative and insignificant for 2016, but negative and highly significant for the informal sector. These results imply that being male decreases the probability of accessing informal financial services, compared with the excluded category (female category, which is the base category).

Further, the study found that being in the urban centre increases the probability of accessing the formal financial services, compared to the base outcome. For the 2013 sample, financial access distance proximity as proxied by distance to the nearest mobile banking financial providers reveal that the probability of accessing formal financial services was less likely for those who take thirty minutes, two hours or three

hours compared to those who take about ten minutes. However, those who take thirty minutes, two hours or three hours were more likely to seek informal financial access hence an increase in the mobile money agent distance increases the probability of accessing informal financial services. Again, this is in accordance to the expectations. The second objective was to find out the effect of financial literacy on savings. The study found that the probability of saving increases with the level of education in the two estimations. Also, the study found that an increase in age and income of an individual increases the probability of saving. The study also found that males have a lower probability of savings compared to women. The marginal effect of urban region is negative and significant in 2016 survey but insignificant in 2013 survey. In addition, the study found a negative and significant relationship between distance to the nearest mobile money agent and savings hence an increase in distance to the nearest mobile money agent decreases the probability of savings. For instance, results for both 2013 and 2016 suggest that those who take about two hours and four hours are less likely to access mobile banking services compared with those who take about ten minutes.

5.2 Conclusions

This study expected that increase in financial literacy causes an increase in financial access. The study found that increase in financial literacy (as proxied by increase in education level) indeed increases the probability of accessing formal financial services while it reduces the probability of accessing informal financial services. The study further found that increase in age and increase in income cause an increase in the probability of accessing formal financial services but decreases the probability of accessing informal financial services. Concerning the effect of financial literacy on savings, increase in financial literacy (as proxied by increase in education level) and

increase in income increases the probability of savings. Increase in household size and increase in the distance to the nearest mobile money agent decreases the probability of savings.

5.3 Policy Recommendations

Several recommendations can be drawn from the findings of this study. The probability of accessing formal financial strand increases with the level of education while the probability of accessing informal financial strand decreases with the level of education. The probability of savings also increases with the level of education. This calls for concerted efforts by the stakeholders, especially the government, to ensure that at least every student gets to a college level. This can be achieved through providing financial support to the students to further post-secondary and tertiary education levels. These institutions also need to be well equipped and offer quality education that guarantees employability and ensures better life for the students. This will ensure inclusion by encouraging formal financial access and mobilization of savings which are vital to economic development.

Second, it is clear from the study that the probability of accessing formal financial strand increases with the increase in income. At the same time, the probability of saving increases with income. The Kenyan government should come up with the strategies to boost income level of its citizens. This may include development of skills, providing a conducive business environment, innovations and adoption of new technology in production and services. This is because those with low incomes levels are likely to access financial services from the informal sector.

Third, those who spend more hours to access the nearest mobile money agent have lower probability of accessing financial services compared to those who take few minutes. Similarly, those spending more time to access the nearest mobile banking

service have a lower probability of savings, compared to their counterparts who spend few hours. This calls for expansion of mobile money agents by the mobile banking service providers. This will net more people into financial inclusion. Similar observation applies to those who reside in rural areas: they are less likely to access financial services compared to their urban area counterparts. Therefore, there is need for banks and mobile money providers to increase their penetration into the rural areas. The government can help by providing subsidies to the private companies set up branches or agents in the rural areas (for instance, tax rebates). This can also be through providing infrastructure like roads and electricity.

Finally, women are likely to access informal financial services than men but have a higher probability of having a savings than them. There is therefore a need to promote financial education to the general public on the importance of savings in the formal financial sector. This is because saving in the informal sector is inherent of many risks. This can be done through public barazas, social media, and televisions or through local radios. Financial education can further be extended to primary and secondary schools. The use of present technologies in banking (mobile money banking) should also be encouraged as it has great capacity of enhancing savings.

5.4 Scope for Further Research

This study focused on the effects of financial literacy on financial access in Kenya and effects of financial literacy on savings in Kenya. Several key findings were drawn from the study. Nevertheless, there is a need to further explore related areas in order to fully understand issues related to financial literacy. These may include research on: (i) how amount saved varies with the distance to the nearest mobile money agent. (ii) how the effect of financial literacy on savings and financial access differ across counties, using county level data. Data can be found in various reports of FinAccess

surveys (2009, 2013 and 2016) (iii) effect of mobile money banking on individuals savings in Kenya (iv) whether different levels of financial literacy matter for access of particular financial product, for example, bonds and (v) whether borrowing depends on financial literacy.

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