THE EFFECT OF FINANCIAL LITERACY ON FINANCIAL INCLUSION: EVIDENCE FROM UGANDA

by

STEPHEN JASON KASOZI

Submitted in accordance with the requirements for the degree of

DOCTOR OF PHILOSOPHY

In the subject

Management studies

AT THE

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROFESSOR DANIEL MAKINA

APRIL 2020

DECLARATION

Name: **Stephen Jason Kasozi**

Student number: **34397981**

Degree: **Doctor of Philosophy in Management Studies (Finance)**

Title:

THE EFFECT OF FINANCIAL LITERACY ON FINANCIAL INCLUSION: EVIDENCE FROM UGANDA.

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that ethical clearance to conduct the research had been obtained from the Department of Finance, Risk Management & Banking, University of South Africa (Unisa). I also declare that the study was carried out in strict accordance with UNISA's Policy on Research Ethics and that I conducted the research with the highest integrity during all phases of the research process, considering Unisa's Policy on Copyright Infringement and Plagiarism.

29/04/2020

SIGNATURE **DATE**

DEDICATION

I dedicate this thesis to my late father, Mr. H.F.M Kiwanuka who in all love taught me that ‘a rolling stone gathers no moss’ and to my beloved mother Mrs. F.D Kiwanuka who constantly encourages of me the attribute of ‘finishism’.

ACKNOWLEDGEMENTS

I first and foremost thank and give gratitude to the Almighty God Who makes all things possible. This thesis would not be possible without His Grace. Then, I would like to extend my sincere gratitude to my supervisor Prof D Makina whose invaluable insights, guidance and patience enabled me throughout this journey. A special token of thanks goes to my superiors at the University of South Africa for providing the necessary logistical, emotional, and financial support and to Dr D Van Zyl for guiding the crucial methodological approach for this study. Simultaneously, several valuable individuals guided and supported my research efforts. These included Dr B Makina who did a superb editorial job on the thesis, Miss Margarette Van Zyl, who always willingly sourced the relevant literature, Mrs Mashego S Maite who always supported and encouraged me and Ms B Singh who did a wonderful job of typesetting the thesis. Thank you all immensely!

Secondly, I would like to thank the Management of FinMark Trust (SA) and Financial Services Deepening Uganda (FSDU) for providing the data sources and questionnaire for this study. Particularly, I would like to extend my gratitude to Mr J Lutwama, my brother, colleague, and Head of Business Environment at FSDU. Your valuable insights, support and encouragement enabled me in more ways than you can ever imagine. Thank you so much!

Finally, I would like to thank my family and friends for providing the social reinforcements that kept my spirits up during this journey. Special thanks go to Engineer. P Kagoda for your wisdom and valuable critic to my study, Mr P Kotze, for wise input, Mr A Phenya and Mr V Fick for motivation, all my beloved siblings, my mother – Daisy, the mother of my precious son – Daisy, and my beloved son Solomon for the love and encouragement. I will forever be grateful to you all for the support you accorded me in one way or another. May God Bless you all.

ABSTRACT

While a significant portion of the global population remains financially excluded, most empirical studies and policy interventions for increasing financial inclusion appear to focus predominantly on supply-side determinants to financial inclusion as opposed to a combination of supply and demand factors. This undermines efforts to include certain segments of the global population. Recent efforts to assess the effectiveness of demand-side factors like financial literacy appear to apply only prescriptively without tangible empirical evidence to support its efficacy - presumably due to a lack of reliable data sources at the one end, and/or due to the subjective nature of the concept itself. This presents a gap in the literature pertaining to the role financial literacy plays towards promoting formal financial inclusion globally.

The study contributes to the existing body of knowledge by investigating whether financial literacy affects financial inclusion using the FinScope (2018) dataset of Uganda as a unit of analysis. It applies Principal Component Analysis (PCA) and theoretical underpinnings from literature, to construct a composite financial literacy index which is then regressed against a measure of financial inclusion in Uganda. Outputs from the logistic and probit regressions confirm unequivocally that; (1) financial literacy significantly and positively affects financial inclusion in Uganda even in the presence of other variables like age, gender, income and education, (2) individuals who make *financial ends meet, plan for their financial future*, *seek financial advice before choosing financial products* and/or *are receptive towards the evolution of technology*, are 'ceteris paribus', more likely to be financially included than not, (3) technological advancement and the use of mobile money enhance financial inclusion in Uganda and (4) mobile money use appears to enhance the financial literacy of individuals. Income, education and age vary positively with financial inclusion while adult males are more likely to be financially included than females. These findings provide policy implications for stimulating financial inclusion in Uganda particularly in the aspects of promoting financial education and financial product awareness for women, leveraging technology and the use of mobile money services.

Keywords: *Financial literacy, Financial inclusion, Principal Component Analysis, probit regressions, logistic regressions, Uganda.*

OPSOMMING

Hoewel ’n beduidende gedeelte van die wêreldbevolking finansieel uitgesluit bly, blyk die meeste empiriese studies en beleidsintervensies vir verhoogde finansiële insluiting hoofsaaklik te fokus op aanbodkant-bepalers van finansiële insluiting – in teenstelling met ’n kombinasie van aanbod- en vraagfaktore. Dit ondermyn pogings om sekere segmente van die wêreldbevolking in te sluit. Dit wil voorkom of onlangse pogings om die doeltreffendheid van aanbodkant-faktore soos finansiële geletterdheid te assesseer, slegs voorskriftelik geld, sonder tasbare empiriese bewyse ter ondersteuning van die doeltreffendheid daarvan – vermoedelik vanweë ’n gebrek aan betroubare databronne en/of die subjektiewe aard van die konsep self. Daar is dus ’n leemte in die literatuur met betrekking tot die rol wat finansiële geletterdheid speel in die bevordering van formele finansiële insluiting wêreldwyd.

Die studie dra tot die bestaande kenniskorpus by deur te ondersoek of finansiële geletterdheid finansiële insluiting affekteer. Die FinScope (2018) datastel van Uganda word as ’n ontledingseenheid gebruik. Daarvolgens word Principal Component Analysis (PCA) en teoretiese ondersteuning uit die literatuur toegepas om ’n saamgestelde finansiëlegeletterdheid-indeks te ontwikkel, waarvolgens regressie dan teen ’n maatstaf van finansiële insluiting in Uganda plaasvind. Uitsette van die logistieke en probit-regressies bevestig onomwonde dat; (1) finansiële geletterdheid ’n beduidende en positiewe uitwerking op finansiële insluiting in Uganda het, ten spyte van ander veranderlikes soos ouderdom, geslag, inkomste en opvoeding, (2) individue wat *finansieel uitkom met wat hulle het, vir hul finansiële toekoms beplan*, *finansiële advies vra voordat hulle finansiële produkte kies* en/of *ontvanklik teenoor tegnologiese omwenteling is*, ‘ceteris paribus’, ’n groter kans het om finansieel ingesluit te word al dan nie, (3) tegnologiese vooruitgang en die gebruik van mobiele geld finansiële insluiting in Uganda bevorder (4) die gebruik van mobiele geld klaarblyklik individue se finansiële geletterdheid verbeter. Inkomste, opvoeding en ouderdom wissel op positiewe wyse met finansiële insluiting, terwyl volwasse mans eerder finansieel ingesluit sal word as vrouens. Hierdie bevindinge impliseer beleidsimplikasies vir die stimulering van finansiële insluiting in Uganda, veral met betrekking tot die bevordering

van finansiële opvoeding en finansiële produkbewustheid onder vroue, hefboomfinansieringstegnologie en die gebruik van mobielegelddienste.

Sleutelwoorde: *finansiële geletterdheid, finansiële insluiting, Principal Component Analysis, probit-regressies, logistieke regressies, Uganda.*

NGAMAFUPHI

Njengoba ingxenye enkulu yenani labantu emhlabeni ikhishwe inyumbazane ngasemkhakhei wezimali, izinhlelo eziningi zocwaningo oluphathekayo kanye nemizamo yemigomo ehlose ukufaka iningi labantu kwezezimali ibonakala igxile kakhulu kwizimpawu ezingasohlangothini oluthumelayo zokufakwa kweningi ngasezimalini, okuyinto esuke iphambane nenhlanganisela yemithelela yezinga lokufunekayo kanye nezinga lokutholakalayo. Lokhu akuyishayi indiva imizamo yokufaka izingxenye ezithile zenana labantu bonke bomhlaba. Imizamo yakamuva nje yokuhlola ukusebenza kahle kwemithelela engasohlangothini lokufunekayo okunjengokufundiswa ngezimali kubonakala kusebenza kuphela ngendlela enqunyiwe, ngaphandle kobufakazi obuphathekayo obuxhasa ukuzikhandla – kungumqondo wenxa wokwentuleka kwemithombo yedatha eyethembekayo Kanye/noma ubunjalo begama ngokwalo. Lokhu kuveza isikhala kumbhalo wobuciko mayelana nendima edlalwa wukufundiswa ngezimali ekuthuthukisweni kwezinga lokufakwa kwabantu emkhakheni wezimali emhlabeni wonke.

Ucwaningo lufake igalelo kwiphiko elikhona lolwazi ngokuphenya ukuthi mhlawumbe ukufundiswa ngezimali kuthinta ukufakwa ngakwezezimali. Uhlelo lwesethi yedatha yakwa-FinScope (2018) yase Uganda isetshenziswe njengeyunithi yohlaziyo. Lokhu kusebenza ohlelweni lwe-*Principal Component Analysis (PCA)* nasohlelweni lwezincazelo zomqondo wombhalo wobuciko, ukwakha uhlelo olukhulu lwenkomba yokufundiswa ngezimali, ephinda iphindiselwe emuva mayelana nomzamo wokufakwa ngasezimalini ezweni lase-Uganda. Imiphumela yegalelo evela ku-logistic naku *probit regressions* kuqinisekisa ngaphandle kokuzaza ukuthi; (1) ukufundiswa ngezimali futhi kunomthelela omuhle kuhlelo lwezokufakwa kwezezimali e-Uganda, ngisho nanoma kukhona ezinye izinto ezinjengeminyaka, ubulili, imali engenayo kanye nezinga lemfundo, (2) *abantu abanemizamo yokwenza imali, bahlelela ikusasa labo lezimali*, *bafuna iseluleko sezimali ngaphambi kokukhetha imikhiqizo yemali Kanye/noma basesimeni sokwamukela inguquko yobuchwepheshe bethekinoloji phecelezi bakwi* ‘ceteris paribus’, basethubeni eliphezulu lokufakwa kwezezimali, kunokuthi bangafakwa nakancane, (3) Intuthuko yethekinoloji Kanye nokusetshenziswa kwemali ethunyelwa ngobuchwephesha bethekinoloji kuqinisa

uhlelo lokufakwa kwezezimali e-Uganda (4) ukusetshenziswa kwemali ethunyelwa nge-inthanethi kubonakala kuqinisa uhlelo lwezokufundisa kwabantu ngezimali. iholo, imfundo kanye neminyaka kwehluka kahle kakhulu mayelana nohlelo lokufakwa kwezezimali, kanti abantu abadala besilisa banethuba eliphezulu lokufakwa kwezezimali ukwedlula abantu besimame. Lolu lwazi olutholakele luchaza inhloso yomgomo yokuvuselela uhlelo lokufakwa ngakwezezimali e-Uganda, ikakhulu mayelana nokwexwayiswa Kanye nothuthukiswa kohlelo lokufundiswa ngezimali phakathi kwabesifazane, ukuphakanyiswa kobuchwepheshe Kanye nokusetshenziswa kwezinsiza zemali ethunyelwa ngobuchwepheshe be-inthanethi.

Amagama asemqoka: *Ukufundiswa ngezimali, uhlelo lokufakwa kwezezimali, Uhlelo lokuhlaziya lwe-Principal Component Analysis, uhlelo lwe-probit regressions, uhlelo lwe-logistic regressions, i-Uganda.*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

2SLS	Two Stage Least Squares
ACCION	Centre for Financial Inclusion
ADB	African Development Bank
AFI	Alliance for Financial Inclusion
ANOVA	Analysis of Variance Analysis
ATM	Automated Teller Machine
BOU	Bank of Uganda
CDF	Cumulative Distribution Function
CGAP	Consultative Group to Assist the Poor
DFID	Department of International Development
DV	Dependent Variable
EAs	Enumeration Areas
FE	Fixed Effects
FINLIT	Financial Literacy Foundation Uganda
FINMARK	Financial Markets Trust South Africa
FMT	FinMark Trust South Africa
FSDU	Financial Sector Deepening Uganda
G20	Global Twenty
GDP	Gross Domestic Product
GFLEC	Global Financial Literacy Excellence Centre
GMM	Generalized Method of Moments
GSMA	Global System for Mobile Communications Association
HDI	Human Development Index
IBRD	International Bank for Reconstruction and Development
ICT	Information and Communication Technology
IFC	International Finance Corporation
IIC	Inter-Item Correlation
IMF	International Monetary Fund
INFE	International Network for Financial Education
IPSOS	Data Collection Consortium Uganda
IV	Instrumental Variables

KMO	Kaiser-Meyer-Olkin Measure
LPMs	Linear Probability Models
LR	Likelihood Ratio
MFIs	Microfinance Institutions
MFW4A	Making Finance Work for Africa
MoFPED	Ministry of Planning Finance and Economic Development
M-Pesa	Mobile Money Service in Kenya
MSA	Measure of Sampling Adequacy
NFIS	National Financial Inclusion Strategy
OECD	Organization of Economic Co-operation and Development
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
PPS	Probability Proportional to Size
PSFU	Private Sector Foundation of Uganda
RE	Random Effects
SADC	South African Development Community
SEM	Structural Equation Modeling
SMEs	Small to Medium Enterprises
UBOS	Uganda Bureau of Statistics
UFA	Universal Financial Access Initiative
USA	United States of America

CHAPTER 1
INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION AND BACKGROUND

Over the past three decades, extensive literature and empirical findings have explored perspectives towards the promotion of an inclusive formal financial system globally, as well as for specific nations (see: World Bank, 2014 Triki & Faye, 2013; Beck & Demirgüç-Kunt, 2008; Kempson & Whyley, 1999). According to the Global Findex Report of 2017, over 30% of the world's adult population (about 1.7 billion people) does not have an account with a formal financial institution. In developing economies like those in Africa, only 63% of the population has access to financial services which includes mobile money accounts (World Bank, 2017:2). The lack of access to finance is often the cause of the persistent income inequalities within populations and contributes to the slower growth among economies (Beck, Demirgüç-Kunt & Honohan, 2009: 120).

It is increasingly recognized that addressing financial inclusion requires a holistic approach in dealing with both supply and demand-side aspects to financial exclusion (Triki & Faye, 2013: 9; Atkinson & Messy, 2013: 7; Beck & De La Torre, 2007: 79). Demand factors are obtained directly from the users of financial products or services and reflect both met and unmet financial needs. They focus on socioeconomic and demographic characteristics that include but are not limited to the following factors: income, occupation, level of education, employment, religious affiliation, financial literacy and culture. Supply-side factors are comprised of structural characteristics of regulated financial institutions and focus on geographical access, product and service designs, pricing, technology and the density of financial products and services (Fininclus Report, 2011: 9; World Bank, 2012: 17).

Empirical findings on these factors provide helpful perspectives on advancing financial inclusion. For instance, Triki and Faye (2013: 122) recommend improvements in credit information systems, collateral registries to reduce information asymmetry, capacity building and business development services as supply-side policy initiatives at firm level to help accelerate the financial inclusion process. In the same vein, they argue

that poor consumer knowledge, a lack of financial management skills and/or financial literacy, which translate into poor accounting and record keeping or improper business plans, are some of the demand-side impediments to financial inclusion (Triki & Faye, 2013: 69).

Furthermore, the World Bank's reference framework on financial inclusion proposes strategies that identify potential access barriers and implement measures to address them while at the same time adopting products and services that promote consumer protection and financial literacy (World Bank, 2012: 17). Such literature and policy recommendations provide useful perspectives on advancing financial inclusion globally, that is, in terms of identifying the demand and supply-side impediments and/or the strategic imperatives required to increase financial inclusion. However, some demand-side impediments receive less research focus, presumably due to their subjectivity at quantifying and/or a possible lack of readily available data sources to quantify them. A notable example among these is financial literacy.

Financial literacy refers to the ability to make informed judgments and to take effective decisions regarding the management of money (Huston, 2010: 311). It includes knowledge but goes further to include attitudes, behaviors and skills and stresses the importance of decision-making – applying knowledge and skills to real life processes, with the result of improved financial wellbeing for the individual (Atkinson & Messy, 2011: 569). Financial literacy and financial inclusion are looked at as 'twin pillars' of financial development (Ramakrishnan, 2012: 2).

According to Triki and Faye (2013: 35) financial literacy is a key determinant to financial inclusion yet little is currently known about this concept in Africa. Several researchers highlight the need for financial literacy in fostering financial inclusion. For instance, Atkinson and Messy, (2013: 15) correlate financial literacy and financial inclusion by linking product awareness to product choice, Dev (2006) identifies financial literacy as one of the impediments to financial access for poor small-scale farmers in India and recommends that financial institutions take the responsibility of educating the poor and vulnerable by giving wide publicity to their financial instruments. Swamy (2014: 3) identifies financial literacy and credit counselling as critical elements for the financial inclusion of women in India. The World Bank (2012:

15) recognizes that consumer protection and financial literacy help to build public confidence and raise the demand for financial services – arguing that disclosure and transparency promote financial inclusion and that financial literacy enables consumers to benefit from financial decisions. Atkinson and Kempson (2008) and Ramji (2009) recommend that more needs to be done in the realm of financial literacy so that bank accounts are optimally used by consumers. Atkinson and Kempson (2008: 7) further argue that policy makers need to understand how people make financial decisions and manage their money to be certain that their interactions with financial institutions are beneficial.

Therefore, understanding the complexities of people's financial behaviors, attitudes and skills can shed light on aspects of financial inclusion. To this end, the Organization of Economic Co-operation and Development (OECD), in conjunction with Making Finance Work for Africa (MFW4A), launched initiatives by way of demand-side surveys to improve diagnostics for understanding financial literacy (Triki & Faye 2013: 35). Against this backdrop, current research seeks to investigate the contribution financial literacy makes in enabling greater financial inclusion since there appears to be a lack of consensus on the acceptable measure of financial literacy and/or its influence on financial inclusion (Atkinson & Messy, 2013).

First, to surmise the adequate existence of current literature on the nexus between financial literacy and financial inclusion is mainly prescriptive since there is a paucity of literature and empirical evidence on the causality between the two concepts. The only notable study by Grohmann, Kluhs and Menkhoff (2018), which is quite recent, investigates the link between financial literacy and financial depth across countries using macroeconomic variables. Several other studies merely relate financial literacy on stock market participation (van Rooji, Lusardi & Alessie, 2007), financial market participation (Cole & Shastry 2009), long-term financial planning (Alhenawi & Elkhal, 2014), financial education and financial behavior (Fernandes, Lynch & Netemeyer, 2014; Atkinson & Messy, 2013) and others. These studies differ from the current study in their geographical scope of analysis and the observation that they do not specifically investigate the link between financial literacy and financial inclusion.

Secondly, existing literature indicates that no standardized measure for financial literacy exists (Atkinson & Messy, 2011: 569). From a theoretical perspective, financial literacy influences financial knowledge which translates into financial behavior, personal attitudes, and skills which enable the use of formal financial services (Kempson *et al.* 2013: xiii). However, the term financial literacy is multifaceted implying that no yardstick exists to measure the concept. At the one end, financial literacy is measured as a combination of concepts that include knowledge about compound interest, inflation, risk diversification, and others (Grohmann *et al.* 2018; 86; van Ooijen & van Rooji, 2016: 7; van Rooij *et al.* 2009: 6). This approach is discredited by the inability to account for the 'passive' nature of financial knowledge because while it covers knowledge, it does not necessarily indicate a person's ability to make sound financial decisions (Silgoner, Bettina, & Weber, 2015:36). Secondly, the survey questions with this approach, are often limited in their ability to make cross-country comparisons that extend in scope to capture socio-demographic and economic characteristics beyond developed economies (Atkinson & Messy, 2012:16), and lastly, the approach is limited in its effort to capture other desired behavioral capabilities (Hastings, Madrain & Skimmyhorn, 2013:355).

At the other end financial literacy is measured as a combination of personal finance attributes and behaviors that determine how well an individual interacts with the environment to maximize their future financial utility (Atkinson & Messy, 2013: 14; Atkinson & Kempson, 2008: 10). This approach is credited by its ability to link financial knowledge to financial behavior and to apply to a greater demography that includes the less developed and less educated economies. Consequently, the lack of consensus on a standard measure for financial literacy partly explains why several studies and policy interventions prescriptively link financial literacy to financial inclusion based on certain aspects like financial knowledge which relate to financial literacy and affect financial inclusion – as opposed to empirical evidence guided by a conventionally accepted measure of financial literacy influencing financial inclusion.

This lack of rigorous evidence directs the current study to investigate the effect of financial literacy on financial inclusion with the following caveats in mind. Firstly, that financial inclusion is driven by several demand and supply-side determinants some of which are not easy to obtain or quantify, secondly, that the financial literacy concept

is broad and maybe influenced by other psychosocial and societal factors that are not easily quantified, and lastly, that demand-side determinants to financial inclusion like financial literacy, are often limited to the available datasets which originate mainly from survey studies that are currently limited in scope.

While financial inclusion remains an important topic on the agenda for sustainable long-term economic growth, several initiatives to promote financial inclusiveness by the International Monetary Fund (IMF), the G20[1], the World Bank, the International Finance Corporation (IFC), the Alliance for Financial Inclusion (AFI), the Consultative Group to Assist the Poor (CGAP) and other global banking institutions assume an increasingly active role at the international level in collecting data and setting standards to improve financial inclusion (Amižić, Massara & Mialou, 2014: 4). According to Mitton (2008: 2), financial inclusion should have two elements, namely, good financial decision-making (the demand side of the equation) and access to suitable products and services (the supply side). To achieve a level of equilibrium, the demand factors must favorably equate to the supply factors.

In this regard, the Global Financial Development report of 2014 emphasizes the need for promoting the use of financial services for individuals as a way of mitigating market failures such as asymmetric information and moral hazard, which prevent the widespread use of financial products. This involves designing products that fit consumer needs and delivering services at prices that individuals can afford. It also includes educating the consumer to avoid costly mistakes upon entering into the formal financial market (World Bank, 2014: 51).

While the growth in financial inclusion around the world continued to rise from 51% in 2011 to 62% in 2014 and 69% in 2017, certain important observations are visible about this growth. First, account ownership varied widely around the world with 94% of adults

[1] The Group of Twenty (G20) Finance Ministers and Central Bank Governors. The G20 is made up of the finance ministers and central bank governors of 19 countries: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom, the United States of America and the European Union (EU).

within the OECD economies having accounts[1], compared to 63% of adults from developing economies. The wide variation in account ownership among developing economies is mainly attributed to advances in digital technology and the use of mobile money accounts. Most account holders have an account at the bank, a microfinance institution, or another type of regulated financial institution, with a significant portion holding mobile money accounts (World Bank, 2017: 1, 2). Secondly, ownership within the developing economies seems to occur among semi-formal and informal financial sectors, fueled by a demand for affordable services and supported mainly by the advent of mobile money financial services. In Sub-Saharan Africa, mobile money accounts have since spread from East Africa – the region's mobile money hub, to new parts of Sub- Saharan Africa with the share of adults with a mobile money account surpassing 30 percent in Côte d'Ivoire and Senegal — and 40 percent in Gabon (World Bank, 2017: 2).

The financial services landscape of Uganda (the unit of analysis) provides a good platform for investigating the nexus between financial literacy and financial inclusion. Despite the significant advances in the composition of financial solutions, the country is increasingly recording a growing trend in the use of semi-formal than formal financial products and services (see; FinScope, 2018). According to the latest Topline findings by FinScope (2018), Uganda had 18.6 million bankable adults representing about 41% of the estimated total population. With certain overlaps in the usage patterns considered, the country recorded an overall improvement in formal (formal and semi-formal) financial inclusion from 54% in 2013 to 58% in 2018. However, these demographics represented a decline in formal banking from 20% in 2013 to 11% in 2018 caused by an uptake in mobile money services. Non-bank formal financial services increased from 52% in 2013 to 67% in 2018 fueled again by an upsurge in mobile money services. Mobile money services increased from 56% in 2013 to 67% in 2018 appearing to dominate the growth in the semi-formal financial services industry. Finally, there was a decline in the use of informal financial services from 74% in 2013 to 56% in 2018 and a resulting increase in the financially excluded from 15% in 2013 to 22% in 2018 (FinScope, 2013, 2018). These results indicate a slowing

[1] The 2014 Global Findex database defines account ownership as having an account either at a financial institution or through a mobile money provider. Due to the limited products provided by mobile money services, this study considers the mobile money financial service sector as semi-formal.

demand for formal than semi-formal financial services (including mobile money) and a concerning decline in the use of financial services overall. As such, it is necessary to investigate some of the possible causes to these trends.

It is plausible to opine however, that with other limiting factors assumed constant, the increase in the variety of financial solutions within the country was not coupled with similar efforts to sensitize and educate the intended users about the pros and cons of the solutions. Furthermore, it is likely that a significant number of the bankable adults are shunning these financial solutions due, among others, to a lack of financial knowledge or financial literacy. This would offer some rationale for the declining use of banking services at the expense of other semi-formal and informal services which do not offer similar solutions in terms of security and risk. Swamy (2014: 2) argues that financial inclusion is intended to connect individuals to banks with consequential benefits that ensure that financial systems play their active role of promoting inclusive growth through either 'supply leading' (financial development spurring growth) or 'demand following' (growth generating the demand for financial services) channels. It is therefore necessary to investigate whether this shift in the usage patterns by bankable Ugandans, can be attributed to their levels of financial literacy.

1.2 THE PROBLEM AND ITS SETTING

Financial inclusion plays a pivotal role in the theoretical and empirical policy discourse on inclusive growth and economic development such that, increasing the former invariably enhances the latter. Additionally, the multidimensional nature of financial inclusion requires policy interventions that include both demand and supply-side determinants in ensuring the increased uptake of formal financial products and services (see: Sarma, 2015: 605; Arun & Kamath, 2015: 268; Beck, 2013: 34; Beck & Demirgüç-Kunt, 2008: 393; Mahendra, 2006: 4310). It is notable, however, that while earlier theoretical, empirical and policy discourse focused mainly on supply-side determinants whose data sources were readily available, current interventions succinctly suggest the inclusion of certain demand-side determinants like attitude, behavior, financial literacy and religion, which owe to some subjectivity and whose data sources are not readily available.

For instance, recent policy interventions highlight in part, the need for financial literacy through financial education initiatives, as a critical enabler to financial inclusion, yet, there seem to be no studies that empirically confirm a possible causality between these two concepts. It is therefore presumptuous to conclude, as a rule of thumb, that increasing financial literacy automatically translates into good financial behavior and facilitates uptake of formal financial products and services, without empirical evidence to back this claim. Conversely, it is erroneous to undermine the role financial literacy plays considering that several findings associate, 'ceteris paribus', a lack of financial literacy or its determinants with: (1) voluntary financial self-exclusion and the growth in informal financial markets (Arun & Kamath, 2015: 268; Servon & Kaestner, 2008: 279; Kempson *et al.,* 2004); (2) low saving and borrowing behavior (Sayinzoga, Bulte & Lensink*.,* 2016; Lusardi & Mitchell, 2007) and (3) poor financial planning, investments and retirement (Mouna & Anis, 2017; Bucher-Koenen & Lusardi, 2011; van Rooij *et al.,* 2009).

To compound the problem, the current financial services usage patterns in Uganda indicate a decline in the use of formal financial services despite the prevalence of secure financial solutions like insurance, retirement planning, savings, investments and technology which are usually provided by this form of financial service. It appears that the growing complexity of these financial solutions requires astute financial skills and capabilities such that, a lack thereof causes individuals to shun the services – other factors assumed constant. Research indicates that consumers of financial offerings tend to shy away from them if they lack the financial skills sets or capabilities necessary to manage them effectively (Zakaria & Sabri, 2013: 197; World Bank, 2012: 33; Servon & Kaetner, 2008: 274; Kempson & Whyley, 1999). Therefore, to seek some clarity on the relationship between financial literacy and financial inclusion this study poses the research question: 'Does financial literacy influence financial inclusion in the context of Uganda?' It is pertinent to investigate whether these two concepts have a cause and effect relationship so as to inform, realign and where necessary, redirect policy interventions for improving financial inclusion. Therefore, this study attempts to evaluate whether financial literacy has an impact on financial inclusion using Uganda as a unit of analysis.

1.3 THE RESEARCH OBJECTIVES

The primary objective of this study was to determine whether, and to what extent, financial literacy influences financial inclusion in Uganda. Cognizant of the research question above, the study focused on the following secondary objectives:

1. To develop a composite financial literacy index based on existing literature.

Premised on the existing theoretical and empirical literature, the study acknowledged a lack of consensus about an acceptable measure for financial literacy with the two divergent views suggesting that financial literacy should comprise a knowledge of complex financial management concepts like inflation, risk diversification, interest rates and time value of money at the one end, and the view that financial literacy should constitute personal finance behaviors, attitudes and practices that enable an individual to maximize their financial future welfare, at the other end. Cognizant of these two slightly overlapping approaches, the study sought to reconcile these views into the development of an acceptable financial literacy index applicable to the less developed and/or less educated economies of the world.

2. To investigate the effect of financial literacy on financial inclusion using Uganda as a unit of analysis.

3. To investigate the effect other demand and/or supply-side factors have on financial inclusion in Uganda based on the existing theoretical and empirical postulations.

To fulfill the above two secondary objectives, the study sought to establish whether levels of financial literacy and/or the composite index of financial literacy increase (s) the chances of financial inclusion by a bankable adult in Uganda. In the same vein it sought to confirm or refute existing empirical postulations regarding the effect of socio-demographic factors on financial inclusion in Uganda.

1.3.1 The research hypotheses

Literature on financial literacy generally supports the notion that higher financial literacy increases financial inclusion (Hsaio & Tsai, 2018; Grohmann*, et al.* 2018). This view manifests through studies that investigate several constructs or determinants of financial literacy and how they relate to individual financial behaviour. Financial knowledge, for instance, influences personal attributes such as attitudes, awareness, and cognitive abilities, which in turn affect how individuals' budget or manage their finances (Atkinson & Messy, 2011: 659). Similarly, enhanced financial knowledge is essential for behavioral change since increased financial literacy training leads to enhanced financial behavior and the greater use of financial services (Sayinzoga, *et al.,* 2016). Conversely, the lack of financial awareness negatively impacts market participation (Guiso & Jappelli, 2005). This underpins the importance of financial literacy on financial inclusion.

It follows, therefore, that despite related literature that reliably identifies institutional factors such as financial depth, physical proximity, transaction costs, and others (Allen, Demirguc-Kunt, & Klapper*.,* 2016), the functioning of financial markets requires financially informed consumers as well (Grohmann *et al.,* 2018: 84). This study hypothesized that financial literacy affects financial inclusion through several determinants that define the former. As such, the null and alternative hypotheses for this study were stated as follows:

H_0: The determinants of financial literacy have no significant influence financial inclusion in Uganda.

H_1: The determinants of financial literacy significantly influence financial inclusion in Uganda.

1.4 JUSTIFICATION OF THE STUDY

Several empirical postulations contend that financial inclusion continues to be a global challenge since its achievement underpins economic development and the welfare of nations (Grohmann, *et al,* 2018: 84; Arun & Kamath, 2015: 279; Triki & Faye, 2013: 95). Nevertheless, while significant strides continue to be made towards an all-

inclusive formal financial system globally, this section outlines the three inter-connected observations that directed further study culminating into an existing problem and the choice of Uganda as a unit of analysis.

First, until quite recently, most studies that sought to increase financial inclusion focused extensively on supply-side aspects to financial inclusion as opposed to a combination between supply and demand-side impediments. This premised on the observation that supply-side data sources are easily obtainable from the macro and microeconomic databases provided by governments and financial institutions. Recent studies have henceforth recognized the need for demand-side imperatives that address the end-user aspects of the financial product or service and extended their scope to compliment the access dimension to financial inclusion (see: Triki & Faye, 2013: 28).

However, due to the subjective nature of these few but often standardized demand-side surveys, it appears that certain demand factors have not been obtained cognizant of their different social and economic contexts. This partly explains why, for instance, mobile money services are common to developing than developed economies and/or why certain financial inclusion policy interventions encourage the promotion of financial literacy without concrete empirical evidence to substantiate its usefulness. It appears that these studies are conducted in disregard of the various social and demographic contexts thereby providing a 'one size fits all' solution.

Secondly, there is a paucity of empirical studies that specifically link financial literacy to financial inclusion with most studies merely linking aspects of the latter to the former. The absence of a standardized yardstick to measure financial literacy implies that measures applicable to the more developed economies are often applied to the less developed economies without regard to the other underlying social and economic contexts. Finally, the financial services landscape of Uganda indicates a decline in the use of formal financial services from 20% in 2013 to 11% in 2018 explained by a counter increase in semi-formal financial services (including mobile money use) and an increase in financial exclusion from 15% in 2013 to 22% in 2018 (FinScope, 2013, 2018). This suggests that a significant number of bankable adults are shunning formal financial solutions due, among other factors, to a lack of financial literacy. According

to FInScope (2018:32), about 70% of Ugandan adults do not have a secondary education which could explain their low levels of financial literacy. Swamy (2014:2) argues that financial inclusion is intended to connect individuals to banks with consequential benefits that ensure that financial systems play their active role of promoting inclusive growth.

This study sought to contribute to the current empirical discourse by addressing these limitations in the following ways: (1) Use the existing literature and country-specific data to guide the construction of a composite financial literacy index applicable to the developing economies, (2) investigate the effect of financial literacy on financial inclusion using Uganda as a unit of analysis and (3) confirm or refute the *a priori* expectations on the influence other demand and/supply-side determinants have on financial inclusion in Uganda.

1.5 STRUCTURE OF THE THESIS

The rest of the thesis is organized as follows:

Chapter 2: Demand for and Access to Financial Services: Theory and evidence

The chapter provides a theoretical framework contextualizing the demand and access impediments to formal financial inclusion and situates the current problem of financial literacy as a potential barrier to promoting financial inclusion.

Chapter 3: The financial literacy – financial inclusion paradigm

The chapter surveys the current theoretical and empirical underpinnings on financial literacy to establish their link to financial inclusion – and reviews the existing approaches of measuring the two concepts. It also provides a snapshot of the financial literacy trends in Uganda

Chapter 4: Hypotheses development and methodological issues

This chapter redevelops the study's objectives and testable hypotheses and delves into the existing methodologies which informs the analysis of both financial literacy and financial inclusion to develop a conceptual framework that will guide the model specification process.

Chapter 5: Research design and statistical methods

This chapter outlines the research design and statistical methods used to investigate the effect of financial literacy on financial inclusion in Uganda. It also identifies the methodological limitations of the study.

Chapter 6: Construction of the financial literacy index

This chapter presents the statistical findings on the construction of the composite financial literacy index and outlines the Principal Component Analysis (PCA) procedure applied in the construction of this index.

Chapter 7: Model estimation and empirical results

The chapter presents the model estimations of the relationship between financial literacy and financial inclusion in Uganda using binary logistic and probit estimations.

Chapter 8: Conclusions and implications for further research

The final chapter summarizes the theoretical and empirical underpinnings that inspired the study and provides the conclusions of the study. It also discusses the study's contribution towards the existing body of knowledge and suggests avenues for future research.

CHAPTER 2
DEMAND FOR AND ACCESS TO FINANCIAL SERVICES: THEORY AND EVIDENCE

2.1 INTRODUCTION

Financial inclusion is increasingly recognized as an important tool for promoting growth and reducing poverty. Existing literature adequately discusses its nexus to financial development and economic growth (Beck, Demirguc-Kunt & Honohan, 2009: 119). Yet, it is observable that even well-developed financial systems fail to financially include certain segments of their populations (Sarma & Pais, 2011: 613; Sarma, 2012: 1).

The current thrust in the empirical and policy discourse recognizes that to enhance financial development, both demand and access impediments to financial inclusion must be addressed. In fact, current policy efforts extend their domains from accessing the depth of financial services, in terms of total outstanding deposits and credits, to aspects of financial outreach and the extent and desire to which households and firms' access and use formal financial services (Beck & Demirguc-Kunt, 2008: 383). The increase in access, however, does not seem to guarantee usage. This chapter attempts to investigate possible factors that hinder increased adoption to formal financial services.

2.1.1 Goal and layout of the chapter

The chapter commences by surveying the current theoretical and empirical underpinnings regarding financial inclusion to contextualize the current problem and objectives of this study. It is organized as follows: section 2.2 provides a theoretical framework on financial inclusion, briefly contextualizing the demand and access impediments to formal financial inclusion. It also situates the current problem of financial literacy as a potential barrier to promoting financial inclusion. Section 2.3 provides an account of the current global trends in financial inclusion focusing on both local and international settings. Section 2.4 discusses the principal theories and

strategies in financial inclusion while section 2.5 focuses on the current empirical issues. Section 2.6 concludes the chapter.

2.2 DEMAND FOR AND ACCESS TO FINANCIAL SERVICES

Over decades, extensive literature and empirical findings have explored perspectives towards the promotion of an all-inclusive formal financial system (see for instance: Kempson & Whyley, 1999; Beck & Demirgüç-Kunt, 2008; Triki & Faye, 2013; and World Bank, 2014). Statistics however reveal that a significant portion of the world's population remains unbanked. According to the Global Findex Report of 2017, over 30% of the world's adult population (about 1.7 billion people) does not have an account with a formal financial institution. In developing economies like those in Africa, only 63% of the population has access to financial services (World Bank, 2017: 2).

Financial inclusion is a pre-condition to inclusive development and refers to the process of ensuring the accessibility, availability, and usage of formal financial services to all members of an economy (Basant & Brajaraj, 2011: 1; Sarma & Pais, 2011: 3). The demand for and access to financial services causes the persistent income inequalities within populations and the slower growth among them (Beck, *et al.,* 2009: 119). Empirical evidence justifies the critical role financial inclusion plays in wealth creation (Rhine & Green, 2006), income inequality and poverty reduction (Beck & Demirguc-Kunt, 2008), advancement of information and communication technologies (ICT) (Andrianaivo & Kpodar, 2011) and promoting economic growth (Sarma & Pais, 2011).

Studies also indicate that the lack of formal financial inclusion causes financial market imperfections such as informational asymmetries and transactions costs that are particularly felt among poor households who lack the necessary collateral, credit histories, and connections. This hinders their ability to finance high-return investments and reduces the efficiency of resource allocation, thereby adversely impacting growth and poverty alleviation (Galor & Zeira, 1993: 37; Beck *et al.*, 2009: 120).

Within the wider context, financial inclusion is encapsulated in the finance-growth nexus where financial markets and institutions exist to channel savings from surplus

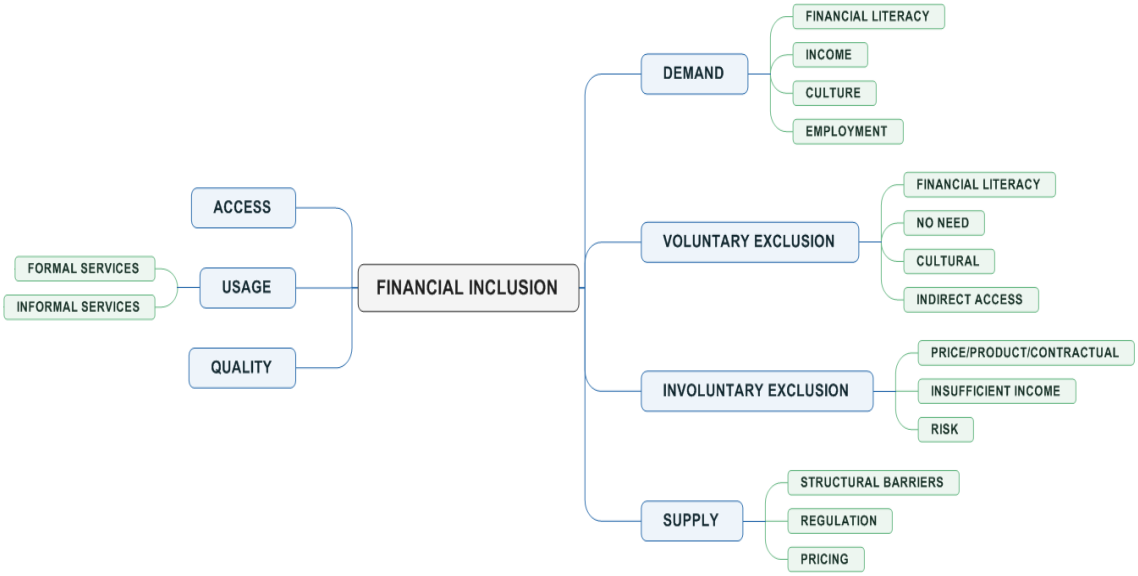
units to deficit units and in so doing, narrow the financial gap between the 'haves' and 'have not's'. This nurtures investment activities and facilitates economic growth (Chisasa, 2014: 18). While the causality between financial market growth and economic growth remains contentious, Swamy (2014: 2), Beck *et al.* (2009: 119) and Honohan and Beck, (2007: 2) contend that financial markets exist to overcome the effects of information asymmetries and transaction costs which prevent the direct pooling and investment of society's savings. These savings and payments services facilitate the exchange of goods and services, while at the same time providing opportunities to all market participants, thereby boosting growth, income distribution and reducing poverty. Conversely, growth opportunities are missed, inequalities persist, and in extreme cases, financial crises arise.

Financial inclusion is therefore an increasing global policy initiative whose objective is to provide, not only accessible formal financial services, but services that are typically efficient, usable, far-reaching and affordable. While inclusive financial development dictates an equitable balance between the supply and demand of financial services, existing literature indicates that most of the financial inclusion efforts incline mainly towards the aspect of access by implementing strategies for increased depth, as opposed to interrogating and stimulating the demand for financial services (Beck, *et al.,* 2009: 119). It is only until recently that this focus has shifted towards addressing aspects of use. Clearly, an increase in financial depth without regard to other social-psycho, economic and demographic characteristics in the population, does little to attract most of the population who still shun formal financial services.

Therefore, this section serves two purposes: first, it provides a theoretical framework depicting and explaining the building blocks in the financial inclusion process. Then, in attempting to narrow this focus to the aim of this study, it situates financial literacy as an important factor for enhancing financial inclusion. Typically, the financial inclusion process centers around two common pillars, namely, the supply for financial services and the demand for financial services. Beck, *et al.*, (2009: 122) propose a theoretical framework that encapsulates this financial inclusion paradigm. In this framework, they clearly distinguish between the several aspects that define financial inclusion in terms of access and use, and which, in recent years have become focal

areas for policy makers and governments. This framework is depicted in figure 2.1 below.

Figure 2.1: Distinguishing between access and use of financial services.



Source: Adapted from Beck *et al.,* (2009:.122).

According to Figure 2.1 above, the interplay between the supply and demand of financial services prescribes that access (supply) requires a prerequisite (quality) to guarantee usage (demand). On the one hand, a financial offering must be accessible and attractive to include certain qualifying attributes such as affordability, innovation and simplicity that warrant adoption. On the other hand, such attributes do not matter altogether because some prospective users shun them nonetheless (voluntary self-exclusion).

Beck, *et al.,* (2009: 122), Honohan and Beck, (2007: 2) and Kempson and Whyley, (1999: 2) identify three groups of potential users of financial services. These include those that have financial access and use it (financially included), those that do, but do not use it (voluntarily excluded) and those who altogether have no access (involuntarily excluded). While recent policy efforts attempt to address all categories, they seem to implicitly align with the aspect of financial deepening (spread in the variety of financial services) rather than financial inclusiveness or outreach (greater coverage or use of

the financial services) (Triki & Faye, 2013: 32; Beck, *et al.,* 2009: 120, Honohan, 2008: 4). Additionally, Beck *et al,* (2009: 120), observe that “even deep financial systems may offer limited outreach”.

By contrast, the demand for financial products and services is driven by a myriad of factors that include, but is not limit to, certain socioeconomic factors such as occupation, income level, personal risk as well as certain demographic and socio-psychological characteristics for example level of education, age, gender, culture and financial behavior which are typically problematic to quantify (Triki & Faye, 2013: 32). However, like the supply-side factors, these demand factors explain the cause and effect to incidences of financial exclusion (voluntary and involuntary) and are linked to the prevalent growth of an otherwise unregulated, yet potentially exploitative informal financial sector (Sarma & Pais, 2011: 3; Honohan, 2008: 5; Claessens, 2006: 222). Consequently, Swamy, (2014: 2) suggests exclusion as a better way for estimating financial inclusion.

Against this backdrop, Kempson and Whyley (1999: 21) expand financial exclusion to comprise five major forms. These are first, access exclusion, which occurs where segments of the population remain excluded due either to the remoteness to financial services or to the risk management process of the financial system. Second is conditional exclusion which involves a mismatch in the product/service preferences between the consumer and financial institution. Then there is price exclusion, where the demand for financial services is a function of the price. Marketing exclusion occurs when the targeted marketing and sales efforts exclude sections of the population and finally self-exclusion refers to a situation where sections of the population exclude themselves owing to fear of rejection or other psychological factors.

This multifaceted nature of financial exclusion suggests several issues. First, that the lack of access to finance is common among the poor and occurs to people who live at the margins of society (Sarma & Pais, 2011: 5; Beck, Demirguc-Kunt & Peria, 2007: 235). Secondly, that financial exclusion is dynamic in nature so that the lack of adoption is not entirely due to a lack of access to financial services. Otherwise stated, access to financial services is not synonymous with use (Beck, et al., 2007). In fact, in their study, Kempson and Whyley, (1999: 4), observed that some of their respondents

had formal financial services at some earlier point but had given them up, suggesting that a decline in formal participation arguably stimulates an increase in informal participation and vice versa, thereby justifying growth in informal financial markets (see: Demirguc-Kunt & Klapper, 2013: 282). Finally, exclusion results from both supply and demand factors implying that policy efforts should complement both aspects to provide a broader outlook on financial inclusion (Arun & Kamath, 2015: 271; World Bank, 2012: 18; Kendall, Mylenko & Ponce, 2010: 36). Low levels of knowledge about financial products coupled with mistrust in financial services influence this process in much the same manner as remoteness and/or marginalisation do (Kempson & Whyley, 1999: 14).

Beck and De La Torre (2007: 81), conclude that while problems of access arise due to transaction costs and information asymmetries, such uncertainty does not by itself constitute the access problem. “Voluntary self-exclusion does not constitute a “problem of access,” except in the cases where self-exclusion reflects unduly low levels of financial literacy or is a psychological response to past systematic discrimination”. Similarly, Atkinson and Kempson, (2008: 7) adequately crystallise the financial inclusion dilemma as follows:

“There is a great deal of policy interest in findings ways to increase levels of financial inclusion in both developed and less developed countries. However, policy makers need to understand how people make financial decisions and manage their money, in order to be certain that their interactions with financial institutions are beneficial. Moreover, poor financial skills can themselves be a barrier to financial inclusion such that ‘financial education is then a potential solution to the problem of lack of access’. Given that young people tend to adopt attitudes and behaviours from their parents, it is likely that the barrier to financial inclusion presented by poor financial skills is particularly relevant in countries where levels of financial penetration have been low historically.”

Therefore, while the literature is replete with theory, empirical, and policy recommendations to financial inclusion, most of it conventionally focuses on expanding the frontiers of assess in terms of addressing the supply-side constraints (with a few demand side factors) to financial inclusion. It is only until recently that some studies have redirected towards assessing these typically subjective demand side constraints such as financial literacy, culture, ethnicity and religion, among others. This is not surprising since the latter present a subjective bias in quantifying and may

contain data gaps (Huston, 2010; Remund, 2010). However, the lack of elaborate research on these constraints presents a gap in the current literature that warrants study. This review situates financial literacy as an important driver to broader formal financial inclusion.

Financial literacy is broadly defined as the ability to make informed judgments to enable effective decision–making regarding the management of money. It includes knowledge but goes further to include attitude, behaviour and skills and stresses the importance of decision-making — applying knowledge and skills to real life processes, with the result of improved financial wellbeing for the individual (Atkinson & Messy, 2011: 14; Remund, 2010: 279). Current policy reforms on financial inclusion particularly highlight financial literacy as an important ingredient to reducing financial exclusion, affirming financial awareness and improving the overall financial welfare of individuals. In fact, Triki and Faye, (2013: 35) recognise it as vital in providing a consumer perspective for understanding financial inclusion.

Additionally, the African Development Bank's (ADB's) framework for financial inclusion in Africa recognises financial literacy as a vital component for harnessing the untapped potential of those individuals and businesses currently excluded from the formal financial mainstream (Triki & Faye, 2013: 25). Calcagno and Monticone, (2015: 363) cite low levels of financial literacy as the cause for the suboptimal financial decisions among the financially included, while the World Bank recognises it as a pillar to developing consumer financial protection policies. According to the World Bank's financial inclusion strategies – reference framework, consumer financial protection entails: (1) a free flow of information for informed decision making, (2) protection against unfair and deceptive financial practices and (3) improved financial literacy among consumers to increase trust in financial markets (World Bank, 2012: 33).

Typically, financial inclusion is linked to financial stability, financial integrity, market conduct and the financial literacy of consumers. Policy efforts and analyses should be prepared with reference to these key areas (World Bank, 2012: 11). Financial literacy plays a crucial role in households' decisions about how to invest wealth and how much to borrow in financial markets. It sets the precedence for promoting access to finance by creating incentives and environments that promote desired financial behaviours

such as savings, budgeting or using credit wisely. In the risk context, financial literacy enables the poor to manage their savings or investments and provides a platform for diverse but safe offerings like insurance and retirement planning which are typically not provided through the informal market. Ramakrishnan, (2012: 2), argues that financial literacy and financial inclusion should be looked at as 'twin pillars' of financial development and ultimately, financial stability. Indeed, current global trends and efforts in financial inclusion recognise the relevance of financial literacy in not only attracting the unbanked but improving the financial welfare of the currently banked.

2.3 GLOBAL TRENDS ON FINANCIAL INCLUSION

The global financial inclusion landscape revolves around three interlinked drivers which are access to financial services (supply), quality of financial services, and the usage of financial services (demand). Recent statistics on financial inclusion by the World Bank's Universal Financial Access initiative (UFA2020) indicate that during the last decade, financial exclusion declined from an estimated 2.5 billion unbanked people worldwide, (World Bank, 2014: 3) to approximately 2.0 billion individuals (World Bank, 2017; 2; Demirguc-Kunt, 2014: 351). Policy reforms and impact assessment interventions identify technological advancements such as mobile payments, mobile banking, borrower identification techniques, and others, as well as a considerable deregulation of the financial markets, as the possible drivers to this cause (World Bank, 2014: 3).

Notably however, a significant portion of the excluded still exists. Of these, about 59% cite a lack of enough money as the major impediment which implies a lack of affordable financial services (low-income groups) or an absence of services designed to fit low income users. Other barriers include a remoteness to service providers, a lack of the necessary documentation, a lack of trust in financial service providers and religion (World Bank, 2014: 3). The World Bank, in collaboration with the International Finance Corporation (IFC) and others, envisions to financially include approximately 1 billion adults by the year 2020, by providing access to a transaction account or an electronic instrument to store money, send payments and receive deposits, as a basic building block to managing financial lives (World Bank, 2017).

This vision will be realised through an enhancement of the catalytic drivers of access and usage, viz a viz: (1) remodelling transactions accounts and payment product designs, in cognisance to the existing legal and regulatory frameworks, (2) increasing the availability of access points, (3) creating awareness and financial literacy among the population and (4) leveraging the large-volume recurrent payment streams. The critical enablers will include growth in financial and ICT infrastructure, re-adjustments in the legal and regulatory frameworks and a commitment from public and private sectors whose role it is to drive the process (World Bank, 2017).

Incidentally, financial inclusion varies widely across the globe. According to the Global Findex Report of 2012, sharp disparities exist in the use of financial services between high-income and developing economies and across individual characteristics. The proportion of adults with an account in high-income economies more than doubles that in developing economies. Secondly, account penetration is nearly universal in high-income economies, with 89% of adults reporting that they have a formal account while only 41% doing so in developing economies (Demirguc-Kunt & Klapper, 2012: 2).

In Africa, this disparity manifests further. At one end, proponents who view a promising financial inclusion outlook argue that Africa has led the process of technological innovation by designing and providing new financial products in the form of mobile banking, mobile payments and biometric identification for individuals. These products have in turn dictated a more flexible financial regulatory framework, thereby significantly reducing transaction costs and fostering the widespread use of financial services (World Bank, 2014: 51; Triki & Faye, 2013: 17). At the other end, the opponents believe the financial inclusion process looks bleak. They argue that while access to financial services has dramatically improved, less than a quarter of adults in Africa have a formal bank account and that more adults use informal rather than formal financial services (Triki & Faye, 2013: 43).

On average, 23% of adults in Africa own an account with a formal institution although large variations exist across the continent. Gender disparities in account ownership indicate that 7% more men are likely to have formal accounts than women. Similarly, adults with a tertiary education and those aged between 25 and 64 are likely to have a formal account, suggesting ‘user’ gaps that highlight the importance of financial

literacy in expanding financial inclusion. A significant portion of the excluded depends on informal financial services, with 80% of them citing inadequate income as the reason for not having a formal account. Over 25% identify cost, distance and documentation as barriers to inclusion. Furthermore, a significant portion of the underserved employs alternatives to traditional banking that have been made possible by the advent of mobile technology. There is an infrequent use of banking services even among the formally included, with a significant number using these accounts mainly for remittance related activities. Consequently, access to formal finance in Africa still appears unique suggesting that even deep financial systems can fail to deliver services to all (Triki & Faye, 2013: 44, 45).

The financial services landscape of Uganda (the unit of analysis) provides a good platform for investigating the nexus between financial literacy and financial inclusion. Despite the significant advances in the composition of financial solutions, the country is increasingly recording a growing trend in the use of semi-formal than formal financial products and services (see; FinScope, 2018). According to the latest Topline findings by FinScope (2018), Uganda had 18.6 million bankable adults representing about 41% of the estimated total population. With certain overlaps in the usage patterns considered, the country recorded an overall improvement in formal (formal and semi-formal) financial inclusion from 54% in 2013 to 58% in 2018. However, these demographics represented a decline in formal banking from 20% in 2013 to 11% in 2018 caused by an uptake in mobile money services. Non-bank formal financial services increased from 52% in 2013 to 67% in 2018 fueled again by an upsurge in mobile money services. Mobile money services increased from 56% in 2013 to 67% in 2018 appearing to dominate the growth in the semi-formal financial services industry. Finally, there was a decline in the use of informal financial services from 74% in 2013 to 56% in 2018 and a resulting increase in the financially excluded from 15% in 2013 to 22% in 2018 (FinScope, 2013, 2018). These results indicate a slowing demand for formal than semi-formal financial services (including mobile money) and a concerning decline in the use of financial services overall.

While technological advancement has resulted into an unprecedented proliferation of financial innovations, rural areas in Uganda remain unbanked and most of their financial services, which are provided by the semi-formal and informal sectors, are

unregulated and unsafe (FinScope, 2018: 19). Evidence suggests that low-income and financially excluded populations have active financial lives that require a broad range of financial services to take advantage of the economic opportunities (World Bank, 2014). Consequently, promoting financial inclusion became one of Bank of Uganda's (BOU's) strategic objectives, aimed at extending accessible but affordable financial services to all, partly to fulfil the bank's commitment towards the Maya Declaration of 2011, but more importantly, to enhance inclusive economic growth.

To this end, the BOU, in collaboration with the Ministry of Finance, Planning and Economic Development (MoFPED), the Alliance for Financial Inclusion (AFI), Financial Sector Deepening Uganda (FSDU) and others, embarked on a six year National Financial Inclusion Strategy (NFIS 2017-2022) aimed at reducing financial exclusion in the following ways: eliminating barriers to access, developing credit and digital infrastructure, deepening and broadening formal savings, investments and insurance usage, and protecting and empowering individuals with enhanced financial capabilities (BOU, 2017: 21). These initiatives strengthen earlier policy interventions that sought to, among others (1) strengthen financial literacy through several financial education initiatives, (2) enhance financial consumer protection by promoting public awareness about the consumer —- financial institution, rights and responsibilities, (3) provide a regulatory framework to promote technological innovations that increase access and usage while ensuring the safety and stability of the financial sector, and (4) maintain data on access, usage and quality of financial services in order to identify the gaps that need to be closed by key stakeholders (BOU, 2013: 6).

The present study attempts to contribute to these policy efforts by interrogating the role financial literacy plays in enabling greater financial inclusion. The growing participation in Uganda's semi-formal and informal financial markets as opposed to the formal banking market seems to suggest a lack of astute personal finance behaviours and practices among market participants. Yet the increasing innovation in financial products and services, the continuing shift in the responsibility of providing social security from government and financial institutions to individuals, and the growing importance of individual retirement planning, among others make financial literacy an essential ingredient for promoting financial inclusion (Lusardi & Mitchell, 2014: 7; Ramakrishnan, 2011).

2.4 THEORIES AND STRATEGIES ON FINANCIAL INCLUSION

Arguably, the nexus between financial development and economic growth justifies the financial inclusion paradigm. Financial development and financial inclusion are interrelated in the sense that financial development refers to the emergence of financial institutions that help to overcome market frictions, which prevent the direct pooling and investment of society's savings (Beck *et al.*, 2009: 119). Similarly, financial inclusion refers to efforts, through financial intermediation, to provide accessible, safe, easy to use and affordable financial services, especially to the poor and marginalised groups of society (Swamy, 2014: 2). It is thus inconceivable to maximise financial development and/or achieve inclusive economic growth without providing acceptable financial services to all.

It is debatable whether economic development or financial development lead to an all-inclusive financial system. Sarma and Pais, (2012: 5) observe, that even well-developed financial systems like those in the United States (US) and Europe fail to financially include all sections of their populations. However, it is presumptuous to assume that the lack of financial services constitutes an 'access' problem when aspects such as voluntary self-exclusion are not fully interrogated (Beck & De La Torre, 2007: 81). Still, financial inclusion, on the one hand, and financial development/economic growth on the other, share a common link. Several theoretical, empirical and policy discussions use these terms in tandem (see for instance, Swamy, 2014; 2; Beck & Demirguc-Kunt, 2008: 384; Honohan & Beck, 2007: 2; Beck *et al.*, 2007: 234). Hence, it is necessary to understand how the finance-growth nexus relates to the financial inclusion paradigm.

Accordingly, theory and empirical literature postulate that the role financial development plays in promoting economic growth is unclear (see; Chisasa, 2014: 18; Demirgüç-Kunt & Maksimovic, 1998; Rajan & Zingales, 1998; King & Levine, 1993; McKinnon, 1973, and Goldsmith, 1969). Specifically, it is inconclusive whether financial development causes economic growth or whether the reverse is true. It appears that financial development plays a simultaneous role in stimulating both financial inclusion in the short run and economic development in the long run, with

possible feedback loops, although the exact causality among these variables remains a contentious issue empirically.

Financial development has several advantages. It (1) ameliorates market frictions, thereby enhancing greater investment capacity, generating capital and attracting human involvement; (2) allows for the entry of talented new comers (firms and individuals) and by extending the necessary financial services, it expands opportunities beyond the rich and connected (Klapper, Laeven, & Rajan, 2006; Rajan & Zingales, 2003) and (3) promotes technological innovation through the generation of ideas since the availability of finance incentivises the population to think creatively (King & Levine, 1993). To this end, a well-functioning financial system should create equal opportunities for all and enable the economically and socially excluded to integrate better into the economy (Sarma & Pais, 2011: 2).

For instance, Guiso, Sapienza and Zingales, (2004: 930) observe that a move from a financially less developed region to a developed one increases an individual's or firm's chances of starting a business by 5.6%. Furthermore, this environment accelerates the individual's or firm's financial stability in a much shorter time than would be the case in a financially less developed environment. Therefore, considering the link between financial development and financial inclusion, it is plausible that the latter plays a significant role in sustaining employment, economic growth, and financial stability (Kim, Yu & Kabir, 2018; Arun & Kamath, 2015: 267; Amidžić, Massara, & Mialou, 2014: 2).

Additionally, financial development creates enabling conditions for growth either through a supply-leading (financial development spurring growth) or a demand-following (growth generating demand for financial services) channel (Swamy, 2014: 2). It is this financial development — growth link, or the financial development — financial inclusion link, that seems to justify why financial inclusion continues to theoretically explain several supply and demand-biased determinants to financial development such as income, employment, infrastructure development, ICT development, financial literacy, and others.

For instance, Sarma and Pais, (2011: 21) identify a positive association between financial inclusion and financial development, income, urbanisation, adult literacy and digitalisation. They confirm that financial exclusion reflects social exclusion since countries with a low GDP per capita, high levels of income inequality, low rates of literacy, low urbanisation and poor connectivity, seem to be less financially inclusive. Furthermore, Andrianaivo and Kpodar (2011) confirm financial inclusion as one of the channels through which ICT, which includes mobile phone telephony, influences economic growth. Anzoátegui, Demirguc-Kunt, and Peria, (2014: 338); Beck, Demirguc-Kunt and Levine, (2009) establish a positive relationship between remittances and financial inclusion, typically with regards to new formal deposits, albeit their results are not robust for the demand for and use of credit facilities. Kim, *et al.,* (2018) confirm positive effects of financial inclusion on the economic growth and observe mutual causalities between the two, based on the panel Granger causality tests.

The current progressive approach towards financial inclusion prescribes global policies that apply at macro and micro levels of society, whose evolution is grounded on initiatives that primarily attempt to bridge the gap between formal financial inclusion and the poor or the financially excluded (Arun & Kumath, 2015: 268). These policies apply output from possible theories on financial inclusion as postulated, cases of possible causality among key variables and empirically tested determinants to financial inclusion as building blocks for attracting the financially excluded. For instance, growth in mobile phone technology is desirable for promoting financial inclusion in Africa (Zins & Weill, 2016; Arun & Kamath, 2015: 268). An interrogation of banking policies and regulatory environments attracts demand for formal finance (World Bank, 2012: 30) while potentially cutting back on the growth of unregulated informal markets (Sangmi, 2013: 97). Financial outreach rather than depth is considered more effective at promoting financial inclusion (Arun & Kamath, 2015: 279; Beck *et al.,* 2007). Hence, a review of current policies and strategies is necessary to identify successful initiatives as well as potential gaps in the policy reforms to the financial inclusion process.

Over the past three decades, the World Bank (IBRD), in collaboration with various stakeholders, groups and initiatives such as The Centre of Financial Inclusion

(ACCION), International Finance Corporation (IFC), Alliance for Financial Inclusion (AFI), the Consultative Group To Assist the Poor (CGAP), the African Development Bank (AfDB), the Department of International Development (DFID), Universal Financial Access2020, the Global Twenty (G20) spearheaded a drive to improve access to financial services globally and specifically, among the financially excluded. This goal premised on the realisation that financial inclusion has the transformative power to improve lives and accelerate economic growth (World Bank, 2014).

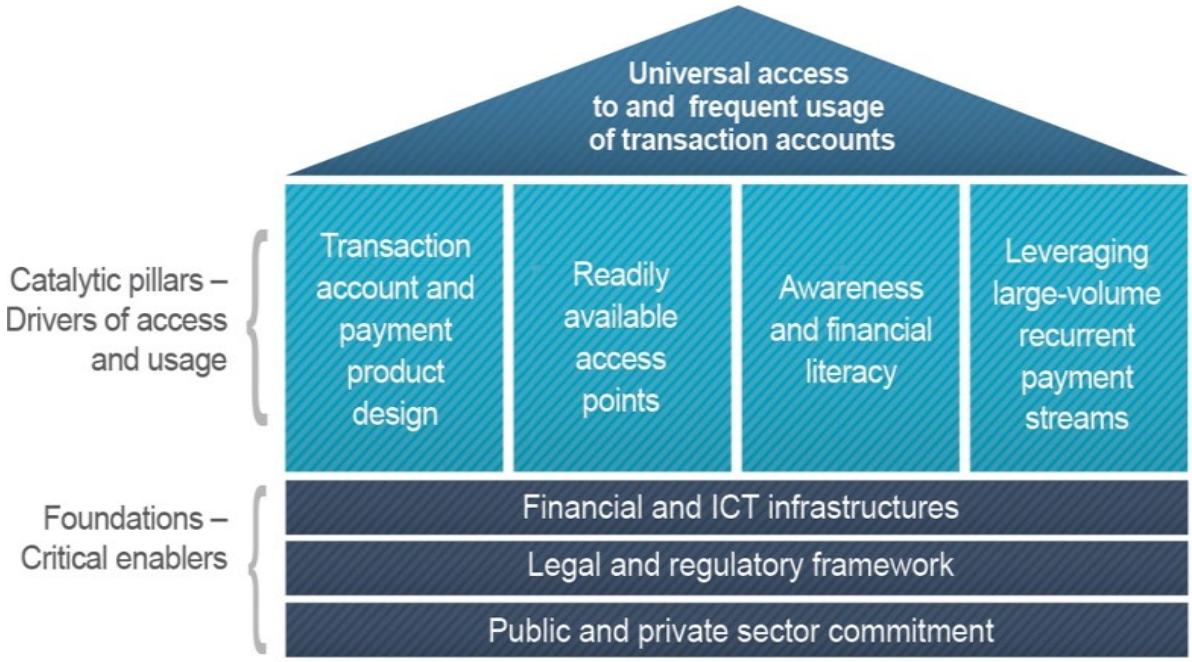
To date, this drive has led to the formal inclusion of over 500 million individuals, leaving a staggering 2 billion individuals without formal financial services (World Bank, 2014). Several observations underpin the evolution of these financial inclusion policies and strategies. Originally, emphasis was placed on improving access by overcoming potential barriers faced by institutions in reaching lower income groups. This demanded more financial depth and outreach and stressed the need for greater accessibility and the provision of universal zero balance and no-frills bank accounts, among others (Beck *et al*., 2007; 2008; Arun & Kamath, 2015: 268). Such policies and strategies typically followed a supply-side approach to financial inclusion.

More recently, however, due to the unprecedented growth in informal financial markets and the advent of technological innovation, the focus has changed in earnest to address the other two components of financial inclusion, namely usage and the quality of financial services. Arun and Kamath (2015: 268), categorically state that “It is a break from the past where most financial inclusion initiatives were supply-led”. The current approach encompasses not only the need to provide access to the underserved, but the frequent and regular use of financial services, even among the served. It emphasises that need for quality of service – one that incorporates a strong consumer protection framework and promotes financial literacy among consumers on the basis that informed and financially educated users maximise and benefit more from the financial services (World Bank, 2012: 6).

The World Bank’s Universal Financial Access Initiative 2020 (UFA2020) has committed to enabling 1 billion adults worldwide, to gain access to a transaction account or an electronic instrument with which to store money, send payments and receive deposits. UFA2020’s strategic plan, based on G20’s High-Level Principles for

Digital Financial Inclusion is now used as a reference tool for many counties. This framework is depicted in figure 2.2 below.

Figure 2.2: G20 High level principles for digital financial inclusion



Source: Adopted from: World Bank (2017).

The proposed framework incorporates all key drivers to financial inclusion namely access to, usage and quality of financial services. Briefly, on the supply side, it emphasises an increase and possible re-design in account penetration (both transaction and electronic), the tailoring of consumer products and services such as savings, credit, insurance, pensions and others according to consumer preferences, and the proliferation of financial access points such as bank branch and automated teller machine (ATM) densities. The critical enablers are a growth in the financial and ICT infrastructures, a re-design of the guiding legal and regulatory frameworks and a commitment from public and private entities who drive the process (World Bank, 2017).

On the demand side, the framework emphasises the need to create financial capabilities through the process of creating awareness and financial literacy and to foster financial stability, integrity and market conduct (World Bank, 2012: 11). The

World Bank, (2014: 16) recognises that while nonusers of formal financial services do not constitute an access problem, due to a lack of demand, financial literacy can still improve such awareness and generate this demand, making the latter a significant input in the financial inclusion process.

It is noteworthy that by and large, four strategic imperatives appear robust to promoting financial inclusion going forward. Firstly, there is a need to leverage on digital and other technological innovations such as mobile phone telephony. Secondly, it is necessary to tap into mechanisms of the semi-formal and informal markets to forge formal complaint market regulations and/or attempt to replicate formal complaint but acceptable product or service designs. Furthermore, there is a need to utilise Micro-Finance Institutions (MFIs) and Small to Medium Enterprises (SMEs) as conduits to the financial inclusion campaign. The third strategic imperative is to explore and institute legal and regulatory frameworks that accommodate tailored but affordable financial services while maintaining market stability and credibility, and lastly, it is important to increase financial awareness by enhancing user financial capabilities through sustained financial literacy efforts.

Innovation in ICT, specifically with regards to mobile phone telephony, overcomes infrastructural gaps to formal financial inclusion. Andrianaivo and Kpodar (2011: 2), observe that the growing mobile cellular networks in sub-Saharan Africa which cover over 55% of the continent, are vital to most financially excluded adults. Their growth implies policy initiatives that could promote financial inclusion in the region. Arun and Kamath (2015: 268) and Triki and Faye (2013: 106), further concur that mobile phone technology could push Africa's financial inclusion agenda forward, given the large mobile consumer base and the absence of traditional banking infrastructure. "Technology could become a game changer in the sense that it could enable the continent's financial system to outperform the traditional banking model and establish itself as the world leader in mobile financial services" (Triki & Faye, 2013: 106). The Republic of Kenya provides good reference to the advantages gained in mobile financial service proliferation.

Kenya spearheaded this transformative process of technology with the introduction of its M-Pesa mobile financial service, a 'branchless' banking and non-bank led financial

service that allows millions of individuals otherwise excluded from the formal financial system, to perform relatively cheap, secure and reliable financial transactions. M-Pesa was launched in 2007 but by 2011, it had a subscriber base of 68% of the population (Triki & Faye, 2013: 109; Demirguc-Kunt & Klapper, 2012: 9). Currently the country's mobile financial services are well into their secondary phase of regulatory compliance on electronic payments, seeking to grow a larger portfolio of compliant products and services (Arun & Kamath, 2015: 270).

Africa currently leads the trend of mobile financial services with over 56 deployments in place. Sub-Saharan Africa alone accounts for over 45% of the world's total mobile money deployments. A GSMA[1] survey performed in June 2011 shows that East Africa has become the most active mobile money market in the World with 46% of mobile money transactions processed in 2011, originating from the region. About 25 African countries have a mobile subscriber penetration that exceeds the 90% level, and the rapid spread of mobile phones implies that the number of mobile users exceed by far, the number of banked people in many African countries (Triki & Faye, 2013: 107, 108). Therefore, whilst stringent regulatory compliance, low levels of income, financial literacy, and others, still impede the development of technology-based financial services, mobile services provide a unique means for promoting financial inclusion.

Similarly, it is empirically true that a significant portion of the financially excluded comprises the poor, low-income earners and individuals who live at the margins of society (Andrianaivo & Kpodar, 2011: 2). Therefore, when the qualifying entry criterion of the formal financial sector shuns these individuals, they resort to informal finance for survival (Yuan & Xu, 2015: 7). Basant and Brajaraj, (2011: 1) note that this portion of marginal households are obliged to use informal and unregulated finance, through money lenders who charge them exorbitantly and push them back into a vicious cycle of poverty.

Consequently, it is inconceivable to maximise financial inclusion without addressing the financing mechanisms in the informal financial sector. To this end, Zins and Weill,

[1] Global System for Mobile Communications Association (GSMA) represents the interests of mobile service operators worldwide

(2016: 47) recognise informal finance and mobile phone banking as critical drivers to inclusive finance in Africa, citing that the dualistic nature of financial markets on the continent requires an interaction between formal financial institutions and informal agents (which include semi-formal institutions, MFIs and SMEs). Informal financial agents, according to Steel, Areyeetey, Hettige and Nissanke, (1997) serve market niches that banks fail to reach, thereby lowering transaction costs and default risk, and positively deepening access to financial services in the medium term. They recommend an integration of informal financial institutions into financial development frameworks since the former help to, among others, mobilise household savings and financing for small businesses.

While this is plausible, some theorists oppose this view on the premise that informal markets are incompetent in the absence of formal institutions (Arun & Kamath, 2015: 48), are exploitative (World Bank, 2014: 48; Basant & Brajaraj, 2011), and are costly and unreliable (Ardic, Heimann & Mylenko, 2011: 16). Nonetheless, the argument that informal markets increase outreach at grass root level is uncontested (Arun & Kamath, 2015: 48). Therefore, while the above-mentioned financial inclusion drivers address the supply end of inclusive finance, they are inadequate by themselves in explaining demand aspects that interrogate the usage and quality of the financial services.

The multifaceted nature of financial inclusion requires policies that incorporate both demand and supply perspectives and critically assess whether access is aligned to demand and that the latter is contingent on the quality of the financial services (Arun & Kamath, 2015: 268; World Bank, 2014, 48; Cohen & Nelson, 2011. 5). To this end, the onus on policy makers, as per the Maya declaration[1] is to: (i) create an enabling, technology-driven environment that increases access but lowers the costs of financial services; (ii) implement proportionate regulatory frameworks that balance financial inclusion with financial integrity and financial stability; (iii) integrate consumer protection and empowerment through developed financial capabilities and lastly, control and monitor the process (World Bank, 2012: 7).

[1] The Maya Declaration of 2011 was an initiative by the Alliance for Financial Inclusion (AFI) to encourage national commitments towards financial inclusion.

Evidently, informal finance and mobile technology drive financial inclusion if they are concomitant with strategic efforts that address regulation, financial stability, financial integrity, market conduct and consumer empowerment (Hannig & Hansen, 2010: 2). While this study attempts to contribute towards consumer empowerment through financial literacy and capability, in the studies conducted so far, the impact of financial literacy on financial inclusion is merely implied. There is a dearth of empirical literature that specifically interrogates the causation between the two, probably because financial literacy is endogenous to several other determinants to financial inclusion, for example income, education and employment which dominate its possible impact. The following section looks at empirical studies on financial inclusion and attempts to highlight areas where the relationship between financial literacy and financial inclusion is categorically specified.

2.5 EMPIRICAL FINDINGS ON FINANCIAL INCLUSION

As indicated above, there is a paucity of empirical research directly linking financial literacy to financial inclusion despite the vast theoretical body of knowledge postulating the influence of the former on the latter (see: Atkinson & Messy, 2013; Atkinson & Kempson, 2008: 7). The implicit assumption is that financial literacy is endogenous with several other determinants to financial inclusion, which arguably obscure its unique effect (Sarma & Pais, 2011: 13). Alternatively, financial literacy exerts a second-order effect on financial inclusion by impacting on other factors that directly influence the demand for financial services. This suggests that financial literacy catalyses processes which stimulate the demand for financial services (for example knowledge about financial products, financial behaviour, savings behaviour, and credit behaviour).

Within this context, current empirical discourse cannot isolate its impact on financial inclusion without considering the effect of other supply and demand determinants. This section presents a holistic but brief empirical overview of the supply and demand factors influencing financial inclusion, laying emphasis, where applicable, to the demand impediment – financial literacy. It includes, where necessary, a comparative evaluation of the merits and demerits in the several methodologies used, to guide the choice of an appropriate methodology going forward (Chisasa, 2014: 55). In addition,

to delimit the review to the scope of the study, the empirical discussion focuses exclusively on aspects of financial inclusion for households and individuals.

Earlier empirical efforts on financial inclusion focussed predominantly on promoting access through readily available density data sources such as bank branch outreach, mobile phone penetration, automatic teller machines (ATMs) per capita and GDP per capita (World Bank, 2014). While this data provided trends on the supply of financial services, it was limited in indicating individual user patterns and in explaining the socio-economic and psychological impediments to financial inclusion. Consequently, current empirical studies blend and/or alternate between the readily available data sources provided by financial institutions and active population surveys which capture the salient user characteristics on individual financial behaviour. As Demirguc-Kunt, (2014: 350), tacitly puts it, “measurement is challenging because access to finance and use of finance are distinct concepts”.

Additionally, depending on the nature of the data, several empirical approaches have emerged to investigate the determinants to financial inclusion. These include baseline population surveys, ordinary and two stage least squares (OLS and 2SLS) regressions using probit or logistic models, factor analysis, structural equation models (SEM) and others. The empirical processes involve identifying and regressing financial inclusion proxies with proxies that mirror the supply and demand constraints to financial services. The ensuing segments look at some of these approaches.

Literature on financial inclusion is replete with empirical studies identifying the physical, social-economic and psychological impediments to formal financial inclusion. However, most of these studies share commonalities. Firstly, they explicitly confirm significant causality between financial inclusion and certain theoretically grounded financial inclusion determinants such as income level, employment and infrastructure development while simultaneously splitting consensus on others that lack a strong theoretical under pinning like gender, for instance. Secondly, studies employing secondary data encounter the limitation of missing information or inconsistent data gaps, especially with regards to the less developed economies (see; Sarma & Pais, 2011; 32; Beck *et al.,* 2009: 123, Claessens, 2006: 212). Thirdly, few studies incorporate social-economic impediments such as financial literacy, culture and

religion in their analyses; and lastly, most studies spread across countries and few are typically country-specific (see; Triki & Faye, 2012).

For instance, Sarma and Pais, (2011: 13), conducted a countrywide analysis on 49 low, middle and high-income countries to investigate the link between financial development and financial inclusion, using an index for financial inclusion (IFI). Their index integrates three different sets of variables aimed at assessing the impact of socio-economic, infrastructural, and banking factors on economic development. While limited by missing data gaps, their logistic output indicates significant alignment between financial inclusion and economic development, measured using the Human Development Index (HDI). In fact, across the spectrum, factors such as income, employment, adult literacy and infrastructure development affect financial inclusion positively, while rural population, income inequality and foreign domiciled banks, do so negatively (Sarma & Pais, 2011:18, 19). While this study provides valuable insights into the promotion of financial inclusion, its limitation on data restricts a complete rationale of how technological advancements, improvements in infrastructure and high levels of financial literacy influence the changing landscape of the banking industry worldwide (Sarma & Pais, 2011: 31). Additionally, the study focuses on adult literacy which does not necessarily equate to financial literacy.

Similarly, Claessens, (2006) analyses survey data on the households' use of financial services - a precondition to economic well-being. He observes a lack of universal financial access across countries with microeconomic, legal and regulatory obstacles hindering the process. He recommends a strengthening of institutional infrastructure, liberalisation of markets, greater competition, and the innovative use technology as essential. Interestingly, he highlights the general need to increase financial literacy levels to curb financial risks and manage financial benefits (Claessens, 2006: 226).

Furthermore, after controlling for income, Honohan, (2008: 2498) observes a positive correlation between greater mobile phone penetration and better institutional governance with financial access across 160 countries. His OLS regressions, incorporating secondary and primary data (MFIs, banks and household surveys), confirm negative correlations between financial access and poverty, albeit with weaker findings after multiple regressions. He concludes that the "anti-poverty potential of

financial access remains econometrically elusive." Nevertheless, the study acknowledges the potential shortfall of using different datasets due to the different data proxies used.

The on-going empirical debate identifies and analyses factors that underpin financial inclusion to inform policy change and improve financial access. It appears to oscillate between factors that promote financial depth, at the one end and those that favour financial access at the other. Nevertheless, all factors are critical for inclusive finance (see; Beck & Demirguc-Kunt, 2008: 383; Demirguc-Kunt, Beck & Honohan, 2008: 25 and Beck & De La Torre, 2007: 80). For instance, Beck, *et al.,* (2007), investigate access and use of banking services by conducting a regression analysis on bank survey data of 99 developed and developing countries. They confirm, with minor differences, the close association between financial outreach indicators and the standard determinants of financial sector depth. Likewise, the study confirms the expectation that greater outreach facilitates greater access to financial services. Regrettably however, their wide scope of study potentially poses a missing data limitation that requires validation using robustness checks (Beck *et al.,* 2007: 258).

Furthermore, Allen *et al*. (2016: 12), use a recent but more consistent dataset to conduct a comprehensive analysis on ownership and use of formal accounts. Their Global Findex database comprises of over 150 000 randomly selected adults in over 140 countries. Their study uses the Heckman-style model[1] to control for selection bias and runs alternative instrumental variable estimations to counter endogeneity. The study jointly estimates a probit selection procedure, probit model by maximum likelihood and two-stage least squares (2SLS) estimations, to analyse the influence of several physical, social-economic and psychological factors on the binary dependent variable, account ownership.

Overall, the study confirms that greater financial inclusion is associated with lower account costs, greater proximity to financial intermediaries, stronger legal rights, and politically stable environments. The effectiveness of policies to promote inclusion varies depending on the characteristics of the individuals considered. However, the

[1] Heckman (1976) Model helps in estimating regression models which suffer from sample selection bias.

likelihood of account ownership or ownership in order to save, varies positively with income, age, infrastructure development, education level, employment, marriage, strong consumer policies, and others (Allen *et al.,* 2016: 12).

Additionally, the gender variable (women or men) does not exhibit a statistically significant association with account ownership, albeit women appear to use formal accounts less frequently than men (Allen *et al.,* 2016:.16). This observation, together with findings that women access more informal credit than men (Heyer & King, 2015: 137), that women are considered active agents of change yet continue to be socially marginalised (Swamy, 2014: 3) and are predominant among the financially excluded (World Bank, 2012: 3), suggests social-economic disparities that require social-economic interventions such as financial education for women in order to overcome them. Interestingly, despite the depth in the analysis above, the role played by certain theoretically prescribed financial inclusion determinants for instance financial literacy is not categorically specified.

Notably, while several empirical studies inform policy change on the factors underpinning financial inclusion, very few or close to none (based upon the researcher's knowledge) empirically examine the role financial literacy plays (Atkinson, McKay, Collard & Kempson, 2007: 30). Arguably, the current theoretical stance on the financial literacy — financial inclusion paradigm — is merely prescriptive in the sense that while several studies recognise the role of financial literacy, very few or none provide substantive empirical evidence to prove this claim (see, Bay, Catasus & Johed, 2012; Atkinson & Messy, 2011: 664; Atkinson & Kempson, 2008: 7).

Theoretically, financial literacy promotes financial inclusion based on its ability to stimulate awareness, create demand and promote the responsible use of finance (World Bank, 2014). In fact, a World Bank global survey on consumer protection and financial literacy recognises the latter as crucial for improved efficiency, transparency, competition and access to retail financial markets, since it reduces information asymmetries and power imbalances among providers and users of financial services. Financial literacy also increases consumer confidence and reduces purchasing risk, which encourage competition and lead to cost-effective but higher quality financial products and services (World Bank, 2014: 3).

While most studies relating financial literacy to financial inclusion form part of the next chapter, it is notable that few of these studies empirically relate to financial inclusion. Rather, several emphasise the role financial literacy plays in stimulating financial awareness, promoting uptake of certain financial solutions and increasing financial education, among others. It is these attributes that purportedly stimulate financial inclusion. For instance, Xia, Wang and Li, (2014: 119); Acquah-Sam and Salami, (2013) and Cole and Shastry, (2009) investigate the influence of financial literacy on financial market participation while Johnson and Sherraden, (2007: 119) examine financial literacy and capability as barriers to the financial participation of economically disadvantaged youths in the United States (US). Alhenawi and Elkhal, (2013: 211) and Rooji, Lusardi and Alessie (2009), investigate the correlation between financial literacy and financial planning. Furthermore, Assad (2015: 114); Carpena, Cole, Shapiro, and Zia, (2011); Atkinson and Kempson, (2008: 6), explore the effectiveness of financial literacy attributes such as financial knowledge, overconfidence, and numeracy skills on financial decisions and Alsemgeest (2015: 155), outlines some pros and cons to financial literacy education, among others.

It appears from the above therefore, that a lack of financial literacy undermines the financial inclusion process, yet, for some, financial literacy education does not seem to influence financial decisions and/or the adoption of financial services (Alsemgeest; 2015: 155; Cole & Shastry, 2009: 1). Therefore, an attempt to analyse this relationship may provide a platform to inform and where necessary, correct current policies on financial inclusion.

2.6 CHAPTER SUMMARY

The discussions in this chapter anchored on the foundations of financial inclusion presented through a framework that explains the underlying demand and supply impediments to this concept. This context was necessary to (1) capture the past, present and future theoretical and policy dimensions, on efforts geared towards serving the persistently large population of the financially excluded, and, (2) situate the theoretical and where applicable, empirical context of financial literacy as a vital component to promoting formal financial inclusion.

Accordingly, global trends on financial inclusion were reviewed to indicate a significant number of the adult population without formal financial services, at the expense of a growth in the use of informal financial services. Effective theories, strategies and empirical studies were then reviewed to indicate the growing demand for ICT innovations, SMEs interventions, financial market deregulation and compliance and consumer protection and financial literacy, as some of the vital drivers to promoting financial inclusion. Incidentally, despite the growing body of literature linking financial literacy to financial inclusion, there is a paucity of empirical studies to support these claims. To this end, the following chapter takes an in-depth review on the possible causality between financial literacy and financial inclusion.

CHAPTER 3
THE FINANCIAL LITERACY - FINANCIAL INCLUSION PARADIGM

3.1 INTRODUCTION

As indicated in the previous chapter, despite the proliferation of academic discourse and policy interventions linking financial literacy to financial inclusion, there is no conclusive empirical evidence (according to the researcher's knowledge) that confirms a direct cause and effect between these two concepts. Possible alternative explanations for this vary. They include: (1) the fallacy that most financially literate individuals – as a rule of thumb, make good financial decisions; (2) the lack of an appropriate yardstick with which to measure financial literacy, (3) the possibility that financial literacy is endogenous to other financial inclusion proxies that mirror and/or suppress its intended effect, (4) the challenges involved in obtaining and analyzing subjective financial literacy data, (5) the broad dimensions in the financial literacy definition which extend from the easy-to-know financial management concepts, to broader concepts that encompass applications of personal finance behavior, and (6) the possible lag effects in financial literacy interventions whose impact may not be appraised at the point of application. Taking cognizance of the above, this review attempts to situate financial literacy in the financial inclusion paradigm to establish whether the former influences the latter.

3.1.1 Goal of the chapter

The chapter surveys the current theoretical and empirical underpinnings on financial literacy to establish their link to financial inclusion. It sets the precedent for addressing the current objective of the study, to empirically investigate whether financial literacy positively and significantly influences financial inclusion in Uganda.

3.1.2 Layout of the chapter

This chapter is structured along the sections that follow. Section 3.2 defines terms and concepts to delineate the scope of this study while section 3.3 reviews the narrow and broader definitions of financial literacy. Section 3.4 uses the current theoretical and

empirical underpinnings to discuss the interface between financial literacy and financial inclusion and section 3.5 reviews the existing approaches of measuring financial literacy. In section 3.6, a brief empirical overview of other proxies to financial inclusion is provided. Section 3.7 provides a snapshot of financial literacy in Uganda, the unit of analysis for this study and section 3.8 concludes the chapter.

3.2 A DEFINITION OF TERMS

A brief definition of terms and concepts is necessary firstly, to specify the correct meaning as applied throughout this thesis and secondly, to assist in delineating the study scope to its main objective.

3.2.1 Financial inclusion and financial exclusion

This study uses, where applicable, the terms financial inclusion and financial exclusion interchangeably, the latter being the corollary of the former. While financial inclusion refers to efforts to provide access to formal financial services and to develop individual capacities for managing such services (Arun & Kamath, 2015: 267; Allen *et al.,* 2016: 1), efforts to increase financial outreach for a population, by default, aim to reduce the number of the financially marginalized individuals within that population (Sarma, 2012: 2).

Leyshon and Thrift (1995: 312) and Kempson and Whyley (1999: 2) define financial exclusion as processes that prevent the poor and disadvantaged social groups from gaining access to the formal financial system. These authors look exclusively at financial exclusion as the starting point to combating financial inclusion since it covers the broader processes of social exclusion and explains the lack of any financial products, regardless of the reason. This aligns favorably with the intended aim of this study.

3.2.2 Financial literacy and financial capability

The progression of theoretical and empirical literature on financial literacy tends to broaden the latter's definition from simple easy-to-know financial concepts (or financial

knowledge) to broader but complex aspects that define astute financial education concepts and emphasize the application of knowledge and consistent financial behavior (financial capability).

According to Huston (2010: 296), financial literacy, financial knowledge and financial education are often used interchangeably in the literature. This hinders the adoption of a standardized yardstick for measuring financial literacy. Therefore, taking cognizance of the above, this study adopts the same stance with Huston (2010: 296) that the appropriate approach to measure financial literacy involves adopting indicators that explain the variation in the levels of financial literacy. To this end, and unless otherwise stated, this study specifically focuses on connotations that define financial literacy to delineate the scope of the study.

3.2.3 Individuals, households and firms

It is notable that while financial inclusion policies and implementation efforts focus on a domain or population, clear disparities exist in the usage and access patterns between households, individuals and firms. For instance, the requirements for obtaining financial services among firms vary considerably with those required of households and individuals due to the different structural and legal forms of these different entities.

This study delves specifically into the financial inclusion dynamics of households and individuals to capture the salient financial literacy aspects of the population and how they contribute to enabling financial inclusion. This decision is dictated by: (1) the available nature of data to be used for analysis and (2) the broader social context in which this study is based, in attempting to explain aspects of financial inclusion using the unit of analysis – Uganda.

3.2.4 Financial products and financial services

Financial inclusion defines the provision of a financial offering to the public, whether in product or service form. It is noteworthy that current literature and empirical findings use the terms financial products and financial services interchangeably due to a

common variation in the definition of a financial product or service, or merely due to personal choice. This study follows suit in generalizing these terms but stresses the view that a financial offering is met or unmet.

3.3 DEFINING FINANCIAL LITERACY AND FINANCIAL CAPABILITY

A growing body of the existing literature shows a correlation between the individual's level of financial knowledge and his/her financial behavior, such that, lower levels of measured financial literacy are often associated with lower rates of retirement planning (Lusardi & Mitchell, 2007), investment planning (Lusardi & Mitchell, 2007), stock market participation (van Rooij, *et al*, 2009), higher debt usage (Lusardi & Tufano, 2009) and others. Financial literacy acts as a principal guide to making financial decisions (Guiso & Viviano, 2015: 1347), and as a platform through which embedded financial knowledge indicators act as inputs to model the need for financial education or to explain the variation in financial outcomes (Huston, 2010: 297).

The term financial literacy has been ambiguously defined in recent times and this lack of a consistent definition and/or measure, has limited the extent to which findings from research on financial literacy can be used to track changes in financial literacy across the broader population or to evaluate the relative effectiveness of financial literacy interventions (Schmeiser & Seligman, 2013: 245).

In its broader form, financial literacy defines the ability to understand financial information and to make effective decisions based on that information (Schmeiser & Seligman, 2013: 245; Huston, 2010: 308). Financial literacy typically includes knowledge but goes further to include attitudes, behaviors, skills and the importance of decision-making, that is, applying knowledge and skills to real-life processes, with the result of improved financial wellbeing for the individual (Atkinson & Messy, 2011: 659).

Remund (2010: 284) defines financial literacy as a measure of the degree to which one understands key financial concepts and has the ability and confidence to manage personal finances through appropriate short-term decision-making as well as long-range financial planning, while mindful of life events and changing economic

conditions. Vitt, *et al*., (2005: 7) define it as the ability to read, analyze, manage and write about personal financial conditions that affect an individual's wellbeing. To them, it includes the ability to discern financial choices, discuss money and financial issues without discomfort and plan to respond competently to life events that affect every day financial decisions.

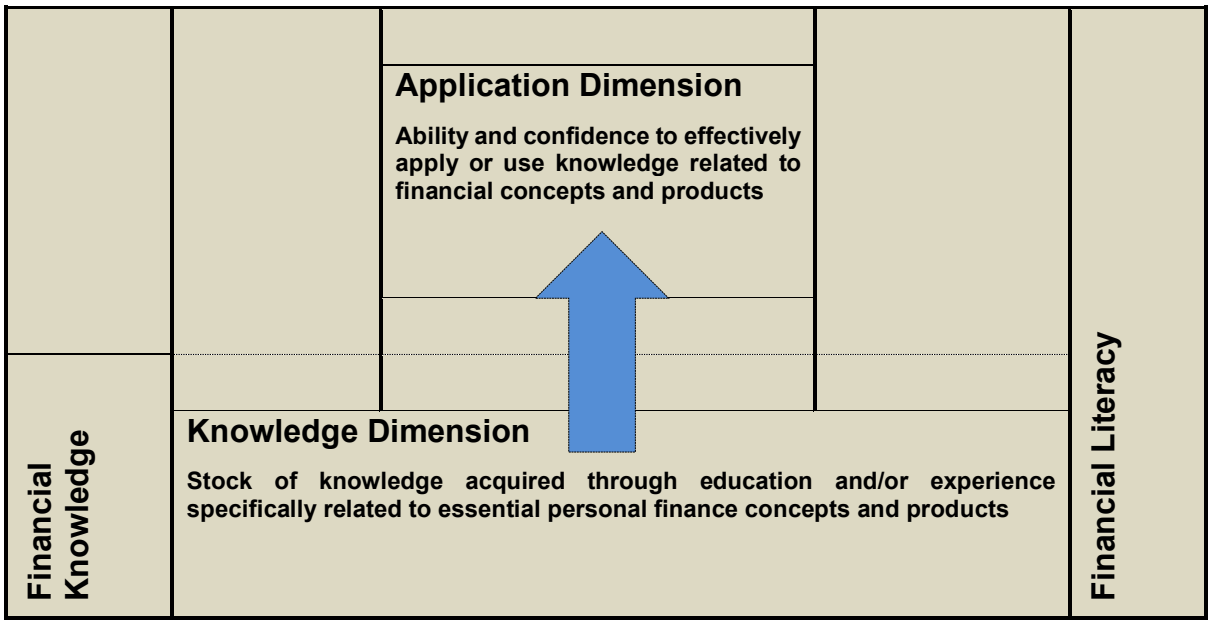
While there is clear overlap of some key-terms in the above definitions, it is evident that over time, financial literacy definitions have ranged from simplistic ones that emphasize easy-to-know financial management concepts, to complex ones that include such terms as financial education, financial knowledge, financial confidence, financial behavior, financial planning, personal finance, and others. These extensions stress not only the need for financial knowledge but also a shift in individual financial behavior (financial capability).

Additionally, literature indicates that the terms financial literacy, financial knowledge and financial education are often used interchangeably (Huston, 2010: 296; Schmeiser & Seligman, 2013: 245), and yet they are distinct but interconnected. For instance, Cole and Shastry, (2009: 2) hypothesize that financial education increases financial literacy, which ultimately affects financial behavior. Similarly, Capuano and Ramsay (2011: 32) confirm the supposition that financial knowledge is positively correlated with consumer financial behavior, and that the causality runs from knowledge to behavior. Assad (2015: 101) validates the critical role financial literacy, financial knowledge and financial confidence play in influencing financial decisions, while Robb (2012: 5) highlights the distinction between financial literacy and financial knowledge, arguing that while financial literacy involves the ability to understand financial information and to make informed decisions, financial knowledge merely involves a recall of facts. Nevertheless, several studies find causality among these terms, which directly or indirectly affects financial decisions (see Lusardi & Mitchell, 2007; Lusardi & Tufano, 2009; Cole, Sampson & Zia, 2009).

Generally, however, there seems to be no universal definition of financial literacy. The consensus among researchers is that certain common concepts typically constitute the term. According to Capuano and Ramsay (2011: 37), Huston (2010: 306), Remund (2010: 279) and Hastings, *et al.* (2013: 349), financial literacy should not only cover

knowledge about financial concepts; but the recipients of such knowledge should also apply it to their daily livelihoods to achieve financial success. Thus, financial literacy becomes the ability to understand financial terms and concepts and to skillfully translate them into behavior. The consistent application of financial behavior then constitutes financial capability. In Figures 3.1 and 3.2 below, Huston (2010: 306) contextualizes the financial literacy – financial capability paradigm.

Figure 3.1: The original concepts on financial literacy



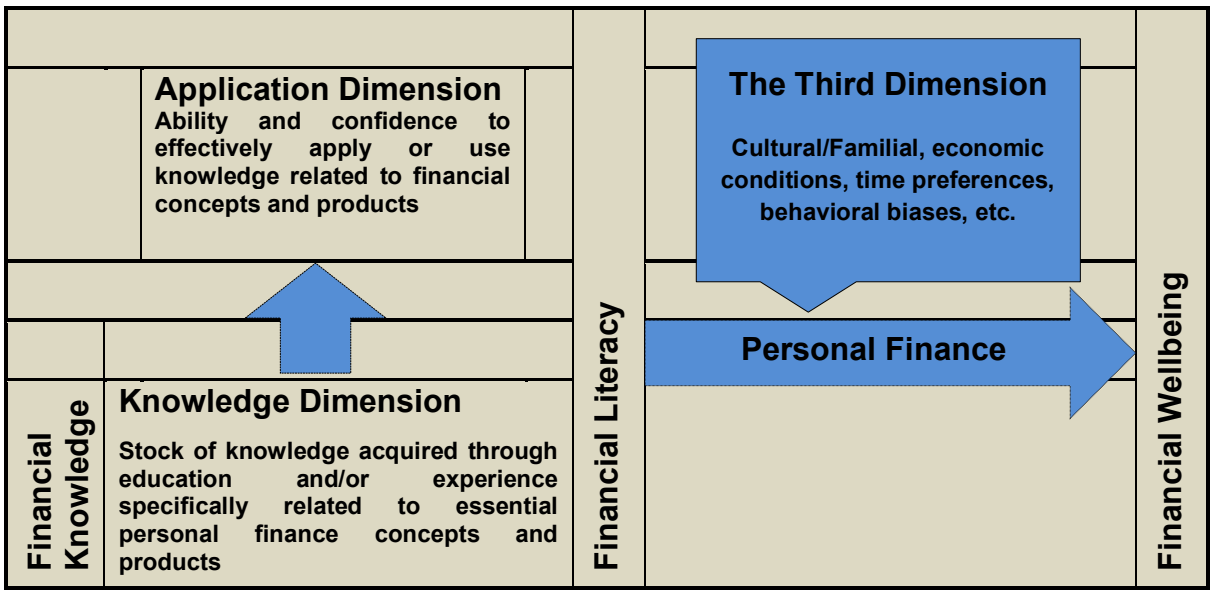
Source: Adapted from Huston (2010: 307).

In Figure 3.1 above, Huston (2010: 307) argues that financial knowledge is an integral part of but is not equivalent to financial literacy. Financial literacy must have an additional application dimension, implying that individuals must have the ability and confidence to use this knowledge to make financial decisions. This argument is consonant with that of Robb, (2012:2).

Therefore, extending the financial literacy definition further, Huston (2010: 308) asserts that while both knowledge and the application of human capital specific to personal finance may be important, the overall level of attained personal finance knowledge influences the person's financial literacy. She contends that financial literacy is a human capital attribute that can be used in financial activities to increase lifetime utility from consumption, which is, adopting behaviors that enhance financial

wellbeing. However, influences such as behavioral biases, self-control problems, family, peers, economy, community and institutions can affect this financial wellbeing. Hence, these influences must be managed simultaneously. Figure 3.2 below shows the relationship between financial knowledge, financial education, financial literacy, financial behavior and financial wellbeing as proposed by Huston (2010: 307). This defines the extended levels of financial literacy or as commonly put, financial capability.

Figure 3.2: Current concepts on financial literacy



Source: Adapted from Huston (2010: 308)

Incidentally, the terms financial literacy and financial capability are often used interchangeably yet literature proposes that they are not the same. Huston (2010: 307) and Remund (2010: 279) argue that financial literacy encompasses financial knowledge but has an extra dimension, namely application, in which an individual must have the ability and confidence to apply this financial knowledge.

Financial capability extends this definition even further and argues that knowledge and application are insufficient if they do not incorporate a behavioral component on personal finance knowledge that ensures the ultimate financial well-being of the individual (Kempson, Perotti & Scot, 2013: xii; Huston, 2010: 308; Atkinson & Kempson, 2008: 7). Financial capability is a broader definition of financial literacy, indicating advanced levels of financial literacy and encapsulating such key terms as

awareness, knowledge, skills, attitude, behaviors and financial wellbeing (Atkinson & Messy, 2011: 659). Several empirical studies agree with this extended definition of financial literacy (see: Johnson & Sherraden, 2007; Atkinson, McKay, Collard & Kempson, 2007: 29 and Atkinson & Kempson, 2008: 11).

However, it is notable that the lack of a consistent definition for financial literacy and the interchangeable use of the former with the term financial capability presents a challenge in developing a common construct for measuring financial literacy (Atkinson & Messy, 2011: 658). To this end, this study looks specifically at financial literacy and where applicable, the extended levels of financial literacy as encapsulated within the financial capability definition. Firstly, however, it is necessary to investigate how financial literacy relates to financial inclusion.

3.4 CAUSALITY BETWEEN FINANCIAL LITERACY AND FINANCIAL INCLUSION

Current literature indicates the importance of financial literacy in advancing financial inclusion yet the causality between these two terms has not yet been fully investigated. Atkinson and Kempson, (2008: 7) observe that while there is a great deal of policy interest in finding ways of establishing how individuals manage their money, this information has not always been linked to the financial inclusion literature. This section attempts to theoretically situate financial literacy with financial inclusion to set the precedent for empirically investigating whether the former influences the latter.

First, a striking finding of recent work on financial literacy indicates that individuals lack the very basic knowledge of financial concepts, which would in principle guide their financial decisions (Guiso & Viviano, 2015: 1347). This undermines collective efforts to promote financial inclusion. Policy makers need to understand how people make financial decisions and/or manage their money to ensure that their interactions with financial institutions are beneficial. Moreover, poor financial skills are often a barrier to financial inclusion, so that financial education becomes an essential component for increasing financial access (Atkinson & Kempson, 2008: 7).

Arun and Kamath (2015: 267) observe that besides providing access, financial inclusion should address factors that enable individuals to better manage their financial resources and build financial capabilities. They recognize financial literacy and consumer education as critical drivers of the broader focus on financial exclusion and the meeting of needs of the currently unbanked (Arun & Kamath, 2015: 282). Similarly, strategic approaches at national level reflect the international policy interest in financial inclusion, financial education, financial consumer protection and evidence that financial literacy and financial inclusion are associated. National policies of many countries now provide a framework for improving financial inclusion alongside financial literacy or for targeting the financially excluded within a financial education framework, since the ultimate intention of financial education for financial inclusion is to support behavior change (Atkinson & Messy, 2013: 7, 8).

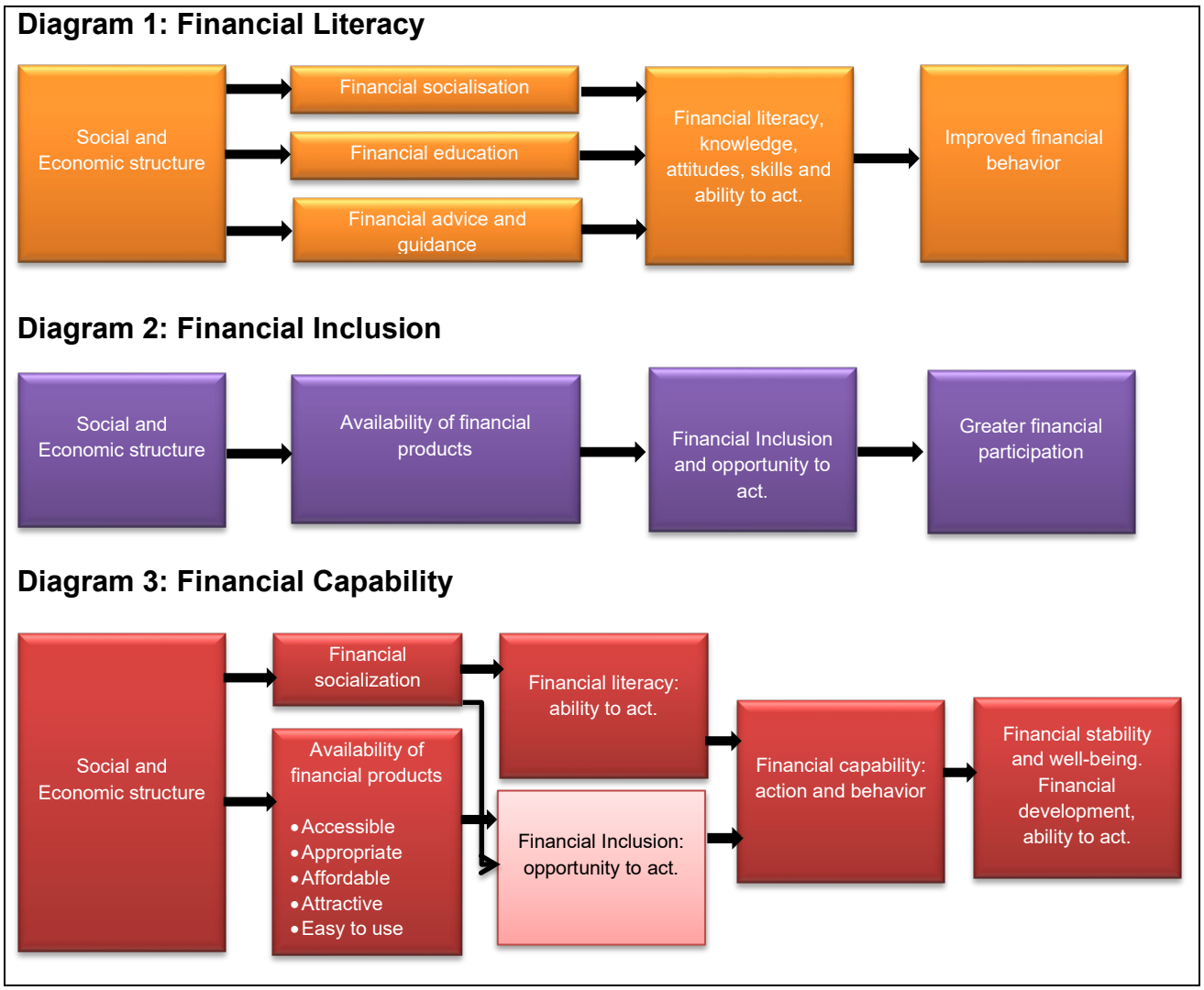
Whilst a vast body of the theoretical literature recognizes financial literacy as a critical enabler to financial inclusion, a clear-cut causality between these two concepts remains contentious empirically. Financial literacy essentially relates to an input – financial knowledge, which influences several other outputs that include, but are not limited to financial behavior (Hilgert & Hogarth, 2003), financial confidence (Xia, Wang & Li, 2014), and financial planning (Alhenawi & Elkhal, 2013). Additionally, financial literacy is itself regarded as a by-product of financial education, which invariably influences financial decisions (Hastings, *et al.,* 2013; Atkinson & Messy, 2013: 18; Huston, 2010: 308). These inherent factors seem to influence financial inclusion.

Indeed, the linkages between the above-mentioned terms and the financial literacy definition make it challenging to accurately situate financial literacy with financial inclusion and render the accurate prescription of a universally standardized measure for financial literacy inconceivable (see Huston, 2010 and Remund, 2010). To this end, several empirical studies input these terms, either wholly or partly, when constructing an acceptable measure for financial literacy and/or when assessing its possible causality to financial inclusion.

It is noteworthy, however, that the absence of optimal financial literacy attributes or adequate financial knowledge, affects individual financial behavior thereby limiting individual formal market participation (Guiso & Viviano, 2015: 1347; Hasting *et al.,*

2013). This impedes financial inclusion efforts. Atkinson and Messy, (2013:3) confirm that lower levels of financial inclusion are associated with lower levels of financial literacy. Additionally, Atkinson and Kempson (2008: 7) argue that an increased understanding of the complexities of people's financial behaviors, attitudes and skills can shed light on other aspects of financial inclusion, especially from the demand-side of financial access. Therefore, the link between financial literacy and financial inclusion is better clarified using theoretical and/or empirical underpinnings of financial literacy, its extended dimensions and how they collectively relate to financial behavior and/or financial decision-making. Sherraden (2013: 11) provides a three-diagram schematic representation of these relationships in Figure 3.3 below.

Figure 3.3: Relationship between financial literacy and financial inclusion



Adapted from Sherraden, (2013: 11)

Concisely, Figure 3.3 above indicates that knowledge, which translates into financial literacy, is critical to influencing financial behavior. Financial behavior is therefore a prerequisite for financial market participation, albeit contingent on the availability of suitable financial products. Therefore, financial literacy promotes financial inclusion by providing the knowledge, attitudes and skills necessary for individuals to engage with financial markets. Sherraden (2013: 11) argues that the combined influence of financial knowledge, attitude and skills generates financial capability, which results in individuals' ability and opportunity to act in their best financial interests to improve their financial well-being. This financial capability is regarded as an advanced form of financial literacy (see Atkinson, McKay, Kempson & Collard, 2006: 11). To this end, current theoretical and empirical discourse revolves around establishing the causality between financial literacy or financial knowledge and financial decisions or financial behavior, attitudes, and skills, which play a crucial role in explaining the dynamics of financial inclusion. The following sub-sections explore some of these areas.

3.4.1 Financial knowledge and financial literacy

Financial knowledge is a prerequisite for financial literacy and the relationship between these concepts appears to originate from financial education to financial knowledge and to financial literacy (see Alhenawi & Elkhal, 2013: 235; Huston, 2010: 308). This explains why these terms are often used interchangeably in the literature, and often to influence the same variable – financial behavior (see; Hilgert & Hogarth, 2003; McComick, 2009; Cole & Shastry, 2009; Hastings, *et al.,* 2013; Xia, Wang & Li, 2014; and Guiso & Viviano, 2015). Financial education presents the platform through which financial knowledge about financial skills such as budgeting, planning, managing credit and others is disseminated to the public. While this information does not necessarily reduce exposure towards economic shocks, it invariably equips the individual with prudent financial behavior to maximize his/her utility in financial markets (Brown, Collins, Schmeiser & Urban, 2015: 9; World Bank, 2014: 31).

Kempson *et al.* (2013: 3) observe that these concepts are crucial pieces of information that individuals need to choose the optimal allocation of consumption and savings. They note that low levels of financial knowledge are associated with poor financial outcomes albeit with scanty evidence to substantiate this claim, or even to support the

suggestion that increasing knowledge by itself improves long-term financial decision-making. They conclude that while financial knowledge is crucial, a broader definition, which addresses aspects of financial behavior (financial literacy) is necessary.

Incidentally, while these terms appear similar, they are not the same. Kempson *et al.* (2013: 3), define financial knowledge to encompass at least three different aspects that include mathematical skills (numeracy), awareness of the existence of financial products, services and institutions and the expertise required to interact with financial institutions. Conversely, financial literacy extends this definition to include the ability and confidence to appreciate financial risks and opportunities, to make informed choices, to know where to seek help and other effective actions that improve financial well-being (World Bank, 2009: 2).

An understanding of the association between these terms is particularly important because the rapid progression of financial markets with complex financial products implies that individuals can elect either to adopt or shun away from them if they do not understand or are unable to judge the quality of the financial advice provided, if any (Bucher-Koenen & Lusardi, 2011: 566). While this has implications for financial inclusion efforts, a review of the relationship between financial literacy/financial knowledge and financial decisions becomes particularly relevant for this study. It should be noted that the words financial literacy and financial knowledge are often used interchangeably (Huston, 2010: 296). In fact, Alhenawi and Elkhal, (2013: 215) examine financial literacy in terms of financial knowledge and its association with long-term planning aspects such as investing, budgeting and saving.

3.4.2 Financial literacy and financial decisions

The progression of the theoretical and empirical discourse on the association between financial literacy and financial decisions indicates a general causality between these two concepts. However, findings indicate a general lack of consensus on the direction of causality, which seems to split between what theorists prescribe and what empirical studies find (Alsemgeest, 2015: 157). Firstly, financial literacy is potentially considered an endogenous variable, which makes its assessment for causality with financial decision-making, challenging (Klapper, Lusardi & Panos, 2013: 3904). Additionally,

Guiso and Viviano, (2015: 1348) observe that while several theoretical studies document as a rule of thumb, a positive correlation between financial literacy and financial decisions, empirical identification of the same is indeterminate. These authors identify at least three reasons why this is so.

Firstly, the documented positive correlation simply represents a reverse causality in the sense that individuals with better financial decisions have a stronger motive to acquire financial knowledge. Secondly, it reflects the fact that financial literacy is not randomly distributed within the population so that high levels of financial literacy are a function of certain unobservable traits such as talent, ability and patience, which automatically lend to better financial decision-making. They observe that due to the endogenic nature of the variables predicting financial literacy, these two scenarios tend to bias the relationship upward by overstating the benefits of financial literacy so that one requires an exogenous variation in the estimation to counter this problem. Current empirical studies have not convincingly resolved this issue thus far, albeit efforts to identify other instrumental variables are underway. Lastly, the researchers opine that there are no justified benchmarks against which to measure a good or bad financial decision, implying for instance, that greater or less savings are meaningless if not compared to a set benchmark, since such benchmarks are individual specific and individual choices vary (Guiso & Viviano, 2015: 1348; Lusardi, 2012: 1; Remund, 2010: 278).

In addition, despite the proliferation of research examining this relationship, no standardized definition or measure of financial literacy exists (Alhenawi & Elkhal, 2013: 212; Huston, 2010: 296). Furthermore, current measures of financial literacy are not empirically corroborated as causal predictors of subsequent financial behavior or financial well-being (Schmeiser & Seligman, 2013: 244). However, against such a backdrop, several theoretical and empirical studies still offer plausible rationale to this relationship. First, several studies confirm that low levels of financial literacy are associated with low levels of financial decisions or poor financial decision–making (Schmeiser & Seligman, 2013: 244; Klapper *et al.,* 2013: 3904; Kempson, *et al.,* 2013: xii; Lusardi & Mitchell, 2011 and Cole *et al.,* 2009: 2). This translates into lower market participation and offers credence to the current incidence of financial exclusion

worldwide. Notably, most of these empirical studies hold conflicting views on the resulting causality of this relationship.

According to Kempson *et al.* (2013: xii) and Cole and Shastry, (2009: 1), the growing complexity of financial offerings resulting from economic development or financial inclusion efforts, restricts individuals with low levels of financial literacy from effectively utilizing financial resources, smoothing consumption over time and managing their risks. This deficiency translates into a lack of skills, attitudes, poor self-control and procrastination, which in the end create a general distrust of financial institutions.

Similarly, Cole and Shastry, (2009: 1) use an instrumental variable (IV) estimation technique to confirm that education only increases cognitive abilities which influence market participation. Their study on the correlation between education, cognitive ability and financial literacy with financial market participation deviates from previous studies by noting that financial literacy education does not seem to affect financial decisions. However, education appears to influence financial behavior through decision-making, borrowing behavior, discount rates, risk aversion and peer influence.

Conversely, Klapper, *et al.* (2013: 3904) use a 2008/2009 panel dataset from Russia to examine the influence of financial literacy on financial behavior. Their study uses an IV estimation model, incorporating a new set of instruments to control for endogeneity. They observe that even with increasing consumer credit in Russia, only 41% of their respondents understand interest compounding and only 46% of them can answer a simple question about inflation. They confirm that financial literacy relates positively to financial market participation and negatively to using informal sources of borrowing. Moreover, these authors find that financial literacy in Russia is significantly and positively related to the use of formal banking and borrowing but negatively related to the use of informal sources of financing.

Additionally, they note that financial literacy is not only low in the general population but is particularly severe among specific groups such as women, the old and pensioners as well as low income and low educational attainment groups (Lusardi, 2012). Typically, financially literate individuals, the researchers confirm, are less likely

to report negative income shocks but more likely to report a higher availability of unspent income (Klapper, 2013: 3908).

Taking this debate further, Cole, *et al.* (2011), confirm a strong correlation between financial literacy and behavior, noting, however, that financial education interventions play a modest role of increasing the demand for bank accounts only, specifically for those individuals with low levels of financial literacy. These authors provide two leading views to explain the limited demand for formal financial services. Firstly, these services are expensive and involve high fixed costs that deter low-income groups thereby forcing them to seek alternative informal services. Secondly, limited financial literacy acts as a barrier to the demand for financial services since a lack of knowledge or familiarity about formal financial products negatively influences this demand (see also Alsemgeest, 2015: 157).

This invariably explains the increasing growth of the informal financial market at the expense of the formal. Cole, *et al.* (2011) found that in 76 emerging economies worldwide, the informal market constitutes on average 36% of each country's Gross Domestic Product (GDP) and that this portion appears to increase over time. Arguably, therefore, drawing these individuals and firms into the formal financial sector would greatly counter financial exclusion.

Alsemgeest (2015: 157) justifies the importance of financial literacy to financial behavior by highlighting some merits and demerits of the former to the latter, and how they influence financial market participation. At one end, the severity of global over-indebtedness, for instance, represents, in many instances, a 100% ratio between household debt and disposable income, which implies a clear lack of astute financial knowledge and behavior. This, coupled with the proliferation of complex financial products and services, entails that some consumers are ill-prepared to make healthy financial choices to improve their financial well-being. This intricate dilemma requires an increase in consumer financial knowledge since better-informed individuals, make better financial choices.

At the other end, the relationship between financial literacy and financial behavior remains empirically contentious more so because financial behavior appears to be

influenced by some other factors outside the current domain of empirical studies. Shim, Xiao, Barber and Lyons (2009: 710) contend that a person's demography, personal values and economic socialization also impact his/her financial knowledge, attitudes and behavior and that these variables ultimately determine financial success and well-being. For instance, Sam, Geetha and Mohidin, (2012) found that family influences had a significant influence on certain financial management practices such as credit card use among young adults. Arguably, financial literacy education might not be the answer to the global personal financial crisis since everyone manages his/her finances based on personal preference and hence, applying a normative approach of 'one size fits all' could be detrimental to many consumers (Alsemgeest, 2015: 157; Remund, 2010: 310).

In conclusion, financial literacy education currently receives limited empirical support elucidating its effects on consumer confidence, general illiteracy, biases in financial decision–making and personal or emotional triggers such as self-control, frugality, wisdom and responsibility (Alsemgeest, 2015: 158). More importantly, there are persistent knowledge gaps about the "fundamental relationships between literacy education and behavior partly because researchers lack the appropriate data" (Hung, Parker & Yoong, 2009:1) In addition, "few studies have been able to construct sophisticated measures of financial literacy and definitively establish causal links between financial education, literacy and behavior" (Hung *et al*., 2009: 1). Table 3.1 below presents a primer of the empirical and theoretical literature indicating the possible causality between financial literacy/knowledge and financial decisions/behavior. Observably, despite the clear lack of consensus, some studies agree to a possible directional causality between these variables. The next section reviews the current measures of financial literacy as well as documented empirical evidence to support its link to financial inclusion.

Table 3.1 Synopsis of the causality between financial literacy/financial knowledge and financial behavior/financial decisions.

Authors	Relationship	Possible causality
Acquach-Sam & Salami, (2013)	Financial knowledge vs financial decisions	Positive
Brown *et al.* (2014: 1)	Financial literacy vs financial decisions	Positive
Alhenawi & Elkhal, (2013)	Financial knowledge vs financial decisions	Positive
Atkinson & Messy, (2013: 3)	Financial literacy vs financial decisions	Positive
Bay, Catasus & Johed, (2014: 37)	Financial literacy vs financial decisions	Positive
Carpena, Cole, Shapiro & Zia, (2011)	Financial literacy vs financial decisions	Positive
Cole & Shastry (2009: 1)	Financial literacy vs financial decisions	Negative
Klapper, *et al.* (2013: 3904)	Financial literacy vs financial decisions	Positive
Cole *et al.* (2011: 2)	Financial literacy vs financial behavior	Positive
Fernandes & Lynch, (2014: 26)	Financial literacy vs financial behaviors	Negative
Guiso & Viviano, (2015)	Financial literacy vs financial decision	Positive
Lusardi & Mitchell, (2014: 37)	Financial literacy vs Financial decisions	Positive

Source: Author's compilation

3.5 MEASURES OF FINANCIAL LITERACY

While a significant debate on the causality between financial literacy, financial behavior and financial inclusion continues, current measures of financial literacy appear to partly explain the general lack of consensus among most studies (see; Hung *et al*., 2009: 2). This section reviews the current approaches used to measure financial literacy. It begins by reviewing the current data sources applicable for measuring financial literacy and then surveys the common dimensions applicable to measuring this concept, including the supporting theoretical and empirical underpinnings.

Observably, the measurement of financial inclusion has in the past generally focused on density indicators such as bank account usage, bank branch outreach, mobile phone penetration, automated teller machine (ATMs) per capita, and others, where

the applicable secondary data sources are readily available (Demirguc-Kunt, *et al.,* 2008:4). While such data helps provide access trends on the use of financial services, it provides limited information on the behavioral user patterns that assess the socio-economic and psychological (demand-side) impediments to financial inclusion, as is arguably the case with financial literacy (see Triki & Faye, 2013: 35).

To date, the complex approach of measuring financial literacy identifies the most appropriate data source as primary data which is obtainable through active demand-side surveys. Typically, demand-side surveys summarize user information about financial offerings, while simultaneously providing a field perspective on usage patterns, as well as the underlying motivations and reasons for usage. Additionally, they can include a breadth of topics that can be analyzed simultaneously, as well as a level of depth in the questionnaire design (World Bank, 2012: 18). However, literature on financial literacy identifies at least three reasons why survey studies produce inconsistent results on the causality between financial literacy and financial behavior.

Firstly, according to Assad (2015: 114) and Hung, *et al*. (2009: 2), these surveys rarely collect enough information, implying that the obtained results are only as good as the survey design. Secondly, several surveys are not entirely representative of the population they purport to represent and/or may not be comparable across different populations (Atkinson & Messy, 2011: 13; Hung *et al.,* 2009: 2). Lastly, “a great deal of variation continues to exist in how researchers define and measure financial literacy itself” (Hung, *et al.,* 2009: 2), such that the financial literacy definition extends from simple knowledge concepts to broader aspects that overlap into aspects of financial capability and well-being. This confusion hinders the ability to design meaningful and effective consumer protection programs (Remund, 2010: 277).

Interestingly, most empirical studies attempt to delineate both their financial literacy measure and study scope to obtain plausible results (see for instance Assad, 2015; Alhenawi & Elkhal, 2013; Lusardi & Mitchell, 2011 and Cole *et al.,* 2011). It is nevertheless, the varying conceptual and operational definitions of financial literacy, together with their output measures, that continue to steer further research on financial

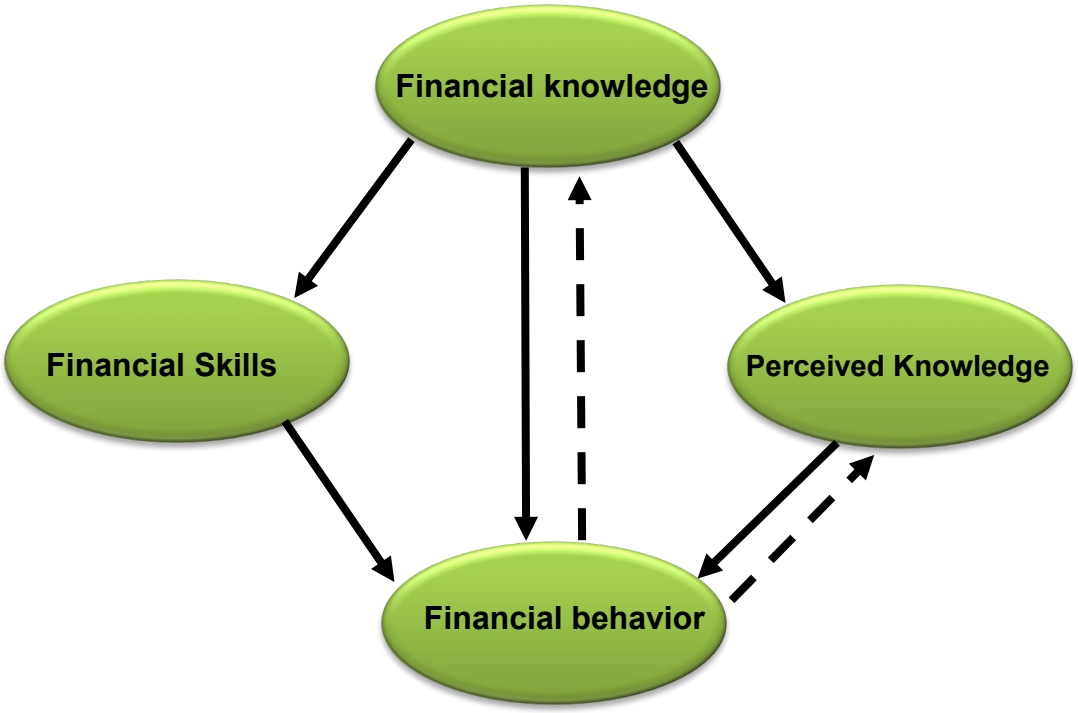
literacy. The following section looks at some common variations in the financial literacy measure.

3.5.1 Measuring financial literacy

Observably, a sufficient number of overlapping approaches apply in measuring financial literacy. These approaches stem from the perceived definition of the term itself. Huston (2010: 296) asserts that “an overview of the meaning and measurement of financial literacy is presented to highlight current limitations and assist researchers in establishing standardized, commonly accepted financial literacy measures”. Typically, to ensure comparability and consistency across the evidence base, core concepts of the financial literacy definition are usually defined. These are then operationalized to determine a composite measure for financial literacy (Hung, *et al.,* 2009: 3). For instance, Hung *et al.* (2009: 3), concisely define financial literacy as the ability to use financial knowledge and skills to effectively manage financial resources for a lifetime of financial well-being.

While, the above definition highlights concepts of knowledge, skills and financial well-being, other variations may include perceived knowledge, financial behavior, financial confidence, financial experience, cognitive abilities and others. Indeed, Huston (2010: 296) maintains that “financial knowledge indicators are used as inputs to model the need for financial education and explain the variation in financial outcomes such as savings, investing and debt behavior”. Therefore, to elaborate on the financial literacy definition and/or measures, Hung *et al*. (2009: 10) provide a conceptual model that adequately encapsulates this term and provides the building blocks for measuring financial literacy. This is provided in Figure 3.4 below:

Figure 3.4: Conceptual model of financial literacy



Adapted from Hung *et al.* (2009:10)

The conceptual model in Figure 3.4 above depicts the relationship between the principal financial literacy components. Hung, *et al.* (2009: 10) argue that financial knowledge, which represents a basic form of financial literacy, also reflects perceived financial knowledge. These two collectively influence financial skills so that financial behavior becomes a function of all three components – actual financial knowledge, perceived financial knowledge and financial skills. Furthermore, the experience gained through consistent financial behavior feeds back into actual and perceived financial knowledge, contingent on certain internal and external influences of the individual, viz: attitudes, resources and the environment.

Arguably, it is Remund (2010) and Huston (2010) who sufficiently advance the literature on translating the financial literacy definition into measurable criteria. Remund (2010: 279) splits the financial literacy definition into conceptual definitions (those that translate abstract concepts into concrete terms), and operational definitions (those that translate concrete terms into measurable criteria). Conceptual definitions define (1) knowledge of financial concepts, (2) ability to communicate about financial

concepts, (3) aptitude in managing personal finances, (4) skill in managing personal finances and (5) ability to effectively plan for the future. These concepts on financial literacy sufficiently overlap with those presented in the financial literacy model above (see Figure 3.4).

Regrettably, the process of operationalizing these concepts remains, for the most part, moot. According to Remund (2010: 285), most studies do not provide an in-depth operational analysis or a consistent operational definition for these financial literacy concepts. This makes it difficult to compare financial literacy across and within various sub-populations. Nonetheless, current research efforts attempt to address this limitation by using socio-economic data on aspects such as household income, spending habits, debt, savings, retirement planning and others. The caveat to this approach is that these measurable elements fail to accurately analyze the individual's financial literacy or the perceived sense of financial literacy since they exclude other extenuating factors such as health, number of family dependents and other life events that usually have a strong bearing on financial behavior.

Huston (2010: 298) proposes a slightly similar approach to measuring financial literacy. Her study applies a construct validation methodology to previous studies to identify common financial literacy concepts as applied to most of the studies. Essentially, the process involves: (1) defining a construct to allow for operationalization that is complete and mutually exclusive from other constructs, (2) assessing the instrument content in order to identify items that are relevant to a particular construct/concept, (3) assessing the measurement criteria of these studies, including the data collection procedures and the general wording of the research instrument and (4) coding the construct based on whether it is defined conceptually beyond the operational measure, or whether a definition is merely implied.

After assessing the construct commonalities of these studies, four main categories emerge – personal finance basics (including basic numeracy skills, time value of money, purchasing power and personal financial accounting), borrowing (behavioral use of credit cards, consumer loans or mortgages), saving/investing (saving and investing present resources for future use through saving accounts, stocks, bonds and mutual funds) and protection (using either insurance or other risk management

techniques). Studies that include all content areas are most likely to accurately assess financial literacy (Huston, 2010: 304).

Additionally, her analysis confirms (1) that the terms financial literacy and financial knowledge are often used interchangeably, (2) a general lack of conceptualization and definition of the construct financial literacy, (3) the use of measures that are not often comprehensive, and (4) the lack of a guide for measurement interpretation. To address these barriers, she argues that financial literacy should be conceptualized as having two dimensions – understanding (personal finance knowledge) and use (personal finance application) so that it is defined as measuring how well an individual can understand and use personal finance-related information (see also Figure 3.1). To conclude, she opines that clarification of the financial literacy construct should be the first step in the operationalization process so that the instrument designed to measure this construct includes both knowledge and application items (Huston, 2010: 305, 307).

Cognizant of the above, several other studies typically use a variation of the above as a framework for measuring financial literacy. Notably, these studies attempt to vary their methodologies and scope to control some of the existing inconsistencies mentioned. For instance, Atkinson and Messy (2012) measure financial literacy using data from a pilot survey on 14 OECD[1] countries. Their study uses the Statistical Package for Social Scientists (SPSS) to examine knowledge, attitudes and behavior and how they relate to various aspects of financial literacy, including budgeting and money management, short and long-term financial planning and financial product choice. Furthermore, the study captures other salient socio-demographic details of their sample, including age, gender and income, and others.

Their analysis incorporates the three following vital aspects: (1) it investigates how each financial literacy construct behaves on its own, in addition to how the three interrelate, to determine the overall measure of financial literacy; (2) it uses factor analysis to confirm whether each of the questions in the survey instrument capture the underlying phenomenon/construct. Factor analysis and equal weighting techniques

[1] Organization of Economic Cooperation and Development (OECD) currently includes 34 countries.

are also applied to create scores for each respondent and to score the constructs respectively; and (3) it assigns arbitrary scores to each construct to indicate high and low achievers thereby countering the limitation of a lack of a guide to measurement interpretation (Atkinson & Messy (2012: 18, 19).

The results indicate a general lack of financial knowledge amongst a sizeable population in all surveyed countries. Similarly, the financial behavior construct appears moderate, averaging slightly over 50% towards positive financial behavior across countries, thereby indicating a large proportion of individuals who would benefit from initiatives to improve financial behavior (Atkinson & Messy, 2012: 32). Further, the attitudes construct varies widely across countries, whilst the combined measure of financial literacy indicates an average score of 13.7 (about 60%) on a scale of zero – 22, with variations among countries.

Additionally, the findings reveal a consistently positive association between financial knowledge and financial behavior, positive attitudes and positive behavior. Financial education affects financial literacy, positive attitudes, financial knowledge, financial behavior and income positively whilst socio-demographic variations indicate that women are less knowledgeable and yet they exhibit more positive financial behavior than men do. Moreover, higher levels of financial literacy are associated mostly with middle-aged individuals than with the young and old (Atkinson & Messy, 2012: 10, 11).

Notably, while this study presents plausible advances in the measurement and application of financial literacy, it is limited in certain aspects. First, the lack of a downright standardized survey instrument implies that the findings cannot be generalized to all countries within the survey scope itself, or applied as is, to other economies outside the OECD scope (Atkinson & Messy, 2012: 6). Secondly, it is unclear what criteria were followed in assigning scores to the financial literacy constructs and/or to the combined measure itself. These limitations suggest, among other factors, that the process of conceptualizing and measuring financial literacy remains debatable. To this end, the following sub-section provides a brief overview of other similar approaches used in measuring financial literacy. It should be noted that the review is not intended to explore all possible approaches and measures of financial literacy; rather, it seeks to highlight key areas in the measurement and application of

financial literacy, to inform the appropriate conceptualization, measurement and methodology for this study.

3.5.2 Empirical studies on financial literacy

As indicated earlier, the progression of current theoretical and empirical discourse on financial literacy appears to suggest a strong correlation between the latter and financial behavior (Cole *et al.,* 2009: 6). Ideally, a positive correlation between these two concepts invariably influences the rate at which individuals adopt and use formal financial services, contingent on the availability of these services. This does not seem to be the case as evidence indicates that a significant number of the global population still shuns formal financial services. It is also noteworthy that a paucity of studies currently interrogates the causal link between financial literacy and financial inclusion. Conversely, several studies examine the causality between financial literacy and/or its dimensions, with factors that drive the demand for financial services. This review provides an exposition of some of these studies, focusing specifically on the approaches by which this term is conceptualized and measured, and how it influences behavior toward financial products and services.

One of the leading views explaining the limited demand for financial services is that financial literacy acts as an important barrier (Cole, *et al.,* 2009: 2, 7). Consequently, several current studies explore the possible links between financial literacy and financial activities that stimulate formal financial market participation. For instance, financial literacy has been linked to the following: household portfolio diversification (von Gaudecker, 2015), stock market participation (Xia, Wang & Li, 2014; Cole & Shastry, 2009), small business success (Dahmen & Rodriguez, 2014), financial decision-making (Lusardi & Mitchell, 2014; Klapper, *et al.,* 2013; Lusardi, 2012), saving decisions (Jappelli & Padula, 2013), education and economic outcomes (Hastings *et al.,* 2013), retirement planning (van Rooij, *et al*., 2009) and others.

Notably, each of these studies specifies a definition and measure for financial literacy, a scope delineating the study, and an appropriate methodology to counter common analytical inconsistencies. Similarly, most studies use primary data obtained through active demand surveys, whilst a few others use secondary data of existing surveys.

For instance, Klapper *et al.* (2013) examine the consequences of financial literacy using a panel dataset from a survey on Russia during the 2008 - 2009 financial crisis. To align with similar studies, their study measures the levels of financial literacy using the number of correct responses from a set of financial literacy questions that cover numeracy skills, knowledge about interest compounding, inflation and the use of bank accounts or formal credit (Hasting *et al*., 2013: 352). Their data also provides demographic and socioeconomic information relevant for assessing financial vulnerability among respondents.

The analysis estimates probit and logit regressions that incorporate several specifications. First, regressions are transposed whereby a dependent variable with outcomes of 2009 is regressed using 2008 values of financial literacy and other explanatory variables. This is done to control for simultaneity between financial literacy and financial outcomes, along with the potential problem of endogeneity in the financial literacy measure. Secondly, the study uses an Instrumental Variables (IV) estimation technique to assess the impact of financial literacy on financial behavior. Thirdly, to account for the unobserved heterogeneity that could affect the relationship between financial literacy and set outcomes, the analysis involves data for both years in estimating random effects (RE) and fixed effects (FE) regression models. Lastly, the analysis includes a series of robustness checks to confirm the validity of the findings (Klapper, *et al*., 2013: 3911, 3922).

Findings confirm, among others, (1) that financial literacy is significantly related to greater formal financial market participation and is negatively related to the use of informal financial services; (2) that greater financial literacy helps individuals to face unexpected macroeconomic and income shocks; and, (3) that knowledge of inflation, interest compounding and the capacity to do interest calculations, plays a pivotal role in explaining financial behavior. Summarily, they recommend financial literacy as essential for developing markets, especially concerning individual responsibility towards savings, investments and debt behavior (Klapper, *et al.,* 2013: 3923).

Using a similar approach, Cole, *et al*. (2009) investigate, through a part observational, part analytical study, whether prices or financial literacy, drives the demand for financial services in emerging markets. Their study uses standardized household

survey data from India and Indonesia to examine the relationship between financial literacy and the demand for financial products. Their financial literacy measure is like the one above albeit it includes an additional question to assess the diversification of risk. Additionally, the survey captures other household demographics such as household expenditure and cognitive abilities. Furthermore, the researchers subsequently conduct an intervention experiment to verify part of their overall findings and to assess whether financial literacy acts as a barrier to opening a bank account.

Results confirm with compelling evidence, firstly that financial literacy is an important predictor of household financial behavior and well-being in emerging economies and that efforts to expand the depth and breadth of financial systems should consider promoting it; secondly that educational programs on financial literacy have modest effects of stimulating the demand for financial services, yet, their demand is very high; thirdly that financial literacy is one of the strongest and most consistent predictors of the demand for financial services; and finally that invariably, financial inclusion is better achieved through efforts that reduce the prices of financial services, or lower the cost technological solutions such as mobile banking, than through large-scale financial literacy interventions (Cole, *et al.,* 2009: 37 – 40).

Furthermore, van Rooij, *et al*. (2009) examine the relationship between financial literacy and retirement planning among households in the Netherlands. Their financial literacy measure is similar to the one above albeit it incorporates, using factor analysis, two sets of financial literacy indices – one with very basic financial literacy questions that assess the prerequisite day-to-day financial transactions, and a more complex one that interrogates aspects related to financial instruments and the diversification of risk. Their population is segmented into education, age, gender and income, to elicit demographic and socioeconomic characteristics of the population. The analysis involves simple descriptive as well as complex multivariate and sensitivity analyses to deduce the effect of financial literacy on retirement planning.

While they acknowledge a possible misspecification of one of their financial literacy indices, thereby presenting a possible endogeneity problem, their Ordinary Least Squares (OLS) and Generalized Method of Moments (GMM) regressions confirm a strong and positive association between financial literacy and retirement planning with

the nexus of causality moving from financial literacy to financial planning (van Rooij, *et al*. (2009). Additionally, women are significantly less knowledgeable than men, while education and income vary positively and significantly with financial literacy and older individuals are less knowledgeable than younger ones. However, findings using the sophisticated financial literacy index appear to be less widespread among the population, indicating a general lack of knowledge on complex financial instruments (van Rooij, *et al*., 2009: 7, 8).

Ideally, while most studies conventionally use a set of financial literacy questions to assess financial literacy, others apply this measure more broadly. For instance, Dahmen and Rodriguez (2014) assess the impact of financial literacy on the success of 14 across-industry small businesses in the United States of America (USA). Their case study involves in-depth interviews with owners of the businesses to elicit responses from a set of financial management questions that interrogate, at one end, simple financial management skills like financial ratios, and at the other, application of these skills, by, for instance, investigating how frequently the business prepares and/or analyses its financial statements. Findings indicate a clear association between inadequate financial literacy and financial difficulties by entrepreneurs. While their sample is modest and not entirely representative, it indicates that 50% of their firms lacked the adequate financial literacy skills to successfully manage the financial affairs of their businesses (Dahmen & Rodriguez, 2014: 8).

Similarly, Atkinson and Messy (2012) broadly measure financial literacy using a series of core questions that relate to its key dimensions such as financial knowledge, financial behavior and attitudes and how these translate into financial concepts in the form of budgeting, money management, short and long-term financial planning, and financial product awareness and choice. Statistically, their methodology confirms possible correlations between these dimensions, indicating that greater financial literacy is a function of a combination of all dimensions if present in adequate measure and that they collectively influence the financial well-being of an individual (see section 3.5.1) This approach, although variant to the above, is consistent with studies that tend to broaden the financial literacy definition into dimensions that measure financial capability (see for instance; World Bank, 2013; Kempson, *et al.,* 2013; Huston, 2010 and Johnson & Sherraden, 2007).

Observably, a few consistent shortcomings are typical of most of these studies. First, as indicated earlier, there is a general variation in the specification of a composite financial literacy construct. This automatically varies the complexity of the applicable methodology and the required robustness checks necessary to validate findings. In addition, a miss-specified construct of financial literacy poses a potential problem of measurement error, which automatically leads to spurious results. Secondly, data on financial literacy is very subjective, given the observation that it is obtained from population surveys. This presents a potential problem of unobserved heterogeneity, which leads to potential endogeneity or omitted variable bias (see van Rooij *et al*., 2009: 14). Thirdly, most survey studies are not comparable across different populations mainly due to the different socioeconomic environments in which they are founded and the possible variations in the construction of the survey instrument. This survey data is limited in terms of global coverage (World Bank, 2009: 30). Fourthly, sampling approaches of most surveys do not guarantee utmost representativeness to their populations, and finally, to the best of the researcher's knowledge, none of these studies directly examines the causality between financial literacy and financial inclusion. This study attempts to investigate the possible link between these two aspects. Firstly, however, a brief overview of other demand and supply-side determinants of financial inclusion is necessary and is provided in the following section.

3.6 OTHER DEMAND AND SUPPLY-SIDE DETERMINANTS TO FINANCIAL INCLUSION

Currently, several theoretical, empirical and policy interventions to financial inclusion identify the need to address the latter through an effort equilibrium between the demand and supply-side policy interventions to formal financial inclusion (see Arun & Kamath, 2015: 279; OECD, 2013: 71; Beck & De la Torre, 2007: 79 and Classens & Tzioumis, 2006). On the one hand, supply-side initiatives address infrastructural and product/service delivery gaps that include, but are not limited to, market frictions such as transaction costs and the resulting scale economies of financial services at the level of the user, the institution and the market. On the other hand, demand-side imperatives attempt to differentiate between the economic and non-economic factors that explain possible cases of financial self-exclusion (Beck & De la Torre, 2007: 82).

Beck & De la Torre, (2007: 81) argue that:

> *"Traditionally, access problems have been defined by reference to some form of observable limitation that leads to a contrast between the active use of a given financial service (say, a loan) by a certain group, on the one hand, and the low use (or lack of use) of that service by another group, on the other hand. Thus, we talk about geographic limitations—reflected, for instance, in the absence of bank branches or delivery points in remote and sparsely populated rural areas that are costlier to service. We also talk about socio-economic limitations—when financial services appear inaccessible to specific income, social or ethnic groups either because of high costs, rationing, financial illiteracy, or discrimination."*

Broadly, therefore, supply-side determinants to formal inclusion are categorized into institutional and structural frameworks that include but are not limited to product pricing (transaction costs), technological innovations (like mobile money), consumer protection initiatives (like consumer education and protection) and the availability and/or accessibility of financial products or services, where as demand-side determinants include individual specific factors for instance income level, age, level of education, gender, cultural beliefs, financial literacy, and others. Typically, most empirical studies apply a combination of these variables to determine their influence on financial inclusion and to inform policy debates on expanding access to financial services. This study follows suit by assessing whether financial literacy plays a significant role in influencing financial inclusion in Uganda.

3.7 A SNAPSHOT OF FINANCIAL LITERACY IN UGANDA

In 2013, the reserve Bank of Uganda (BOU) commissioned a five-year financial inclusion project as part of its revised 2012-2017 strategic plan. This was done cognizant of (1) the rapid pace in technological advancement resulting in an unprecedented proliferation of financial innovations; and (2) the observation that many rural households[1] remain unbanked and depend mainly on the informal sector, in a

[1] According to the FinScope 2018 topline findings, this represents 76% (about 14.1 million individuals) of the adult bankable population of Uganda (FinScope, 2018: 6).

fragmented and unsafe environment with limited linkages. The project sought to increase access to financial services and to empower individuals to make rational decisions in their finances. It prioritized among others, (1) the strengthening of financial literacy through financial education initiatives, and (2) the strengthening financial consumer protection and promoting public awareness of consumer rights and responsibilities, to bridge the divide between financial institutions and their clients (BOU, 2013: 3; BOU, 2017: 23).

Prior to the above process, the FINLIT foundation of Uganda in collaboration with the Private Sector Foundation of Uganda (PSFU) conducted a baseline financial literacy survey on the adult population using four broad financial literacy dimensions that included money management, planning ahead, product choices and staying informed. Findings indicated that only 37.1% of the urban population and 19.6% of the rural population were familiar with available financial services and that most of this knowledge was biased toward informal and semi-formal entities. Similarly, only 26% indicated saving with 34% of them doing so informally through mobile money accounts, for instance. Additionally, only 45% of the adult population indicated that they plan for future expenses yet, over 80% of them had no plans in place for retirement. Most respondents were not familiar with financial products on the market and hence, ignorant about product choices. Interestingly, over 75% of the respondents were cognizant of the need to keep informed about financial markets yet only 39% of them tracked information relevant to their financial circumstances (FinLit, 2012)

While these values generally indicate low levels of financial literacy across the population, it is interesting to assess how such dynamics have since changed considering the above-mentioned policy interventions. Additionally, these findings were not directly linked to financial inclusion efforts in the country and hence, this study attempts to investigate whether the current financial literacy levels in Uganda have a significant impact on financial inclusion in the country.

3.8 CHAPTER SUMMARY

This chapter attempted to contextualize financial literacy within the financial inclusion paradigm. It began by defining some key terms to delineate the focus of the study.

Thereafter, it delved into the various definitions of financial literacy, observing that current theoretical and empirical literature does not definitively distinguish between financial literacy and financial capability. The review further dissected the financial literacy definition to link its dimensions to financial inclusion.

The review revealed that financial literacy attributes such as financial behavior, financial decisions, attitudes and financial knowledge, among others, play a crucial role in influencing financial market participation. The chapter then concluded by looking at the different measures of financial literacy and how they empirically influence financial choices and the subsequent adoption of financial services. These perspectives on financial literacy and financial inclusion assist in providing the framework for investigating whether the former influences the latter within the broader context of Uganda. The following chapter incorporates some of these findings to outline methodological issues.

CHAPTER 4
HYPOTHESES DEVELOPMENT AND METHODOLOGICAL ISSUES

4.1 INTRODUCTION

The preceding chapters outline the current theoretical and empirical issues underlying the link between financial literacy and financial inclusion. Central to this discussion is the observation that, firstly, there are various approaches by which these concepts are defined and quantified in practice, so that essentially, variations in definitions render it impossible to have a yardstick with which to quantify either or both these terms. Secondly, several empirical approaches have been devised to measure these concepts individually rather than as a collective. These methodologies are dictated, among others, by the availability and nature of data required for analysis, the setting within which empirical studies are conducted and consideration of several subjective variables that require robustness checks to ensure that the findings are valid and devoid of spurious results. Thirdly, and probably most important, is the observation that despite several theoretical underpinnings that link financial literacy to financial inclusion, there are currently no empirical studies that critically investigate this causality.

Against this backdrop, it is particularly concerning that several financial inclusion policy interventions today highlight the need for financial literacy programs such as increasing financial awareness and financial education in promoting, ‘ceteris paribus’, the uptake of financial products and services, yet little or no empirical evidence exists to suggest that these two concepts have a cause-and-effect relationship. On the one hand, it is logical to presume that increasing financial knowledge automatically facilitates good financial behavior. On the other, however, documented evidence indicates that even financially knowledgeable individuals fail to make rational financial decisions (see; Cohen & Nelson 2011: 3). This presumption creates a gap in the literature that warrants investigation. While credence is given to earlier research works that focus mainly on structural aspects to financial inclusion, it is interesting to examine whether financial literacy, alongside these documented supply and demand-side determinants to financial inclusion, influences the latter. This chapter looks at methodological issues., As a point of departure, it synthesizes the current research

problem, situates the research objectives and where applicable, develops testable hypotheses.

4.1.1 Goal of the chapter

This chapter discusses methodological issues that inform an appropriate empirical approach to this study. It starts by synthesizing the current problem and developing objectives and testable hypotheses. It then presents the design of an appropriate approach for investigating whether financial literacy affects financial inclusion. In addition, it delves into existing methodologies that inform the analysis of both financial literacy and financial inclusion to develop a conceptual framework that guides the model specification process. The approach involves identifying measurable indicators of financial literacy and other demand and/or supply-side indicators, which are then empirically juxtaposed against measures of financial inclusion, to gauge whether financial literacy affects financial inclusion. Finally, the chapter briefly discusses the variables identification and estimation processes, the econometric techniques to apply and the envisaged confounding issues where applicable.

4.1.2 Layout of the chapter

The chapter is structured as follows: section 4.2 re-synthesizes the problem to contextualize the study, while sub-sections 4.2.1 and 4.2.2 develop the research question, objectives and testable hypotheses. Section 4.3 discusses the specific theoretical and empirical issues on the narrower and broader definitions of the constructs of financial literacy, and how they have guided current empirical approaches. Section 4.4 develops a conceptual framework to guide the measurement of financial literacy, while section 4.5 outlines the common empirical proxies for measuring financial inclusion and its determinants. Section 4.6 addresses methodological approaches, focusing specifically on the most used to assess financial literacy and financial inclusion. Section 4.7 provides an overview of the proposed empirical approach, including the envisaged confounding issues, while the last section concludes the chapter.

4.2 THE RESEARCH PROBLEM

As earlier discussed, financial inclusion plays a pivotal role in the theoretical and empirical policy discourse on inclusive growth and economic development such that, increasing the former invariably enhances the latter. Additionally, the multidimensional nature of financial inclusion requires policy interventions that include both demand and supply-side determinants in ensuring the increased uptake of formal financial services (Mahendra, 2006: 4310). It is notable, however, that while earlier theoretical, empirical and policy discourse focused mainly on supply-side determinants whose data sources were readily available, current interventions succinctly suggest the inclusion of certain demand-side determinants, for instance attitude, behavior, financial literacy and religion, which owe to some subjectivity and whose data sources are not readily available.

For example, recent policy interventions highlight in part, the need for financial literacy through financial education initiatives, as a critical driver to financial inclusion, yet, there seem to be no studies that empirically confirm a possible causality between these two concepts. It is therefore presumptuous to conclude, as a rule of thumb, that increasing financial knowledge automatically translates into good financial behavior and hence facilitates uptake of formal financial products and services, without empirical evidence to back this claim.

Conversely, it is erroneous to undermine the role financial literacy plays considering that several findings associate, 'ceteris paribus', a lack of financial literacy or its determinants with: (1) voluntary financial self-exclusion and the growth in informal financial markets, constituted with predatory providers of financial services (Arun & Kamath, 2015: 268; Servon & Kaestner, 2008: 278; Kempson *et al.,* 2004); (2) low saving and borrowing behavior (Sayinzoga *et al.,* 2016; Sabri & Juen, 2014); and (3) poor financial planning, investments and retirement (Mouna & Anis, 2017; Bucher-Koenen & Lusardi, 2011; Van Rooij *et al.,* 2009).

To this end, it is pertinent to investigate whether these two concepts have a cause-and-effect relationship to inform, realign and where necessary, redirect policy

interventions for improving financial inclusion. This study attempts to evaluate whether financial literacy has an impact on financial inclusion using Uganda as a unit of analysis.

4.2.1 The research objectives

Considering the above, this study sought to determine whether, and to what extent, the determinants of financial literacy influence the uptake and use of formal financial products and services among the adult bankable population of Uganda. The research question formulated for the relevant research objectives was:

- To what extent do the determinants of financial literacy influence the uptake and use of formal financial products and services among the bankable population of Uganda?

Cognizant of the above, the following research objectives were formulated.

- To develop a composite financial literacy measure using data from the FinScope 2018 survey of Uganda.
- To analyze the effect of financial literacy on financial inclusion in Uganda, and,
- To analyze the effect that other demand and/or supply-side determinants have on financial inclusion in Uganda.

4.2.2 The research hypotheses

Literature on financial literacy generally supports the notion that higher financial literacy increases financial inclusion (Hsaio & Tsai, 2018; Grohmann, Kluhs & Menkhoff, 2018; van Rooij *et al*., 2009). This view manifests through studies that investigate several constructs or determinants of financial literacy and how they relate to individual financial behavior. Financial knowledge, for instance, influences personal attributes such as attitudes, awareness and cognitive abilities, which in turn affect how individuals' budget or manage their finances (Atkinson & Messy, 2012). Similarly, enhanced financial knowledge is essential for behavioral change, since increased

financial literacy training leads to enhanced financial behavior and the greater use of financial services (Sayinzoga *et al.,* 2016). Conversely, the lack of financial awareness negatively impacts market participation (Guiso & Jappelli, 2005), thereby underpinning the importance of financial literacy.

It follows, therefore, that despite related literature that reliably identifies institutional factors such as financial depth, physical proximity, transaction costs, and others (Allen *et al.,* 2016), the functioning of financial markets requires financially informed customers as well (Grohmann *et al.,* 2018: 84). This study hypothesizes that financial literacy affects financial inclusion through several determinants that define the former. The main hypotheses for this study were therefore stated as follows:

H_0: The determinants of financial literacy have no significant influence financial inclusion in Uganda.

H_1: The determinants of financial literacy significantly influence financial inclusion in Uganda.

4.3 CONCEPTUAL ISSUES IN MEASURING FINANCIAL LITERACY

As earlier indicated, there are several approaches by which financial literacy is conceptualized and measured in practice, implying that no standardized yardstick applies. Additionally, the term financial literacy is itself closely associated, and in many instances, interchanged with several other terms, for example financial knowledge, financial behavior, financial education, and financial capability and this further compound the quantification process. It is nevertheless logical to opine that these extended aspects or definitions of financial literacy constitute the components and/or the determinants of the latter.

Regrettably, most theoretical and empirical underpinnings on the conceptualization of this term remain mixed, resulting in a broader variety of construct approaches which subsequently dictate a variety of methodologies. This section delves into some of these constructs and how they influence the resulting methodology. This is meant to inform the choice of an appropriate methodology for assessing whether financial literacy influences financial inclusion.

Empirical literature indicates a few commonly applied approaches for quantifying financial literacy for analysis. These approaches take cognizance of (1) the availability and nature of the dataset, including whether the study is across countries, or is micro (at individual or household level), is a randomized controlled trial, has complete or incomplete datasets, and whether the latter is pooled or cross-sectional; (2) the purpose for which the study is designed which prescribes the number of variables endogenous to the financial literacy concept itself, and others extraneous to it; and (3) whether the dataset is primary or secondary in nature.

First, and arguably central to these observations, is that most studies are primary and use survey data obtained across several countries. These studies are commissioned, for instance, by the OECD/INFE[1] bodies of the International Monetary Fund (IMF), The World Bank, GFLEC[2], FINMARK Trust and others, who attempt to customize their instruments to evoke, as accurately as possible, responses about the levels of financial literacy among populations. The second and probably the most common occurs at the micro, country or institutional level and results from mining secondary data from existing primary databases while controlling for macro-specific economic, social and institutional factors. This approach presents a clearer depiction of the levels of financial literacy due to its ability to customize studies. While slight overlaps exist in the financial literacy constructs, marked variations occur among the applicable methodologies.

Typically, most basic studies apply a set of questions to assess financial literacy through determinants such as basic financial knowledge, numerical skills, risk of diversification and knowledge about economic concepts (see Lusardi & Mitchell, 2011; Lusardi, Mitchell & Curto, 2010; van Rooij *et al.,* 2009). Others, based on the contention that knowledge alone is passive, prefer to link the latter to behavior and decision-making (see Huston, 2010; Remund, 2010; Hung *et al*., 2009). The latter view enables a more comprehensive approach to measuring financial literacy albeit it

[1] The Organization for Economic Cooperation and Development/International Network for Financial Education
[2] The Global Financial Literacy Excellence Centre is a George Washington Business School body and one of the world's leading incubators for financial literacy research, policy and solutions envisioned with the task of ensuring that global individuals have the financial knowledge they need to participate in economies and build secure futures.

biases towards aspects that relate to financial capability (see Nanziri & Leibbrandt, 2018: 2). Nonetheless, the applicable methodologies vary considerably.

Van Rooji *et al.* (2009) use customized primary survey data to investigate the relationship between financial literacy and retirement planning. Their data enables a methodology that involves simple descriptive statistics, correlations, and regression analyses, at the one end, and complex bivariate, multivariate and sensitivity analyses, at the other. Conversely, Cole *et al.* (2009) use a random representative sample pooled from the United States Census - decennial surveys (1980, 1990, 2000), to investigate the effect of education, cognitive ability and financial literacy on financial market participation. Their large sample permits the isolation of questions related to education, race, occupation, income and the application of Instrumental Variables (IVs) and non-parametric analyses. Further analysis involves the formation and use of indices, structural equations, and linear probability models to assist in empirically confirming the hypothesis that financial education affects cognitive abilities (not financial literacy), which then influence financial market participation.

Furthermore, Nanziri and Leibbrandt (2018) use pooled FinScope[1] survey data for the 2005 – 2009 period to develop a financial literacy measure and profile the South African population. Their study develops a composite index covering two main financial literacy domains – financial knowledge and financial capability. Questions related to each of these domains are extracted and their combined responses used to obtain a financial literacy score for each respondent using the Principal Component Analysis (PCA) technique. Subsequently, the principal component weights are re-scaled through a linear transformation process to indicate the levels of financial literacy among respondents in their sample. Additional multivariate correlates are employed as robustness checks to conclude unequivocally that black people are less financially literate compared to Whites and Asians, across all specifications.

Therefore, the financial literacy definition or measure has evolved since the pioneering work of Lusardi and Mitchell (2007: 36) who simply defined it as the “knowledge of a few but fundamental financial concepts”. Recent theoretical underpinnings borrow

[1] FinScope Financial Access Surveys. http://www.finmark.org.za

from the capability theory to argue that financial literacy should encompass both knowledge and actions that accompany that knowledge (Nanziri & Leibbrandt, 2018: 2). Several studies that include Remund (2010); Huston (2010); and Hung *et al.* (2009), confirm this observation.

Remund (2010) and Huston (2010) highlight the need to not only conceptualize but also accurately operationalize the financial literacy measure, citing that knowledge is valueless without ability and skills (Remund, 2010: 283). The merits of this approach are threefold. Firstly, expressing certain concepts such as 'risk diversification', 'Inflation' and 'interest compounding' in simple terms, questions or phrases facilitates a move towards a more standardized measure of financial literacy. Secondly, it enables simple-to-understand questions that eliminate individual response bias and spurious results, and lastly, it widens the applicable coverage of the survey instrument to reach beyond advanced economies (see; Grohmann *et al.,* 2018: 86)

Against this backdrop, this study considers a financial literacy measure that captures aspects of financial knowledge but adequately merges them with decision-making and financial behavior. In this regard, and considering all possible methodological caveats, it henceforth identifies an appropriate empirical approach for investigating whether financial literacy affects financial inclusion. The following section develops a conceptual framework for measuring financial literacy.

4.4 FRAMEWORK FOR MEASURING FINANCIAL LITERACY

The empirical literature on measuring financial literacy highlights three slightly overlapping but distinct approaches. All measures observably stem from the 'depth' of the financial literacy definition itself. Similarly, this 'depth' in definition and its subsequent conceptualization prescribes the complexity of the applicable methodology. This section provides a brief comparative overview of the merits and demerits of each to guide the choice of an appropriate measure for this study.

Despite the ongoing discussions on financial literacy, it is notable that most studies focus on measuring financial knowledge and by contrast, apply a minor role to values, attitudes, behavior and a broader perspective on critical economic thinking (Silgoner,

Greimel-Fuhrmann & Weber, 2015: 35). Conversely, even the most comprehensive definition of financial literacy leaves several questions unanswered, for instance, how the different elements interrelate, and which elements contribute most effectively to decision making (Silgoner *et al.,* 2015: 36). It is plausible therefore, that current research merely attempts to find common ground in efforts to establish a standardized construct.

Ideally, the first and most common strand for measuring financial literacy deals with survey questions (open and/or closed-ended), which attempt to assess financial knowledge through an evaluation of financial concepts such as interest rates, inflation, numeracy skills, time value of money, and risk diversification – which collectively mirror financial decisions like savings and investments (Lusardi & Mitchell, 2014: 10). The proportion of correct responses are either expressed as a ratio to the total number of questions (Klapper, Lusardi & van Oudheusden, 2016: 7), represented as a ratio to the population or weighted to form a financial literacy index which is then used to investigate the distribution of scores in a study, as being synonymous with the level of financial literacy (Nanziri & Leibbrandt, 2018: 2). This approach is common to several studies, for example Sayinzoga *et al.* (2016); Schmeiser and Seligman (2013); Hastings *et al.* (2013); van Rooji *et al*. (2009); Cole *et al.* (2009); Lusardi and Mitchell (2006). A variation in questions is also common and is widely accepted since the pioneering works of Lusardi and Mitchell (2006). This approach is merited for its simplicity and it is well established in providing an international benchmark for other studies (see Silgoner *et al.,* 2015:36; Lusardi & Mitchell, 2011). Nonetheless, it has certain limitations.

Firstly, Silgoner *et al.* (2015: 36) argue that often, the validity of the questions used is doubtful in the sense that, albeit they cover knowledge, they are not necessarily indicative of a respondent's capability to make sound financial decisions. Hung *et al.* (2009: 7) for instance, posit that numeracy skills apply more broadly than to financial matters alone and represent a much more basic skill-set – one closely aligned to general cognitive abilities. Hence, they postulate a need to keep them distinct from financial literacy. Secondly, the survey instrument is often limited in its ability to make cross-country comparisons that extend in scope to capture socio-demographic and economic characteristics beyond developed economies (Atkinson & Messy, 2012: 16)

and lastly, the approach is limited in its effort to capture other desired behavioral capabilities (Hastings *et al*., 2013: 355).

The second strand interrogates personal attributes that influence financial knowledge such as attitudes, behavior, cognitive abilities and other social dynamics, for example education, age and gender (Silgoner *et al.,* 2015: 37). Atkinson and Messy (2012: 6), for instance, investigate financial literacy using such elements as financial knowledge, behavior and attitudes, and how they relate to financial decisions like budgeting, money management, short and long-term financial planning and financial product choice. Their approach develops a financial literacy score by determining the number of correct responses as a ratio to the population. While this strand appears to ameliorate the first, it does not explain how financial literacy elements interrelate and/or which element contributes most to effective decision-making (Silgoner *et al.,* 2015: 36).

The third strand fairly aligns with the above albeit it investigates the link between financial knowledge and behavior (Silgoner *et al.,* 2015: 37). Atkinson and Messy (2012: 10), for instance, confirm that respondents with greater financial knowledge exhibit competent financial behavior. Other similar approaches interrogate financial literacy as it relates to retirement planning - van Rooij *et al.,* (2009); debt Lusardi & Tufano (2009); formal market participation Klapper *et al.,* (2013); demand for financial services Cole *et al.,* (2009); portfolio diversification von Gaudecker, (2015); and individual savings habits Mahdzan & Tabiani (2013) among others.

The observable overlaps among these approaches suggest that: (1) each ensuing approach attempts to improve the former in enabling the standardization of a financial literacy measure; (2) measures of financial literacy should include other domains beyond financial knowledge like attitudes, behavior, cognitive abilities and others (Nanziri & Leibbrandt, 2018: 5); (3) a wide variety of well-phrased questions is necessary to capture salient aspects to other domains of financial literacy, reduce question complexity which creates ‘noise’ in survey responses and adapt the instrument to a wider demography (van Rooji *et al.,* 2009: 16, 18; Atkinson & Messy, 2012: 6; Schmeiser & Seligman, 2013: 245); and, (4), that the question as to whether a standardized financial literacy construct or measure exists is moot.

Against this background, this study adopts a measurement framework that attempts to incorporate elements of financial knowledge and financial behavior. First, the proposed model is adopted cognizant of the available secondary data to facilitate the empirical analysis process. Secondly, it lends itself to studies by Schmeiser and Seligman (2013), Huston (2010), Remund (2010) and Hung *et al.* (2009), who provide unique but overlapping conceptual and operational approaches to measuring financial literacy, while controlling for some of the confounding factors mentioned above. Thirdly, the model's construct and subsequent measurement are embedded within an acceptable composite definition provided by the OECD, which loosely states as follows:

> *Financial literacy is the measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through the appropriate short-term decision making and sound, long-range financial planning, while mindful of life events and changing economic conditions (Remund, 2010: 284).*

According to Huston (2010: 306) and Remund (2010: 279), measuring financial literacy commences with the conceptualization and definition of the term itself. Thereafter, the conceptual definition is operationalized. Remund, (2010: 279) adds that conceptual definitions explain abstract terms in concrete terms, while operational ones translate these terms into measurable criteria. He identifies five conceptual definitions common to the literature that include: (1) a knowledge of financial concepts; (2) ability to communicate financial concepts; (3) aptitude in managing personal finances; (4) skill in making appropriate financial decisions; and (5) confidence in effectively planning for future financial needs (Remund, 2010: 279). In his opinion, knowledge drives aptitude, which in turn influences how one manages money, so that, knowledge is worthless without applied experience (Remund, 2010: 284).

Notably, these concepts are sufficiently captured and embedded in Huston's model for measuring financial literacy. According to her, financial literacy is better conceptualized and measured using concepts from personal finance literature, which are generally viewed in two dimensions, namely understanding personal finance knowledge and applying it (Huston, 2010: 305). While these two dimensions fairly

encapsulate the definitions identified by Remund (2010) above, they also align with those provided by the United States President's Advisory Council on Financial Literacy (PACFL) which contends that a financially literate person should have the following attributes: (1) specific financial knowledge, (2) the ability and skills to apply that knowledge, (3) perceived knowledge, (4) good financial behavior, and (5) financial experiences (Hung *et al*., 2009: 5). Generally, the ability to have and apply financial knowledge towards achieving financial well-being is behaviorally based and practically relevant for assessing financial literacy (Hung *et al*., 2009: 11).

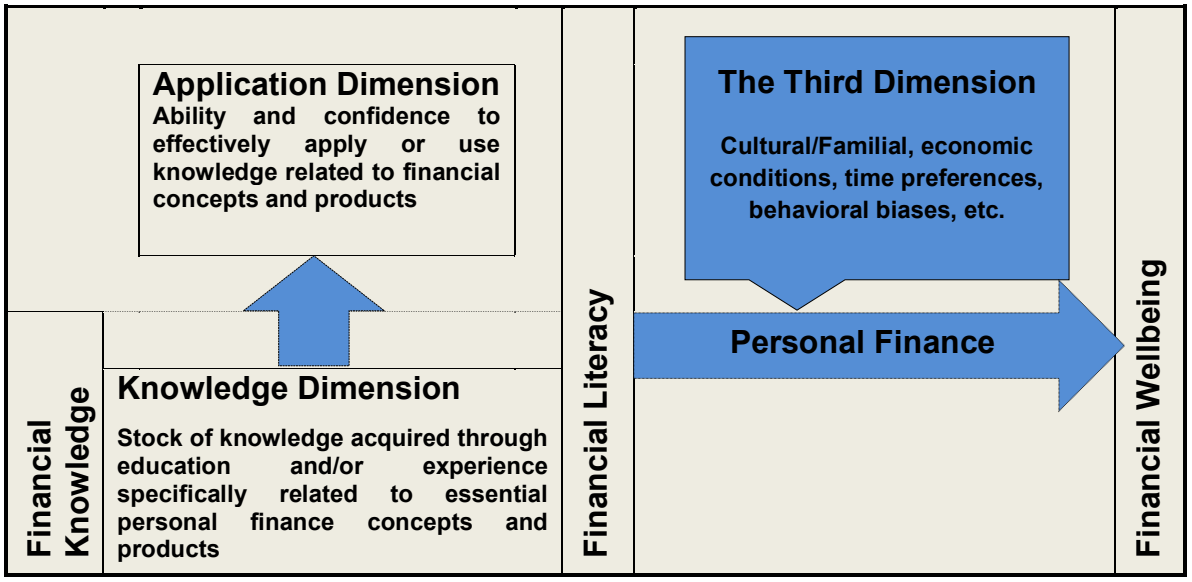
Furthermore, Hung *et al*. (2009: 5) assert that ordinarily, financial literacy is operationalized using one of the following three strategies. The first is through performance tests which are usually knowledge-based and reflect conceptual definitions. The second is through self-assessments which evaluate perceived knowledge and confidence in that knowledge. These are normally limited by the fact that perceived knowledge might not always equate to actual knowledge. The third is through questions that interrogate financial behavior using financial and/or non-financial content domains like savings, investments, and debt, among other decision-making practices (Hung *et al.,* 2009: 8).

This study adapts the latter approach, due mainly to the nature of the data available for analysis, but also from the observation that it inclines towards financial behavior and financial decision–making as opposed to knowledge about financial concepts. The proposed framework by Huston (2010) and supported by the OECD (2013: 52), Atkinson and Messy (2012) and Atkinson and Kempson (2008), highlights a knowledge about financial concepts but emphasizes personal finance knowledge and decision-making which are arguably good attributes of financial literacy. The model is depicted in figure 4.1 below.

In Figure 4.1 below, Huston (2010: 308) contends that financial literacy is a human capital attribute that should be defined and measured by how well an individual understands and uses personal finance-related information. She argues, for instance, that albeit one may lack numeracy skills as a critical literacy enabler, available tools such as calculators and computer software programs compensate for such

deficiencies. She concludes that eliciting information about personal finance behavior is more appropriate than focusing on numeracy skills (Grohmann *et al*., 2018: 93).

Figure 4.1: Framework for measuring financial literacy



Source: Adapted from Huston (2010: 308)

Furthermore, knowledge about financial concepts is not synonymous with financial literacy; rather, it is a component thereof, so that knowledge provides the basis upon which one can enhance their financial literacy, through the application of concepts. Other externalities such as behavioral or cognitive biases, self-control problems, family, peer pressure and others, affect financial behaviors and financial well-being and determine, how, for example, one prepares a budget, saves or invests. She suggests, in conclusion, that a financial literacy measure should include both knowledge and application items and that it should cover the following four main content domains known in the literature – basic financial concepts, borrowing concepts, saving/investment concepts and protection (financial planning) concepts.

Following this approach, this study adapts and uses four personal finance content domains as suggested by Atkinson *et al.* (2007: 31) to measure financial literacy. These domains investigate financial behavior as it relates to *managing money, planning ahead, choosing financial products and staying informed.* These four domains sufficiently encompass the four content domains as suggested by Huston (2010) and yet contain the capacity to evoke varied responses based on the greater

number of items (questions) that can be included in each domain. This increases not only the reliability of the results but ensures that a construct domain is exhaustively defined (Hung *et al.,* 2009: 21).

For instance, the *managing money* domain seeks to investigate the respondents' level of knowledge and understanding about financial products/services and their skills at managing money (Fanta, Mutsonziwa & Naidoo, 2016: 6). This includes, for example, their ability to keep track of finances and plan for unpredictable future expenses. *Planning ahead* assesses whether individuals can meet major expenses without borrowing and whether they plan to cover for the unexpected loss of income. This aspect favorably aligns with savings, investments and retirement planning. *Choosing financial products* measures whether respondents seek to get the best value for financial products and whether they seek financial advice in the process, while *staying informed* evaluates whether respondents are abreast with factors that impact their finances, for example interest rates, inflation, transaction costs, and other economic effects. It also investigates whether they are familiar with what is happening in their financial markets (Atkinson *et al*., 2007: 31).

While this approach sufficiently overlaps all conventional financial literacy constructs, it has two caveats, namely that it has hitherto applied mainly to measuring financial capability and that it inclines towards the measurement of skills, attitudes, and behavior or perceived knowledge, as opposed to conventional measures that assess actual financial knowledge. While these limitations are debatable, it is apparent that firstly, the two terms (financial literacy and financial capability) overlap significantly and are often used interchangeably Secondly, there is a general movement towards an extended concept of financial literacy that encompasses behavior and the interaction of knowledge, skills, and attitudes (Kempson *et al.,* 2013: xiii). This justifies the choice of approach.

Therefore, although several approaches for measuring and operationalizing financial literacy apply, the one by Huston (2010: 308) is an appropriate one for this study. Her approach initially specifies the identification and isolation of at least three strongly linked items/questions (to each factor domain), from an instrument, since fewer than three items may be deficient in capturing the breadth of human capital specifically

related to personal finance. Thereafter, factor analysis is applied to reduce a large number of related variables (dimensionality rich data) into smaller or latent factors, which generate new variables. Responses from the latter are then rated either using a threshold or ranking approach to develop an index reflecting the level of financial literacy of a respondent.

However, since the current study investigates the possible link between financial literacy and financial inclusion, it is likewise necessary to review methodological issues on the proxies for measuring the latter and how they relate to other common determinants. This enables the identification of any pros and cons among the different methodologies and any possible caveats and/or confounding factors that result from applying one proxy over another. As indicated earlier, it will ultimately guide the choice of proxies as well as an appropriate methodology, cognizant of the available secondary data for analysis. The following section focuses on these issues.

4.5 MEASURING FINANCIAL INCLUSION

Although different proxies for measuring financial inclusion exist, they are neither uniform in method, nor do they all necessarily align with the intended focus for this study, particularly because they cover divergent views. These proxies range from indices at one end, to measures of financial depth, inclusiveness, and access to financial services, at the other. First, it is evident that while financial literacy measures are quite subjective, measures of financial inclusion follow a rather objective approach. The latter are generally guided by physical or tangible attributes that are easily obtainable and quantifiable. Conversely, measures of financial literacy are guided by factors that are susceptible to some ambiguity and are difficult to quantify. Secondly, it is only recently that databases on financial literacy have taken root, while there have been copious amounts of data available on aspects of the financial sector, including several cross-country indicators on outreach and access dimensions to financial inclusion (Beck *et al.,* 2009: 122).Thirdly, measures of financial inclusion have often been linked to the supply-side of financial markets, interrogating aspects of financial infrastructure and legal background, among others, as opposed to the demand side which investigates the more intangible aspects of individual behavior, financial skills and attitudes (Grohmann *et al.,* 2018: 84). Therefore, the review hereunder identifies

the most commonly used proxies, the rationale behind their choice and their concomitant methodologies, to guide the choice of an empirical approach for this study.

Grohmann *et al.* (2018: 86) identify the four main financial inclusion proxies common to the literature that measure access to and use of financial services. These include: the proportion of adults who own a bank account at a formal financial institution, including mobile money accounts *(formal account)*, the proportion who own a credit card *(formal credit)*, the proportion who used their bank account to save in the past 12 months *(formal-use saving)* and the proportion who used their credit card during the past 12 months *(formal-use credit)*. Most studies employ either or all the above, contingent on the aspects under investigation and this consequently influences the 'depth' of their empirical approach of choice.

For example, Grohmann *et al.* (2018) apply all proxies while investigating the causality between financial literacy and financial inclusion across 143 countries. Their dataset allows for simple correlations and OLS regressions (with robust standard errors), for ease of interpretation. Additionally, they employ IV methods and fractional response regressions as robustness checks to confirm the stylized fact that higher financial literacy is systematically related to better financial inclusion at a country level, even after controlling for potentially confounding supply-side factors like GDP per capita, education, and financial infrastructure.

Conversely, Fungacova and Weill, (2014) use *formal account, formal-use saving and formal credit* as their proxies to investigate the determinants of the financial inclusion amongst the Chinese population. Their probit estimations using Global Findex data confirm that income, education, gender and age influence the use of formal accounts. Furthermore, Honohan (2008) applies OLS regressions using one proxy (formal account), to investigate the cross-country variation in household access to financial services, focusing on determinants such as ATM geographical coverage and GDP per capita, among others. Sarma and Pais (2011) develop a financial inclusion index to investigate the latter's link to financial development, while Jones (2008) applies only *formal credit* and *formal saving* proxies to design a credit unions' financing model for extending financial services to low-income communities in Britain.

In essence, the choice of a financial inclusion proxy appears to depend on several aspects that pertain to a particular study and include: (1) the nature of the data available for analysis, (2) the defining objectives for the study, (3) several confounding factors that may be endogenous or exogenous to the study and (4) the robustness checks necessary to corroborate the results.

This study adopts the proportion of adults who own an account with a formal financial institution *(formal account*) as the overarching proxy for measuring financial inclusion. This decision is limited by the nature of the available dataset since all other financial inclusion proxies (mentioned above) are not entirely representative of the Ugandan population and could result in spurious results (see appendix A) Secondly, the decision is supported by the observation that financial inclusion exists to attract the previously unbanked. Efobi *et al.* (2014: 5), argue that without access barriers, societal forces in the form of public enlightenment, and incentives should promote the individual use of formal accounts. Thirdly, “having a bank account is the basis for a large number of financial transactions and it makes the holding as well as handling of money easier and safer” (Grohmann *et al.,* 2018: 86).

Therefore, the main strand of analysis in this study investigates the ‘access to finance’ aspect of financial inclusion to gauge whether financial literacy encourages the uptake of financial products and services (Fanta *et al.,* 2016: 14). While this measure partially covers the financial inclusion definition, it nonetheless assumes that an individual owns an account for personal use and such access to formal financial services is particularly relevant for this study. It is hypothesized that financial literacy will positively influence the adoption of formal financial products and services since a good level of financial knowledge is needed for sophisticated financial decision-making (Grohmann *et al.,* 2018: 86; Klapper *et al.,* 2013).

The following section reviews methodological issues on other supply and demand-side determinants to financial inclusion. This is followed by a description of the empirical approaches for investigating whether financial literacy affects financial inclusion in the context of Uganda.

4.5.1 Other determinants to financial inclusion

Empirical literature identifies several determinants that influence financial inclusion and manifest as observable drivers or limitations to the active use of financial services, on the one hand, or the low use (or lack thereof), on the other hand (Beck & De La Torre, 2007: 81). These determinants universally align into demand or supply factors whose overarching dimensions further sub-divide into three general sub-categories that include socio-economic, physical infrastructure and financial infrastructure factors (Sarma & Pais, 2011: 620). This review identifies those variables that associate — with some degree of significance — with financial inclusion and/or financial literacy, since such consideration is necessary to control for any covariates or confounding variables that could bias the outcomes of this study. It is noteworthy, however, that identifying these variables requires careful deliberation since there is a paucity of empirical studies that relate financial literacy to financial inclusion.

Grohmann *et al.* (2018: 87) identify and control for a set of variables that have been shown to relate to financial literacy. These are grouped into financial infrastructure variables, institutional variables, and country-specific variables. Their study uses GDP per capita to control for income levels and controls for educational level using dummies that group respondents into secondary and tertiary education clusters. Furthermore, 'access' is controlled using the bank-branch penetration per 1000km^2 proxy, while legal compliance and the ease for doing business are controlled using indices that measure 'strength of legal rights' and 'business freedom', respectively (see also Allen *et al.,* 2016; Fungacova & Weill, 2012: 12).

Regrettably, most factors of empirical significance associate with financial inclusion rather than with financial literacy, arguably because financial inclusion plays a pivotal role in inclusive development while financial literacy purportedly enhances the former. Sarma and Pais (2011: 621-623) identify income, employment, inequality and literacy as socio-economic variables, while proximity, information technology (ICT) and media, specify physical infrastructure variables. Also, the health of the banking sector, ownership structure, interest rates, transaction costs, and others, control for financial institutional variables.

Furthermore, socio-demographic variables constitute another group of variables that influence studies on financial literacy and financial inclusion. Factors such as age, gender, marital status, religion, and culture are often represented as dummies to appraise the distinguishing characteristics within a variable. For instance, the gender variable is included in a study as a dummy equal to one (1) to represent female respondents and zero (0) to represent the male gender, while age may be represented as *Age* to denote a particular age bracket or Age^2 to capture the possible nonlinearity effects in the relationship between age and financial inclusion (Fungacova & Weill, 2012: 12).

Essentially, there is a lack of consensus about the appropriate set of control variables necessary to investigate the impact of financial literacy on financial inclusion. This is mainly due to a paucity of studies that specifically relate these two concepts. At the one end, studies investigate financial inclusion with commonly recognized determinants, mainly from the supply-side, while at the other, studies on financial literacy do not necessarily relate to financial inclusion. Therefore, to counter this limitation, the current study (1) identifies and applies the most commonly used, but robustly significant proxies from earlier studies; (2) applies the latter cognizant of the data available for analysis; and, (3) controls for any confounding effects to isolate the effect financial literacy has on financial inclusion, if any. Details of these variables are included under the empirical specification section in the following chapter. First, however, this study explores some of the applicable methodologies for measuring the effect of financial literacy on financial inclusion. These are provided below.

4.6. METHODOLOGICAL APPROACHES

Several key approaches apply to measure the link between financial literacy and financial inclusion. However, the choice of one depends on the available dataset and the intended scope or objectives of the study. Accordingly, the current study identifies logistic and probit regressions as the two applicable methodologies to apply, cognizant of the following observations. Firstly, the envisaged study is cross-sectional and applies cross-sectional data. Secondly, the study investigates one unit of analysis, Uganda. Thirdly, it attempts to data-mine information from existing databases, to

extract meaning, and, lastly, it follows several empirical studies that apply and use either or both of these methodologies when assessing the relationship between a categorical response variable and one or more independent variables (Levshina, 2015: 253). This is the case with assessing financial inclusion and meeting the objectives of this study. A brief review of each of these methodologies given below.

4.6.1 Logistic regressions

Logistic regressions help to determine the relationship between a categorical response (dependent or dichotomous) variable and two or more explanatory variables (Levshina, 2015: 253; Brace, Kemp & Snelgar, 2013: 340; Kleinbaum & Klien, 2002:5). This technique is popular in probabilistic multifactorial models that explain and predict the choice between two or more variants based on conceptual, geographic, pragmatic or social factors, whereby, two categorical outcomes imply that the logistic regression model is binomial or dichotomous (Levshina, 2015: 253). Likewise, the measurement of financial inclusion or broadly, the uptake of financial products and services, is viewed in a probabilistic manner where an individual, based on certain underlying factors, may opt to adopt or reject a financial offering. In such cases, the logistic regression computes the log-odds that a particular outcome will prevail to establish, for instance, whether an individual adopts or declines the offering (Brace *et al.,* 2013: 341).

For instance, Efobi *et al.* (2014: 6), Sarma and Pais (2010: 621), and others use logistic regressions and specify their financial inclusion measures to take the binary form of (1) *individual has a bank account* or (0) *otherwise,* to capture the uptake of financial services based on certain underlying variables. Efobi *et al.* (2014: 6) affirm that a logistic regression model based on marginal effects is suitable to measure such relationships. They assert that the estimation technique follows a probabilistic statistical classification model that helps to predict the outcome of a categorical dependent variable if the latter takes on the binary form of (0) and (1). In addition, the technique is a partial derivative of the independent variables and explains the discrete change in each variable as the difference in their predicted probabilities.

For the current study, the primary advantage of applying a logistic model is firstly that it suitably aligns with the anticipated empirical design and will assist in answering the research question. Secondly, unlike other approaches such as discriminant analysis, this approach does not prescribe many assumptions for loading predictor variables (Levshina, 2015: 271). Nonetheless, the approach is not without any confounding issues that require noting.

To begin with, the predictive power of the model depends primarily on the choice of a correct set of independent variables. This stresses the need to identify the correct regressor covariates. Furthermore, logistic regressions require that each data point is independent of all other data points. When observations relate, the model tends to overweigh the significance of those observations (Levshina, 2015: 271). This alludes to potential problems of multicollinearity and endogeneity. Efobi. *et al.* (2014: 7) consistently apply correlation analysis to underscore and remedy any potential bivariate relationships among variables. Similarly, the problem of endogeneity which arises when either of the independent variables correlates with the error term, due to an omitted variable or unobserved heterogeneity, is remedied using IV estimations, the Two-Stage Least Squares (2SLS) approach and the Heckman-style correction model (Grohmann *et al.,* 2018: 92 and Allen *et al.,* 2016: 20).

Lastly, while logistic regressions attempt to predict outcomes based on a set of independent variables, most logit models are vulnerable to overconfidence. The model appears to have more predictive power than it should, due to sampling bias. Consequently, it overstates the accuracy of its predictions (Harrell, 2015: 72). This limitation is controlled by evaluating the model in terms of two components: reliability or calibration (Pearce & Ferrier, 2000).

4.6.2 Probit probability regressions

Several studies on financial inclusion and financial literacy use probit regressions as their predictive form of analysis. These include Allen *et al.* (2016), Fungacova and Weill, (2015), Beck *et al.* (2011), Lusardi *et al.* (2010), van Rooij *et al.* (2009), and others. As with logistic regression models, probit models prescribe a means for

measuring financial inclusion by estimating the likelihood that an event or outcome will occur based on certain underlying factors.

Essentially, both methods meet the maximum likelihood estimation criterion under the random sampling parameter and can accommodate continuous and/or discrete characteristics in their models. Additionally, the random sampling precondition for data permits the use of ordinary least squares (OLS) regressions on the dependent and predictor variables, which produce consistent and unbiased estimations (Wooldridge, 2010: 470, 562). In general, both models have the advantage of applying a functional form that transforms data into a non-linear relationship thereby providing a more efficient estimation.

However, there are subtle differences between these two methods. First, these models differ by how they define their functional forms. The logit model uses the cumulative distribution function (cdf) of the logistic distribution, while the probit model uses the cdf of the standard normal distribution. Nonetheless, both functions will rescale any number to fall between 0 and 1. This implies that both models produce similar albeit not identical results and hence, their interpretations tend to vary (Wooldridge, 2010: 566 – 567). Therefore, in the interest of robustness and constancy, it would be interesting to investigate whether either of these approaches provides similar results on the effect of financial literacy on financial inclusion within the context of Uganda. The following section provides an overview of the proposed empirical approach for this study.

4.7. OVERVIEW OF PROPOSED EMPIRICAL APPROACH

Taking cognizance of the above, this section provides an overview of the envisaged empirical approach for investigating whether financial literacy affects financial inclusion within the context of Uganda. It synthesizes the sections above to provide a synopsis of the proposed empirical approach for the study. Details pertaining thereto are provided in the ensuing chapter on research design and statistical methods.

The proposed methodological approach for the study is structured into three main parts that summarily include: (1) data sourcing, the conceptualization and

measurement of proxies to be used in the study, (2) specification of a suitable model or models depicting the link between financial literacy and financial inclusion and (3) The choice of statistical methods as guided by the discussion on methodological issues above.

The approach commences with the process of identifying suitable questions and the data from the FinScope Uganda (2018) questionnaire and dataset. These are used to construct a financial literacy index and/or partial indices (domains), measures for financial inclusion and other covariates to include to the envisaged model. Secondly, the approach specifies a model for measuring the effect of financial literacy on financial inclusion, and finally, the proposed statistical approaches and envisaged confounding issues are highlighted and addressed. As already indicated, these issues are covered in detail in the ensuing chapter. The section ends with a brief discussion of the anticipated confounding issues and suggested test for robustness.

4.7.1 Confounding issues and tests for robustness

In conclusion, and to the researcher's knowledge, this study is one of the pioneering efforts to investigate the effect of financial literacy on financial inclusion at a micro or country level. The only other notable but similar study by Grohmann *et al.* (2018) investigates the influence of financial literacy on financial inclusion for 143 countries globally. Unlike the latter, this study applies cross-sectional data from the FinScope survey on Uganda in 2018. Additionally, it applies a variation of several diagnostic empirical approaches as presented in prior literature, cognizant of the available data for analysis and other country-level limitations.

The study borrows from existing empirical literature, to mitigate and remedy for anticipated analytical limitations such as endogeneity bias, multicollinearity and model misspecification, among others, which potentially undermine the validity of the results. Additionally, the study applies one measure of financial inclusion and specifies both logistic and probit regression to account for robustness.

4.8. CHAPTER SUMMARY

This chapter presented the main methodological issues relating to the empirical approach of investigating whether financial literacy has an impact on financial inclusion in the context of Uganda. This effort was directed towards informing an appropriate methodological approach for the study which is detailed in the ensuing chapter on research design and statistical methods.

The chapter commenced by re-visiting the research problem, study objectives, and hypotheses, to underpin the relevance of the study. It was noted that there is a dearth of empirical studies that specifically relate financial literacy to financial inclusion, thereby providing the motivation for the study. To this end, the chapter conceptualized and suggested an approach for measuring this relationship. Details are provided in the ensuing chapter on research design and statistical methods.

CHAPTER 5
RESEARCH DESIGN AND STATISTICAL METHODS

5.1 INTRODUCTION

This chapter presents the applicable research design and empirical analyses for investigating whether financial literacy influences financial inclusion in the context of Uganda. It proceeds from earlier chapters which; synthesize the theory and evidence applicable to the demand for, and access to financial services (chapter 2), examine the financial literacy – financial inclusion paradigm (chapter 3), and discuss the conceptual and methodological issues on the possible causality and measurement of financial literacy and financial inclusion (chapter 4) .Briefly, the chapter describes the data sources including the questionnaire design, the sample and population, measures of financial literacy, financial inclusion, and other control variables, the model specification process, the applied statistical methods, and the necessary empirical diagnostics.

The study acknowledges that while several empirical studies appear to separately analyze financial literacy and financial inclusion, they collectively inform an acceptable measurement of the variables, in addition to suggesting appropriate statistical methods for investigating the possible causality between these terms. Accordingly, since the study data mines secondary information from the FinMark Trust[1] database, a significant portion of the chapter is devoted towards elaborating the approaches used to quantify these variables and, financial literacy.

5.1.1 Goal and layout of the chapter

In presenting the applicable research design and statistical methods, this chapter is structured as follows: Section 5.2 presents the research design, while sub-sections 5.2.1 and 5.2.2 describe the data sources, the questionnaire design, the data

[1] FinMark Trust (SA) is a non-profit organization which seeks to promote global financial deepening and regional financial integration by obtaining demand-side data on several countries in Africa and Asia. One of its major intermediaries – FinScope, conducts surveys on access and usage of financial services in several African countries including Uganda.

collection methods, and the population and sampling techniques. Section 5.3 elucidates the measurement of financial literacy while 5.4 depicts the measurement of financial inclusion and other control variables. Section 5.5 presents the model specification and estimation processes using binary logistic models, while 5.6 describes the applicable robustness checks. Section 5.7 discusses the confounding issues and model limitations of the study while the last section concludes the chapter.

5.2 THE RESEARCH DESIGN

A quantitative or positivist research design was chosen for this study, premised on the observation that it predominantly applies scientific methods of inquiry. Positivist research reflects the need to examine the causes that influence outcomes through a discrete set of variables that inform the hypotheses and research questions of the study. The approach involves a careful observation and measurement of the objective reality as it exists, to either support or refute existing theory and make policy recommendations where applicable (Creswell, 2003: 7). Similarly, this cross-sectional empirical study used a variable quantification approach with the appropriate statistical controls to investigate the possible influence of financial literacy on financial inclusion, using Uganda as a unit of analysis.

5.2.1 Data sources and collection methods

The study extracted and built on primary data obtained from the FinScope Consumer surveys commissioned by FinMark Trust (FMT) South Africa. The latter is an independent non-profit organization, funded by the DFID[1], whose role is to advance financial markets for the poor by promoting financial inclusion and regional financial integration. This is achieved through the creation and analysis of consumer financial services data, which provides in-depth insights into the served and unserved communities across the developing world. In addition, it seeks to promote systematic financial sector inclusion by overcoming regulatory, supplier and other market-level barriers hampering the effective use of financial services (FinMark Trust, 2019).

[1] DFID: Department for International Development resident in the United Kingdom.

This FinScope database remains the most comprehensive demand-side instrument of its kind with surveys conducted in over 30 countries in the SADC[1] region, West and East Africa, Asia and beyond. Its benchmark surveys comprehensively explore financial inclusion as it relates to individual attitudes, behavior and social demographics, implying the former's acceptability in countries where surveys are implemented. In addition, per country data can be disaggregated into livelihoods, youth, gender, rural or urban, the poor, informal segments, and others, to provide insights into the specific issues affecting a population (FinMark Trust, 2019).

The current study used secondary data from these surveys due to the above-mentioned reasons and other qualifying attributes, some of which are that the surveys: (1) are nationally representative in reflecting how individuals source and manage their finances; (2) are highly credible in establishing benchmarks on financial inclusion and financial literacy; (3) inform and guide policy interventions by providing insights into market obstacles to growth and/or highlighting opportunities for policy reforms and product innovation; (4) allow for cross-country comparisons on several aspects relating to financial market trends and financial inclusiveness; (5) are consistently reviewed and appraised to obtain the recent market and consumer trends; (6) are country-specific and therefore provide data that can be disaggregated to, for instance, inform and address specific demographic challenges (FinMark Trust, 2019).

In principle, Finmark Trust (SA) conducts consumer surveys every few years to capture the recent trends on the demand, access, and use of financial services. In Uganda, the FinScope Consumer Surveys were conducted in 2006 (FinScope I), 2009 (FinScope II), 2013 (FinScope III) and more recently, FinScope IV which was conducted in 2018. The latest study, which formed part of current study, was funded by DFID through a partnership with Financial Sector Deepening Uganda (FSDU), the FinScope Secretariat and Steering committee, Bank of Uganda (BOU), the Uganda Bureau of Statistics (UBOS), Yakini Development Consultancy (SA) and IPSOS Uganda who conducted the fieldwork and data collection processes.

[1] South African Development Community (SADC) member states include 16 countries mostly from the Southern, Central and West African regions of Africa.

The FinScope IV survey sought to (1) track the overall financial inclusion trends in the country since 2007 and to benchmark these findings with other countries within the region; (2) provide insights that could be utilized at both policy and market levels in order to further deepen financial inclusion; and, (3) describe the financial service needs of the adult bankable population (individuals 16 years or older) in Uganda. Consequently, the questionnaire designed by Yakini Development Consultancy (SA) Limited, covered a broad scope of questions ranging from individual demographics to money-generating activities and expenditure, cash flow and risk management, savings, borrowings, payments and knowledge about financial products/services and service providers (FinScope, 2018).

5.2.2 Population and sampling statistics

The 2018 sample and data on Uganda were drawn, validated and weighted by the Uganda Bureau of Statistics (UBOS). This process involved a three-stage stratified sampling approach to arrive at a representative sample of individuals aged 16 years and older. During the first stage, geographic representation was ensured in which a sample of 320 enumeration areas (EAs) was selected using a probability proportional to size (PPS)[1] approach that ensured national, regional and rural-urban representativeness. The second stage involved the random selection and demarcation of 10 households from each EA, while the third sampled one adult, 16 years or older, from each of the selected households, to conduct the face-to-face interview (FinScope, 2018: 5), using a semi-structured questionnaire (see Appendix A).

This process ensured that the survey results could be disaggregated by region and location (rural or urban), as well as by demographic attributes such as gender, socioeconomic classification, and income-generating activity. The study targeted 320 EAs accounting for 3200 respondents and achieved 316 EAs amounting to 3002 respondents. This represented a 94% response rate. After weighting, the FinScope data represented an adult bankable population of 18.6 million individuals, representing

[1] With the PPS sampling approach, the probability of sampling an enumeration area is directly proportional to the population residing in that area.

approximately 43% of the total population[1] of Uganda (FinScope Uganda, 2018: 5). This is a robust nationally representative individual-based sample of Ugandan adults with probable access to, and the option to use financial services. Moreover, the data is statistically reliable since it was weighted and validated by UBOS. Finally, permission to access the survey questionnaire and accompanying data were granted through an ethical clearance application process to the University of South Africa, FinMark Trust (SA) and FSDU. Such approval is included as Appendix B.

5.3 MEASUREMENT OF THE STUDY VARIABLES.

The FinScope 2018 survey questionnaire of Uganda was designed to align with the OECD/INFE (2011) core questionnaire for measuring financial literacy, the OECD/INFE (2015) toolkit for measuring financial literacy and financial inclusion and the OECD/INFE (2016) international survey of adult financial literacy competencies. The last three provide a guiding framework on how similar studies should structure and measure these variables. As such, the current study referred to either of them in guiding the measurement of financial literacy and financial inclusion.

This semi-structured questionnaire captured responses on biographic information, expenditure, cash flow management, risk management, savings, borrowings, payments, knowledge about financial products and financial service providers, among others. The questions sought to assess an individual's awareness, knowledge, skills, and behavior in enabling sound financial decision-making and ensuring financial wellness as embedded in the OECD (2005) financial literacy definition. Specifically, they interrogated a mixture of attitudes, knowledge, and behavior as manifested in how one keeps track of their finances, makes ends meet, plans for the longer term (retirement saving) and chooses financial products (OECD, 2015: 5). This approach appears to set the current precedent for measuring financial literacy, mainly because it allows for the collection of internationally comparable data and the benchmarking of financial literacy across countries (OECD, 2016: 5; OECD, 2015: 5; FinLit, 2012: 4; Atkinson & Messy, 2012 and Atkinson & Kempson, 2008: 11). The following sub-

[1] The Uganda Bureau of Statistics (UBOS) estimates the population of Uganda at slightly over 43 million individuals in 2018 (UBOS, 2019).

section elaborates on this approach as the study's guiding framework for measuring financial literacy.

5.3.1 Measuring financial literacy

A financial literacy measure was constructed based on four main financial literacy domains as documented by OECD (2015: 5); Atkinson and Messy (2012); FinLit (2012) and Kempson (2009), and as explained in section 4.4 of this study. These are *money management, planning ahead, choosing financial products and staying informed.* The study distilled each of these domains before extracting from the questionnaire, items pertinent to each domain to construct a composite financial literacy measure. It was of note, that the selected questions/items elicit desirable financial literacy behavior since the objective of the study was to establish whether financially literate individuals incline towards the use of formal financial products and services (Atkinson & Kempson, 2008: 26).

5.3.1.1 Money management

The *money management* domain sought to measure respondents' ability to manage money (Remund 2010: 280). It explored how organized an individual is at paying bills, keeping and using financial records, as well as budgeting for lumpy and unexpected expenditure (FinLit, 2012: 4). Typical questions under this domain interrogated the day-to-day financial decisions of individuals either to save, budget or meet daily expenses (Atkinson & Kempson, 2013: 15; Atkinson & Messy, 2012: 25; Remund, 2010). Table 5.1 below shows the questions identified under this category:

Table 5.1: Money Management

Question	Theme	Sources
E2	Responsible in making household decisions	OECD (2015:15), OECD (2016)
E6 (E6.1, 6.2 and 6.3)	Keeping track of finances	OECD (2016: 87); Kempson, (2009: 20)
E7 and E8	Making ends meet	Atkinson & Messy (2012: 29); Kempson (2009: 20)

Source: Author's compilation

5.3.1.2 Planning Ahead

This domain measured an individual's ability to cope with unexpected events as well as plan for the future. It investigated whether one plans for unexpected events, by among others, putting aside substantial savings using the various financial products and services available. In addition, it evaluated whether such efforts are enough to cushion against unexpected events. Furthermore, it assessed how individuals plan for their retirement and whether such plans are enough to afford them a decent lifestyle then (FinLit, 2012: 4). Atkinson and Kempson (2008: 31) define this domain as planning for security and risk in which significant short-term goals such as buying a car or planning a wedding, and long-term goals, for instance retirement planning and insurance, are considered. Table 5.2 below identifies the questions included in this category.

Table 5.2: Planning ahead

Question	Theme	Sources
D9.1	Short-term planning	Kempson (2009)
E11	Long-term planning	Kempson (2009), OECD (2015:18)
F1.1	Attitude towards saving	Kempson (2009)
F1.3	Attitude towards saving	Kempson (2009)
F1.4	Knowledge about saving	Kempson (2009)
F1.5	Knowledge about saving	Kempson (2009)
F9.1	Investments (risk)	Kempson (2009)
F9.3	Investments (risk)	Kempson (2009)
G1.1, G1.2	Borrowing (impulse questions)	Kempson (2009)
J3`	Insurance (risk)	Kempson (2009)

Source: Author's compilation

5.3.1.3 Choosing financial products

The *choosing financial products* domain of financial literacy measured whether individuals adopt and use the different financial products and services on the market and whether they, in the process seek professional advice before making such decisions and compare the costs and benefits of each to assess and identify risky

ones (FinLit, 2012: 4). Atkinson and Kempson (2008: 34) contend that this domain closely relates to financial inclusion since it highlights a lack of trust in financial institutions due, among others, to an insufficient supply of the appropriate financial services, barriers in communication and/or a lack of financial capabilities. They assert that the appropriate use of financial services reflects safer saving practices with reputable institutions and minimizes over-borrowing. The following questions were selected under the domain.

Table 5.3: Choosing financial products

Question	Theme	Sources
E4.1	Seeking financial advice	OECD (2015: 15); OECD (2016)
E5	Seeking financial advice	Kempson (2009)
F1.3	Informed choices	Atkinson & Kempson (2008: 34)
G1.1	Borrowing (Impulse question)	Atkinson & Kempson (2008: 34)
G1.2	Saving/Borrowing (Impulse)	
G8	Exploring product options	FinLit (2012 :4); Kempson (2009: 6)
J3	Adverse expenditure shocks (Risk)	Atkinson & Kempson (2008: 31)

Source: Author's compilation

5.3.1.4 Staying informed

This domain attempted to establish whether respondents feel the need to keep abreast with what is happening in their financial markets and investigated the different methods they use to obtain this information. It interrogated respondents' self-reliance (personal access and interpretation of information) and/or the use of third parties in making financial decisions. It also highlighted one's ability to seek redress for poor or unprofessional product or service offerings (FinLit, 2012: 5). As with *choosing financial products,* this domain closely aligns with financial inclusion since it reflects an individual's attitude towards the adoption of financial products and services. Atkinson *et al.* (2006: 21) ask respondents whether they keep abreast with financial developments within their economy and how often they monitor key indicators such as inflation and interest rates. Also, they inquire whether respondents keep track of, and adopt new products or changes to existing ones and whether they seek advice or

redress in case a product offering falls short of their expectations. The following questions were selected under this domain.

Table 5.4: Staying informed

Question	Theme	Sources
E4.1	Seeking financial advice	Atkinson *et al.* (2006)
F1.4	Tracking interest rates	Atkinson *et al.* (2006)
F2	Financial literacy	Atkinson *et al.* (2006:112)
F9.3	Inflation tracking	Atkinson *et al.* (2006)
F20	Tracking product development	Atkinson *et al.* (2006:21)
G8	Interest rate tracking	Atkinson *et al.* (2006)
G14.2, G14.3,	Tracking product development	Atkinson *et al.* (2006)
H1.3	Tracking product development	Atkinson *et al.* (2006)
H1.6	Tracking product development	Atkinson *et al.* (2006)

Source: Author's compilation

5.3.2 Developing a composite financial literacy measure

As indicated above, financial literacy, like other broad and abstract concepts, cannot be measured directly; rather, a key set of manifestations underlying this concept, are measured. Moreover, financial literacy is not limited to one specific area of behavior or knowledge but spans different domains. It is debatable, therefore, whether a single standardized measure of financial literacy is ultimately possible or whether the latter is best evaluated using each specific domain (Kempson *et al.,* 2013: 17; Zakaria & Sabri, 2013: 199). To this end, the current study attempted to: (1) develop individual respondents' scores based on each of the financial literacy domains listed in section 5.3.1 above and assessed their influence on financial inclusion in Uganda and, (2) constructed a composite financial literacy measure computed as a respondent's combined score of all the four domains above, and likewise assessed its impact on financial inclusion in Uganda, if any.

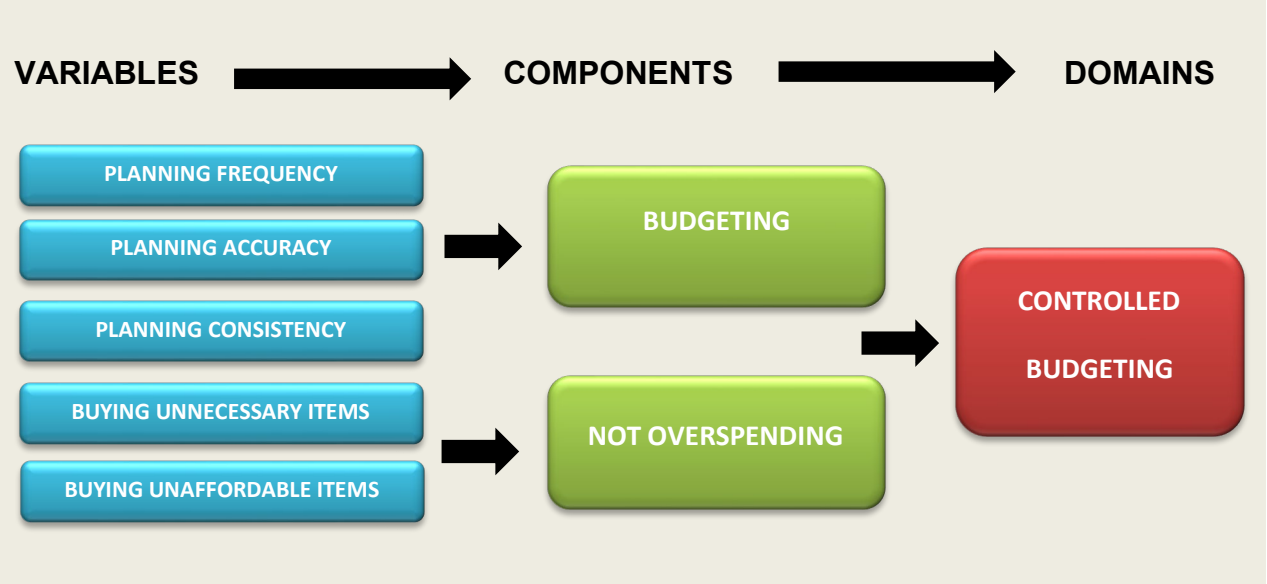
The study incorporated guidelines on measuring financial literacy from the OECD/INFE (2016) international survey of adult financial literacy competencies, Kempson *et al.* (2013), Atkinson & Messy (2012) and Atkinson & Kempson (2008).

This process was threefold. First, for each variable/item, the study allocated a score of one (1) and zero (0) otherwise, to each financially savvy or correct individual response following the approach by OECD (2016) and Atkinson and Messy (2012). Then, it applied Principal Component Analysis (PCA) to the variables in each domain to reduce the dimensionality of the data and identify the principal components or latent factors of each. Finally, a component score was determined by re-scaling these responses between the extremes of 'financially savvy' individuals, at the one end, and 'financially incapable' individuals, at the other. It was the combination of these component scores that constituted a financial literacy domain, while a combination of the latter constituted the composite measure of financial literacy (see Kempson *et al.,* 2013: 58). These processes are detailed below.

5.3.2.1 Principal Component Analysis (PCA)

PCA was applied to the set of questions in each domain to extract those that capture the underlying concept about the domain and exclude those that do not. The technique analyzed the correlation matrix of variables in the questions' dataset and extracted groups of variables that are explained by the same unobserved underlying concept. These components became the empirical counterparts of the manifestations of financial literacy, particular to that domain (OECD, 2016: 50; Atkinson *et al.,* 2013: 58 and Atkinson & Messy, 2012: 18), and were easier to analyze (FinLit, 2012: 5). Atkinson, *et al.* (2013: 62), provide an illustration of this procedure in which, for instance, all variables relating to planning expenses are grouped under the same component —budgeting — while those about buying frequency are grouped under the overspending component. This process is depicted in Figure 5.1 below.

Figure 5.1: Data dimensionality reduction using factor analysis



Source: Atkinson *et al.* (2013: 62).

Secondly, output from the PCA was used to create a score for each component of financial literacy. Atkinson *et al.* (2013: 58) indicate that this score is computed as the weighted sum of the variables within that group of components. The analysis constructs a score S_c for each component C of financial literacy given as a linear combination of the (standardized) variables $V_1 \ldots V_2 \ldots V_k$ contained in the dataset and have a common correlation matrix $\sum$. The model equation is depicted as follows:

$$S_c = W_{c1}\frac{V_1 - \mu_1}{\sigma_1} + W_{c2}\frac{V_2 - \mu_2}{\sigma_2} + \ldots\ldots W_{ck}\frac{V_K - \mu_K}{\sigma_K} \qquad (5.1)$$

Where:

c denotes the component of financial literacy containing variables (V)

S_c denotes the overall score of the component

W denotes the weights which are currently unknown

μ and σ denote the mean and standard deviation of the variables V

The principal advantage of PCA is that the weights attributed to each component are calculated rather than predetermined and represent the relative importance of each component to financial literacy. Additionally, PCA captures all the variance in the

variables and is the most adequate technique when measurement scales are not yet validated (Atkinson *et al.,* 2013: 59; Kempson, 2009: 25). Finally, the overall measure of financial literacy allows for the disaggregation of data into age, gender, education, and others, to enable demographic analysis.

5.3.2.2 Scoring financial literacy

As mentioned in section 5.3.2, the study measured financial literacy by assigning standard scores to the 'financially savvy' responses of individuals. This decision was informed by several reasons. First, the questionnaire layout provided questions with differing levels of importance necessitating some level of scoring (Kempson, 2009: 25). Second, this study was premised on investigating whether financial literacy influences financial inclusion in Uganda, thereby justifying the need to score the former. Third, the approach was partly guided by Kempson (2009: 25) who asserts that some form of response-scoring is essential when measuring a set of internationally comparable core questions on financial literacy, regardless of the size and/or nature of a survey.

Nevertheless, factor analysis provides the ideal approach for scoring large survey questions due to its ability to correlate and measure some underlying concept or factor, thereby isolating fewer variables out of a diverse dataset. However, it is not without limitations. For one, its data requirements limit the use of nominal variables (those that cannot be ordered), since creating an arithmetic score requires responses that indicate a right or wrong answer. Therefore, both methods (factor analysis and data-scoring) are invariably considered ideal for the analysis of large datasets (Kempson, 2009: 25, 26).

Accordingly, the current study adopted a data scoring approach proposed by OECD (2016: 88) as an ideal method for measuring financial literacy. This framework specifies scores for financial literacy and financial inclusion and is considered relevant to the most recent surveys on the same. Additionally, it applies to studies that attempt to elicit responses on individual behavior, knowledge, and attitudes, as was the case in this study (OECD, 2015; Kempson, *et al.,* 2013; Atkinson & Messy, 2012).

Essentially, with financial literacy, a score of 1 (one) is allocated to every correct response and a score of 0 (zero) otherwise. Responses on financial behavior are scored with a point of 1 (one), for every 'financially savvy' response, or zero otherwise. Scaled and/or categorical responses are likewise treated as such for every astute financial decision (for instance, options a, b, c d, and e, maybe allotted 1 point if considered 'financially savvy' behaviors) and 0 (zero) for all other cases, and so on. Ultimately, a financial literacy score is obtained as the sum of scores from each of the domains and may vary depending on the number of principal components or questions in each domain. This value is then normalized and re-scaled to a percentage value for each respondent, for analytical purposes (OECD, 2016: 89).

Kempson *et al.* (2013: 61) suggest that once PCA identifies a group of variables as loading on the same financial literacy component, a single score can be calculated for each individual concerning that component by weighting each variable by the coefficients obtained through the analysis. However, due to the limited range of observed variables, which limits the range of component scores, the latter are alternatively rescaled between extremes of responses, of a 'financially incapable' person (who would then obtain zero) to those of a 'financially savvy' individual (who would score 100). The rescaling formula is provided below as follows:

$$S = \frac{100(S-a)}{(b-a)} \tag{5.2}$$

Where:
S is the original component score
a is the minimum score, and,
b is the maximum score.

5.4 PROXIES FOR FINANCIAL INCLUSION AND OTHER REGRESSORS.

Following the above, the current study identified and extracted a measure of financial inclusion (identified in section 4.5) from the FinScope 2018 consumer survey on Uganda. The semi-structured questionnaire (Appendix A) captured biographic data on age, gender, level of education, employment, income, marital status, and others. This was done in addition to aspects on financial literacy, for instance spending habits, use

of mobile money, remittances, borrowings, savings and general attitudes or perceptions about money. Therefore, to specify a model for investigating the link between financial literacy and financial inclusion, the study identified and extracted several covariates that have been empirically linked to the latter. The choice of these control variables was underpinned by empirical postulations as evidenced by recent research on financial inclusion (see section 3.6) and by the availability of the data. Accordingly, their *a priori* expectations are included. The study applied PCA to identify and include only those control variables that reliably influence financial inclusion, have usable data and enhance the robustness of the applicable models.

PCA is a variable reduction technique that maximizes the amount of variance accounted for in a large set of observed variables, into a smaller group of variables called principal components. It is applied to enhance the degrees of freedom (*d.f*) of the main variable under investigation (Munongo, 2019: 106), and to control for chances of multicollinearity by dropping variables that could affect the regression analysis (Greene, 2008: 61). The PCA process is fourfold and includes: (1) generation of the correlation matrix of the variables, (2) partition of the variance into commonalities, (3) extraction of initial component solution (eigenvalues) and (4) rotation and interpretation (Munongo, 2019: 106; Gujarati, 2011: 79). Table 5 below shows the extracted proxies, their source questions, and *a priori* expectations respectively. It is important to highlight, that empirical findings concerning the variables, may not conform to their *a priori* expectations because of the sensitivity of the regressions, the nature of the data, and/or the choice of proxies chosen to represent them.

Table 5.5: Study proxies, their source questions, and a priori expectations

Variable	Proxy used	Source from Fin Scope Uganda (2018) survey	Expected sign
Financial inclusion (FI)	Bank account ownership (including mobile money accounts)	K1	+/-
Financial literacy	Financial literacy Index	Constructed using PCA	(+) Grohmann *et al*. (2018); Nanziri & Leibbrandt (2018); Arun & Kamath (2015); Cole *et al.* (2010).
Age	Respondent's age	C7	(+) Overall financial inclusion increases with age (Allen *et al.,* 2016: 17)
Gender	Respondent's gender	C8	(+) Common to the male gender, Zins & Weill (2016); Swamy (2014)
Income	Respondent's monthly income	D8	(+) Zins & Weill (2016); Arun & Kamath (2015)
Education	Respondent's educational attainment	C10	(+/-) Allen *et al*. (2016); Zins & Weill (2016); Atkinson & Messy, (2013)
Marital status	Respondent's marital status	C9	(+) For married couples or divorced individuals, Allen, *et al.* (2016); Monticone (2010)
Employment	Respondent's employment status	D3.1	(+) Arun & Kamath (2015)
Household location	Location of dwelling (rural/urban)	HH serial number	(+) Common to urban dwellers, Allen *et al.* (2016)
Informal financial services	Use of informal financial services	KML2	(+/-) Johnson (2016)

Source: Author's compilation.

5.5 MODEL SPECIFICATION AND ESTIMATION

As indicated in the preceding chapter, the current study applied a binary logistic regression model to examine the effect financial literacy has on financial inclusion in Uganda. This decision was informed by some observations. Firstly, there is a paucity of studies specifically investigating the causality between these two concepts (Grohmann *et al*., 2018; OECD, 2015; Atkinson & Messy, 2013). Nevertheless, the various studies that separately investigate aspects of financial literacy and financial inclusion apply this, and/or the binary probit models in their estimations (Fanta *et al.,* 2016; Efobi *et al.,* 2014; Fungacova & Weill, 2014; Klapper *et al.,* 2013; Sarma & Pais, 2011; Cole & Shastry, 2009). As such, they invariably guide an empirical framework for investigating the link between the concepts. Secondly, binary logistic and probit regression models are particularly suitable for analyzing cross-sectional data and

explaining the outcome of a dichotomous (0/1) dependent variable of interest, subject to a set of influencing covariates (Greene, 2008: 772). This was the case with the current study in attempting to investigate whether an individual may opt to have (and probably use) a formal financial account (financial inclusion), subject to a set of explanatory factors.

The superiority of the binary logistic model is based on the robustness of the results it provides and the flexibility and/or simplicity of the analytical procedure (Gujarati & Porter, 2010: 387). To begin with, unlike linear probability models (LPMs), logistic and probit models do not require any assumptions about the distribution of the independent variables, more specifically, they do not require that the latter are linearly related to the dependent variable. Secondly, the models ensure that the estimated outcome probabilities lie within the designated 0 and 1 limits. Thirdly, they do not require a normally distributed error term when the dependent variable is dichotomous in nature, and lastly, they control for the heteroscedasticity, which is common to the error terms of LPM models (Gujarati, 2011: 144; Gujarati & Porter, 2010: 388). Therefore, since the dependent variable (financial inclusion) was dichotomous in nature, the objective of the current study was to estimate the probability that an individual will own (and/or) use a formal financial account based on some underlying factors. As such, ownership and the implied use of the latter was denoted with 1 and 0 otherwise. The dichotomous nature of financial inclusion was expressed as follows:

Financial inclusion =

$$\begin{cases} 1 = success, if\ an\ individual\ owns\ and\ uses\ a\ formal\ financial\ account \\ 0 = Failure, if\ an\ individual\ does\ not\ own\ a\ formal\ financial\ account \end{cases}$$

The binary logistic model for this study, advanced by Gujarati & Porter, (2010: 388), was therefore stated as follows:

$$P_i = E(Y = 1|\, X_i\,) = \frac{1}{1+ e^{-(B_1 + B_2 X_i)}} \tag{5.3}$$

Where P_i represents the probability that an individual owns a formal financial account (dependent variable) represented by the notation *(Y = 1)*, X_i constitutes the main

regressor — financial literacy and a set of control variables, B_2 represents the vector of parameters associated with these independent variables.

For ease of exposition, equation 5.3 was rewritten as:

$$P_i = \frac{1}{1+e^{-Z_i}} = \frac{e^Z}{1+e^Z} \quad (5.4)$$

Where $Z_i = B_1 + B_2X_i$

Equation 5.4 constitutes the cumulative logistic distribution function (CDF)[1] which determines the distribution within which the probability of a random variable lies (Gujarati, 2011: 145). Following from models 5.3 and 5.4 above, the binary logistic equation for this study was specified as follows:

$$finInc_i^k = \beta_0 + \beta_1 finLit_i + \beta_2 X_i + e_i \quad (5.5)$$

Where:

$finInc_i$ is the dependent variable with a binary outcome of 1 if an individual *i* owns a formal financial account and 0 otherwise,

$finLit_i$ is the financial literacy score of an individual *i* computed using the principal component analysis (PCA) procedure — with an anticipated positive sign consistent with related literature (Grohmann *et al*., 2018; Nanziri & Leibbrandt, 2018; Arun & Kamath, 2015),

X_i is a vector of critical control variables parsimoniously determined using PCA,

$superscript\ k = 1$ to denotes the equation to be estimated using the chosen proxy of financial inclusion as suggested in section 4.5,

$\beta_0\ and\ \beta_2$ represent the model coefficients and the vectors of parameters associated with the independent variables respectively, and

e_i represents the error term.

[1] The cumulative distribution function (CDF), denoted by F(x), is associated with the probability function of a random variable given by the expression F(x) = P(X ≤ x), where P(X ≤ x) is the probability that a random variable X takes a value less than or equal to x.

5.5.1 Model diagnostics

Following the model specification process, the binary logistic model parameters were estimated using the maximum likelihood technique. Consistent with the latter, it was necessary to evaluate the significance of financial literacy and other regressors in predicting the adoption of formal financial products or services (financial inclusion). Accordingly, several statistical diagnostics were available. These included the odds ratio, the pseudo R^2 equivalents, the log-likelihood ratio tests and the Wald test (Gujarati, 2011). Each of these tests is briefly reviewed below.

5.5.1.1 Odds ratio

The odds ratio quantifies the relationship between the dichotomous variable (financial inclusion) and the main predictor variable, namely, financial literacy. According to Gujarati (2011: 146), it refers to the measure of association between the binary outcome variable and the independent variable and indicates how the risk of this outcome changes with the variable of interest. Essentially, as the probability (P_i) of an outcome goes from 0 to 1, the logit L_i (the log of odds ratio) moves from -∞ to +∞, such that the probabilities always lie within the 0 and 1 bounds, while the logits remain unbounded. The odds ratio formula, which indicates the likelihood of success (owning a formal financial account) against the odds of failure (not owning a formal financial account), is given by the expression:

$$Odds\ Ratio = \frac{odds\ of\ case}{odds\ of\ no{-}case} \tag{5.6}$$

The strong associations between the independent variable and a given outcome are represented with an odds ratio greater than 1 in either direction. A value less than 1 indicates that a unit increase in the independent variable, 'ceteris paribus', results in the outcome less likely to occur, while a value greater than 1 represents that reverse scenario. The statistical significance of an odds ratio is analyzed by testing if the regression coefficient β is statistically different from zero using the Wald score or likelihood ratio test (Munongo, 2019: 82).

5.5.1.2 Pseudo R2 and the likelihood ratio statistics.

The R^2 measure evaluates the effectiveness of a regression model. Otherwise stated, it measures a model's goodness of fit which represents the strength of the relationship between the independent variable(s) and the binary outcome. According to Gujarati (2011: 43), it measures the proportion of the variation in the binary outcome variable explained by the regressors. As such, it lies between 0 and 1, with 0 indicating a complete lack of model fit, and 1 indicating perfect fit, such that, the closer it is to 0, the worse the fit, while the closer it is to 1, the better the fit.

This is particularly consistent with LPM models. However, with logistic and probit models, the conventional pseudo R^2 measure for this condition is not very meaningful when the dependent variable takes on values of 0 or 1. This is because, contrary to LPM models, the pseudo R^2 depends on the values of all explanatory variables. Consequently, several measures have been proposed in the literature, the most common being the McFadden R^2 (R^2_{McF}) and the Cox and Snell (1989). Another goodness of fit measure consistent with these models is the count R^2 which is defined as:

$$Count\ R^2 = \frac{number\ of\ correct\ predictions}{total\ number\ of\ predictions} \tag{5.7}$$

According to this measure, if the predicted probability for an observation is greater than 0.5, the observation is classified as 1, otherwise, it is classified as 0. A count of all correct predictions and their resulting count R^2 value is then computed using the equation above (Gujarati, 2011: 149). It is observable, however, that these measures of goodness of fit apply only secondary in diagnostic importance. Primary to these are the expected signs of the regression coefficients and their statistical and/or practical significance. These are tested using the likelihood ratio (LR) statistic which is the equivalent of the *F* test in linear models. The LR statistic follows the chi-square distribution with the degrees of freedom (df) equal to the number of explanatory variables in the model. A high LR statistic with a significant *p-value* will indicate accurate goodness of fit (Gujarati, 2011: 149).

5.5.1.3 Log-likelihood ratio statistic.

The log-likelihood ratio is used to compare the goodness of fit among two statistical models — one with parameters and the other without. It tests the deviance between the models by confirming the hypothesis that the excluded parameter is equal to zero and has a chi-square distribution equal to one degree of freedom. Essentially, if the log-likelihoods of the two models are known, the difference between them multiplied by -2 equates to the likelihood ratio chi-square test. This implies that the likelihood test provides the preferred measure for parameter evaluation. However, other tests such as the Wald test also provide statistical inference on the contribution of specific parameters to a model (Trexler & Travis, 1993: 1631).

5.5.1.4 Wald test statistic

A practical shortcoming of the likelihood ratio test is that it usually requires the estimation of both the restricted and unrestricted parameter vectors, and this presents a problem for complex models that are difficult to quantify. An alternative testing procedure for this shortcoming is the Wald (W) test. This test is suitable for large samples and only requires the computation of the unrestricted model (Greene, 2008: 501). The test follows the chi-square statistic with degrees of freedom equal to the number of regressors estimated and assesses the significance of the individual coefficients in a model. For instance, if the chi-square value (Wald test) is high, and the probability of obtaining such a chi-square value or greater is practically nil, then it can be concluded that all regressors have an explanatory impact on the dependent variable (Gujarati, 2011: 329).

5.6 ROBUSTNESS CHECKS

As earlier indicated, this study followed studies by Hsiao & Tsai (2018), Zins & Weill (2016), Paiella (2016) and Fungacova & Weill (2014) in specifying an additional model for robustness checks. While these studies, among others, separately address aspects of financial inclusion and financial literacy, they all apply binary probit models which help to provide a guiding framework for the one chosen for this study. Similarly, estimation using binary probit and logistic models has empirically been proven to allow

for comparatively similar results despite the slight computational differences between the approaches[1] (Gujarati, 2011: 153; Greene, 2008: 772).

The probit model, estimated by the method of maximum likelihood was provided by the equation below:

$$fi_i^k = \alpha_0 + \alpha_1 fL_i + \alpha_2 X_i + e_i \quad (5.8)$$

Where:

fi_i is the categorical dependent variable with a binary outcome of 1 if an individual *i* owns a formal financial account and 0 otherwise,
fL_i is the financial literacy score of an individual *i* parsimoniously determined through the principal component analysis procedure,
X_i is a vector of critical control variables parsimoniously determined using PCA,
$superscript\ k = 1$ to denotes the equation that will be estimated using the chosen proxy of financial inclusion as suggested in section 4.5,
$\alpha_0\ and\ \alpha_2$ represent the model coefficient and the vector of parameters associated with the independent variables respectively, and
e_i represents the error term.

5.7 MODEL LIMITATIONS

Binary logit and probit models provide the simplest possible qualitative response regressions in which the dependent variable is binary in nature and takes on the value of 1 if an attribute is present or zero if absent (Gujarati, 2011: 153). However, these models are not without certain limitations. First, while they can be estimated using OLS regressions, they do not normally assume a linear distribution between the probability of the positive response and the level of the explanatory variables. This requires some data transformation to fulfill the assumption. Similarly, they are not suitable for

[1] Coefficients of the probit model have to be multiplied by 1.81 to be comparable to logit coefficients (Gujarati, 2011:154)

analyzing grouped data since this requires estimation using OLS, which entails data correction for heteroscedasticity of the error terms. As such, they are particularly suitable for analyzing micro-level or cross-sectional data (Gujarati, 2011: 154).

Consequently, they are restricted in their ability to capture the richness offered by longitudinal studies such as trends observed on the same respondent over time. As such, they do not reveal the sequential association between variables and an outcome but provide only an association which is not absolute causation between variables (Munongo, 2019: 86). Finally, according to Paiella (2016: 365), these models are also limited by non-response bias and/or 'I don't know responses' characterized by a general lack of knowledge. This could potentially influence the robustness of the estimated models.

5.8 CHAPTER SUMMARY

This chapter provided an appropriate methodological approach for assessing whether financial literacy influences financial inclusion in the context of Uganda. The chapter commenced with a research design describing the population, the sample and sampling methods, and proceeded to develop a composite financial literacy measure with which to assess the latter's impact on financial inclusion. To this end, it identified the appropriate proxies, their method(s) of extraction, the appropriate econometric approaches and the applicable diagnostic statistics for investigating the relationship. Finally, it employed binary logistic alongside binary probit models to ensure that the findings are robust in explaining this relationship and fulfilling the stated objectives and/or hypotheses of the study. The following chapter provides the detailed analytical process which includes the determination of the study proxies, model estimations, and empirical (descriptive and analytical) findings.

CHAPTER 6
CONSTRUCTION OF THE FINANCIAL LITERACY INDEX

6.1 INTRODUCTION

The preceding chapter 5 provided an analytical framework for investigating the relationship between financial literacy and financial inclusion in Uganda. It began by describing the statistical process of developing a composite financial literacy index, which is then applied as the principal independent proxy to binary logistic and probit models to determine its impact on financial inclusion in Uganda. This chapter presents the preliminary statistical findings on the development of the composite financial literacy index and elucidates the principal component analysis (PCA) procedure applied in the construction of the index It also follows from earlier chapters (2, 3 and 4) that review the theoretical and empirical discourse relating the two concepts and suggest, 'ceteris paribus', a possible link between them. Firstly, it aligns with the argument that financial inclusion is fundamentally a critical driver for economic development albeit from a contextual perspective in which the level of inclusion differently transcends developed and developing nations and is underpinned by the aspect of financial access. Secondly, it postulates that while several theoretical studies confirm this link, few to none have empirically proven the claim. Consequently, the measurement of financial literacy and/or the levels thereof becomes relative in consideration of the different contextual factors such as the level of economic development, the development of financial systems, compliance or regulation, and others (Sholevar & Harris, 2019: 7).

The chapter is structured along the following lines: Section 6.2 contextualizes the underlying research paradigm followed in developing the financial literacy index, while section 6.3 details the PCA process applied to each of the financial literacy domains. Section 6.4 provides the estimated statistical outputs from PCA for each of the financial literacy domains and the composite financial literacy index supported by the associated reliability and validity tests and the last section concludes the chapter.

6.2 DEVELOPING OF A FINANCIAL LITERACY INDEX

6.2.1 Research paradigm for developing a financial literacy index

As earlier indicated see section 5.2, the research design and the subsequent development of a composite financial literacy index were guided by a positivist research paradigm in which scientific methods of inquiry are applied to a discrete set of variables that inform the hypotheses and research questions of the study, to estimate the objective reality as it exists and subsequently support or refute existing theory and/or policy (Creswell, 2003: 7).

The index development process uses an investigative theoretical approach (a vital element of positivist research) to follow a linear chain of deductive and/or inductive[1] reasoning in which study concepts such as financial literacy and other proxies (for instance, financial inclusion or other confounding factors), are operationalized through a set of variables represented by items/questions from the FinScope 2018 consumer survey instrument of Uganda (see Hallebone & Priest, 2009: 86). The expert identification and selection of the items from this questionnaire (see section 5.3.1), was guided by a review of the specialized literature on financial literacy and by expert input from specialists within the field.

The data measurement and transformation or reduction processes involved a stylized approach of coding items which helped to classify, associate or link categories implied in the dataset into numerical and quantifiable forms that could be attributed to similar aspects or themes. Some of these themes emerged as principal components with regard to illuminating the research question. Finally, tests of validity and reliability were conducted to assess the extent to which the operationalized variables are adequate proxies for the theorized concepts they represent (Hallebone & Priest, 2009: 86, 89, 128). This process was conducted through a PCA procedure and is detailed below.

[1] Inductive reasoning is a type of thinking that involves identifying patterns in the data set to reach conclusions and build or support existing theories while deductive reasoning starts with theory and hypotheses before the collection and analysis of the data (Hair *et al.,* 2011: 276; Hallebone & Priest, 2009: 183).

6.3 PRINCIPAL COMPONENT ANALYSIS

The development of a composite financial literacy index (see section 5.3.1) was premised on the operationalization of four financial literacy domains/constructs known from the literature to collectively represent a financially astute individual, namely *money management, planning ahead, choosing financial products and staying informed*. Before conducting PCA, four processes were followed in the operationalization of these constructs. These processes were done to confirm construct validity and fulfill the preconditions for running PCA. Therefore, each included a rigorous expert review of the literature and corroboration with specialists on financial literacy.

The processes included: (1) identification and theoretical definition of the constructs, (2) items/questions identification, selection and checks for possible overlaps, which involved a process of mapping using Microsoft Excel, (3) binary coding of 0 and 1 of selected items to align the latter with the structure of each construct and to operationalize a measure for that construct within the index. For clarity, each 'financially savvy' response was coded as one (1), and zero (0) otherwise in line with the OECD/INFE (2015) toolkit for measuring financial literacy (refer to section 5.3.2.2). Lastly, an assessment and distribution of items (frequencies) within each domain was conducted to identify and exclude items with low variability. PCA was then run on the selected items in each construct to determine underlying relationships.

According to Hair, Celci, Money, Samouel and Page, (2011: 390), PCA is a variable reduction technique which maximizes the variance accounted for by a set of variables. It reduces the latter to a smaller set of composite variables called principal components or dimensions. Unlike other factor analysis models, PCA has the advantage of utilizing the entire variation in an original set of variables by explaining as much of the original variance as possible, using fewer principal components, for prediction purposes (Hair *et al.*, 2011: 105, 390).

Accordingly, the following processes were followed in the PCA procedure: (1) generation of the correlation matrix, (2) partition of variances into communalities, (3) extraction of the initial component solution (eigenvalues) and (4) rotation and

interpretation. To fulfill the underlying preconditions for the above-mentioned, certain underlying process diagnostics were ascertained. Firstly, the suitability of the data for factor analysis was supported through the criteria of sample size and the strength of the correlation among variables. Hair *et al.* (2014: 100) and Pallant (2011: 183) contend that larger sample sizes (over 350 respondents) are suitable for reliable PCA output while Pallant (2011: 183) recommends intercorrelation coefficients of 0.3 and above, among items as a precondition for running PCA.

Secondly, the factorability of the data was assessed using two statistical measures generated by the Statistical Package for Social Scientists, Version 25 (SPSS v25). These included Bartlett's test of sphericity (statistical test of the overall significance of all correlations within a correlation matrix) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. Pallant (2011: 183) argues that the former should be significant at the $p < 0.05$ level, while the latter, which ranges between 0 and 1, should have a suggested minimum value of 0.5 for acceptable factor analysis (Hair *et al.* 2014: 102).

The analysis ensured the following: (1) it examined the factor-loading matrix to identify significant loadings in the baseline PCA model including the accompanying measures of factorability; (2) it identified and excluded items with low communalities (values of 0.3 and below) in line with Hair *et al.* (2014: 115), (3) it rerun PCA to assess for improved significance in the factor loadings of retained items; (4) it assessed for internal consistency reliability by calculating the Cronbach's Alpha (alpha) and the Inter-Item Correlation Matrix (IIC). According to Hair *et al.* (2014: 90), the Cronbach's Alpha is one of the most commonly used indicators of internal consistency that ranges between 0 and 1, with values of 0.6 and below deemed in the lower level of acceptability. However, if such occurs, an assessment of the IIC is recommended where a score of 0.2 or above is considered acceptable (Pallant, 2011: 97). In instances where both the alpha and IIC values are low, items with low squared correlations are identified and excluded and a rerun of the PCA output is done to assess for improvement. (5) it identified and assigned meaning (based on conceptual foundation) to the factor solutions or dimensions to which all variables had significant loadings. This process was guided by statistical diagnostics that included: factor rotation (where applicable), total variances and scree plots. (6) it calculated and compared each domain's overall score based on the count of financially savvy

responses, at the one end, and on the overall statistical output of PCA, at the other. Finally, the various constructs were aggregated to form a composite financial literacy index. The following section presents the output for each of the constructs mentioned above and the resulting composite financial literacy index.

6.4 STATISTICAL OUTPUT FROM PRINCIPAL COMPONENT ANALYSIS

In the above section, four statistical processes were followed during the PCA procedure to determine a measure for each of the financial literacy constructs. This section presents the output of each of each of the constructs.

6.4.1 Money management (MM)

The *money management* construct sought to investigate respondents' skills at managing money. It explored their ability at paying bills, keeping and using financial records, budgeting for lumpy and unexpected expenditure and making 'financial ends meet' (section 5.3.1.1). Table 6.1 below identifies the items originally selected for this construct.

Table 6.1: Money management (questions paraphrased)

Code	Item/Question
E2	*Are you involved in your household's financial decisions?*
E6.1	*Do you keep track of the money you receive and spend?*
E6.2	*Do you know how much you spent last week?*
E6.3	*Do you adjust your expenses according to the money you have available?*
E7	*When you are running out of money, what do you do to ensure that your money lasts until you get more money?*
E8	*If you should have unexpected expenses tomorrow, how will you cope?*

Source: Author's own compilation.

Due to low statistical variability of responses, a preliminary analysis of the items' variability excluded items E7 and E8. Furthermore, an examination of the variables' communalities indicated that item E2 represented a lower than acceptable amount of

variance (0.109) in the factor solution of the construct (see appendix C). As such, it was excluded from further analysis (Hair *et al.,* 2014: 115). This improved the overall statistical output of the retained items. Table 6.2 below indicates the final output of communalities for this construct indicating that most of them exceeded the acceptable variance level of 0.3 (Hair *et al.,* 2014: 115).

Table 6.2: Communalities for money management

Communalities		
	Initial	Extraction
E6_1_bin	1,000	0,681
E6_2_bin	1,000	0,631
E6_3_bin	1,000	0,388

Extraction Method: Principal Component Analysis.

Source: Author's own compilation.

6.4.1.1 Correlation matrix for money management

A correlation matrix represents the intercorrelations among variables within a construct. It ensures that the data matrix has enough correlations to justify the application of PCA. Table 6.3 below indicates the correlation matrix for items from the *money management* construct.

Table 6.3: Correlation matrix for money management

Component Matrix[a]	
	Component
	1
E6_1_bin	0,825
E6_2_bin	0,794
E6_3_bin	0,623

Extraction Method: Principal Component Analysis.

a. 1 component extracted.

Source: Author's own compilation.

According to Hair *et al.* (2014: 102), PCA is justified when correlations among variables are not too low or equal (where no structure exists to group variables). Therefore, after the exclusion of item E2 whose intercorrelation was low (see appendix C), a visual inspection of the data matrix revealed variable intercorrelations close to or higher than the acceptable 0.3 coefficient to justify the application of PCA (Hair *et al.,* 2014: 102; Pallant, 2011: 192). Further analysis to assess for data suitability was then conducted through the Kaiser-Meyer-Olkin (KMO) test for sampling adequacy and Bartlett's test for Sphericity. These results are indicated in Table 6.4 below.

Table 6.4: Kaiser-Meyer-Olkin and Bartlett's tests for money management

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,595
Bartlett's Test of Sphericity	Approx. Chi-Square	1152,485
	df	3
	Sig.	0,000

Source: Author's own compilation.

The Bartlett's test of sphericity is a statistical test that measures the presence of correlations among variables in a correlation matrix. It provides the statistical significance that the latter has significant correlations among at least some of the variables. Notably, this test is sensitive to detecting correlations among variables of large sample sizes (Hair, *et al.,* 2014: 102). However, a statistically significant Bartlett's test of sphericity at the 5% level indicates that enough correlations exist among the variables for PCA to proceed. Table 6.4 above indicates a p-value of 0.00 to suggest the PCA is valid and an appropriate technique for analysis. Similarly, the KMO measure of sampling adequacy (MSA), determines whether the responses from a given sample are representative or not and evaluates the correlations and/or partial correlations to determine whether the data is likely to coalesce on given factor solutions (Munongo, 2019: 108). This index ranges between 0 and 1 with values closer to 1 considered as most accurate. The index value increases with the sample size, average correlations, the number of variables/items and a decrease in component solutions. However, Hair *et al.* (2014: 102) recommend MSA values of 0.5 and above

as adequate for PCA analysis. Table 6.4 above provides a sampling adequacy measure of 0.595 suggesting adequacy for PCA.

Subsequently, PCA was conducted to reduce the dimensionality of rich data to a set of latent factors (principal components). This process included an evaluation of the table of communalities (see table 6.2), the table of total variances, scree plots, the component matrix and rotated matrix (where applicable), the labelling of principal components and the re-scaling of the overall construct score. The processes are detailed below.

Table 6.5: Total variance explained for the money management construct

Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,700	56,671	56,671	1,700	56,671	56,671
2	0,798	26,597	83,267			
3	0,502	16,733	100,000			

Extraction Method: Principal Component Analysis.

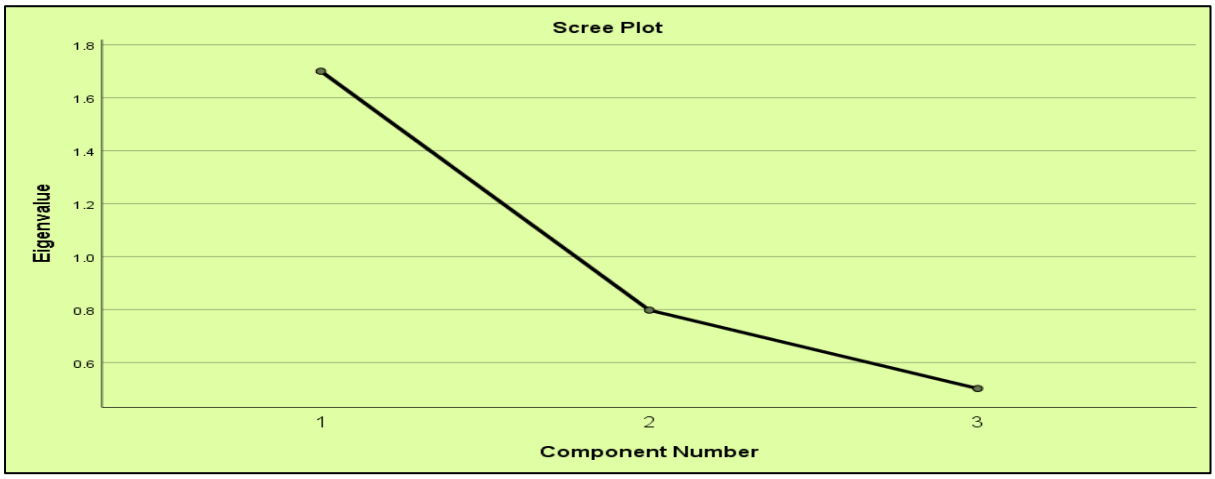
Source: Author's own compilation.

Table 6.5 above indicates the component(s) total variance explained in the *money management* construct. Pallant (2011: 192) contends that the total variance table determines how many principal components (factor solutions) to extract for a given construct. He argues, using Kaiser's 1974 criterion, that only components that have eigenvalues of 1 or more should be considered (Pallant, 2011: 184). Accordingly, only one component with an eigenvalue of 1.7 was selected from this construct accounting for a proportion of 56.671% in the total variance in the construct.

This finding was corroborated by Catell's scree plot which represents the scale of eigenvalues for all possible components/factors within the construct. This test involves plotting and inspecting each of the factors' eigenvalues to identify a point at which the

curve changes direction and becomes horizontal. Catell (1966) recommends retaining all factors above the elbow or break in the plot since they contribute most to the explanation of the variance in the data (Pallant, 2011: 184). Figure 6.1 below shows the scree plot for the *money management* construct.

Figure 6.1: Scree plot for the money management construct



Source: Author's own compilation.

Figure 6.1 depicts the fact that while the curve bends at the second component, only one component that has an acceptable eigenvalue of 1 or higher resides in the region above this bending point. Further analysis indicated the loadings of 3 items/variables (see table 6.2) onto this component. According to the component matrix table displaying the factor loadings of all variables on a component, variables E6.1, E6.2 and E6.3 all loaded significantly onto one component. Hair *et al.* (2014: 110) argue that loadings indicate the degree of correspondence between the variables and the component, with higher loadings (hereto 0.5 or greater) making the variable representative of the component. Table 6.6 below indicates the unrotated component matrix of the money management construct. Notably, only one component was extracted for this construct and so the matrix could not be rotated.

Table 6.6: Component matrix for the money management construct

Component Matrix[a]	
	Component
	1
E6_1_bin	0,825
E6_2_bin	0,794
E6_3_bin	0,623
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Source: Author's own compilation.

6.4.1.2 Scale diagnostics for the money management construct

The extracted component solution was then re-specified and labelled as 'making ends meet' based on the overall implied meaning of all items therein. This set the precedent for developing a partial financial literacy scale based on the *money management* construct. The scale's development was guided by three criteria: (1) a total numerical count of all 'financially savvy' responses was done for items within the construct where all these responses were given a binary coding of one (1) and zero (0) otherwise and an overall score for each respondent determined; (2) an overall statistical output for each respondent was determined using the coefficients from PCA; and, (3) for ease of interpretation, standardization, and choice, each component score was normalized to vary between 0 and 1 (0% - 100%) by dividing its total score by 1 (see equation 5,2). Further, an arbitrary score of 50% and above was considered as reflective of good financial behavior (financially literate individual).

The scale was developed cognizant of the following process diagnostics suggested by Pallant (2011: 97) to include: (1) inspection of the case processing summary statistics to ensure that the correct number of cases was analyzed, (2) inspection of the internal consistency reliability statistics to ensure that items 'hang together', which was appraised through the Cronbach's alpha. According to Pallant (2011:97) the Cronbach's Alpha should meet the acceptable 0.5 and above value depending on the number of items on the scale, and/or mean IIC values ranging between 0.2 and 0.4 are considered acceptable if the alpha values are low due to fewer scale items, (3)

inspection of the inter-item correlation matrix and the item-total statistics to ensure that all values are positive and implicitly measure the same underlying concept, (4) review of the item-total statistics to verify that the 'corrected item-total correlations' are positive and have coefficients of 0.3 and above, and ascertaining that none of the values in the 'alpha if item deleted column' exceed the calculated alpha value which otherwise suggests presence of outliers, and (5) inspection of the scale and/or scale frequencies.

Table 6.7 below provides the scale diagnostics for the 'making ends meet' – the extracted component for the *money management* construct. As indicated below, the component satisfied the diagnostic requirements necessary to develop a scale. First, the case summary statistics confirmed that a correct number of items was considered for analysis. Secondly, the alpha value was 0.611 for the 3 standardized items in the component — above the minimum acceptable level of 0.5 to guarantee the internal consistency reliability of the scale. Thirdly, all inter-item correlations were positive, implying that they measured the same underlying concept. Fourthly, the 'corrected item-total correlations' were all sufficiently above the acceptable 0.3 level to justify adequate intercorrelations among items, and lastly, none of the values within the 'alpha if item deleted' column was above the measured alpha value to confirm the absence of outliers.

Table 6.7: Scale diagnostics for the money management construct

Case Processing Summary

		N	%
Cases	Valid	3002	100,0
	Excluded[a]	0	0,0
	Total	3002	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on	N of Items
0,616	0,611	3

Inter-Item Correlation Matrix

	E6 1 bin	E6 2 bin	E6 3 bin
E6 1 bin	1,000	0,493	0,298
E6 2 bin	0,493	1,000	0,240
E6 3 bin	0,298	0,240	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
E6_1_bin	1,22	0,536	0,511	0,278	0,383
E6_2_bin	1,23	0,561	0,466	0,253	0,455
E6_3_bin	0,94	0,744	0,311	0,100	0,661

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
1,69	1,158	1,076	3

MM Count Frequencies

		Frequency	Percent	Valid	Cumulativ
Valid	0	2722818	14,7	14,7	14,7
	1	5630032	30,3	30,3	45,0
	2	4272425	23,0	23,0	68,0
	3	5947365	32,0	32,0	100,0
	Total	18572641	100,0	100,0	

Source: Author's own compilation.

Overall, scale statistics indicated an average score of 56.33% (1.69 out 3) on the 'making ends meet' scale for the bankable adults[1] in Uganda which when benchmarked at a 50% level indicates an above-average score. This value aligns with the 55% score for adults who obtained 2 out of 3 'financially savvy' scores (see frequency distribution above). Furthermore, the study computed a statistical summary

[1] The term "bankable adult" in Uganda or "bankable population" of Uganda refers to adults 16 years or older.

of both scale measurements to compare between the two outputs. This is provided in table 6.8 below.

Table 6.8: MM_PCA and MM_Count scale statistics

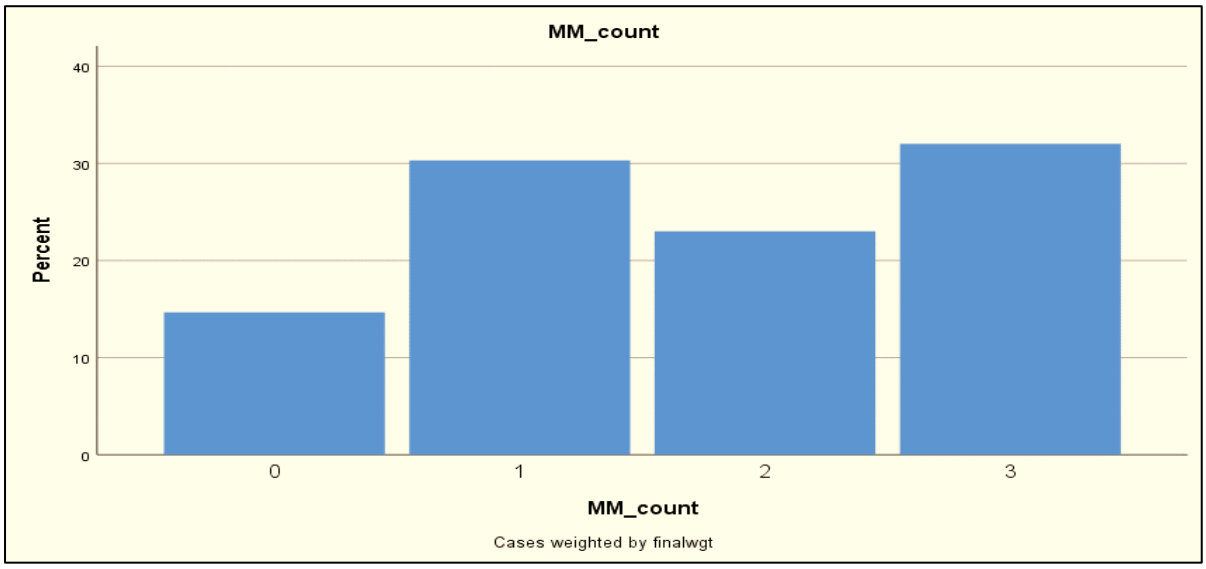
MM_PCA			MM_Count		
N	Valid	18 572 641	N	Valid	18 572 641
	Missing	0		Missing	0
Mean		0.277	Mean		1.72
Median		0.2509	Median		2
Mode		1.22	Mode		3
Std deviation		0.98996	Std deviation		1.065
Minimum		-1.54	Minimum		0
Maximum		1.22	Maximum		3

Source: Author's own compilation.

Both measures produced similar findings albeit with differences in computational output. The count measure indicated that the mean score for 'making ends meet' was 57.33% (1.72 score out of 3) – again similar to the results obtained above. Additionally, the scale's frequency distribution indicated that all variables/items contributed adequately to the variance in the construct.

This distribution is represented using a bar chart in figure 6.2 below. While these frequencies were similar to those generated using the PCA criteria (see the histogram in appendix C), they indicate that a significant number of the respondents scored within the 1 (30%) and 3 (32%) range suggesting greater aptitude towards making ends meet among the population.

Figure 6.2: Bar chart for the money management count scale



Source: Author's own compilation.

Finally, Pearson's correlation coefficients were generated for the two scales to detect significant differences between them. Table 6.9 below depicts the output.

Table 6.9: Pearson's correlations between MM_PCA and MM_Count scales

Correlations			
		MM_PCA	MM_Count
MM_PCA	Pearson Correlation	1	.999**
	Sig. (2-tailed)		0,000
	N	18572641	18572641
MM_count	Pearson Correlation	.999**	1
	Sig. (2-tailed)	0,000	
	N	18572641	18572641

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

Source: Author's own compilation.

According to Table 6.9 above, output from both scales was similar and statistically significant at the 1% level implying that choice of either scale for further analysis would generate similar findings. As such, a money management count-scale ranging from a minimum of zero (0) to a maximum of three (3) was adopted to measure this construct. This was normalized to a 0 to 1 scale by dividing the total number of items in the construct by 1.

6.4.2 Planning ahead (PA)

The *planning ahead* (PA) construct sought to estimate respondents' ability to cope with unexpected events such as buying a car, planning a wedding and planning for retirement, among others. It evaluated their saving, investing and speculative behavior in financial markets (section 5.3.1.2). Table 6.10 below identifies the items originally extracted for this construct (See also appendix A).

Table 6.10: Planning ahead (questions paraphrased)

Code	Item/Question
D9.1	*Did you in the past 12 months do anything to ensure you have more money?*
E11	*How do you plan for future needs when old and cannot work?*
F1.1	*You sometimes do not buy things you want to save money.*
F1.3	*Do you get information about the different ways of saving before deciding where to save?*
F1.4	*You try different saving options to find one that provides the most interest.*
F1.5	*You buy things as a means of saving, for instance, land, stocks, etc.*
F9.1	*Have you in the past 12 months made any investment with the purpose of profiting?*
F9.3	*Have you in 12 months kept anything to sell it at a profit?*
J3	*Do you have any insurance, for instance, medical insurance?*
G1.1	*You avoid borrowing money if you can.*
G1.2	*You prefer to save money for something rather than borrow to pay for it.*

Source: Author's own compilation.

A similar approach to section 6.4.1 was followed in estimating this construct. First, an expert review of the latter excluded items G1.1 and G1.2 as weakly indicative of the construct definition while preliminary analysis on variability excluded items E11 and J3 due to low numbers. A correlation matrix was then run for the retained items as indicated below.

6.4.2.1 Correlation matrix

Tabachnick and Fidell, (2007: 614) argue that a factorable matrix should have several sizeable correlations albeit the latter depend on the sample size. They observe that larger sample sizes tend to produce smaller correlations. However, they contend that if no correlations exceed the 0.3 coefficient, factor analysis is questionable. Table 6.11 below indicates enough correlations above this value to support further analysis.

Table 6.11: Correlation matrix for planning ahead (PA)

Correlation Matrix								
		D9_1_bin	F1_1_bin	F1_3_bin	F1_4_bin	F1_5_bin	F9_1_bin	F9_3_bin
Correlation	D9_1_bin	1,000	0,088	0,147	0,161	0,298	0,416	0,283
	F1_1_bin	0,088	1,000	0,267	0,207	0,134	0,089	0,078
	F1_3_bin	0,147	0,267	1,000	0,510	0,215	0,155	0,105
	F1_4_bin	0,161	0,207	0,510	1,000	0,244	0,157	0,115
	F1_5_bin	0,298	0,134	0,215	0,244	1,000	0,474	0,334
	F9_1_bin	0,416	0,089	0,155	0,157	0,474	1,000	0,603
	F9_3_bin	0,283	0,078	0,105	0,115	0,334	0,603	1,000

Source: Author's own compilation.

6.4.2.2 KMO test for sampling adequacy and the Bartlett's test

Further analysis of the *planning ahead* construct assessed for data suitability using the Kaiser-Meyer-Olkin (KMO) test for sampling adequacy and Bartlett's test for Sphericity indicated in table 6.12 below.

Table 6.12: Kaiser-Meyer-Olkin and Bartlett's tests for planning ahead

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,705
Bartlett's Test of Sphericity	Approx. Chi-Square	4175,363
	df	21
	Sig.	0,000

Source: Author's own compilation.

As suggested in section 6.4.1.1, the KMO measure for sampling adequacy (MSA) was 0.705 meaning it was significantly above the acceptable 0.5 value criterion (Hair *et al.,* 2014: 102), while Bartlett's test of sphericity had significant correlations at values lower the 1% level. Fulfillment of the above assumptions meant that further analysis could be conducted on the items in the construct. As such, PCA was conducted on the variables in the *planning ahead* (PA) construct using among others, outputs from variance communalities, total variances, scree plots, and component matrices. These are discussed below.

6.4.2.3 Communalities and the total variance explained

Principal component extraction supports the premise that the more the factors extracted, the better the model fit and/or the percentage variance in the data explained. However, the more the factors, the less parsimonious the solution, thereby implying a possible trade-off in the analysis (Tabachnick & Fidell, 2007: 644). Therefore, communalities provide a qualifying criterion for assessing the variance contributed by the variables. Table 6.13 provides the communalities for the planning ahead construct.

Table 6.13: Communalities for the planning ahead construct

Communalities		
	Initial	Extraction
D9_1_bin	1,000	0,404
F1_1_bin	1,000	0,334
F1_3_bin	1,000	0,685
F1_4_bin	1,000	0,640
F1_5_bin	1,000	0,492
F9_1_bin	1,000	0,757
F9_3_bin	1,000	0,617

Extraction Method: Principal Component Analysis.

Source: Author's own compilation.

A communality represents how much of the variance a variable is accounted for by the component solution (components combined) so that large communalities denote that a large amount of the original variance in a variable has been accounted for by the

component solution (Hair *et al.,* 2011: 394). According to Hair *et al,* (2014: 115) items with squared component loadings (communalities) of 0.3 or more are acceptable based on the sample size and may be included in the analysis. Table 6.13 indicates that all included items had acceptable variances for inclusion. Similarly, Tabachnick and Fidell, (2007: 644) identify the size of eigenvalues as the first quick estimate of the number of principal components (underlying variable relationships) to extract during an initial run with principal component extraction. Table 6.14 below represents the total variances explained for the PA construct.

Table 6.14: Total variance explained for the planning ahead construct

Total Variance Explained

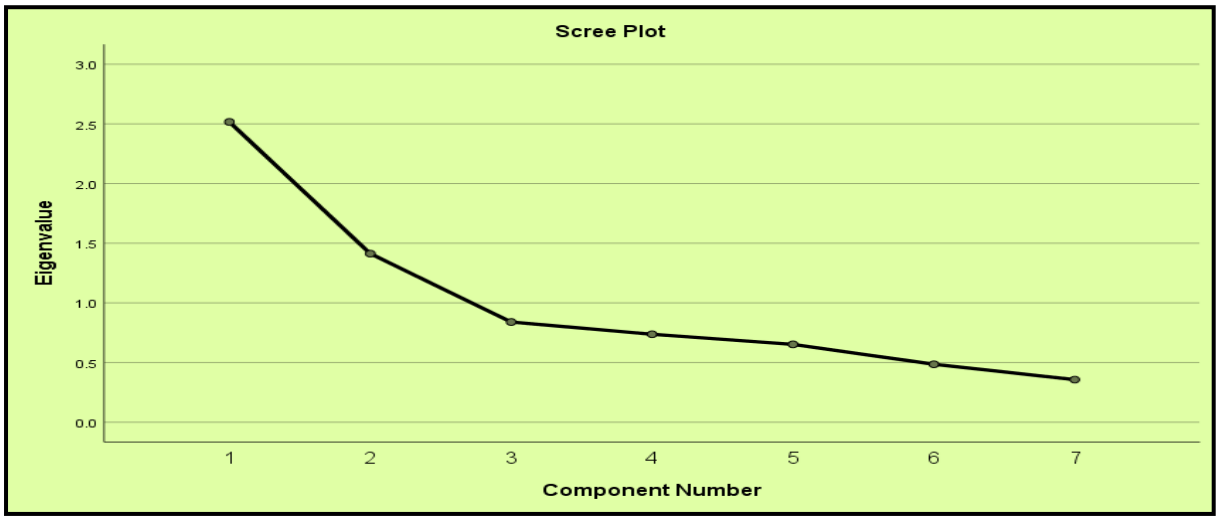
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Comp	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2,516	35,948	35,948	2,516	35,948	35,948	2,220	31,712	31,712
2	1,413	20,180	56,129	1,413	20,180	56,129	1,709	24,417	56,129
3	0,840	11,996	68,125						
4	0,737	10,530	78,655						
5	0,652	9,316	87,971						
6	0,485	6,935	94,906						
7	0,357	5,094	100,000						

Extraction Method: Principal Component Analysis.

Source: Author's own compilation.

Eigenvalues represent variance such that standardized variance contributions of 1 per variable indicate adequate representation. As such, a component with an eigenvalue less than 1 is considered unimportant from a variance perspective and should be excluded (Tabachnick & Fidell, 2007: 644). Table 6.14 indicates that two principal components for the *planning ahead* construct were extracted with eigenvalues of 1 and above. Cumulatively, these components accounted for a total variance of 56.129% with the first component accounting for 35.948% and the second, 20.180%. These findings are corroborated by Catell's scree plot in figure 6.3 below.

Figure 6.3: Scree plot for the planning ahead construct



Source: Author's own compilation.

Figure 6.3 above presents a scree plot representing a scale of eigenvalues (plotted on the ordinate) against the various components within the construct (arranged along the abscissa). It confirms that 2 principal components were extracted for the *planning ahead* construct represented as 2 dotted points lying above the point at which the curve begins to flatten. Additionally, 7 items were loaded onto these 2 principal components and are depicted in the unrotated component matrix in table 6.15 below.

Table 6.15: Component matrix for the planning ahead construct

Component Matrix[a]		
	Component	
	1	2
F9_1_bin	0,769	-0,406
F1_5_bin	0,691	-0,122
F9_3_bin	0,662	-0,423
D9_1_bin	0,596	-0,221
F1_3_bin	0,515	0,648
F1_4_bin	0,524	0,604
F1_1_bin	0,337	0,469

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Source: Author's own compilation.

Observably, the component matrix above adequately loaded 4 and 3 items on components 1 and 2 respectively. However, given the minimum acceptable factor loadings of 0.3 and above, items F1.1, F1.3 and F1.4 appeared to cross-load with both components. This necessitated rotation to reduce the number of components on which the variables under investigation had loadings. A Varimax with Kaiser Normalization — orthogonal rotation, was employed to maximize this variance for each of the components while simultaneously suppressing cross-loading among variables (see Hair *et al.,* 2011: 390). Orthogonal rotation using Varimax has the advantage of rotating components with their axes maintained at 90 degrees to present a different component loading pattern (simple structure) that makes the components mathematically independent of each other. Table 6.16 below represents the results of the rotated component matrix, confirming that 4 and 3 items for the *planning ahead* construct adequately loaded (without cross-loadings) onto components 1 and 2 respectively. These component loadings were practically significant for structure interpretation (see; Hair, *et al.,* 2014: 111).

Table 6.16: Rotated component matrix for the planning ahead construct

Rotated Component Matrix[a]		
	Component	
	1	2
F9_1_bin	0,869	0,051
F9_3_bin	0,785	-0,018
F1_5_bin	0,654	0,254
D9_1_bin	0,624	0,120
F1_3_bin	0,105	0,821
F1_4_bin	0,135	0,788
F1_1_bin	0,045	0,576

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 3 iterations.

Source: Author's own compilation.

Furthermore, a component transformation matrix representing functions of the angles of rotation that result from a post-multiplication of the original loadings within the

rotated matrix (Harman, 1976), was generated. This matrix depicts the correlations among the components before and after the rotation. Table 6.17 below depicts the component transformation matrix for the *planning ahead* construct.

Table 6.17: Component transformation matrix for the planning ahead construct

Component Transformation Matrix		
Component	1	2
1	0,855	0,518
2	-0,518	0,855
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		

Source: Author's own compilation.

According to Tabachnick and Fidell (2007: 649), interpretation of a component depends on the underlying concept definition unifying the group of variables loading onto it, and the respective correlations of such loadings. These authors recommend the assigning of meaning to components with variable loadings of 0.32 and above. Following this criterion, the rotated matrix identified items D9.1 (0.624), F1.5 (0.654), F9.3 (0.785) and F9.1 (0.869) as loading onto the first latent component A, which was then labelled as 'planning for the future' based on the collective meaning of the items therein. Similarly, the second latent component B, which included items F1.1 (0.576), F1.3 (0.821) and F1.4 (0.788) was collectively labelled as 'attitude towards planning for the future'. The following sub-sections outline the scale diagnostics for each of these principal components and the overall measure for the PA construct.

6.4.2.4 Planning for the future (Component A)

Further analysis was conducted on the latent components (A and B) for the planning ahead construct to estimate a scale for all respondents, at one end, and to determine sub-scales for the overall construct, at the other. This process was guided by the approach suggested by Pallant, (2011: 97) in which certain qualifying process diagnostics are followed in ensuring that the scale is reliable and meets the requirements for internal content validity. This approach is elaborately described in section 6.4.1.2 hence only the main results are presented below.

Table 6.18 below details the results of the scale diagnostics for the ‘planning for the future’ sub-construct, (component A). Accordingly, this component/sub-construct satisfied the diagnostic requirements necessary to develop a scale. Firstly, the case summary statistics confirmed that a correct number of items was considered for analysis. Secondly, the alpha value was 0.728 for the 4 standardized items in the component, which is evidently above the minimum acceptable level of 0.5 to guarantee the internal consistency reliability of the scale. Thirdly, all inter-item correlations were positive, implying that they measured the same underlying concept and fourthly, the ‘corrected item-total correlations’ were all sufficiently above the acceptable 0.3 level to justify adequate intercorrelations among items. Lastly, none of the values within the ‘alpha if item deleted’ column was above the measured Cronbach’s alpha value to confirm absence of outliers (Pallant, 2011: 100).

Scale statistics showed that the average bankable Ugandan obtained a low score of 27.25% (1.09 out 4) on the ‘planning for the future’ scale which when benchmarked against an acceptable score of 50% indicates below-average planning for the future. These findings are supported by the frequency distribution of scores on the scale which confirms that only 21.5% (scores of 3 and 4) of Ugandans appear to be planning for their future (see table below).

Table 6.18: Scale diagnostics for component A

Case Processing Summary

		N	%
Cases	Valid	3002	100,0
	Excluded[a]	0	0,0
	Total	3002	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,724	0,728	4

Inter-Item Correlation Matrix

	D9_1_bin	F1_5_bin	F9_1_bin	F9_3_bin
D9_1_bin	1,000	0,298	0,416	0,283
F1_5_bin	0,298	1,000	0,474	0,334
F9_1_bin	0,416	0,474	1,000	0,603
F9_3_bin	0,283	0,334	0,603	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
D9_1_bin	0,87	1,114	0,417	0,187	0,715
F1_5_bin	0,69	0,959	0,473	0,240	0,694
F9_1_bin	0,77	0,858	0,668	0,486	0,560
F9_3_bin	0,94	1,130	0,530	0,368	0,663

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
1,09	1,653	1,286	4

PA_1_count frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8229122	44,3	44,3	44,3
	1	3818067	20,6	20,6	64,9
	2	2530229	13,6	13,6	78,5
	3	2763531	14,9	14,9	93,4
	4	1231692	6,6	6,6	100,0
	Total	18572641	100,0	100,0	

Source: Author's own compilation.

Additionally, almost half of the population (44.3%) scored zero for this sub-construct compared to 6.6% who scored high on this scale (4 out of 4 items). This implies that a significant number of the population are not making rational decisions about their future financial welfare. Cognizant of the above, a 'planning for the future' scale was

designed using both the count of 'financially savvy' responses and the statistical output from PCA. Pearson's correlation coefficients were generated for the two scales to detect significant differences (see appendix C). Both scales were similar and statistically significant at the 1% level, implying that choice of either scale for further analysis would generate similar findings. This study opted for the count scale and the final statistical summary of this scale is depicted in Table 6.19 below (refer to appendix C for output according to PCA).

Table 6.19: Scale statistics for planning for the future (component A)

Statistics		
		PA_1_count
N	Valid	18572641
	Missing	0
Mean		1,19
Median		1,00
Mode		0
Std. Deviation		1,317
Minimum		0
Maximum		4

Source: Author's own compilation.

The scale statistics indicate mean and modal scores of 29.75% (1.19 score out of 4) and 25% (1 score out of 4) respectively to confirm that a significant number of individuals are not making provisions for their future. Therefore, a 'planning for the future' count scale ranging from a minimum of zero (0) to a maximum of four (4) was adopted to measure this sub-construct. This was normalized to a 0 to 1 scale by dividing the total number of items in the construct by 1.

6.4.2.5 Attitude towards planning for the future (Component B)

The 'attitude towards planning for the future' sub-construct (component B) sought to further assess respondents' beliefs and values regarding the notion of financially planning ahead for the future. As such, the analytical process of scale development followed a similar pattern. However, a preliminary analysis of the items in this sub-construct excluded item F1.1 due to low squared multiple correlations (factor loadings)

with other items in the construct. Further analysis was then conducted on the retained items and the following scale diagnostics were run as depicted in Table 6.20 below.

Table 6.20: Scale diagnostics for attitude towards planning for the future

Case Processing Summary

		N	%
Cases	Valid	3002	100,0
	Excluded[a]	0	0,0
	Total	3002	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,673	0,675	2

Inter-Item Correlation Matrix

	F1_3_bin	F1_4_bin
F1_3_bin	1,000	0,510
F1_4_bin	0,510	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
F1_3_bin	0,28	0,201	0,510	0,260	
F1_4_bin	0,41	0,241	0,510	0,260	

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
0,68	0,667	0,816	2

PA_2_count frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	10097758	54,4	54,4	54,4
	1	4355830	23,5	23,5	77,8
	2	4119053	22,2	22,2	100,0
	Total	18572641	100,0	100,0	

Source: Author's own compilation.

Table 6.20 indicates that the case summary statistics analyzed the correct number of items. Secondly, the alpha value was 0.675 for the 2 standardized items, which is above the minimum acceptable level of 0.5 to guarantee the internal consistency reliability of the scale. Thirdly, all inter-item correlations were positive, implying that items measured the same underlying concept. In addition, the 'corrected item-total correlations' were all sufficiently above the acceptable 0.3 level to justify adequate intercorrelations among items and lastly, it could not be established whether all values

within the ‘alpha if item deleted’ column were below the measured alpha value, since the former could not be generated using 2 items (Pallant, 2011: 100).

Scale statistics indicated a mean score of 34% (0.68 out of 2) among the bankable population, generally suggesting a low attitude towards planning for the future when benchmarked against an acceptable median of 50%. The frequency distribution of scores on this scale confirmed that over half of the bankable adults did not believe in planning for their future while only 22.2% expressed interest in the same (scores of 2 out of 2). Subsequently, Pearson’s correlations between the scales (PCA and count) were run to confirm that both generated statistically similar results at the 1% level, implying that choice of either scale would render similar results (refer to appendix C for output according to PCA). Table 6.21 below depicts the overall count statistics on the ‘attitude towards planning for the future’ sub-construct.

Table 6.21: Overall count statistics for attitude towards planning for the future

Statistics		
		PA_2_count
N	Valid	18572641
	Missing	0
Mean		0,68
Median		0,00
Mode		0
Std. Deviation		0,814
Minimum		0
Maximum		2

Source: Author’s own compilation.

The median and modal scores generally indicate that a significant number of the population scored below the 34% average, confirming the observation that they do not believe in securing their future financial welfare. Based on these statistics an overall scale for ‘attitude towards planning for the future’ was developed with a minimum of 0 and a maximum of 2 which was then normalized to the 0 to 1 (percentage scale) by dividing the number of items in the sub-construct by 1.

Subsequently, an overall score for the *planning ahead* (PA) construct was developed by statistically combining the two sub-constructs, namely ‘planning ahead for the

future' and 'attitude towards planning ahead for the future above'. The development of this scale is underpinned by the same statistical processes and scale diagnostics detailed above. Table 6.22 presents the scale diagnostics of the combined scores for both sub-constructs.

Table 6.22: Scale diagnostics for the overall planning ahead (PA) construct

Case Processing Summary

		N	%
Cases	Valid	3002	100,0
	Excluded[a]	0	0,0
	Total	3002	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,400	0,409	2

Inter-Item Correlation Matrix

	PA_1_count_s	PA_2_count_s
PA_1_count_s	1,000	0,257
PA_2_count_s	0,257	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PA_1_count_s	0,342	0,167	0,257	0,066	
PA_2_count_s	0,272	0,103	0,257	0,066	

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
0,615	0,337	0,5809	2

Source: Author's own compilation.

Firstly, the case summary statistics confirm that the correct number of items were analyzed. However, the combined alpha value was 0.409 for the 2 sub-constructs, which is marginally below the minimum acceptable level of 0.5. Pallant, (2011: 97) argues that alpha values tend to be low due to a reduced number of items on the scale. He contends that in such instances, it is appropriate to report the 'mean inter-item correlations' value with an optimal range of 0.2 – 0.4 considered acceptable. This study guaranteed the internal consistency reliability of the scale based on this premise, with an acceptable mean IIC value of 0,257 for both items. Secondly, all inter-item correlations were positive implying that they measured the same underlying concept, thirdly the 'corrected item-total correlations' were low but sufficiently close to the acceptable level of 0.3 to justify adequate intercorrelations among items. Lastly, it

cannot be established whether none of the values within the 'alpha if item deleted' column was above the measured alpha value since the former could not be generated using two items. (Pallant, 2011: 100). The final scale statistics indicate that the mean bankable adult in Uganda scored 30.75% (0.615 out of 2) on this scale, suggesting an overall low score for the *planning ahead* construct when benchmarked against a median score of 50%. This generally suggests that most Ugandans are not financially planning for their future welfare. Finally, an overall scale for this construct was developed with a minimum value of 0 and a maximum of 2. This was normalized to the 0 to 1 (percentage scale) by dividing the number of items in the construct by 1.

6.4.3 Choosing financial products (CFP)

The *choosing financial products* construct of financial literacy sought to measure whether individuals adopt and use the different financial products and services in their financial markets and whether they, in the process: (1) seek professional advice before making such decisions and, (2) compare the costs and benefits of each to assess and identify risky ones. Briefly, it explores individuals' interaction with financial institutions (see section 5.3.1.3). Table 6.23 below identifies the items originally extracted for this construct.

Table 6.23: Choosing financial products (questions paraphrased)

Code	Item/Question
E4.1	*Do you sometimes ask somebody for advice regarding money matters?*
E5	*Who do you usually ask for financial advice?*
F1.3	*Do you get information about the different ways of saving before deciding where to save?*
G1.1	*You avoid borrowing money if you can.*
G1.2	*You prefer to save money for something rather than borrow to pay for it.*
G2	*Which of the following service providers would you prefer to borrow from?*
G8	*Do you get information about the different service offering before you borrow?*
J3	*Do you have insurance that helps you with medical expenses?*

Source: Author's own compilation.

A similar approach was undertaken in estimating a scale for this construct. First, an analytical review of the construct excluded items G2, E5 and J3 due to low variability. Secondly, an expert review of the literature on financial literacy identified items G1.1

and G1.2 as weakly aligned to the construct definition and these were also eliminated from the analysis. A correlation matrix was then run for the retained items and is depicted in Table 6.24 below.

Table 6.24: Correlation matrix for Choosing financial products (CFP)

Correlation Matrix				
		E4 1 bin	F1 3 bin	G8 bin
Correlation	E4_1_bin	1,000	0,228	0,193
	F1_3_bin	0,228	1,000	0,286
	G8_bin	0,193	0,286	1,000

Source: Author's own compilation.

Table 6.24 indicates sizeable correlations albeit lower than the acceptable 0.3 level. Tabachnick and Fidell, (2007: 614) observe that larger sample sizes (as is the case here), tend to produce smaller correlations. However, further analysis using measures for sampling adequacy (MSA), tests for sphericity and item communalities supported the factorability of the matrix. These are depicted in table 6.25 below.

Table 6.25: KMO, Bartlett's test, and communalities

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,595
Bartlett's Test of Sphericity	Approx. Chi-Square	472,925
	df	3
	Sig.	0,000

Communalities

	Initial	Extraction
E4_1_bin	1,000	0,419
F1_3_bin	1,000	0,549
G8_bin	1,000	0,506

Extraction Method: Principal Component Analysis.

Source: Author's own compilation.

As indicated above, the KMO measure for sampling adequacy (MSA) was 0.595, sufficiently above the acceptable 0.5 value criterion while Bartlett's test of sphericity was significant at the 1% level, which is more accurate than the recommended 5% level. Additionally, the sum of squared component loadings (communalities) indicated sufficient variance per variable in the component solution (Hair *et al.,* 2011: 394).

Therefore, further analysis was conducted to assess any underlying relationships among items within the construct. These are depicted by the total variance explained in Table 6.26 below.

Table 6.26: Total variance explained for 'choosing financial products'.

Total Variance Explained

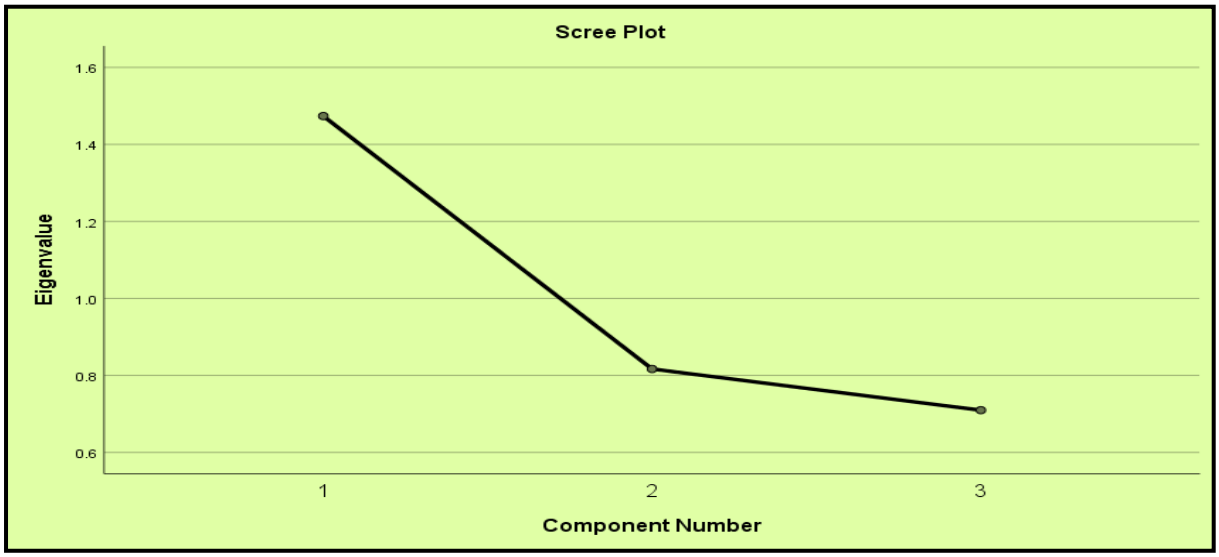
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,474	49,120	49,120	1,474	49,120	49,120
2	0,817	27,225	76,344			
3	0,710	23,656	100,000			

Extraction Method: Principal Component Analysis.

Source: Author's own compilation.

Table 6.26 above indicates that only one principal component was extracted through the above procedure as explained by the eigenvalue of 1 and above (Tabachnick & Fidell, 2007: 617). This component accounted for 49.120% of the total variance explained in the construct. Catell's scree plot in Figure 6.4 below corroborates these findings.

Figure 6.4: Scree plot for the choosing financial products construct



Source: Author's own compilation.

Figure 6.4 above indicates that only one component (with an eigenvalue of 1 and above) lay above the point at which the curve tends to flatten. Besides, all items

appeared to sufficiently load onto this component as indicated by the unrotated component matrix in Table 6.27 below.

Table 6.27: Component matrix for the "choosing financial products" construct

Component Matrix[a]	
	Component
	1
F1_3_bin	0,741
G8_bin	0,711
E4_1_bin	0,647
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Source: Author's own compilation.

Table 6.27 indicates that all three variables in the construct loaded adequately onto this principle component. Therefore, using the loading pattern of the variables and their collective underlying meaning, the component was renamed and labelled as 'seeking financial advice'. Additionally, since all variables loaded onto one component, the matrix could not be rotated. Therefore, a scale for this construct was designed using the approach detailed in section 6.4.1.2 above.

The scale diagnostics of the component in Table 6.28 below indicated the following. First, the case summary statistics confirmed that the correct number of items was considered for analysis. Secondly, the alpha value was 0.481 for the 3 standardized items in the construct which is marginally below the minimum acceptable level of 0.5. As such, following Pallant, (2011: 97), the study assured the internal consistency reliability of this scale based on the mean inter-item correlations value which was recorded at 0.236 (0.228 + 0.286 + 0.193)/3 and lay within the acceptable 0.2 – 0.4 range. Thirdly, all inter-item correlations were positive, implying that they measured the same underlying concept and fourthly, most of the 'corrected item-total correlations' were above the acceptable level of 0.3 coefficient to justify adequate intercorrelations among items and lastly, none of the values within the 'alpha if item deleted' column was above the measured alpha value, implying that there were no outliers. The final scale statistics indicate that the mean bankable adult in Uganda scored 38% (1.14 out of 3) on this scale, generally suggesting a below-average score

for ‘seeking financial advice’ based on the acceptable arbitrary median of 50%. Table 6.28 below provides the scale diagnostics for this construct.

Table 6.28: Scale diagnostics for the ‘choosing financial products’ construct

Case Processing Summary

		N	%
Cases	Valid	3002	100,0
	Excluded[a]	0	0,0
	Total	3002	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on	N of Items
0,473	0,481	3

Inter-Item Correlation Matrix

	E4_1_bin	F1_3_bin	G8_bin
E4_1_bin	1,000	0,228	0,193
F1_3_bin	0,228	1,000	0,286
G8_bin	0,193	0,286	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
E4_1_bin	0,58	0,493	0,264	0,070	0,434
F1_3_bin	0,73	0,465	0,326	0,113	0,314
G8_bin	0,96	0,600	0,305	0,099	0,371

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
1,14	0,924	0,961	3

CFP_count_frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	5671232	30,5	30,5	30,5
	1	6587235	35,5	35,5	66,0
	2	4352736	23,4	23,4	89,4
	3	1961438	10,6	10,6	100,0
	Total	18572641	100,0	100,0	

Source: Author’s own compilation.

Furthermore, the scale frequencies in Table 6.28 showed a modest 10.6% (scores of 3 out of 3) of individuals who implicitly seek financial advice before choosing financial

products and a substantial 66% (scores of 0 and 1 out of 3) of them who do not. Ultimately, both scales (count and PCA) were compared for significant differences in output and none were observed, even at the 1% level (see appendix C). For consistency, the study opted for the count scale. Table 6.29 below provides the final statistical output with regards to 'seeking financial advice'.

Table 6.29: Overall count statistics for 'seeking financial advice'

Statistics		
CFP_count		
N	Valid	18572641
	Missing	0
Mean		1,14
Median		1,00
Mode		1
Std. Deviation		0,971
Minimum		0
Maximum		3

Source: Author's own compilation.

The table above indicates that a significant number of the bankable adults scored low on this scale (see also Table 6.28) implying that most Ugandans do not seek financial advice when choosing financial products. Based on these statistics, an overall scale for the 'seeking financial advice' component was developed with a minimum score of 0 and a maximum of 3. This scale was then normalized to the 0 to 1 (percentage scale) by dividing the total number of items in the construct by 1.

6.4.4 Staying informed (SI)

This construct sought to measure whether respondents use the available media platforms to keep abreast with events in their financial markets, at the one end, and their attitude towards the adoption of financial offerings at the other. Atkinson *et al.* (2007: 21) assess whether respondents keep abreast of financial developments within their economy by monitoring key indicators such as inflation, interest rates and technology, and whether they keep track of, and adopt new product offerings or changes to existing ones. It also assessed whether consumers seek advice or redress for poor product offerings. This construct arguably aligns with the *choosing financial*

products construct and so a slight overlap in the extracted items was considered plausible (see; Atkinson *et al.,* 2007). Table 6.30 shows the items that were originally extracted for this construct.

Table 6.30: Staying informed (questions paraphrased)

Code	Item/Question
E4.1	*Do you sometimes ask someone for advice regarding money matters?*
F1.4	*You try different saving options to find one that provides the most interest.*
F2	*To which of the following financial options do you feel your savings are safest.*
F9.3	*Have you in 12 months kept anything to sell at a profit?*
F20	*Have you ever saved electronically (that is, you did not handle cash?)*
G8	*Do you get information on interest rates etc. before you decide to borrow?*
G14.2	*Have you received a loan electronically before (on your phone for instance)?*
G14.3	*Have you made a loan payment electronically before?*
H1.3	*You are prepared to learn how to use new technology.*
H1.6	*It is riskier to carry cash than to use cards and ATM for transactions.*

Source: Author's own compilation.

Preliminary analysis on variability excluded items F20, G14.2 and G14.3 due to low numbers. A correlation matrix was then run for the retained items and is depicted in Table 6.31 below.

Table 6.31: Correlation matrix for staying informed (SI)

Correlation Matrix								
		E4_1_bin	F1_4_bin	F2_bin	F9_3_bin	G8_bin	H1_3_bin	H1_6_bin
Correlation	E4_1_bin	1,000	0,182	0,107	0,119	0,193	0,181	0,091
	F1_4_bin	0,182	1,000	0,126	0,115	0,269	0,148	0,128
	F2_bin	0,107	0,126	1,000	0,026	0,062	0,190	0,119
	F9_3_bin	0,119	0,115	0,026	1,000	0,142	0,079	0,019
	G8_bin	0,193	0,269	0,062	0,142	1,000	0,092	0,060
	H1_3_bin	0,181	0,148	0,190	0,079	0,092	1,000	0,259
	H1_6_bin	0,091	0,128	0,119	0,019	0,060	0,259	1,000

Source: Author's own compilation.

The matrix indicates sizeable correlations among the items albeit few. As indicated by Tabachnick and Fidell (2007: 614), large samples (as is the case here) tend to produce

smaller correlations since their pairwise partial correlations tend to be very low when adjusted for the effects of other variables. In such cases, other tests for factorability such as the measure of sampling adequacy and Bartlett's test of sphericity are applied. These are detailed below.

6.4.4.1 KMO test for sampling adequacy and the Bartlett's test

Table 6.32 below indicates that KMO measure for sampling adequacy for this construct was 0.669 — sufficiently above the acceptable 0.5 value, while Bartlett's test of sphericity had significant correlations at the 1% level. This implies that conditions for factorability were met for PCA to proceed.

Table 6.32: Kaiser-Meyer-Olkin and Bartlett's tests for staying informed

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,669
Bartlett's Test of Sphericity	Approx. Chi-Square	1053,272
	df	21
	Sig.	0,000

Source: Author's own compilation.

PCA was then conducted on the variables in the *staying informed* (SI) construct using, among others, the output from variable communalities, total variances, scree plots, and component matrices. These are discussed below.

6.4.4.2 Items' communalities and the total variance explained

Communalities represent variance and explain how much of the latter a variable contributes to a component solution. Table 6.33 below indicates that all item communalities were above the acceptable 0.3 level to support further analysis (Hair *et al.,* 2014: 115).

Similarly, Tabachnick and Fidell, (2007: 644) identify sums of communalities (eigenvalues) with standardized variance contributions of 1 and above as adequate

representation for extraction. As such, only two principal components were extracted with eigenvalues of 1 and above. These components cumulatively accounted for a total variance of 42.026% with the first component accounting for 25.740% and the second, 16.286%.

Table 6.33: Communalities and total variances for staying informed

Communalities

	Initial	Extraction
E4 1 bin	1,000	0,339
F1 4 bin	1,000	0,422
F2 bin	1,000	0,330
F9 3 bin	1,000	0,324
G8 bin	1,000	0,517
H1 3 bin	1,000	0,525
H1 6 bin	1,000	0,485

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Comp	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,802	25,740	25,740	1,802	25,740	25,740	1,506	21,513	21,513
2	1,140	16,286	42,026	1,140	16,286	42,026	1,436	20,513	42,026
3	0,909	12,982	55,009						
4	0,886	12,661	67,669						
5	0,839	11,989	79,658						
6	0,716	10,226	89,884						
7	0,708	10,116	100,000						

Extraction Method: Principal Component Analysis.

Source: Author's own compilation.

Corroborating these findings using Catell's scree plot in Figure 6.5 below confirmed that 2 principal components were extracted for the staying informed construct.

Figure 6.5: Scree plot for the staying informed

Source: Author's own compilation.

These components are identified as dotted points lying above the point at which the curve begins to flatten. Additionally, further analysis confirms that 7 items loaded onto the two principal components. A discussion of these loadings follows below.

6.4.4.3 Component matrix for the staying informed construct

The unrotated component matrix provides a preliminary indication of items that loaded on each of the components. Table 6.34 below provides the matrix for the *staying informed* construct.

Table 6.34: Component matrix for the staying informed construct

Component Matrix[a]		
	Component	
	1	2
F1_4_bin	0,602	0,244
H1_3_bin	0,581	-0,434
E4_1_bin	0,556	0,173
G8_bin	0,531	0,485
F2_bin	0,426	-0,386
H1_6_bin	0,459	-0,524
F9_3_bin	0,345	0,453

Extraction Method: Principal Component Analysis.
a. 2 components extracted.

Source: Author's own compilation.

This matrix appeared to adequately load 4 and 3 items onto components 1 and 2 respectively. However, regardless of the signs, items F9.3, H1.6 appeared to cross-load on both components. This necessitated rotation to further classify the components. Therefore, the Varimax with Kaiser Normalization — orthogonal rotation — was employed to maximize the variance of each of the components (Hair *et al.,* 2011: 390). Table 6.35 below represents the results of the rotated component matrix.

Table 6.35: Rotated component matrix for the staying informed construct

Rotated Component Matrix[a]		
	Component	
	1	2
G8_bin	0,719	-0,005
F1_4_bin	0,611	0,221
F9_3_bin	0,559	-0,106
E4_1_bin	0,529	0,243
H1_3_bin	0,142	0,711
H1_6_bin	-0,009	0,696
F2_bin	0,059	0,572

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 3 iterations.

Source: Author's own compilation.

Post-rotation confirms that 4 and 3 items adequately loaded onto components 1 and 2 respectively, with their loadings practically significant for structure interpretation (see Hair, *et al.,* 2014: 111). This is verified by the component transformation matrix in Table 6.36 below which depicts the component correlations before and after rotation.

Table 6.36: Component transformation matrix for the staying informed construct

Component Transformation Matrix		
Component	1	2
1	0,744	0,669
2	0,669	-0,744

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Source: Author's own compilation.

Consequently, the rotated component matrix identified items G8 (0.719), F1.4 (0.611), F9.3 (0.559) and E4.1 (0.529) into component 1 which was labelled as 'monitoring economic indicators' based on the item loadings and the collective meaning of the items therein. Likewise, component 2, which included items H1.3 (0.711), H1.6 (0.696) and F1.4 (0.788) was collectively labelled as 'attitude towards technology' (see Tabachnick & Fidell, 2007: 647). The following sub-sections outline the scale diagnostics for each of these sub-constructs and the overall measure for the *staying informed* (SI) construct.

6.4.4.4 Monitoring economic indicators (Component 1)

A similar approach was followed to develop a scale for this sub-construct. Table 6.37 below depicts the scale diagnostics for the 'monitoring economic indicators' sub-construct (component 1).

Table 6.37: Scale diagnostics for monitoring economic indicators

Case Processing Summary

		N	%
Cases	Valid	3002	100.0
	Excluded[a]	0	0,0
	Total	3002	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,447	0,450	4

Inter-Item Correlation Matrix

	E4 1 bin	F1 4 bin	F9 3 bin	G8 bin
E4 1 bin	1,000	0,182	0,119	0,193
F1 4 bin	0,182	1,000	0,115	0,269
F9 3 bin	0,119	0,115	1,000	0,142
G8 bin	0,193	0,269	0,142	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
E4_1_bin	0,60	0,637	0,247	0,062	0,392
F1_4_bin	0,88	0,670	0,285	0,094	0,343
F9_3_bin	1,01	0,838	0,180	0,033	0,440
G8_bin	0,98	0,732	0,312	0,103	0,326

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
1,15	1,080	1,039	4

SI_1_count frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	5648060	30,4	30,4	30,4
	1	6666694	35,9	35,9	66,3
	2	3949157	21,3	21,3	87,6
	3	1791117	9,6	9,6	97,2
	4	517613	2,8	2,8	100,0
	Total	18572641	100,0	100,0	

Source: Author's own compilation.

This component fairly satisfied the diagnostic requirements necessary to develop a scale. First, the case summary statistics confirmed that a correct number of items was considered for analysis. Secondly, the alpha value was 0.450 for the 4 standardized items in the component — close to, but below the minimum acceptable level of 0.5 — to guarantee the internal consistency reliability of the scale. Thirdly, while all inter-item correlations (IICs) were positive and implicitly measuring the same underlying concept, the mean IIC was 0.170, which again is close to, but lower than the acceptable 0.2 threshold. Furthermore, most of the 'corrected item-total correlations' were sufficiently close to or higher than the acceptable 0.3 level to justify adequate intercorrelations among items and lastly, none of the values within the 'alpha if item deleted' column was above the measured alpha value to confirm absence of outliers (Pallant, 2011: 100). Preliminary scale statistics indicated that the average bankable Ugandan scored a modest 28.75% (1.15 out 4) on the 'monitoring economic indicators' scale.

These findings are supported by the frequency distribution of scores indicating that more than half of the bankable population 66.3% (scores of 0 and 1) are doing little to nothing to monitor economic trends in their financial markets. Only 12.4% (scores of 3 and 4), appear to monitor their financial markets before choosing financial products.

While this sub-construct did not fulfill the conditions for internal consistency reliability, a scale was nonetheless designed using both the count score of financially savvy responses and the statistical output from PCA. Pearson's correlations between the scales indicated that there were no significant differences between them, even at the 1% level. As such, the study opted for the count measure and such results are reported below (refer to appendix C for output according to PCA).

Table 6.38 below represents the final scale statistics for the 'monitoring economic indicators' sub-construct. It confirms that the mean score was 29.75% (1.19 score out of 4) while both median and modal scores were at the 25% level, thus reasserting the observation that a significant number of the bankable population do not monitor economic trends as a guideline to choosing financial products and services. Therefore, a count scale for the sub-construct ranging from a minimum of zero (0) to a maximum of four (4) was adopted. This scale was then normalized to a 0 to 1 scale by dividing

the total number of items in the construct by 1. Table 6.38 below presents the statistical summary of the count measure for ‘monitoring economic indicators’.

Table 6.38: Scale statistics for ‘monitoring economic indicators’

Statistics		
		SI_1_count
N	Valid	18572641
	Missing	0
Mean		1.19
Median		1.00
Mode		1
Std. Deviation		1.058
Minimum		0
Maximum		4

Source: Author’s own compilation.

6.4.4.5 Attitude towards technology (Component 2)

A similar approach was followed in developing a scale for this sub-construct. Table 6.39 below provides the scale diagnostics on ‘attitude towards technology’. Observably, the component fairly satisfied the diagnostic requirements necessary to develop a scale. First, the case summary statistics confirmed that a correct number of items was considered for analysis. Secondly, the alpha value was 0.412 for the 3 standardized items in the component — close to, but below the minimum acceptable level of 0.5 — to guarantee the internal consistency reliability of the scale. Thirdly, while all inter-item correlations were positive and implicitly measuring the same underlying concept, the mean IIC was 0.189 which again was close to, but lower than the acceptable 0.2 threshold. In addition, most of the ‘corrected item-total correlations’ were sufficiently close to but lower than the acceptable 0.3 level to justify adequate intercorrelations among items and finally, none of the values within the ‘alpha if item deleted’ column was above the measured alpha value to confirm the absence of outliers (Pallant, 2011: 100). The scale statistics indicated an average score of 59.33% (1.78 out of 3) among the bankable population in Uganda implying a positive attitude towards technology. Scale frequencies in table 6.39 below indicate a greater distribution of the bankable population towards a higher belief in technology (63% who

scored 2 and 3 on the scale). This could probably explain the greater use of mobile telephony in Uganda.

Table 6.39: Scale diagnostics for 'attitude towards technology'

Case Processing Summary

		N	%
Cases	Valid	3002	100,0
	Excluded[a]	0	0,0
	Total	3002	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,409	0,412	3

Inter-Item Correlation Matrix

	F2 bin	H1 3 bin	H1 6 bin
F2 bin	1,000	0,190	0,119
H1 3 bin	0,190	1,000	0,259
H1 6 bin	0,119	0,259	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
F2_bin	1,26	0,581	0,194	0,041	0,411
H1_3_bin	1,11	0,551	0,299	0,093	0,213
H1_6_bin	1,20	0,557	0,242	0,072	0,318

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
1,78	0,978	0,989	3

SI_2_count frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2285273	12,3	12,3	12,3
	1	4556624	24,5	24,5	36,8
	2	6526372	35,1	35,1	72,0
	3	5204372	28,0	28,0	100,0
	Total	18572641	100,0	100,0	

Source: Author's own compilation.

Table 6.40 below represents the final scale statistics for the 'attitude towards technology' sub-construct. It confirms a mean score of almost 60% (1.79 score out of 3) with both median and modal scores above the 50% level — implying that a significant number of respondents have a positive attitude towards technology. Therefore, a count scale for the sub-construct ranging from zero (0) to three (3) was adopted. This scale was then normalized to a 0 to 1 scale by dividing the total number of items in the construct by 1.

Table 6.40: Scale statistics for 'attitude towards technology'

Statistics		
		SI_2_count
N	Valid	18572641
	Missing	0
Mean		1.79
Median		2,00
Mode		2
Std. Deviation		0.986
Minimum		0
Maximum		3

Source: Author's own compilation.

6.4.4.6 Overall measure for the staying informed construct (SI)

Subsequently, an overall measure for the staying informed construct (SI) was developed as a statistical combination of the 2 sub-constructs above. The scale diagnostics for this construct are presented in Table 6.41 below.

Table 6.41: Scale diagnostics for the 'staying informed' construct

Case Processing Summary

		N	%
Cases	Valid	3002	100,0
	Excluded[a]	0	0,0
	Total	3002	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,369	0,377	2

Inter-Item Correlation Matrix

	SI_1_count_s	SI_2_count_s
SI_1_count_s	1,000	0,233
SI_2_count_s	0,233	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SI_1_count_s	0,595	0,109	0,233	0,054	
SI_2_count_s	0,288	0,067	0,233	0,054	

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
0,883	0,216	0,4648	2

Source: Author's own compilation.

The diagnostics above indicate that the *staying informed* construct did not fully meet the internal consistency reliability necessary to develop a scale. While the case summary statistics above confirmed that a correct number of items was considered, the combined alpha value was only 0.377 for the 2 sub-constructs — marginally below the minimum acceptable level of 0.5. However, the combined mean IIC value was 0.233 and within the acceptable 0.2 and 0.4 range to support the internal validity of the scale (Pallant, 2011: 97). Nevertheless, the fact that both sub-constructs produced lower than acceptable IICs and/or alpha values casts some doubt on the internal validity of this scale.

Secondly, while all the 'corrected item-total correlations' were positive and implicitly measured the same underlying concept, they were marginally below the acceptable

0.3 level to justify adequate intercorrelations among items and lastly, it cannot be established whether none of the values within the 'alpha if item deleted' column was above the measured alpha value since the former could not be generated using two items (Pallant, 2011: 100).

However, a decision to consider the validity and inclusion of this scale was supported for two reasons. To begin with, it is plausible that unlike other constructs where several items meaningfully loaded, items in this construct were insufficient to fully operationalize it. This could be because the original questionnaire was not customized to measure financial literacy. In addition, it is possible that while the content validity and measurement of the construct was guided by a formative approach, the obtained item responses contained a reflective bias. Gable and Sedera (2009) observe that while the conceptualization and operationalization of a construct is controlled by a researcher, responses and their ultimate validation may be influenced by the respondent. They argue that the formative or reflective nature of a response must be coupled with formative or reflective measures respectively, to avoid misspecification. It is therefore plausible that responses to selected items were reflective of the overall construct rather than the specific evaluations of each component (Gable & Sedera, 2009: 3). This explains why component reliability was low and yet construct validity was acceptable.

To illustrate further, the 'attitude towards technology' sub-construct interrogates respondents' perception and use of technology in Uganda. Yet the country's extent and use of technology is predominantly digital and applies mostly with mobile telephony as opposed to other internet platforms[1] consistent among the more developed economies (see FinScope, 2018: 10). This implies that applying a 'one size fits all' measure (question) on the use of technology among Ugandans would likely provide conflicting results when compared to the more advanced economies where technology use is driven by, among others, internet and/or digital connectivity, ATM usage and other platforms. Therefore, accurate assessment of the sub-construct

[1] The FinScope, (2018:10) top-line findings on Uganda indicate that over half (52%) of the population use mobile phones as opposed 10% who have access to the internet and probably use it to transact electronically.

would require taking cognizance of the economic and social contexts of the country and a customization of the items used for measurement.

Subsequently, the final scale statistics for the *staying informed* (SI) construct indicated that the mean bankable population scored 44.15% (0.883 out of 2) on this scale. Based on the acceptable arbitrary median of 50%, this score indicates a generally moderate level of staying informed among bankable Ugandans. Therefore, an overall scale for the *staying informed* construct was developed with a minimum value of 0 and a maximum of 2, which was then normalized to the 0 to 1 (percentage scale) by dividing the number of items in the construct by 1.

6.4.5 The Composite financial literacy Index

Following the development of scales for each of the financial literacy constructs above, a composite financial literacy index was developed as a statistical combination of the four constructs, namely, *money management, planning ahead, choosing financial products and staying informed.* The scoring of this index was guided by both a count measure of financially savvy responses at the one end and a statistical output using PCA at the other and is provided by equation 6.1 below:

Financial literacy (finlit) = fn (money management (MM) + planning ahead (PA) + choosing financial products (CFP) + staying informed (SI) (6.1)

The PCA procedure was guided by an approach similar to that provided in equation 5.1 while the count measure obtained a summation of the normalized scores in each of the financial literary constructs taking cognizance of the relative weights contributed by each construct to the index. Since both measures produced similar results (see section 6.4.1.2), the study opted for the count measure of financial literacy. Table 6.42 below provides the scale diagnostics for this index.

Table 6.42: Scale diagnostics for the composite financial literacy index

Case Processing Summary

		N	%
Cases	Valid	3002	100,0
	Excluded[a]	0	0,0
	Total	3002	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,725	0,756	4

Inter-Item Correlation Matrix

	MM_count_s	PA_count_s	CFP_count_s	SI_count_s
MM_count_s	1,000	0,236	0,199	0,285
PA_count_s	0,236	1,000	0,661	0,590
CFP_count_s	0,199	0,661	1,000	0,644
SI_count_s	0,285	0,590	0,644	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
MM_count_s	1,127	0,540	0,270	0,089	0,730
PA_count_s	1,385	0,475	0,630	0,487	0,598
CFP_count_s	1,313	0,443	0,620	0,537	0,597
SI_count_s	1,250	0,534	0,657	0,480	0,613

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
1,692	0,811	0,9006	4

Source: Author's own compilation.

The table above indicates that the index satisfied the diagnostic requirements necessary to develop a scale. First, the case summary statistics confirmed the correct number of items for analysis. Secondly, the alpha value was 0.756 for the 4 standardized constructs in the index and above the minimum acceptable level of 0.5 to guarantee the internal consistency reliability of the scale. Thirdly, all inter-item correlations were positive, implying that they measured the same underlying concept. Additionally, most of the 'corrected item-total correlations' were sufficiently above the acceptable 0.3 level to justify adequate intercorrelations among items and lastly, none of the values within the 'alpha if item deleted' column was above the measured alpha value to confirm the absence of outliers (Pallant, 2011: 100). Final scale statistics indicate that the average bankable Ugandan scored a moderate 42.3% (1.692 out 4)

on the composite financial literacy index. While this value is lower than the acceptable 50% median, it nonetheless indicates a good score for the average Ugandan.

6.5 CHAPTER SUMMARY

In attempting to assess whether financial literacy influences financial inclusion in Uganda, this chapter set to develop a literature-guided financial literacy index and individual financial literacy constructs with which to achieve this objective. Through the application of Principal Component Analysis, the study identified and optimized a set of variables (components) that reliably represent a financially astute (financially literate) individual. These components were later operationalized to form a financial literacy scale which was then applied to binary logistic and probit models to assess its effect on financial inclusion. The following chapter estimates the outputs between financial literacy and financial inclusion in Uganda.

CHAPTER 7
MODEL ESTIMATION AND EMPIRICAL RESULTS

7.1 INTRODUCTION

The previous chapter detailed the statistical processes followed in the construction of a composite financial literacy index and the constructs of the latter. This chapter presents the econometric output from the binary logistic and probit estimations applied to investigate the effect of financial literacy on financial inclusion in Uganda. It is organized as follows: Section 7.2 precedes the analysis with a descriptive overview of the relationships among the variables used in this study. It details the between-group analyses between measures of financial literacy and certain population demographics (control variables) at the one end, and measures of financial literacy and financial inclusion at the other. This sets the precedence for binary logistic estimations between measures of financial literacy, control variables, and the study's proxy for financial inclusion presented in section 7.3. Section 7.4 repeats the latter analysis using the composite financial literacy index, while section 7.5 covers the robustness checks of these relationships using binary probit estimations. Section 7.6 summarizes the model estimation results and the last section concludes the chapter.

7.2 BETWEEN GROUP ANALYSIS

Preliminary analysis employed two statistical processes to investigate the relationships between the variables in the study. First, it employed independent-sample t-tests to investigate the relationship between scores of financial literacy and two demographic sub-groups within the Ugandan population. The aim was to assess, for instance, whether there are any significant differences in the mean financial literacy scores between males and females. The process involved: (1) inspecting the group statistics tables to verify whether the means, standard deviations and totals for each group are accurate as per the analysis; (2) analyzing the independent sample t-tests to assess the equality of variances among sub-groups using among others, the Levene's test of equality of variances and, (3) assessing possible differences in the mean financial literacy scores of sub-groups based on statistical significance (Pallant, 2011: 239).

Additionally, it applied the one-way analysis of variance (ANOVA) approach to compare the mean financial literacy scores of more than two demographic sub-groups within the population. This involved comparing the mean financial literacy scores (performance rated on a 0 to 1 scale) of the different age groups within the Ugandan population. Specifically, the analysis involved an inspection of descriptive tables to verify the correct scores of means, standard deviations and total scores, tests of homogeneity of variance, tests for the robustness of the equality of means and the assessment of post-hoc tests where applicable (Pallant, 2011: 249).

Due to space limitation, the data from these analytical processes was extracted and applied to Table 7.1 below, which provides a comparison of mean scores of financial literacies across gender groups, age groups, levels of income as well as the use of mobile money within the population of Uganda. A discussion of each of these factors follows and detailed analytical tables are included in appendix C.

7.2.1 Financial literacy and gender

As indicated in Table 7.1 below, an independent-samples t-test was conducted to compare the mean financial literacy scores of females and males in Uganda. There were significant differences in these scores across all financial literacy constructs and the overall financial literacy index, with the latter indicating a mean score (M) of 0.40 and standard deviation (SD) of 0.222 for females and M = 0.46 and SD = 0.226 for males. With equal variances assumed, these results were statistically significant at the 1% level (p = 0.001, two-tailed). The findings indicated that across all constructs and the overall financial literacy index, bankable Ugandan males are more financially literate than their female counterparts. This observation aligns with earlier theoretical and empirical discourse on gender-based differences in financial literacy (Allen *et al.,* 2016: 2).

Table 7.1: Between-group analysis of financial literacy and population demographics.

Factor	Total n=3002	Gender		Age				Income					Mobile Money	
		Female n=1950	Male n=1052	16 -24 n=854	25 – 31 n=674	32 – 45 n=766	45+ n=708	None n=368	1 - 35000 n=625	35001 – 100 000 n=705	100 001 – 300 000 n=657	300 001 – 100 000 n=511	No n=1382	Yes n=1620
MM*	M=0.56	0.54	0.61	0.55	0.59	0.60	0.52	0.39	0.51	0.57	0.62	0.67	0.56	0.62
	SD=0.36	(0.359)	(0.354)	(0.361)	(0.355)	(0.361)	(0.350)	(0.362)	(0.363)	(0.352)	(0.336)	(0.330)	(0.365)	(0.343)
		t - statistics p = 0.000			**t - statistic p = 0.000**					**t - statistic p = 0.000**			**t -statistic p = 0.000**	
PA*	M=0.31	0.29	0.34	0.27	0.35	0.35	0.26	0.13	0.25	0.32	0.35	0.44	0.23	0.37
	SD=0.30	(0.283)	(0.298)	(0.279)	(0.298)	(0.297)	(0.277)	(0.195)	(0.264)	(0.287)	(0.229)	(0.298)	(0.260)	(0.298)
		t - statistics p = 0.000			**t -statistic p = 0.000**					**t - statistic p = 0.000**			**t - statistic p = 0.000**	
CFP*	M=0.38	0.36	0.41	0.36	0.42	0.43	0.31	0.24	0.31	0.39	0.43	0.50	0.29	0.45
	SD=0.32	(0.320)	(0.318)	(0.306)	(0.320)	(0.336)	(0.308)	(0.262)	(0.305)	(0.319)	(0.319)	(0.323)	(0.293)	(0.325)
		t - statistics p = 0.000			**t - statistics p = 0.000**					**t - statistics p = 0.000**			**t - statistics p = 0.000**	
SI*	M=0.44	0.42	0.48	0.46	0.48	0.47	0.35	0.35	0.37	0.45	0.47	0.54	0.34	0.53
	SD=0.23	(0.226)	(0.237)	(0.212)	(0.221)	(0.240)	(0.237)	(0.211)	(0.217)	(0.229)	(0.229)	(0.229)	(0.211)	(0.214)
		t - statistics p = 0.000			**t - statistic p = 0.000**					**t - statistic p = 0.000**			**t - statistics p = 0.000**	
FinLit*	M=0.42	0.40	0.46	0.41	0.46	0.46	0.36	0.28	0.36	0.43	0.47	0.54	0.34	0.49
	SD=0.23	(0.222)	(0.226)	(0.217)	(0.226)	(0.225)	(0.220)	(0.196)	(0.205)	(0.216)	(0.215)	(0.219)	(0.207)	(0.216)
		t - statistics p = 0.000			**t - statistic p = 0.000**					**t- statistic p = 0.000**			**t - statistics p = 0.000**	

Source: Author's own compilation.

MM*, PA*, CFP*, SI*, refer to "money management", "planning ahead", "choosing financial products" and "staying informed" respectively and denote the constructs of financial literacy while FinLit* refers to the combined financial literacy index.Values without parenthesis represent the mean scores measured on a scale of [0 – 1], while values in parenthesis denote the standard deviations (SD) of the mean scores.

t – statistic measured at the 1% level of significance.

7.2.2 Financial literacy and mobile money use

Similarly, independent-sample t-tests were used to assess the relationship between the use of mobile money and the level of financial literacy across the bankable population of Uganda. While the assumption of equal variances could not be made in this case due to a lower than acceptable 0.05% level of significance (see; Levene's test of equality of variances in appendix C), findings indicated that significant differences exist between the mean financial literacy scores of users and no-users of mobile money. Moreover, all financial literacy constructs indicate a higher score for users of mobile money compared to non-users. The overall financial literacy index, *finlit,* (see Table 7.1 above) indicated higher mean scores of M = 0.49, SD = 0.207 among mobile money users compared to M = 0.34, SD = 0.216 among non-users. These findings were statistically significant at the 1% level (p = 0.001, two-tailed).

While these findings align with earlier theoretical and empirical literature, the causality between the two has not yet been fully empirically investigated. There is a likelihood that in Uganda, financially literate individuals incline towards the use of mobile money, yet it is also plausible that mobile money use stimulates astute financial behaviors such as savings and investments among the population. As such, this causality needs further investigation.

7.2.3 Financial literacy and age

Additionally, the study used an independent groups design approach to assess the effect of mean financial literacy scores on the different age groups in Uganda using the one-way analysis of variance (ANOVA) procedure. This test assesses the relationship between one independent variable (with different sub-groups) with one continuous dependent variable — in this case financial literacy — and confirms for any significant differences in mean scores of the dependent variable across the different groups (Pallant, 2011: 250).

This one-way between-groups ANOVA was conducted to explore the impact of financial literacy on age, where the bankable population was divided into four age groups: (1) 16 – 24 years, (2) 25 – 31 years, (3) 32 – 45 years and (4) 46 years and

above. While most of the financial literacy constructs violated the homogeneity of variances assumption due to lower *p*-values than the acceptable 0.05% critical level (Levene's test[1]), the composite measure of financial literacy (*finlit*) did not (*p*-value of 0.437) and confirmed that statistically significant differences exist between the mean scores of financial literacy and age at the 1% level of significance.

Results in Table 7.1 indicate that groups 2 (M = 0.46, SD = 0.226) and 3 (M = 0.46, SD = 0.225) provided similar but higher mean scores for financial literacy compared to groups 1 (M =0.41, SD = 0.217) and 4 (M = 0.36, SD = 0.220). This suggests that financial literacy is not a linear function of age. Rather, it increases with the latter until a certain age — in this case 46 and above years — and then begins to decline. Interestingly, these trends align with formal account ownership in Africa according to Triki & Faye, (2013: 49) and debt literacy by Lusardi & Tufano, (2009:8).

7.2.4 Financial literacy and income

The study also examined the relationship between financial literacy and the monthly income earned by the bankable Ugandans. The latter were divided into five income groups based on the local currency denomination[2]: (1) no income, (2) 1 – 35 000, (3) 35 001 – 100 000, (4) 100 001 – 300 000 and (5) 300 001 and above. While the condition of homogeneity of variances was not met, all ANOVA *p*-values were statistically significant at the 1% level to suggest statistically significant differences among the mean scores of financial literacy and income. Table 7.1 indicates a linear positive relationship between financial literacy and the income level since across each construct and/or the financial literacy index, an increase in income is coupled with an increase in the obtained financial literacy score. This observation aligns with the theoretical and empirical literature on income and financial literacy. Finally, independent t-tests were used to examine the relationship between financial literacy and financial inclusion. Findings are presented in Table 7.2 below.

[1] Levene's test for homogeneity of variances tests whether the variance in the mean scores of groups is the same. If this value is greater than 0.05, then this assumption has not been violated (Pallant, 2011:253).
[2] Shilling (shs) the currency denomination of Uganda

TABLE 7.2: Between-group analysis of financial literacy and financial inclusion.

Total n = 3002	MM	PA1	PA2	CFP	SI1	SI2	FinLit
Not financially included n = 840	M = 0.48	M = 0.16	M = 0.15	M = 0.21	M = 0.15	M = 0.45	M = 0.28
	SD = 0.367	SD = 0.262	SD = 0.301	SD = 0.235	SD = 0.185	SD = 0.320	SD = 0.182
Financially included n = 2 162	M = 0.60	M = 0,32	M = 0.42	M = 0.44	M = 0.34	M = 0.65	M = 0.48
	SD = 0.347	SD = 0.332	SD = 0.420	SD = 0.325	SD = 0.267	SD = 0.316	SD = 0.217
t -statistic	t (1 460) = -9. 075	t (1 919) = -13. 415	t (2 117) = -19. 533	t (2 100) = -21. 798	t (2 186) = -21. 396	t (1 513) = -15. 569	t (1 811) = -24. 656
significance	*p* = 0.000	*p* = 0.000	*p* = 0.000	*p* = 0.000	*p* = 0.000	*p* = 0.000	*p* = 0.000

Source: Author's own compilation.

MM denotes money management (making ends meet)
PA1 denotes planning ahead (planning for the future)
PA2 denotes planning ahead (attitude towards planning for the future)
CFP denotes choosing financial products (seeking financial advice),
SI1 denotes staying informed (monitoring economic indicators),
SI2 denotes staying informed (attitude towards technology)
FinLit refers to the composite financial literacy index.

7.2.5 Financial literacy and financial inclusion

Table 7.2 above provides a preliminary analysis of the relationship between the mean financial literacy scores of financially included and financially excluded individuals in Uganda. While equal variances among these mean groups could not be assumed ($p \geq 0.05$ for Levene's test), the latter indicated statistically significant differences at the 1% level ($p = 0.001$, two-tailed). As such, two observations were made. First, across all constructs, financially included individuals obtained higher mean financial literacy scores than their counterparts, indicating a possible causality between financial literacy and financial inclusion. Secondly, financially included individuals appeared to score higher on 'attitude towards technology' (M = 0.65) and 'making ends meet' (M = 0.60) than on, among others, 'monitoring economic indicators' (0.34) and/or 'planning ahead for the future' (0.32). The higher attitude towards technology among the population appears to suggest that leveraging technology could enhance financial inclusion efforts in Uganda.

7.3 BINARY LOGISTIC REGRESSION ESTIMATIONS

This section presents the binary logistic models that predict the chances that a bankable individual in Uganda is financially included based on a predictive set of variables. These models allow for the prediction of a discrete outcome such as group membership (or financial inclusion) based a given set of underlying predictor variables (Tabachnick & Fidell, 2007: 437). The analysis follows a set of processes that result in the determination of model adequacy based on the "goodness of fit" criterion and provide: (1) an indication of the relative importance of each predictor variable and/or a possible interaction among the latter and, (2) a summary of the accuracy of the classification of cases based on the mode, which allows for the calculation of the sensitivity and specificity of the model (Pallant, 2011: 171).

The underlying assumptions for the binary logistic regressions which apply to this study were ensured through: (1) a large sample size with an adequate number of predictors, (2) tests for multicollinearity to check and control for high intercorrelations among independent variables and, (3) checks and exclusion of possible outliers (Pallant, 2011: 169). These processes are discussed later in the chapter.

The study models the chance of financial inclusion by a bankable adult in Uganda as a function of financial literacy (principal independent variable) and certain population demographics (control variables) which include age, gender, income and education. Two binary logistic regression outputs (models 1 and 2) are obtained using the default SPSS v25 Enter method. These models attempt to assess model-fit based on the two relationships whose functions are detailed below:

(1) *Financial inclusion (finInc) = fn (money management (MM) + planning for the future (PA1) + attitude towards planning for the future (PA2) + choosing financial products (CFP) + monitoring economic indicators (SI1) + attitude towards technology (SI2) + age + gender + income + education).* (7.1)

(2) *Financial inclusion (finInc) = fn (financial literacy (finlit) + age + gender + income + education.* (7.2)

Where financial literacy *(finlit)* = (MM + PA1 + PA2 + CFP + SI1 + SI2)

7.3.1 Model diagnostics

The model diagnostic process involves an inspection, interpretation and comparison between two model forms, namely, Block 0 and Block 1, to assess for "goodness of fit". The Block 0 model is the null and serves as a baseline for comparison with other models. It provides the output prior to the inclusion of any independent variables and consists of the intercept (constant). Block 1 shows the results of the logistic output following the addition of selected independent variables. The systematic approach of model interpretation includes four processes among others. First is the inspection of the case processing summary to ensure that the correct number of cases are analyzed and that the criterion for sample size is adequate for logistic regression. Then there is the dependent variable coding which indicates how SPSS deals with the coding of the dependent variable. In this case, a coding of 1 denotes a financially included individual and 0 otherwise. The next process is an interpretation of the Block 0 model's classification table to confirm the correct number of cases prior to the inclusion of

independent variables, and finally is the interpretation of the Block 1 model after the inclusion of independent variables.

Interpretation of Block 1 involves an inspection of the Omnibus Tests of Model coefficients which provide the result of the likelihood ratio test and indicate whether the inclusion of independent variables significantly improves the model fit over and above the results obtained for Block 0. This is referred to as the "goodness of fit test". Ideally, the model's -2 log-likelihood value (in model summary) decreases with the inclusion of enhancing predictor variables and the chi-square value should be statistically significant at values lower than the 0.05 level to confirm that the model performs better than SPSS original guess in Block 0 (Pallant, 2011: 175; Tabachnick & Fidell, 2007: 447). Conversely, the Hosmer & Lemeshow Goodness of Fit Test supports model adequacy only when the obtained chi-square value is not statistically significant at the 0.05 level.

Similarly, the pseudo R-square statistics which include the Cox & Snell R Square and the Nagelkerke R Square (in model summary) provide an indication of the amount of variation in the dependent variable explained by the model and range from a minimum of 0 to a maximum of approximately 1, with values closer to the latter indicating high model adequacy. The classification table serves two functions. It assesses how well the model predicts the correct category for each case, for example, categories of financially included and/or financially excluded individuals. This value is compared with the Block 0 classification table to assess the overall cases accurately specified or PAC[1]. A higher percentage indicates improvement of the model at specifying cases. Furthermore, it provides additional statistical tests to measure the sensitivity, specificity and predictability of the model (Pallant, 2011: 176).

Finally, the 'variables in the equation' table provides information about the contribution each predictor variable makes towards the model. It computes the probability of financial inclusion using odds ratios such that, predictor-variable odds ratios greater than one indicate higher chances of a financial inclusion outcome, while lower ones indicate the reverse outcome. The Wald test measures the significance of each

[1] PAC refers to percentage accuracy in classification (Pallant, 2011: 176).

coefficient in the logistic output and if statistically significant at values lower than the 0.05 level, the concerned variable explains the financial inclusion outcome (Makina, 2012: 372; Pallant, 2011: 177). Lastly, *B* coefficients specify the model by determining the probability that a case falls into a specific category and not the other, while *Exp (B)* coefficients indicate "the change in odds of being in one of the categories of outcome when the value of the predictor increases by one unit" (Pallant, 2011: 177; Tabachnick & Fidell, 2007: 461). The following sub-section details this process to model the chance that a bankable adult in Uganda is financially included, based on certain independent demand-side factors.

7.3.2 Dependent variable coding and Case processing summary

This section presents the logistic regression models that predict the chances of financial inclusion in Uganda. Table 7.3 below presents the case processing summary and the original coding of the dependent variable financial inclusion. The former indicates that all respondents (3002) representing the bankable population in Uganda were included in the analysis while the latter confirms that a coding of 0 and 1 denotes a financially excluded and financially included individual respectively.

Table 7.3: Dependent variable coding and case processing summary.

Dependent Variable Encoding	
Original Value	Internal Value
0 Not financially included	0
1 Financially included	1

Case Processing Summary			
Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	3002	100,0
	Missing Cases	0	0,0
	Total	3002	100,0
Unselected Cases		0	0,0
Total		3002	100,0

a. If weight is in effect, see classification table for the total number of cases.

Source: Author's own compilation.

The study models the chance of financial inclusion by a bankable adult in Uganda as a function of financial literacy as defined by six constructs which are as follows: (1) money management (MM), (2) planning for the future (PA1), (3) attitude towards

planning for the future (PA2), (4) choosing financial products, (5) monitoring economic indicators and (6) attitude towards technology and four control variables; age, gender, income and education.

7.3.3 Model 1

This model consists of six independent variables representing the constructs of financial literacy (described above) and is presented in two forms: Block 0, and Block 1. Block 0 is the null model and represents the output without independent variables. It acts as the baseline for comparison with other models and only consists of a constant (Tabachnick & Fidell, 2007: 439). Tables 7.4 displays the model 1 Block 0 output which consists of the classification table, variables in the equation and variables not in the equation.

Table 7.4: Model 1 Block 0.

Classification Table[a,b]

Observed			Predicted FinInclusion Financial inclusion [K1_1] 0 Not included	1 Included	Percentage Correct
Step 0	FinInclusion Financial inclusion [K1_1]	0 Not included	0	840	0,0
		1 Included	0	2162	100,0
	Overall Percentage				72,0

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	0,945	0,041	540,684	1	0,000	2,574

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	MM_count_s	83,797	1	0,000
		PA_1_count_s	139,932	1	0,000
		PA_2_count_s	262,066	1	0,000
		CFP_count_s	321,442	1	0,000
		SI_1_count_s	301,903	1	0,000
		SI_2_count_s	226,394	1	0,000
	Overall Statistics		496,905	6	0,000

Source: Author's own compilation.

The classification table above indicates how well the null model predicts the broad measure of financial inclusion (K1.1)[1] in Uganda. Given the cases of the two decision outcomes (financially included and financially not included), 72% (2162/3002) of these cases opted to be financially included while 28% (840/3002) did not. Accordingly, without further information or the inclusion of independent variables, the study predicts that if for every case an individual opts to be financially included, the null model will be accurate 72% of the time. Therefore, the overall percentage of cases that are correctly specified by the constant-only/null model is 72% hence it can be concluded that the model is valid and a good fit for the data to be replicated.

However, following a between-model comparison approach, the study statistically compares the null model with one containing predictor variables to assess for differences in model fit. Table 7.4 displays the "Variables in the Equation" section which indicates that the Wald Chi-square statistic does not equate to zero. According to this statistic, the null hypothesis is accepted if the former equates to zero and/or is not statistically significant at the 5% level (Tabachnick & Fidell, 2007: 59).

However, the *p*-value for this statistic was 0.000 and below the critical value of 0.05. This means that the null hypothesis was rejected, and it was concluded that the predicted odds for financial inclusion in Model 1 Block 0 is 2.574, at a statistically significant level lower than 1%. Additionally, the score tests for predictor variables under the 'Variables not in the Equation' section indicate non-zero values at statistically significant *p*-values (0.000) lower than the acceptable 5% level. This suggests that including these independent variables into the null model would improve its predictive ability.

Therefore, the second step in the analysis was to assess whether predictor variables contribute to a better prediction of the outcome. This process involves a comparison between the null/constant-only model and the null model including predictor variables (Tabachnick & Fidell, 2007: 458). Table 7.5 below shows the results of the binary

[1] The broad measure of financial inclusion is based on the definition of "formal account ownership" and includes participation with the following in the context of Uganda: (1) Banks, (2) Microfinance institutions, (3) Formal micro lenders, (4) Savings and credit cooperatives (SACCOs), (5) Cooperatives, (6) Mobile money services, (7) Insurance services, (8) Pension services and (9) Savings groups/Merry-go-rounds but excludes Informal money lenders. This constitutes about 72% of the bankable population (FinScope Uganda, 2018).

logistic regression following the addition of the components that define financial literacy.

Table 7.5: Model 1 Block 1 (METHOD = ENTER).

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	562,100	6	0,000
	Block	562,100	6	0,000
	Model	562,100	6	0,000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2996.933[a]	0,171	0,246

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3,604	8	0,891

Classification Table[a]

Observed			Predicted FinInclusion Financial inclusion [K1_1] 0 Not included	1 Included	Percentage Correct
Step 1	FinInclusion Financial inclusion [K1_1]	0 Not included	284	556	33,8
		1 Included	210	1952	90,3
	Overall Percentage				74,5

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	MM_count_s	0,342	0,128	7,170	1	0,007	1,408
	PA_1_count_s	0,895	0,185	23,493	1	0,000	2,448
	PA_2_count_s	0,744	0,173	18,602	1	0,000	2,105
	CFP_count_s	1,125	0,310	13,205	1	0,000	3,081
	SI_1_count_s	0,708	0,402	3,105	1	0,078	2,029
	SI_2_count_s	1,347	0,141	91,072	1	0,000	3,845
	Constant	-0,905	0,105	74,039	1	0,000	0,404

a. Variable(s) entered on step 1: MM_count_s, PA_1_count_s, PA_2_count_s, CFP_count_s, SI_1_count_s, SI_2_count_s.

Source: Author's own compilation.

As mentioned in section 7.3.1 above, the omnibus test of model coefficients gives the results of the likelihood ratio test which indicates whether the addition of an independent variable (financial literacy) significantly improves the model fit. Table 7.5 above provides the omnibus test of model coefficients which indicates a chi-square value of 562.1 on 6 degrees of freedom (df), with a block *p*-value of 0.000. This value was statistically lower than the 0.05 level of significance, implying that Model 1 Block

1, containing the set of financial literacy predictors, performs better than SPSS's original guess in Model 1 Block 0 and confirms an improved model "goodness of fit" (Pallant, 2011: 175).

Conversely, the Hosmer & Lemeshow test confirms model goodness of fit when the chi-square statistic is not significant (Tabachnick & Fidell, 2007: 459). According to Table 7.5, this value was 3.604 on 8 df with a *p*-value of 0.891. This value is not statistically significant at the 95% confidence level, suggesting improved model goodness of fit and confirming the earlier observation that Model 1 Block 1 performs better than SPSS's original guess in Model 1 Block 0.

Additionally, the model summary in Table 7.5 indicates a reduction in the -2 Log likelihood *(-2LL)* values between the two models. According to Hair *et al.* (2014: 323) and Tabachnick and Fidell (2007: 448), improved model fit is confirmed when there is a reduction in the calculated *-2LL* values between the null model and the null model with predictor variables. Table 7.5 confirms that this *-2LL* statistic decreased from 3559.033 (2996.933 + 562.1) to 2996.933 between the null model and the null model with predictors respectively. This reduction in *-2LL* values confirms an improvement in model fit between the latter and the former and suggests that the inclusion of financial literacy predictor variables significantly improved the model's adequacy (Hair, *et al*., 2014: 332).

Furthermore, Table 7.5 presents the pseudo R-square statistics in the model summary which provide further information about the usefulness of this model. These values (Cox & Snell R-square and the Negelkerke R-square) provide an indication of the amount of variation in the dependent variable explained by the model. Notably, while these measures are merely analogous to the R-square statistic computed for multiple linear regressions, they nonetheless approximate the former for logistic regressions. Secondly, while the Cox & Snell R^2 measure is based on Log-likelihoods and accounts for sample size, it does not achieve a value of 1. It is the Nagelkerke R^2 which adjusts its value to equate to 1 (Tabachnick & Fidell, 2007: 460). Table 7.5 indicates that these statistics were 0.171 and 0.246 respectively suggesting that between 17.1% and 24.6% of the model variability is explained by the set of financial literacy predictors in the model (Pallant, 2011: 176).

Further output in Table 7.5 displays the classification table of Model 1 Block 1 which indicates how well the latter predicts the correct category of financially included and financially not included cases. This value is compared to the classification table of the null model to assess for improvement (Pallant, 2011: 176). Table 7.5 indicates an improved albeit minimal percentage accuracy of classification (PAC) of 74.5% for Model 1 Block 1, compared to 72% for Model 1 Block 0. The former accurately identifies 90.3%[1] of the cases as financially included (true positives) and 33.8%[2] of them as financially not included (true negatives). As such, the positive predictive value[3] of the model was 77.8% (1952/ (556 + 1952) while its negative predictive value[4] was 57.5% (284/ (210 + 284) (Pallant, (2011: 176). These results confirm that Model 1 Block 1 results in an improved model fit compared to the null model.

Finally, the 'variables in the equation' section provides information about the contribution each predictor variable makes to the model and/or the dependent variable, financial inclusion. Statistical inference is provided by: (1) the Wald statistic which should be statistically significant at the 5% level to confirm variable contribution, (2) corresponding *B*-coefficients which represent the log-odds of the binary logistic regression equation and provide both the probability of a case falling in a particular category and the direction (positive or negative) of the relationship, and (3) the *Exp (B)* coefficients which are the odds ratios and represent the change in the odds of being in one of the categories when the value of the predictor variable increases by one unit (Pallant, 2011: 177)

According to the Wald statistic in Table 7.5, all financial literacy predictors excluding SI1 (monitoring economic indicators) contributed significantly to the predictive ability of the model at *p* values ($p = 0.001$) lower than the 5% level of significance. This means that each is a significant predictor of financial inclusion in Uganda. Similarly, they all had corresponding positive and statistically significant relationships with financial

[1] This represents the sensitivity measure of the model, that is, the percentage of financially included cases (true positives) correctly identified by the model (Pallant, 2011: 176).
[2] This represents the specificity measure of the model, that is, the percentage of financially not included cases (true negatives) correctly identified by the model (Pallant, 2011: 176).
[3] This is the percentage of cases that the model identifies as financially included and is actually observed in this group (Pallant, 2011: 176).
[4] This is the percentage of cases that the model identifies as financially not included and is actually observed not to have the characteristic (Pallant, 2011: 176).

inclusion as indicated by their *B* – coefficients. The study concluded that financial literacy has a positive and statistically significant effect (*p*-value = 0.000) on financial inclusion in Uganda. The fitted Model 1 Block 1 equation is shown as equation 7.3 below.

$$finInc = -0.905 + 0.342MM + 0.895PA1 + 0.744PA2 + 1.125CFP + 1.347SI2 \quad (7.3)$$

where:

finInc = financial inclusion in Uganda
MM = money management (making ends meet)
PA1 = planning ahead (planning for the future)
PA2 = planning ahead (attitude towards planning for the future)
CFP = choosing financial products (seeking financial advice),
SI2 = staying informed (attitude towards technology)

Finally, the odds ratios that a bankable Ugandan is financially included are represented by the predictor variable's *Exp (B)* coefficient in Table 7.5 above. According to Makina, (2012: 374) an odds ratio (*Exp (B)* coefficient) greater than one indicates a greater probability of an individual being financially included. As such, it can be inferred, 'ceteris paribus', that: (1) individuals who 'make financial ends meet' are 1.408 times more likely to be financially included; (2) those that plan for their future financial welfare are 2.448 times more likely to be financially included; (3) individuals with a positive attitude towards planning for the future are 2.105 times more likely to be financially included; (4) those that seek financial advice before choosing financial products are 3.081 times more likely to be financially included and (5) those with a positive attitude towards the evolution of technology are 3.845 times more likely to be financially included. Therefore, based on the above, it appears that knowledge of, and the application of technology, seeking financial advice and planning for the future, are the critical financial literacy drivers to financial inclusion in Uganda. This observation is supported by the higher odds ratios exhibited among these predictor variables. The following sub-section presents the binary logistic regressions of the full model which includes the control variables.

7.3.4 Model 2

The second (or full) model presents the comparative results of the binary logistic regression subject to the inclusion of the financial literacy constructs and the four control variables, namely, age, gender, income and education. Like model 1, Model 2 is presented dually consisting of a Block 0 and a Block 1 to allow for output comparison. Table 7.6 below presents the model 2 Block 0 output.

Table 7.6: Model 2 Block 0.

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	2859	95,2
	Missing Cases	143	4,8
	Total	3002	100,0
Unselected Cases		0	0,0
Total		3002	100,0

a. If weight is in effect, see classification table for the total number of cases.

Classification Table[a,b]

Observed			Predicted Financial inclusion [K1_1] Not included	Predicted Financial inclusion [K1_1] Included	Percentage Correct
Step 0	Financial inclusion [K1_1]	Not included	0	802	0,0
		Included	0	2057	100,0
	Overall Percentage				71,9

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	0,942	0,042	511,917	1	0,000	2,565

Variables not in the Equation[a]

			Score	df	Sig.
Step 0	Variables	MM_count_s	85,697	1	0,000
		PA_1_count_s	138,722	1	0,000
		PA_2_count_s	257,055	1	0,000
		CFP_count_s	318,529	1	0,000
		SI_1_count_s	297,928	1	0,000
		SI_2_count_s	212,266	1	0,000
		Age (C7)	9,894	1	0,002
		Gender (C8)	1,569	1	0,210
		Monthly income (D8)	15,903	1	0,000
		Educational level (C10)	236,657	1	0,000

a. Residual Chi-Squares are not computed because of redundancies.

Source: Author's own compilation.

The model consists of ten independent variables, with 6 representing the components of financial literacy and four, the control variables which are age, gender, income and education. It is presented in two forms: Block 0, and Block 1. Block 0 (Table 7.6 above) is the null/constant-only model representing the output without independent variables and acts as the baseline for comparison with other models (Tabachnick & Fidell, 2007: 439). It consists of the case processing summary, a classification table, variables in the equation and variables not in the equation.

The case processing summary in Table 7.6 indicates that the overall analysis was conducted on 2859 cases out of a total sample of 3002 individuals. This represented 95.2% of the original sample, with 4.8% of them omitted for missing information. The classification table indicates how well the null model predicts the broad measure of financial inclusion. Given the cases of the two decision outcomes (financially included and financially not included), 71.9% (2057/2859) of these cases opted to be financially included while 28% (802/2859) did not. Without further information or the inclusion of independent variables, the study predicts that if, for every case, an individual opts to be financially included, the null model will be accurate 71.9% of the time. Therefore, the overall percentage of cases correctly specified by this model is 71.9% and the model is valid and a good fit for data replication.

Following a between-model comparison, the study statistically compares the null model with one containing predictor variables to assess for differences in model fit. Table 7.6 displays the 'Variables in the Equation' section which indicates that the Wald Chi-square statistic does not equate to zero. According to Tabachnick and Fidell (2007: 59), the null hypothesis is accepted if this value equates to zero and/or is not statistically significant at the 5% level. This statistic indicates a *p*-value of 0.000 which is below the critical value of 0.05. As such, the study rejects the null hypothesis and concludes that the predicted odds ratio for financial inclusion in Model 2 Block 0 is 2.565 and is statistically significant at a level lower than 1%. Similarly, all predictor variable scores excluding gender (C8), in the 'Variables not in the Equation' section indicate non-zero values at statistically significant *p*-values (0.000) lower than the critical 5% level. This implies that including these variables into the null model would improve its predictive ability.

Therefore, further analysis compares the null/constant-only model above with the null model including predictor variables. Table 7.7 below shows the Model 2 Block 1 results of the binary logistic regression following the addition of all independent variables.

Table 7.7: Model 2 Block 1 (METHOD = ENTER).

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	704,513	10	0,000
	Block	704,513	10	0,000
	Model	704,513	10	0,000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2688.785[a]	0,218	0,314

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	7,910	8	0,442

Classification Table[a]

Observed			Predicted Financial inclusion [K1_1]		Percentage Correct
			Not included	Included	
Step 1	Financial inclusion [K1_1]	Not included	334	468	41,6
		Included	209	1848	89,8
	Overall Percentage				76,3

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	MM_count_s	0,321	0,136	5,587	1	0,018	1,379	1,056	1,800
	PA_1_count_s	0,821	0,197	17,420	1	0,000	2,272	1,545	3,341
	PA_2_count_s	0,707	0,182	15,067	1	0,000	2,029	1,419	2,900
	CFP_count_s	1,057	0,326	10,498	1	0,001	2,879	1,519	5,457
	SI_1_count_s	0,760	0,420	3,271	1	0,071	2,137	0,938	4,868
	SI_2_count_s	0,953	0,158	36,598	1	0,000	2,594	1,905	3,533
	Age (C7)	0,015	0,003	20,421	1	0,000	1,015	1,008	1,021
	Gender (C8)	-0,320	0,103	9,658	1	0,002	0,726	0,593	0,888
	Monthly income (D8)	0,000	0,000	18,108	1	0,000	1,000	1,000	1,000
	Educational level (C10)	0,804	0,080	101,877	1	0,000	2,233	1,911	2,611
	Constant	-2,872	0,252	129,750	1	0,000	0,057		

a. Variable(s) entered on step 1: MM_count_s, PA_1_count_s, PA_2_count_s, CFP_count_s, SI_1_count_s, SI_2_count_s, C7: Age, C8: Gender, D8: Monthly income, C10: Highest educational level .

Source: Author's own compilation.

Table 7.7 above indicates that the omnibus test of model coefficients had a chi-square value of 704.513 on 10 degrees of freedom (df), with a block *p*-value of 0.000. This

value was statistically lower than the 0.05 level of significance, implying that Model 2 Block 1, containing all the independent variables, performs better than SPSS's original guess in Model 2 Block 0. This confirms an improved model 'goodness of fit' (Pallant, 2011: 175). Conversely, the Hosmer & Lemeshow which confirms model 'goodness of fit' when the Chi-square statistic is not statistically significant, had a value of 7.910 on 8 df with a *p*-value of 0.442. Since this value was not statistically significant at the 95% confidence level, this study confirmed improved model 'goodness of fit' and supported the earlier observation that Model 2 Block 1 performs better than SPSS's original guess in Model 2 Block 0. Similarly, the model summary in Table 7.7 indicates a reduction in the -2 Log likelihood *(-2LL)* values between the two models. The table shows that this *-2LL* statistic decreased from 3393.298 (2688.785 + 704.513) in the null model, to 2688.785 in the null model with predictor variables. This reduction in the *-2LL* statistic indicates an improvement in model fit between the latter and former models and confirms that the inclusion of the independent variables significantly improves the model's adequacy (Hair, *et al*., 2014: 332).

Furthermore, the Table 7.7 presents the pseudo *R*-square statistics in the model summary which provide further information about the usefulness of this model. The Cox & Snell R^2 and the Negelkerke R^2 provide an indication of the amount of variation in the dependent variable explained by the model. These values were 0.218 and 0.314 respectively, suggesting that between 21.8% and 31.4% of the model variability is explained by the set of independent variables in the model (Pallant, 2011: 176).

Further output in Table 7.7 displays the classification table of Model 2 Block 1 which indicates how well the latter predicts the correct category of financially included and financially not included cases. This value is compared to the classification table of the null model to assess for improvement (Pallant, 2011: 176). Table 7.7 indicates an improved albeit minimal percentage accuracy of classification (PAC) of 76.3% for Model 2 Block 1 compared to 71.9% for Model 2 Block 0. The model accurately classified 89.8%[1] of the cases as financially included (true positives) and 41.6%[2] of

[1] This represents the sensitivity measure of the model, that is, the percentage of financially included cases (true positives) correctly identified by the model (Pallant, 2011: 176).
[2] This represent the specificity measure of the model, that is, the percentage of financially not included cases (true negatives) correctly identified by the model (Pallant, 2011: 176).

them as financially not included (true negatives). Therefore, the positive predictive value[1] of the model was 79.8% (1848/ (468 + 1848) while the negative predictive value[2] was 61.5% (334/ (209 + 334) (Pallant, (2011: 176). These results confirm that Model 2 Block 1 results are an improved model fit compared to the null model.

Finally, the 'Variables in the Equation' section provides information about the contribution each predictor variable makes to the model and/or the dependent variable, financial inclusion. Using the statistical inference in section 7.3.3, the Wald statistic indicates that all independent variables excluding SI1 (monitoring economic indicators) contributed significantly to the predictive ability of the model at *p* values lower than the 5% level of significance. This means that each variable is a significant predictor of financial inclusion in Uganda. Similarly, all except gender (C8) had corresponding positive and statistically significant relationships with financial inclusion as indicated by their *B* – coefficients. The study concluded that these variables collectively have a positive and statistically significant effect (*p*-value ≤ 0.05) on financial inclusion in Uganda. The fitted Model 2 Block 1 equation is shown as equation 7.4 below.

finInc = -2.872 + 0.321 MM + 0.821 PA1 + 0.707 PA2 + 1.057 CFP + 0.953 SI2 + 0.015 age + 0.001 income + 0.804 education – 0.320 gender (7.4)

where:

finInc = financial inclusion in Uganda
MM = money management (making ends meet)
PA1 = planning ahead (planning for the future)
PA2 = planning ahead (attitude towards planning for the future)
CFP = choosing financial products (seeking financial advice),
SI2 = staying informed (attitude towards technology)

The odds ratios that a bankable Ugandan is financially included are represented by a predictor variable's *Exp (B)* coefficient in Table 7.7 above. According to Makina (2012:

[1] This is the percentage of cases that the model identifies as financially included and is actually observed in this group (Pallant, 2011: 176).
[2] This is the percentage of cases that the model identifies as financially not included and is actually observed not to have the characteristic (Pallant, 2011: 176).

374), a statistically significant odds ratio (*Exp (B)* coefficient) greater than one indicates a greater probability of an individual being financially included.

Accordingly, the following observations were made about the bankable population of Uganda, 'ceteris paribus': (1) individuals who 'make financial ends meet' are 1.379 times more likely to be financially included; (2) those that plan for their future financial welfare are 2.272 times more likely to be financially included; (3) individuals with a positive attitude towards planning for the future are 2.029 times more likely to be financially included; (4) those that seek financial advice before choosing financial products are 2.879 times more likely to be financially included; (5) those with a positive attitude towards the evolution of technology are 2.594 times more likely to be financially included; (6) older individuals are 1.015 times more likely to be financially included than their younger counterparts; (7) there is a direct positive relationship between income and financial inclusion; (8) more educated individuals are 2.233 times more likely to be financially included than the less educated or uneducated and, (9) results pertaining to gender indicate that males are 0.725 times less-likely to be financially excluded than females (Pallant, 2011: 178).

Arguably it appears that seeking financial advice before choosing financial products, knowledge of, and the application of technology, educational level and planning for the future are some of the critical drivers to financial inclusion in Uganda as supported by the higher odds ratios among these predictor variables. The following sub-section assesses the overall model fit, including the measures of model robustness.

7.3.4.1 Assessing the overall model fit

As earlier indicated, the full model containing all independent variables was statistically significant with a chi-square value of X^2 (10, N = 2859) = 704.513, $p \leq 0.001$ indicating that the model was able to distinguish between respondents who are financially included and financially not included. The assessment of model-fit is based on three approaches detailed above, which are statistical measures of overall fit, the pseudo R^2 measures and classification accuracy (Hair *et al.,* 332: 2014). Table 7.8 below provides a comparative summary of this overall model-fit assessment.

Table 7.8: Assessment of overall model-fit

Model	Block 0	Block 1	Change	Significance
1 (Financial inclusion)				
• % Accuracy of classification	72%	74.5%	2.5%	0.000
• -2 Log likelihood *(-2LL)*	3559.03	2996.93	562.1	0.000
• Nagelkerke R^2	-	24.6%	-	-
• Hosmer & Lemeshow	-	3.604	-	0.891
• Positive predictive value	-	77.8%	-	0.000
• Negative predictive value	-	57.5%	-	0.000
2 (Financial inclusion + Control variables) full model				
• % Accuracy of classification	71.9%	76.3%	4.4%	0.000
• -2 Log likelihood *(-2LL)*	3373.30	2688.79	704.5	0.000
• Nagelkerke R^2	-	31.4%	-	-
• Hosmer & Lemeshow	-	7.91	-	0.442
• Positive predictive value	-	79.8%	-	0.000
• Negative predictive value	-	61.5%	-	0.000

Source: Author's own compilation.

First, the chi-square statistics of the *-2LL* values between models indicate a decline from one model to the other. According to Hair *et al*. (2014: 332), larger to smaller *-2LL* values between the null and full model respectively, obtained at statistically significant levels lower than 5%, indicate improved model fit. Table 7.8 indicates a decline in these values between model 1 (2996.93) and model 2 (2688.79) at statistically significant levels of p = 0.000 to suggest improved model fit from the null (constant-only) model to full (variable) model.

Secondly, the Nagelkerke R^2 which measures the amount of variability in the dependent variable explained by the predictor variables indicates an increased variation from 24.6% in model 1 to 31.4% in model 2. While the latter represents a low value of about one-third of the variation in the dependent variable, it nonetheless represents improved model-fit for purposes of practical significance. Additionally, the Hosmer & Lemeshow statistic which measures the correspondence between the actual and predicted values of the dependent variable, indicated a reduced statistical significance of 0.891 for model 1 and 0.442 for model 2 to suggest no significant

differences between the values and confirm improved fit for model 2. Lastly, there was an improved classification of cases between model 1 (null model) and model 2 (variable model). Table 7.8 indicates an improved percentage classification of cases (PAC) of 72% for the null model to 76.3% for the full model. This result is corroborated by an increased predictive accuracy of 77.8% and 57.5% in model 1, to 79.8% and 61.5% in model 2, confirming improved model fit for the latter (Hair *et al.,* 2014: 335).

Finally, the study runs a multiple regression output on the variables to investigate whether the findings are robust across the different models. This analysis is underpinned by an alignment of the qualifying assumptions between the two regression approaches which include among others; conditions of sample size and checks for multicollinearity and/or outliers (Pallant, 2011: 151). Table 7.9 below provides the model summary and the ANOVA output from the multiple regression.

Table 7.9: Model summary for multiple regression output

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.446[a]	0,199	0,196	0,403

a. Predictors: (Constant), C10: Education Level, D8: Monthly Income, C8: Gender, MM_count_s, PA_1_count_s, PA_2_count_s, C7: Age, SI_2_count_s, CFP_count_s, SI_1_count_s

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114,614	10	11,461	70,591	.000[b]
	Residual	462,411	2848	0,162		
	Total	577,025	2858			

a. Dependent Variable: Financial inclusion [K1_1]

b. Predictors: (Constant), C10: Education Level, D8: Monthly Income, C8: Gender, MM_count_s, PA_1_count_s, PA_2_count_s, C7: Age, SI_2_count_s, CFP_count_s, SI_1_count_s

Source: Author's own compilation.

The output above indicates an R-square value of 0.199, implying that about 20% of the variance in the dependent variable – financial inclusion — is explained by all independent variables in the model. The adjusted R^2 value which provides a better estimate of the true population indicates a similar and acceptable statistic of 19.6%. This value is modest for model fit but approximates the values obtained in Model 2 Block 1 above. It represents a practically significant result based on the sample size (n = 3002) since the model incorporates only demand-side variables as opposed to a

combination of both demand and supply-side variables. Based on this observation, the current model variability is considered acceptable.

The ANOVA output which tests the null hypothesis that the *R* multiple equates to zero at the 95% confidence level, indicates a *p*-value of 0.000 which is statistically and significantly lower than the 5% level. As such, the study rejects the null hypothesis and concludes that the obtained R^2 value is valid and a true reflection of the model fit (Pallant, 2011: 161). Table 7.10 below provides the coefficients table representing the relative importance of each of the predictor variables in the model.

Table 7.10: Coefficients table for model output

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	0,141	0,036		3,891	0,000		
	MM_count_s	0,064	0,022	0,051	2,893	0,004	0,899	1,113
	PA_1_count_s	0,128	0,029	0,091	4,392	0,000	0,654	1,528
	PA_2_count_s	0,085	0,026	0,077	3,210	0,001	0,487	2,055
	CFP_count_s	0,203	0,048	0,145	4,234	0,000	0,241	4,141
	SI_1_count_s	0,057	0,061	0,033	0,929	0,353	0,223	4,486
	SI_2_count_s	0,177	0,026	0,130	6,835	0,000	0,774	1,292
	C7: Age	0,002	0,001	0,060	3,308	0,001	0,863	1,159
	C8: Gender	-0,046	0,016	-0,049	-2,854	0,004	0,956	1,046
	D8: Monthly Income	9,056E-09	0,000	0,038	2,246	0,025	0,985	1,015
	C10: Educational Level	0,104	0,011	0,188	9,805	0,000	0,768	1,301

a. Dependent Variable: Financial inclusion [K1_1]

Source: Author's own compilation.

Standardized beta coefficients in Table 7.10 indicate the unique contribution each predictor variable makes to the dependent variable when the variance explained by all other variables is controlled for (Pallant, 2011: 161). Observably, most of the variables in this model make comparatively weaker unique contributions at explaining the dependent variable. However, their strengths and causality are comparable to findings obtained in the logistic estimations in section 7.3.4.

For instance, seeking financial advice before choosing financial products (CFP = 0.145), planning ahead for the future (PA1 = 0.091), attitude towards planning ahead for the future (PA2 = 0.077), attitude towards technology (S12 = 0.130), age (0.060),

gender (- 0.049) and others, provide statistically significant and similar relationships with financial inclusion at the 1% and 5% levels, indicating that they all uniquely affect the dependent variable – financial inclusion as earlier observed. Lastly, both approaches indicate that assumptions of sample size and absence of multicollinearity were fulfilled. First, the study used a large sample size (n = 3002) which is recommended for both regressions, and secondly, the collinearity statistics in Table 7.10 indicated absence of multicollinearity since none of the values in the Tolerance column was lower than the 0.1 cut-off value to confirm presence (Pallant, 2011: 158). The study concluded that this output adequately validates earlier findings based on the binary logistic regression output. The following section provides the binary logistic estimation using the composite measure of financial literacy as the principal independent variable.

7.4 ESTIMATIONS USING THE COMPOSITE FINANCIAL LITERACY INDEX

This section follows an approach similar to the one applied in section 7.3 in order to investigate whether financial literacy affects financial inclusion in the context of Uganda. The study applies binary logistic regressions to estimate the relationship between the composite financial literacy index (principal independent variable) and demographic control variables (other independent proxies) with the study's measure for financial inclusion. The financial literacy index *(finlit)* constitutes a statistical combination of six financial literacy constructs as elaborated in section 6.4.5.

7.4.1 Dependent variable coding and case processing summary

The study models the chance that financial inclusion by a bankable adult in Uganda is a function of financial literacy as defined by a composite index of six financial literacy constructs (section 7.3.2), and four control variables which include; age, gender, income and education. The case processing summary similar to Table 7.3 indicates that the initial analysis was conducted on all respondents in the sample of bankable adults in Uganda (n = 3002), while the variable coding for the dependent variable – financial inclusion — denotes a 1 for a financially included adult and 0 for a financially not included individual.

7.4.2 Model 1

This model consists of one independent variable constituting 6 financial literacy constructs and is presented in two forms: Block 0 and Block 1. Block 0 is the null model and represents the output without independent variables. It acts as the baseline for comparison with other models and only consists of a constant (Tabachnick & Fidell, 2007: 439). Table 7.11 displays the model 1 Block 0 output which consists of the classification table, variables in the equation and variables not in the equation.

Table 7.11: Model 1 Block 0.

Classification Table[a,b]

Observed			Predicted FinInclusion Financial inclusion [K1_1] 0 Not included	1 Included	Percentage Correct
Step 0	FinInclusion Financial inclusion [K1_1]	0 Not included	0	840	0,0
		1 Included	0	2162	100,0
	Overall Percentage				72,0

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	0,945	0,041	540,684	1	0,000	2,574

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	FinLit_s	443,807	1	0,000
	Overall Statistics		443,807	1	0,000

Source: Author's own compilation.

The classification table in Model 1 Block 0 indicates how well the null/constant-only model predicts the broad measure of financial inclusion in Uganda. Given the cases of the two decision outcomes (financially included and financially not included), 72% (2162/3002) of these cases opted to be financially included while 28% (840/3002) did not. Accordingly, without further information or the inclusion of independent variables, the study predicts that if for every case an individual opts to be financially included, the null model will be accurate 72% of the time. Therefore, the overall percentage of cases that are correctly specified by the null model is 72% hence it can be concluded that the latter is valid and a good fit for data replication.

A between-model comparison statistically compares the null model above with one containing predictor variables to assess for differences in model fit. Table 7.11 displays the 'Variables in the Equation' section which indicates that the Wald Chi-square statistic does not equate to zero. According to this statistic, the null hypothesis is accepted if the former equates to zero and/or is not statistically significant at the 5% level (Tabachnick & Fidell, 2007: 59).

The *p*-value for this statistic was 0.000 and below the critical value of 0.05. This means that the null hypothesis was rejected, and it was concluded that the predicted odds for financial inclusion in Model 1 Block 0 is 2.574, at a statistically significant level lower than 1%. Additionally, the score test for the predictor variable – financial literacy — under the 'Variables not in the Equation' section indicates a non-zero value of 443.807 on 1 df at a statistically significant *p*-value (0.000) lower than the acceptable 5% level. This suggests that including this independent variable into the null model improves its predictive ability.

Therefore, the second step in the analysis is to assess whether this variable contributes to a better prediction of the outcome. This process involves a comparison between the null model and the null model including predictor variables (Tabachnick & Fidell, 2007: 458). Table 7.12 below shows the results of the Model 1 Block 1 binary logistic regression output following the addition of the composite financial literacy index (independent variable). Accordingly, the omnibus test of model coefficients which indicates whether the addition of an independent variable significantly improves the model fit provides a chi-square value of 494.996 on 1 df with a block *p*-value of 0.000. This value is statistically lower than the 0.05 level of significance implying that Model 1 Block 1, containing the independent variable, financial literacy, performs better than SPSS's original guess in Model 1 Block 0. This confirms an improved model "goodness of fit" (Pallant, 2011: 175).

Conversely, the Hosmer & Lemeshow test confirms model goodness of fit when the chi-square statistic is not significant (Tabachnick & Fidell, 2007: 459). According to Table 7.12 below, this value was 9.843 on 8 df with a *p*-value of 0.276. Observably, the latter was not statistically significant at the 95% confidence level suggesting

improved model 'goodness of fit' and confirming that Model 1 Block 1 performs better than SPSS's original guess in Model 1 Block 0 (null model).

Table 7.12: Model 1 Block 1 (METHOD = ENTER).

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	494,996	1	0,000
	Block	494,996	1	0,000
	Model	494,996	1	0,000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	3064.038[a]	0,152	0,219

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	9,843	8	0,276

Classification Table[a]

Observed			Predicted FinInclusion Financial inclusion [K1_1] 0 Not included	1 Included	Percentage Correct
Step 1	FinInclusion Financial inclusion [K1_1]	0 Not included	282	558	33,6
		1 Included	190	1972	91,2
	Overall Percentage				75,1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	FinLit_s	4,688	0,240	382,178	1	0,000	108,669
	Constant	-0,812	0,092	78,289	1	0,000	0,444

a. Variable(s) entered on step 1: FinLit_s.

Source: Author's own compilation.

Additionally, the model summary in Table 7.12 indicates a reduction in the -2 Log likelihood *(-2LL)* values between the two models. Hair *et al.* (2014: 323) and Tabachnick and Fidell (2007: 448) confirm improved model fit when there is a reduction in the calculated *-2LL* values between the null model and the null model with predictor variables. Table 7.12 confirms that this *-2LL* statistic decreased from 3559.034 (3064.038 + 494.996) to 3064.038 between the null model and variable model respectively. This reduction in *-2LL* values confirms an improvement in model fit between the latter and the former and suggests that the inclusion of the composite

financial literacy variable significantly improved the model's adequacy (Hair, *et al*., 2014: 332).

Furthermore, the Table 7.12 presents the pseudo R-square statistics in the model summary which further corroborate model adequacy. The Cox & Snell R^2 and the Negelkerke R^2 provide an indication of the amount of variation in the dependent variable explained by the model. These statistics indicated values of 0.152 and 0.219 respectively, suggesting that between 15.2% and 21.9% of the model variability is explained by the composite index - financial literacy (Pallant, 2011: 176). However, the Nagelkerke R^2 statistic (the more accurate measure of variability) of 21.9% indicates a low variability since 78.1% (100% – 21.9%) of the variance in the dependent variable, namely, financial inclusion is accounted for by variables not included in Model 1 Block 1. This necessitates further input of control variables to assess for improved model adequacy.

Further output in Table 7.12 above includes the classification table of Model 1 Block 1 which indicates how well the model predicts the correct category of financially included and financially not included cases. This value is compared to the classification table of the null model to assess for improvement (Pallant, 2011: 176). Table 7.12 indicates an improved, albeit minimal, percentage accuracy of classification (PAC) of 75.1% for Model 1 Block 1 compared to 72% for Model 1 Block 0. The former accurately identified 91.2%[1] of the cases as financially included (true positives) and 33.6%[2] of them as financially not included (true negatives). Therefore, the positive predictive value[3] of the model was 77.9% (1972/ (558 + 1972) while its negative predictive value[4] was 59.7% (282/ (190 + 282) (Pallant, (2011: 176). These results indicate that Model 1 Block 1 results in an improved model fit overall compared to the null model.

[1] This represents the sensitivity measure of the model, that is, the percentage of financially included cases (true positives) correctly identified by the model (Pallant, 2011: 176).
[2] This represent the specificity measure of the model, that is, the percentage of financially not included cases (true negatives) correctly identified by the model (Pallant, 2011: 176).
[3] This is the percentage of cases that the model identifies as financially included and is actually observed in this group (Pallant, 2011: 176).
[4] This is the percentage of cases that the model identifies as financially not included and is actually observed not to have the characteristic (Pallant, 2011: 176).

Finally, the 'variables in the equation' section in Table 7.12 above provides information about the statistical contribution of the composite financial literacy index (predictor variable) to the model and/or the dependent variable — financial inclusion. This inference is provided through the Wald statistic, the *B*-coefficients and the odds ratio statistics indicated earlier. First, the Wald statistic of 382.178 on 1df, with a *p* - value of 0.000, indicates that the composite financial literacy index contributes significantly to the predictive ability of the model at levels lower than the 5% level of significance. This implies that financial literacy is a significant predictor of financial inclusion in Uganda. Secondly, the corresponding positive and statistically significant *B* – coefficient of 4.688 at a *p* – value of 0.000 indicates that financial literacy has a positive and statistically significant effect on financial inclusion in Uganda. The fitted Model 1 Block 1 equation is shown as equation 7.5 below.

$$finInc = -0.812 + 4.688finLit \quad (7.5)$$

where:

finInc = financial inclusion in Uganda
finlit = composite financial literacy index

Lastly, the odds ratios that a bankable Ugandan is financially included are represented by the predictor variable's *Exp (B)* coefficient. Odds ratios greater than one indicate a greater probability of an individual being financially included and the reverse is true (Makina, 2012: 374). Therefore, it can be concluded that other factors held constant, financially literate individuals in Uganda are 108.669 times more likely to be financially included than not. Specifically, bankable individuals who score consistently well on all financial literacy constructs have a higher chance (108.669 times) of being financially included than their counterparts who do not. Cognizant of this observation, the study further explored this relationship subject to the inclusion of control variables. This output is provided in Model 2 below.

7.4.3 Model 2

The second (or full) model presents the comparative results of the binary logistic regression subject to the inclusion of the control variables, namely, age, gender,

income and education. Like model 1, Model 2 is presented dually consisting of a Block 0 and a Block 1 to allow for output comparison. Table 7.13 below presents the Model 2 Block 0 output.

Table 7.13: Model 2 Block 0.

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	2859	95,2
	Missing Cases	143	4,8
	Total	3002	100,0
Unselected Cases		0	0,0
Total		3002	100,0

a. If weight is in effect, see classification table for the total number of cases.

Classification Table[a,b]

Observed			Predicted Financial inclusion [K1_1] Not included	Included	Percentage Correct
Step 0	Financial inclusion [K1_1]	Not included	0	802	0,0
		Included	0	2057	100,0
	Overall Percentage				71,9

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	0,942	0,042	511,917	1	0,000	2,565

Variables not in the Equation[a]

			Score	df	Sig.
Step 0	Variables	FinLit_s	435,380	1	0,000
		Age (C7)	9,894	1	0,002
		Gender (C8)	1,569	1	0,210
		Monthly income (D8)	15,903	1	0,000
		Educational level (C10)	236,657	1	0,000

a. Residual Chi-Squares are not computed because of redundancies.

Source: Author's own compilation.

This model consists of five independent variables, with one representing the composite financial literacy index and four, the control variables which are age, gender, income and education. It is presented in two forms — Block 0, and Block 1. Block 0 above is the null/constant-only model representing the output without independent variables and acts as the baseline for comparison with other models

(Tabachnick & Fidell, 2007: 439). It consists of the case processing summary, a classification table, variables in the equation and variables not in the equation.

The case processing statistics in Table 7.13 indicate that the overall analysis was conducted on 2859 individuals out of a total sample of 3002. This represented 95.2% of the original sample with 4.8% of them omitted for missing information. The classification table indicates how well the null model predicts the chosen broad measure of financial inclusion in Uganda. Given the cases of the two decision outcomes (financially included and financially not included), 71.9% (2057/2859) of these cases opted to be financially included while 28% (802/2859) did not. Without further information or the inclusion of independent variables, the study predicts that if, for every case, an individual opts to be financially included, the null model will be accurate 71.9% of the time. As such, the overall percentage of cases correctly specified by this model is 71.9% and the latter is valid and a good fit for data replication.

Following a between-model comparison, the study statistically compares the null model with one containing predictor variables to assess for differences in model fit. Table 7.13 displays the 'Variables in the Equation' section which indicates that the Wald Chi-square statistic of 511.917 does not equate to zero. Additionally, the latter is generated at a *p* – value of 0.000 which is below the critical value of 0.05. Therefore, the null hypothesis of equal frequencies was rejected, and the study concluded that the predicted odds ratio for financial inclusion in Model 2 Block 0 is 2.565 - at a statistically significant level lower than 1%. Similarly, all predictor variable test scores (excluding gender (C8)), in the 'Variables not in the Equation' section indicated non-zero values at statistically significant *p*-values (0.000) lower than the critical 5% level. This suggests that including these variables into the null model would improve its predictive ability.

Therefore, further analysis compares the null/constant-only model above with the null model including predictor variables. Table 7.14 below shows the Model 2 Block 1 results of the binary logistic regression following the addition of all independent variables using the Enter method.

Table 7.14: Model 2 Block 1 (METHOD = ENTER).

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	665,009	5	0,000
	Block	665,009	5	0,000
	Model	665,009	5	0,000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2728.290[a]	0,208	0,299

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7,275	8	0,507

Classification Table[a]

Observed			Predicted Financial inclusion [K1_1] Not included	Included	Percentage Correct
Step 1	Financial inclusion [K1_1]	Not included	316	486	39,4
		Included	196	1861	90,5
	Overall Percentage				76,1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	FinLit_s	4,208	0,261	259,920	1	0,000	67,232	40,308	112,138
	Age (C7)	0,014	0,003	18,296	1	0,000	1,014	1,007	1,020
	Gender (C8)	-0,307	0,102	9,128	1	0,003	0,736	0,603	0,898
	Monthly income (D8)	0,000	0,000	18,879	1	0,000	1,000	1,000	1,000
	Educational level (C10)	0,845	0,078	117,687	1	0,000	2,328	1,999	2,713
	Constant	-2,919	0,247	139,884	1	0,000	0,054		

a. Variable(s) entered on step 1: FinLit_s, C7: Age C8: Respondent gender, D8: Monthly income, C10: Educational level.

Source: Author's own compilation.

Table 7.14 above indicates that the omnibus test of model coefficients had a chi-square value of 665.009 on 5 degrees of freedom (df), with a block *p*-value of 0.000. This value was statistically lower than the 0.05 level of significance, implying that Model 2 Block 1, containing all the independent variables, performs better than SPSS's original guess in Model 2 Block 0. This confirms an improved model "goodness of fit" (Pallant, 2011: 175). Conversely, the Hosmer & Lemeshow test which confirms model goodness of fit when the Chi-square statistic is not statistically significant, had a value of 7.275 on 8 df with a *p*-value of 0.507. Since this value was not statistically significant at the 95% confidence level, the study confirmed improved

model 'goodness of fit' and supported the earlier observation that Model 2 Block 1 performs better than SPSS's original guess in Model 2 Block 0.

Similarly, the model summary indicates a reduction in the -2 Log likelihood *(-2LL)* values between the two models. Table 7.14 shows that this *-2LL* statistic decreased from 3393.299 (2728.290 + 665.009) in the null model, to 2728.290 in the null model with predictor variables (Lottes, DeMaris & Adler, 1996:288). This reduction in the *-2LL* statistic indicates an improvement in model fit between the latter and former models and confirms that the inclusion of the independent variables significantly improves the model's adequacy (Hair, *et al*., 2014: 332).

Furthermore, the pseudo *R*-square statistics in the model summary provide information about the usefulness of this model. The Cox & Snell R^2 and the Nagelkerke R^2 provide an indication of the amount of variation in the dependent variable explained by the model. These values were 0.208 and 0.299 respectively suggesting that between 20.8% and 29.9% of the model's variability is explained by the set of independent variables in the model (Pallant, 2011: 176). However, the Negelkerke R^2 statistic (the true measure of variability) of 29.9% is modest given that 70.1% (100% – 29.9%) of the variance in the dependent variable — financial inclusion — is accounted for by variables not included in the model. However, the plausible explanation for this is that the predictors to financial inclusion were limited (by the survey instrument) to demand-side variables of financial inclusion rather than the supply-side variables and/or a combination of both. Nevertheless, the current model variability is considered acceptable.

Table 7.14 further displays the classification table of Model 2 Block 1 which indicates how well this model predicts the correct category of financially included and financially not included cases. This value is compared to the classification table of the null model to assess for improvement (Pallant, 2011: 176). Table 7.14 indicates an improved percentage accuracy of classification (PAC) of 76.1% for Model 2 Block 1 compared to 71.9% for Model 2 Block 0. The model accurately classified 90.5%[1] of the cases as

[1] This represents the sensitivity measure of the model, that is, the percentage of financially included cases (true positives) correctly identified by the model (Pallant, 2011: 176).

financially included (true positives) and 39.4%[1] of them as financially not included (true negatives). Therefore, the positive predictive value[2] of the model was 79.3% (1861/ (486 + 1861) while its negative predictive value[3] was 61.7% (316/ (196 + 316). These findings confirm that Model 2 Block 1 results are an improved model fit compared to the null model.

Additionally, the 'variables in the equation' section provides information about the contribution each predictor variable makes to the model and/or the dependent variable — financial inclusion. The Wald statistic indicates that all independent variables contributed significantly to the predictive ability of the model at *p* values lower than the 5% level of significance. This means that each variable is a significant predictor of financial inclusion in Uganda. Similarly, all variables except gender (C8) had corresponding positive and statistically significant relationships with financial inclusion as indicated by their *B* – coefficients. The study concluded that these variables collectively have a positive and statistically significant effect (*p*-value ≤ 0.05) on financial inclusion in Uganda. The fitted Model 2 Block 1 equation is shown as equation 7.6 below.

finInc = -2.919 + 4.208 finlit + 0.014 age + 0.001 income + 0.845 education - 0.307 gender (7.6)

where:

finInc = financial inclusion in Uganda
finlit = composite financial literacy index

Consequently, the odds ratios that a bankable Ugandan is financially included are represented by the predictor's *Exp (B)* coefficient in Table 7.14. Makina (2012: 374) and Lottes *et al.* (1996: 286) contend that a statistically significant odds ratio (*Exp (B)* coefficient) greater than one indicates a greater probability of an individual being financially included. Therefore, with other variables held constant, the study infers the

[1] This represent the specificity measure of the model, that is, the percentage of financially not included cases (true negatives) correctly identified by the model (Pallant, 2011: 176).
[2] This is the percentage of cases that the model identifies as financially included and is actually observed in this group (Pallant, 2011: 176).
[3] This is the percentage of cases that the model identifies as financially not included and is actually observed not to have the characteristic (Pallant, 2011: 176).

following about the bankable population of Uganda: (1) individuals who scored consistently on all constructs in the financial literacy index are 67.232 times more likely to be financially included than not; (2) older individuals are 1.014 times more likely to be financially included than their younger counterparts; (3) there is a direct positive relationship between monthly income and financial inclusion; (4) educated individuals are 2.328 times more likely to be financially included compared to their less educated or uneducated counterparts and (5) gender indicates that males are 0.736 times less-likely to be financially excluded than females and this result is statistically significant at the 1% level.

In a nutshell, financial literacy has a positive and statistically significant effect on financial inclusion in Uganda based on a demand for financial services perspective. Moreover, in the absence of supply-side factors such as access to financial services, it exhibits a stronger demand influence than income, age, gender and education, based on the higher odds ratios exhibited. Table 7.15 below presents a full-model output comparison of the two measures of financial literacy.

Table 7.15: Variable-model comparison between financial literacy measures

	Broad measure	Composite measure	Significance
Variables (constructs)	6	1	-
(%) Accuracy of classification (PAC)	76.3%	76.1%	0.000
-2 Log Likelihood value	2688.785	2728.290	0.000
Nagelkerke R^2	31.4%	29.9%	0.000
Hosmer & Lemeshow	7.910	7.275	0.442/0.507
(+) Predictive value	61.5%	61.5%	0.000
(-) Predictive value	79.8%	79.8%	0.000

Source: Author's own compilation.

The broad measure of financial literacy constituted six financial literacy constructs which were analyzed individually as indicated in section 7.3.3, while the composite measure applied a statistical combination of the latter to form an index for financial literacy (section 7.4.2). Table 7.15 above indicates that both measures provided similar and statistically significant findings on the effect of financial literacy on financial

inclusion in Uganda, especially regarding the predictive accuracy of cases. The following section compares these results with outputs from binary probit regression techniques to investigate whether the results are robust with both regression techniques.

7.5 ROBUSTNESS CHECKS USING BINARY PROBIT ESTIMATIONS.

As indicated in section 5.6 binary probit and logistic regressions are similar in that they focus on the proportion of cases in two or more categories of the dependent variable (DV). Both methods are akin to multiple regressions in which the DV is predicted from a set of variables that are continuous and/or coded to be dichotomous and produce estimates of the probability that the DV is equal to one (1) given a set of predictor variables. Their main difference lies in the assumptions underlying the transformation of the proportions forming the DV. The logistic regression uses a logit transformation of this proportion, while the binary probit applies a probit transformation. Specifically, logistic regressions assume an underlying qualitative DV while probit analyses assume an underlying normally distributed DV. Despite these slight differences in computation, output from both approaches are usually very similar (Tabachnick & Fidell, 2007: 457).

The study applied two binary probit models[1] to investigate whether financial literacy affects financial inclusion in Uganda and assess whether the findings are robust with those obtained using the binary logistic approach above. Syntax statements using SPSS v.25 were applied to specify a generalized linear model with a binomial response dependent variable – financial inclusion — and several continuous and/or categorical independent variables based on the assumption of normal distribution.

[1] One model consists of the broad measure of financial literacy constituting six financial literacy constructs while the other constitutes the composite financial literacy index. Both models include four control variables; age gender, income and education.

7.5.1 Binary probit output using the broad measure of financial literacy

Table 7.16 below displays the binary probit estimation using the broad measure of financial literacy (the principal independent variable) and the four control variables, namely, age gender, income and education.

Table 7.16: Binary probit model using the broad measure of financial literacy

Model Information

Dependent Variable	Financial inclusion [K1_1][a]
Probability Distribution	Binomial
Link Function	Probit

a. The procedure models 1 Included as the response, treating 0 Not included as the reference category.

Goodness of Fit[a]

	Value	df	Value/df
Deviance	2668,976	2824	0,945
Scaled Deviance	2668,976	2824	
Pearson Chi-Square	2934,825	2824	1,039
Scaled Pearson Chi-Square	2934,825	2824	
Log Likelihood[b]	-1339,576		

Dependent Variable: Financial inclusion [K1_1]
Model: (Intercept), MM_count_s, PA_1_count_s, PA_2_count_s, CFP_count_s, SI_1_count_s, SI_2_count_s, C7: Age, C8: Gender, D8: Income, C10: Education Level[a]
a. Information criteria are in smaller-is-better form.
b. The full log likelihood function is displayed and used in computing information criteria.

Omnibus Test[a]

Likelihood Ratio Chi-Square	df	Sig.
702,822	10	0,000

Dependent Variable: Financial inclusion [K1_1]
Model: (Intercept), MM_count_s, PA_1_count_s, PA_2_count_s, CFP_count_s, SI_1_count_s, SI_2_count_s, C7: Age, C8: Gender, D8: Income, C10: Education Level[a]
a. Compares the fitted model against the intercept-only model.

Tests of Model Effects

Source	Wald Chi-Square	Type III df	Sig.
(Intercept)	132,809	1	0,000
MM_count_s	5,519	1	0,019
PA_1_count_s	16,232	1	0,000
PA_2_count_s	13,701	1	0,000
CFP_count_s	12,935	1	0,000
SI_1_count_s	2,917	1	0,088
SI_2_count_s	37,958	1	0,000
C7: Age	19,963	1	0,000
C8: Gender	8,416	1	0,004
D8: Income	22,308	1	0,000
C10: Education Level	109,227	1	0,000

Dependent Variable: Financial inclusion [K1_1]
Model: (Intercept), MM_count_s, PA_1_count_s, PA_2_count_s, CFP_count_s, SI_1_count_s, SI_2_count_s, C7: Age, C8: Gender, D8: Income, C10: Education level

Parameter Estimates

Parameter	B	Std. Error	95% Wald Confidence Interval	Hypothesis Test	Exp(B)

			Lower	Upper	Wald Chi-Square	df	Sig.	
(Intercept)	-1.679	0.1457	-1.964	-1.393	132.809	1	0.000	0.187
MM_count	0.188	0.0799	0.031	0.344	5.519	1	0.019	1.206
PA_1_count	0.451	0.1119	0.232	0.670	16.232	1	0.000	1.570
PA_2_count	0.382	0.1033	0.180	0.585	13.701	1	0.000	1.466
CFP_count	0.671	0.1865	0.305	1.036	12.935	1	0.000	1.955
SI_1_count	0.406	0.2380	-0.060	0.873	2.917	1	0.088	1.501
SI_2_count	0.572	0.0928	0.390	0.753	37.958	1	0.000	1.771
C7: Age	0.008	0.0019	0.005	0.012	19.963	1	0.000	1.008
C8: Gender	-0.175	0.0603	-0.293	-0.057	8.416	1	0.004	0.840
D8: Montthly Income	3.505E-07	7.4199E-08	2.050E-07	4.959E-07	22.308	1	0.000	1.000
C10: Education Level	0.479	0.0458	0.389	0.569	109.227	1	0.000	1.615
(Scale)	1[a]							

Dependent Variable: Financial inclusion [K1_1]
Model: (Intercept), MM_count, PA_1_count, PA_2_count, CFP_count, SI_1_count, SI_2_count, C7: Age, C8: Gender, D8: Monthly Income, C10: Education Level
a. Fixed at the displayed value.

Source: Author's own compilation.

Like the logistic analyses presented earlier, the case processing summary (see appendix C) of this output was conducted on 2859 cases out of a total sample of 3002 which represented 95.2% of the original sample with 4.8% of them omitted for missing information. The categorical variable information indicated 28.1% of this sample as not financially included (coded 0) and 71.9% as financially included (coded 1). The generalized linear probit model in Table 7.16 indicates the model goodness of fit based on an estimated binomial scale parameter which represents the ratio of the model's deviance to its degrees of freedom (df) at the one end, and the ratio of the Pearson chi-square value with its corresponding df at the other.

According to Norusis (2007: 256), model deviance is the likelihood ratio test that compares a null model to a full or variable model, with smaller observed deviances of the latter compared to the former, indicating model fit. Stated differently, if a model fits well, the ratio of its deviance to its df should be close to 1. Alternatively, the ratio of its Pearson chi-square value to its corresponding df should approximate this value. Table 7.16 indicates that the former's value (*deviance value/df*) was 0.945 while the latter's value (*chi-square value/df*) was 1.039. Both values were closer to 1 implying that the full model (above) containing all predictor variables, performs better than the null/constant only model and represents a good fit for the data in predicting the chances of financial inclusion in Uganda.

Additionally, the omnibus tests in Table 7.16 provide the results of the likelihood ratio test of significance by testing the null hypothesis that the population values of all coefficients equate to zero (Norusis, 2007: 259). This table indicated a non-zero chi-square value of 702.822 on 10 df, with a *p*-value of 0.000 which was lower than the 0.05 level of significance. Accordingly, the null hypothesis was rejected and it was concluded that the binary probit model, containing all predictor variables, is a better fit for the data and presents an improvement over the null/intercept only model. These findings corresponded with those obtained for the full binary logistic estimation in Model 2 Block 1 (Table 7.7), confirming that the results are robust to both regression approaches.

Similarly, the type III results provided by the "tests of model effects" in Table 7.16 test the null hypothesis that, 'ceteris paribus', a predictor variable's coefficient for effect on the dependent variable equates to zero and/or is not statistically significant at the 95% confidence level (Norusis, 2007: 259). Table 7.16 indicates that all predictor variables' Wald chi-square values (excluding "monitoring economic indicators" (SI1)) were no-zero and statistically significant at levels lower than the 5% level. This result compares to that obtained for the binary logistic output in Model 2 Block 1 (Table 7.7) confirming that the results are robust to both regression approaches.

Finally, 'parameter estimates' in the Table 7.16 indicate how well each predictor variable contributes to the model output and/or the dependent variable — financial inclusion — when all other variable effects are held constant. These estimates indicate that all predictor variables (excluding "monitoring economic indicators" (SI1)) contributed significantly to the outcome variable, namely, financial inclusion, since their *B*-coefficients had statistically significant *p*-values lower than the critical 5% level. In addition, these results compare to the binary logistic output in Model 2 Block 1 (table 7.7) supporting model robustness across both regression approaches.

Moreover, holding all other variables constant, the study infers the following about the bankable population of Uganda: (1) For every unit increase in 'making financial ends meet' (0.188), the chances of financial inclusion among individuals increases by 1.206 times. (2) One unit increase in planning ahead for the future (0.451) increases the chances of financial inclusion by 1.570 times. (3) Bankable Ugandans who possess a

positive attitude towards planning ahead for the future are 1.466 times more likely to be financially included than not. (4) A unit increase in "seeking financial advice" prior to choosing financial products enhances the chances of financial inclusion by 1.955 times. (5) Individuals who have a positive attitude towards the evolution of technology are 1.771 times more likely to be financially included. (6) Chances of financial inclusion increase with age up to a certain limit (46 years according to this study). (7) Bankable males are 0.840 times more likely to be financially included than females. (8) There is a direct relationship between income and financial inclusion. (9) One unit increase in education (0.479) increases the chances of financial inclusion by 1.615 times. Therefore, fitted binary probit model for the broad measure of financial literacy is presented as equation 7.7 below.

$$finInc = -1.679 + 0.188\,MM + 0.451\,PA1 + 0.382\,PA2 + 0.671\,CFP + 0.572\,SI2 + 0.008\,age + 0.001\,income + 0.479\,education - 0.175\,gender \quad (7.7)$$

where:

finInc = financial inclusion in Uganda
MM = money management (making ends meet)
PA1 = planning ahead (planning for the future)
PA2 = planning ahead (attitude towards planning for the future)
CFP = choosing financial products (seeking financial advice),
SI2 = staying informed (attitude towards technology)

7.5.2 Binary probit output using the composite measure of financial literacy

A similar approach as above was applied to investigate whether the composite measure of financial literacy affects financial inclusion in Uganda and whether the results are robust to those obtained using the binary logistic approaches detailed earlier (section 7.4.3). Specifically, binary probit regressions are applied to estimate the relationship between the composite financial literacy index and demographic control variables such as age, gender, income and education (independent proxies), with the study's measure of financial inclusion. The composite financial literacy index *(finlit)* constitutes a statistical combination of six financial literacy constructs elaborated in section 6.4.5. Table 7.17 below displays the binary probit output of this relationship.

Table 7.17: Probit output using the composite measure of financial literacy

Model Information

Dependent Variable	Financial inclusion [K1_1][a]
Probability Distribution	Binomial
Link Function	Probit

a. The procedure models 1 Included as the response, treating 0 Not Included as the reference category.

Goodness of Fit[a]

	Value	df	Value/df
Deviance	2707,482	2821	0,960
Scaled Deviance	2707,482	2821	
Pearson Chi-Square	3137,932	2821	1,112
Scaled Pearson Chi-Square	3137,932	2821	
Log Likelihood[b]	-1358,829		

Dependent Variable: Financial inclusion [K1_1]
Model: (Intercept), FinLit_s, C7: Age, C8: Gender, D8: Monthly Income, C10: Education Level[a]
a. Information criteria are in smaller-is-better form.
b. The full log likelihood function is displayed and used in computing information criteria.

Omnibus Test[a]

Likelihood Ratio Chi-Square	df	Sig.
664,316	5	0,000

Dependent Variable: Financial inclusion [K1_1]
Model: (Intercept), FinLit_s, C7: Age, C8: Gender, D8: Monthly Income, C10: Education Level[a]
a. Compares the fitted model against the intercept-only model.

Tests of Model Effects

Source	Type III Wald Chi-Square	df	Sig.
(Intercept)	142,878	1	0,000
FinLit_s	288,295	1	0,000
C7: Age	17,571	1	0,000
C8: Gender	7,811	1	0,005
D8: Monthly Income	21,705	1	0,000
C10: Education Level	126,848	1	0,000

Dependent Variable: Financial inclusion [K1_1]
Model: (Intercept), FinLit_s, C7: Age, C8: Gender, D8: Monthly Income 10: Education Level

Parameter Estimates

			95% Wald Confidence Interval		Hypothesis Test			
Parameter	B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)
(Intercept)	-1.703	0.1425	-1.982	-1.424	142.878	1	0.000	0.182
FinLit_s	2.471	0.1455	2.185	2.756	288.295	1	0.000	11.828
C7: Age	0.008	0.0019	0.004	0.011	17.571	1	0.000	1.008
C8: Gender	-0.166	0.0595	-0.283	-0.050	7.811	1	0.005	0.847
D8: Monthly Income	3.400E-07	7.2975E-08	1.970E-07	4.830E-07	21.705	1	0.000	1.000
C10: Education Level	0.503	0.0447	0.416	0.591	126.848	1	0.000	1.654
(Scale)	1[a]							

Dependent Variable: Financial inclusion [K1_1]
Model: (Intercept), FinLit_s, C7: Age, C8: Gender, D8: Monthly Income, C10: Education Level
a. Fixed at the displayed value.

Source: Author's own compilation.

Firstly, Table 7.17 estimates the model 'goodness of fit' based on an estimated binomial scale parameter which represents the ratio of the model's deviance to its degrees of freedom (df) at the one end, and/or the ratio of the Pearson chi-square value to its corresponding df at the other. This model deviance is the likelihood ratio test that compares a null model with a full model. A full model fits well when the ratio of its deviance to its df approximates 1. Alternatively, the ratio of its Pearson chi-square value to its corresponding df should approach this value (Norusis, 2007: 257). Table 7.17 indicates that the former's value (*value/df*) was 0.960 while the latter's value was 1.112 with both values closer to 1. This means that the full model (above), containing all predictor variables, performs better than the conventional null model with a constant only and represents a good fit for the data in predicting the chances of financial inclusion in Uganda.

Secondly, the omnibus tests in Table 7.17 provide the results of the likelihood ratio test of model significance by testing the null hypothesis that the population values of all coefficients equate to zero (Norusis, 2007: 259). This table indicates a non-zero chi-square value of 664.316 on 5 df, with a *p*-value of 0.000 which was lower than the 0.05 level of significance. Therefore, the null hypothesis was rejected and it was concluded that the binary probit model, containing all predictor variables, is a better fit for the data and presents an improvement over the null/intercept only model. These findings are similar to those obtained for the full binary logistic estimation in Model 2 Block 1 (Table 7.12), confirming results robustness for to both regression approaches.

Thirdly, the type III results provided by the 'tests of model effects' in Table 7.17, test the null hypothesis that, 'ceteris paribus', a predictor variable's coefficient for effect on the dependent variable equates to zero and/or is not statistically significant at the 95% confidence level (Norusis, 2007: 259). Table 7.17 indicates that all predictor variables' Wald chi-square values are no-zero at statistically significant levels lower than the 5% level. This result is similar to that obtained for the binary logistic output in Model 2 Block 1 (Table 7.12) confirming a similarity between the two regression approaches.

Lastly, 'parameter estimates' in the Table 7.17 indicate how well each predictor variable contributes to the model output and/or the dependent variable — financial inclusion — when holding the effect of all other variables' constant. These estimates

indicate that all predictor variables contributed significantly to the outcome variable, namely, financial inclusion since their *B*-coefficients had statistically significant *p*-values (p =0.000) lower than the 5% critical level. This finding compares to the binary logistic output in Model 2 Block 1 (Table 7.12) confirming results robustness for both regression approaches.

Therefore, holding all other variables constant the study infers the following about the bankable population of Uganda: (1) For every unit increase in financial literacy, the bankable Ugandan is 11.828 times more likely to be financially included than not. (2) A unit increase in age increases the chances of financial inclusion by 1.008 times. (3) Bankable Ugandan males are 0.847 times more likely to be financially included than their female counterparts. (4) Individual income represents a direct and positive relationship with financial inclusion. (5) One unit increase in the level of education increases the chances of financial inclusion by 1.654 times. Therefore, the fitted binary probit model for the composite index is presented as equation 7.8 below.

$$finInc = -1.703 + 2.471\ FinLit + 0.008\ age + 0.001\ income + 0.503\ education - 0.166\ gender \quad (7.8)$$

where:

finInc = financial inclusion in Uganda
finlit = composite financial literacy index

Observably, while both regression approaches present similar results, it is notable firstly that results from the logistic output are more robust than those from the probit analysis and present a clearer depiction of the relationship between financial literacy and financial inclusion. These results provide the precedent for presenting the study's findings on the financial literary-financial inclusion relationship in Uganda. Secondly, both measures of financial literacy inform a detailed relationship between financial literacy and financial inclusion in the presence of the available demand-side predictors such as age, gender, income and education. Despite the absence of supply-side predictors which would increase model prediction, the current findings are considered credible for inference and are outlined below.

7.6 SUMMARY OF EMPIRICAL FINDINGS.

This section presents the summary of the empirical findings into an investigation of the effect of financial literacy on financial inclusion in Uganda. As earlier indicated, binary logistic regressions were applied as the principal estimation procedure and the findings were verified using probit analyses to confirm that the results are robust. The study constructed a financial literacy index (Chapter 5) constituting six financial literacy constructs and regressed them, individually (broad measure) and collectively (composite measure) with a defined proxy for financial inclusion in Uganda. Additionally, and limited by the survey instrument, it included four demand-side control variables, namely, age, gender, income and education to assess their impact on financial inclusion alongside the measures of financial literacy. This procedure followed a comparison approach between a null/constant only model and a full/variable model to assess for model fit. The full model findings are presented below.

7.6.1 Binary logistic findings using the broad measure of financial literacy

A direct/forced entry logistic regression was applied to assess the impact of financial literacy alongside the four control variables age, gender, income and education, on the likelihood of the financial inclusion of a bankable adult in Uganda. The full model consisted of ten independent variables with six constituting the financial literacy constructs and four representing demographic control variables. The full model containing all predictors was statistically significant with a chi-square value of X^2 (10, N = 2859) = 704.513, $p \leq 0.001$ indicating that the model was able to distinguish between respondents who are financially included and otherwise. The model as a whole explained 31.4% of the variance in the financial inclusion status of individuals in Uganda, according to the Nagelkeke R^2, and correctly classified 76.3% of these cases as included.

All independent variables, except “monitoring economic indicators” (SI1), made a unique and statistically significant contribution to the full model. The strongest four predictors of this relationship included; “seeking financial advice” with an odds ratio of 2.879, “attitude towards technology” with an odds ratio of 2.594, “planning ahead for the future with an odds ratio of 2.272 and “education level” with an odds ratio of 2.233.

This indicated, for instance, that individuals who seek financial advice before choosing financial products and those who have a positive attitude towards the evolution of technology are 2.879 and 2.594 times more likely to be financially included respectively. These findings present policy implications for government on efforts to sensitize and educate the public about the existing financial products and the advent of technology, especially in relation to mobile money use. They also highlight a general lack of monitoring economic trends among the population.

Additionally, while other predictors significantly explained financial inclusion, it is notable that (1) adult males are more akin to financial inclusion than females; (2) education plays a crucial role in financial inclusion and, (3) mobile money-use relates and appears to improve financial literacy. All these observations present policy implications for fostering financial inclusion in Uganda.

7.6.2 Binary logistic findings using the composite measure of financial literacy

The above procedure was repeated using the composite financial literacy index to gauge firstly, whether the findings are consistent across both measures, but more precisely, to assess the overall impact of financial literacy on financial inclusion. The full model consisted of five independent variables, that is, one composite financial literacy index and four control variables. The full model containing all predictors was statistically significant with a chi-square value of X^2 (5, N = 2859) = 665.009, $p \leq 0.001$ indicating that the model was able to distinguish between respondents who are financially included and otherwise. The model as a whole explained 29.9% of the variance in the financial inclusion status of individuals in Uganda, according to the Nagelkeke R^2, and correctly classified 76.1% of these cases as included.

All independent variables made a unique and statistically significant contribution to the full model. The strongest two predictors of this relationship were financial literacy, with an odds ratio of 67.232 and education level, with an odds ratio of 2.328. This implied for instance, that individuals who score consistently across the financial literacy spectrum and those who have obtained some form of education, are 67.232 and 2.328 times more likely to be financially included respectively. Evidently, in the absence of certain supply-side impediments to financial inclusion, financial literacy appears to

make an overwhelming contribution towards the financial inclusion of bankable adults in Uganda. These findings present implications for government in terms of sensitizing the public on aspects that relate, but are not limited to, savings and budgeting to 'make financial ends meet', investments, insurance and retirement planning as incentives for planning ahead for the future, seeking financial advice on financial products and services and technological awareness, among others. Further findings indicate that (1) adult males are more likely to be financially included than females; (2) education plays a crucial role in the financial inclusion of individuals and, (3) mobile money-use plausibly increases financial literacy and technological awareness among users. All these observations present policy implications for fostering financial inclusion in Uganda.

7.7 CHAPTER SUMMARY

This chapter presented the empirical findings on the effect of financial literacy on financial inclusion in Uganda using binary logistic, probit and multiple regressions of two measures of financial literacy against a single measure of financial inclusion. The chapter confirmed that the former affects the latter for individuals in Uganda and that this effect is highly significant in the absence of limiting supply-side enablers to financial inclusion. The next chapter discusses the contribution of this study to the new body knowledge, cognizant of the above findings and draws conclusions, recommendations, implications for policy interventions and suggestions for future research premised on the findings above.

CHAPTER 8
CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

8.1 INTRODUCTION

This study aimed at establishing whether financial literacy affects financial inclusion in Uganda. It provided a sound theoretical and empirical basis for investigating the possible relationship between these two concepts and developed a theoretically and empirically supported financial literacy index whose impact was then assessed against a measure of financial inclusion in Uganda. Having concluded the analysis and presented the results in the preceding chapter, this chapter presents a synopsis of the underlying theoretical underpinnings of the study and the accompanying findings. It also highlights the novel contribution the study makes towards the body of knowledge on financial inclusion and suggests future policy implications and/or recommendations based on the findings.

8.1.1 Goal and layout of the chapter

The goal of this chapter is five-fold: firstly, to summarize the theoretical and empirical underpinnings that inspired the study; secondly, to outline by way of concluding remarks the empirical significance of the findings of the study; thirdly, to highlight the contribution the study makes towards the existing body of knowledge on financial inclusion; fourthly, to acknowledge some limitations of the study, and finally, to suggest avenues for future research.

The rest of this chapter is organized as follows: Section 8.2 provides a concise summary of the theoretical underpinnings of the study, while section 8.3 discusses the main empirical findings. Section 8.4 outlines the theoretical and empirical contributions to the study. Section 8.5 acknowledges the shortcomings of the study, and the last section suggests avenues for future research.

8.2 THEORETICAL UNDERPINNINGS OF THE STUDY

The study was inspired by the observation that a significant portion of the global population remains financially excluded (World Bank, 2014:2), yet current empirical studies and policy interventions for increasing financial inclusion appear to focus predominantly on the supply-side determinants to financial inclusion as opposed to a combination of both supply and demand factors. (See Arun & Kamath, 2015: 268). This has resulted in part to a growth in informal markets of financial products and services which has undermined efforts to financially include certain segments of the global population (see: Arun & Kamath, 2015: 268; Demirguc-Kunt & Klapper, 2013: 282). Taking cognizance of the above, it appears likewise, that recent efforts to address certain demand-side impediments are done prescriptively with little or no empirical evidence to support their usefulness.

This study observed, for instance, that several recent policy interventions highlight the need for financial literacy through financial education initiatives, as a critical enabler to formal financial inclusion, yet, there seem to be no empirical studies that confirm a possible causality between these concepts. While it is presumptuous to conclude that increasing financial literacy automatically translates into good financial behavior and the uptake of formal financial products and services, it is erroneous to undermine the role financial literacy plays towards financial behavior and formal financial inclusion without empirically proving the claim. Therefore, to provide some clarity on the relationship between financial literacy and financial inclusion this study posed the research question: 'Does financial literacy influence financial inclusion in the context of Uganda?'. Subsequently, it hypothesized that measures of financial literacy have a significant impact on financial inclusion in Uganda.

Theoretically, financial literacy influences financial knowledge which translates into financial behavior, personal attitude, and skills which enable the use of formal financial services (Kempson *et al.* 2013: xiii). However, the term financial literacy is broad and multifaceted implying that no yardstick exists to measure the concept. At the one end, financial literacy is measured as a combination of concepts that include knowledge about compound interest, inflation, risk diversification, and others, while at the other end financial literacy is measured as a combination of personal finance attributes and

behaviors that determine how an individual interacts with the environment to maximize their future financial utility. This study adopted the latter view to investigate whether financial literacy affects financial inclusion using Uganda as a unit of analysis.

PCA was applied to a set of questions contained in the FinScope 2018 Consumer Survey of Uganda to develop two measures of financial literacy as reflected by four main domains of financial behavior which include: *money management, planning ahead, choosing financial products and staying informed.* The broad measure of financial literacy comprised 6 constructs while the composite measure constituted a statistical combination of the above constructs. Each financial literacy measure, together with four confounding variables, viz: age, gender, income and education, was regressed against a measure of financial inclusion in Uganda using binary logistic and probit models. Both models provided adequate 'goodness of fit' and the summary of results are presented in the section below.

8.3 EMPIRICAL FINDINGS OF THE STUDY

Since this study was premised on theoretical studies that suggest a possible causality between financial literacy (as defined by astute financial knowledge, attitudes and behavior) and financial inclusion (as defined by the adoption of formal financial services), it likewise hypothesized that 'ceteris paribus', a financially savvy individual has a greater chance of being financially included, and with the reverse here being true. Based on this premise the study contended that individuals who score consistently well across the measure (s) of financial literacy have a statistically greater chance of being financially included, other factors held constant. Simultaneously, and in line with theoretical and empirical postulations, the study also assessed whether the confounding variables: age, gender, income and education have a statistically significant influence on financial inclusion in Uganda. Table 8.1 below[1] displays a summary of the results of this study when compared with earlier empirical postulations as depicted in Table 5.5. The following subsections provide a model summary and a discussion of the findings.

[1] Table 8.1 contains only those control variables that offered adequate variability for inclusion in the logistic analysis.

Table 8.1: Summary of expected and actual variable signs

Variable	Expected sign	Actual sign obtained	Source from Fin Scope Uganda (2018) survey
Financial inclusion (FI)	(+/-)	(+)	K1
Financial literacy	(+) Grohmann *et al*. (2018); Nanziri & Leibbrandt (2018); Arun & Kamath (2015); Cole *et al.* (2010).	(+)	Constructed using PCA
Age	(+) Overall financial inclusion increases with age (Allen *et al.,* 2016: 17)	(+) but restricted to an age limit	C7
Gender	(+) Common to the male gender, Zins & Weill (2016); Swamy (2014)	(-)	C8
Income	(+) Zins & Weill (2016); Arun & Kamath (2015)	(+)	D8
Education	(+/-) Allen *et al*. (2016); Zins & Weill (2016); Atkinson & Messy, (2013)	(+)	C10

Source: Author's own compilation.

8.3.1 The broad measure of financial literacy

Premised on prior literature, the broad measure of financial literacy was expected to positively influence financial inclusion in Uganda (see Table 8.1 above). This measure consisted of six financial literacy constructs which defined an array of financially astute behaviors that included the following: (1) *making financial ends meet* (the ability of an individual to consciously plan their day-to-day expenditure), (2) *planning ahead* (the ability for an individual to financially plan for uncertain future events), (3) *attitude towards planning for the future* (the belief in planning for unforeseen future expenses), (4) *seeking financial advice* (the ability for an individual to seek financial advice before choosing financial products), (5) *monitoring economic indicators* (the ability to keep track of future events in the economy) and (6) *attitude towards technology* (individuals' perceptions towards the use of advancing technology)

An 'Enter Method' by logistic regression was applied to assess the impact of the above constructs alongside the four control variables age, gender, income and education, on the likelihood of the financial inclusion of a bankable adult in Uganda. The full model was statistically significant with a chi-square value of X^2 (10, N = 2859) = 704.513, *p*

≤ 0.001 indicating that the model was able to distinguish between respondents who are financially included and financially not included. The model explained 31.4% of the variance in the financial inclusion status of individuals in Uganda, according to the Nagelkeke R^2, and correctly classified 76.3% of these cases as included. This finding unequivocally confirms that the broad measure of financial literacy has a positive and significant effect on financial inclusion in Uganda, even in the presence of other control variables like age, gender, income and education. This means that a bankable individual in Uganda who scores consistently (moderate to high) on all the above constructs has a strong likelihood of being financially included. This finding (as evidenced in sections 2.4 and 4.5) aligns with several theoretical and empirical postulations from current literature (see Grohmann *et al.* 2018; Nanziri & Leibbrandt, 2018; Arun & Kamath, 2015; Kempson *et al.* 2013).

Specifically, after holding other variables constant, the study observed the following about the bankable population of Uganda: (1) individuals who *make financial ends meet* are 1.379 times more likely to be financially included; (2) those that *plan for their future* financial welfare are 2.272 times more likely to be financially included; (3) individuals with a *positive attitude towards planning for the future* are 2.029 times more likely to be financially included; (4) those that *seek financial advice before choosing financial products* are 2.879 times more likely to be financially included; (5) those with a *positive attitude towards the evolution of technology* are 2.594 times more likely to be financially included; (6) older individuals are 1.015 times more likely to be financially included than their younger counterparts; (7) there is a direct positive relationship between income and financial inclusion; (8) more educated individuals are 2.233 times more likely to be financially included than the less educated or uneducated and, (9) the male gender is 0.725 times less-likely to be financially excluded than the female gender. A discussion of these findings follows hereunder.

It is observable as indicated in section 2.5, that all the *a priori* expectations regarding the effect of the control variables; age, gender, income and education on financial inclusion aligned with existing empirical literature (Allen *et al*. 2016:12; Fungacova & Weill, 2014: 201); Triki & Faye, 2013:44). However, the age – financial inclusion relationship was non-linear indicating that financial inclusion in Uganda is dominant among the middle-aged group (30 years – 50 years) as opposed to the young and old

(Allen *et al*. 2016:8; Zins & Weill, 2016: 54). Fungacova and Weill, (2014: 201) explain this aspect in terms of the 'generational effect' in which middle-age groups are prone to adopting financial services based on their acquired knowledge on the advancement of technology (like mobile money technology), perceived financial knowledge through education and a general desire to plan for their future welfare, which was uncommon among the older generation during similar times. For an example, mobile money use in Africa is common among this age group as opposed to the older generation (Triki & Faye, 2013: 60) It is also plausible that in the context of Uganda, financial products and services like insurance, retirement planning and investments were not rife to the older generation as they are to the middle-edged generation in current times

Similarly, males are more likely to be financially included than females (Allen *et al.* 2016: 16; Fungacova & Weill, 2014:202). This aspect is common to empirical literature and is explained by the current 'dominance' of males over females with regards to education, employment and income (Fungacova & Weill, 2014: 203, Lusardi & Mitchell, 2008). The common link between education, employment and income explains why education and income tend to influence financial inclusion positively (Allen *et al.* 2016: 16) However, the positive link between education and formal financial inclusion emphasizes the need for consumer education especially for the marginalized female gender and the uneducated. Arun and Kamath, (2015: 284) argue that consumer education helps to divert indigenous financial resources from insecure informal sources to secure formal sources such as community savings thereby encouraging common goals among the old, female and uneducated groups. Additionally, educated individuals are often employment which translates into income that has to be spent, saved, or invested wisely (see page 37).

Making ends meet, planning ahead and attitude towards planning ahead reflect aspects of budgeting, saving and investments among the population (Kempson, 2009: 4). Individuals who follow these practices inherently prefer formal than informal sources, since the former enables them to manage their savings and investments and provides a platform for diverse but safe offerings such as insurance and retirement planning, which are not adequately provided through the informal market of financial products and services. Mounting evidence indicates that less financially literate individuals tend to have problems with debt, are less likely to save and are more likely

to engage in high-cost credit (Ramakrishnan, 2012:2). It is possible therefore that individuals who follow such practice are more inclined to be formally financially included than not (see also section 3.3).

Seeking financial advice is an astute financial behavior common to financially literate individuals that relates to one's ability to negotiate the best bargain on a financial product offering or mitigate the risks of acquiring the wrong product. It involves a process of consultation with financial providers, a comparison between product costs and benefits and possible redress in case a product fails to meet the required needs (Kempson, 2009:6). The study indicated that adults who seek financial advice before choosing financial products are 2.879 times more likely to be financially included than not.

From a policy perspective, seeking financial advice addresses initiatives that aim to strengthen financial inclusion by promoting product awareness, consumer protection and assistance mechanisms that ensure that individuals choose the right financial products and services to maximize their utility (Atkinson & Messy, 2013: 24). A lack of awareness about the different types of financial products and their ability to meet the required needs, a low level of confidence, and certain attitudes and behaviors that inhibit the use of, and trust in, formal financial products create barriers to access. Poor knowledge of how products work and their likely costs reduces the likelihood of inclusion (Atkinson & Messy, 2013: 18). This means that seeking financial advice provides a feedback loop for promoting financial inclusion among individuals in Uganda (see page 37).

The *Attitude towards technology* sub-construct presented a new dimension of financial literacy uncommon to existing literature which was generated by PCA based on the collective meaning of the items extracted from the FinScope 2018 survey of Uganda. This construct contends that an individual's attitude towards the evolution of technology increases the likelihood of financial inclusion by 2.594 times. This implies that bankable adults in Uganda who have a positive attitude towards technology are more likely to be financially included than not (see section 6.4.4.5). This finding is pivotal to the role technology plays in the financial inclusion space (see page 27). Firstly, technological advancement in Uganda is predominantly biased towards mobile

money technology which is considerably wider and appears to play a crucial role in financial inclusion in the country (FinScope, 2018: 10). Secondly, the study found a positive correlation between mobile money use and financial literacy implying that mobile money users are akin to better managing their finances (see section 7.2.2). Thirdly, several theoretical and empirical studies posit the need for mobile technology at advancing financial inclusion (Zins & Weill, 2016; Arun & Kamath, 2015: 268; Triki & Faye, 2013: 45). Therefore, it is necessary to further leverage mobile money technology as a means of increasing financial inclusion in Uganda.

Finally, *monitoring economic indicators* (SI1) sought to establish whether respondents keep track of events in their economy like changing interest rates, inflation rates and other economic factors that influence the value of their financial investments. It also assessed whether they keep track of and adopt new product offerings or changes to existing ones and/or whether they speculate about their financial markets (see section 2.4). This construct had no statistically significant effect on financial inclusion in Uganda and it was concluded that either the items used to assess the construct were not entirely representative of underlying behavior or the construct plays no significant role in financial inclusion in Uganda. This finding differs from theoretical postulations by Atkinson and Messy, (2013) and Atkinson and Kempson, (2008) and requires further inquiry especially with regards to aspects that relate to the design of the questionnaire. The following section presents the findings using the composite measure of financial literacy.

8.3.2 The composite measure of financial literacy

The composite financial literacy index constituted a statistical combination of all the financial literacy constructs detailed above and a similar logistic regression procedure was applied to assess the impact of the index alongside the four control variables age, gender, income and education, on the likelihood of the financial inclusion of a bankable adult in Uganda. The full model was statistically significant with a chi-square value of X^2 (5, N = 2859) = 665.009, $p \leq 0.001$ indicating that it was able to distinguish between respondents who are financially included and financially not included. It explained 29.9% of the variance in the financial inclusion status of individuals in Uganda, according to the Nagelkeke R^2, and correctly classified 76.1% of these cases as

included. All independent variables made a unique and statistically significant contribution ($p \leq 0.001$) in explaining the chances of financial inclusion in Uganda.

With other variables held constant, the study inferred the following about the bankable population of Uganda: (1) individuals who score consistently well on all constructs in the financial literacy index are 67.232 times more likely to be financially included than not; (2) older individuals are 1.014 times more likely to be financially included than their younger counterparts; (3) there is a direct positive relationship between monthly income and financial inclusion; (4) educated individuals are 2.328 times more likely to be financially included compared to the less educated or uneducated and (5) males are 0.736 times less likely to be financially excluded than females. These results confirmed that financial literacy has a positive and statistically significant effect on financial inclusion in Uganda based on a demand for financial services perspective. Moreover, in the absence of certain supply-side impediments to financial inclusion, it exhibits a stronger demand influence than income, age, gender and education, based on its higher odds ratio.

Although these results appear weaker in significance, they mirror those obtained using the broad measure above and provide an indication of how financial literacy drives financial inclusion - other factors held constant. Taking cognizance of all the domains that stimulate financial inclusion in Uganda, the following policy initiatives are imperative in enabling this process from a demand perspective: (1) the need for policy interventions that provide financial education programs designed to increase product and service awareness among the population; (2) efforts to foster financial stability, compliance, integrity and market conduct of financial institutions; (3) interventions to tailor consumer products and services such as credit, insurance, pensions and others to fit a broader spectrum of consumer preferences and attract the financially marginalized who include women and older age groups and (4) develop technological infrastructure which among others, leverages mobile money technology. These initiatives should improve the levels of financial literacy among the population and further stimulate the demand for financial services in Uganda.

8.4 THE CONTRIBUTION OF THE STUDY

The literature on financial inclusion is replete with local and international, theoretical and empirical studies that guide efforts to increase the use of formal financial products and services globally. However, until recently, most of these studies focused on structural supply-side aspects to financial inclusion with few addressing the demand-side imperatives to financial inclusion. Current studies that have incorporated some of these demand-side factors have been limited by data gaps, to assessing a few factors such as income, age, gender and others whose data sources have been readily obtainable. Even fewer studies have managed to interrogate the usefulness of underlying individual psychosocial and behavioral attributes such as religion, financial literacy, personal attitudes and behavior on financial inclusion due to a lack of data sources at the one end, and/or a lack of objective consensus at the other.

For instance, the lack of a universally acceptable yardstick for measuring financial literacy, and the assumed correlation of this term with concepts like education, financial knowledge and financial behavior, has led several researchers to presumptively link financial literacy to greater financial inclusion without substantive empirical evidence to back the claim. At the one end, several approaches have posited and applied financial knowledge, mathematical or financial concepts and the application of certain financial behaviors as the key determinants of financial literacy driving financial inclusion (Klapper *et al.* 2016; Assad, 2015; Alhenawi & Elkhal, 2013; van Rooji *et al.* 2009). At the other end, studies have argued and likewise applied a broader combination of financial knowledge, skills, attitudes and financial behavior as the drivers to this process (Nanziri & Leibbrandt, 2018; Kempson *et al.* 2013; Atkinson & Messy, 2012; Kempson, 2009). This has created a lack of consensus and hence, a gap in the empirical body of knowledge regarding the appropriate measure for financial literacy and/or its impact on financial inclusion globally.

This study makes a novel contribution to this gap in the body of knowledge by developing from existing literature, a composite financial literacy index which is then used to assess its impact on financial inclusion in Uganda. While the study confirms most of the existing theoretical postulations to the financial literacy – financial inclusion relationship and likewise confirms the links between age, gender, income and

education with financial inclusion, it uncovers new insights relevant to the existing body of knowledge on the effect of financial literacy on financial inclusion. These are briefly highlighted below.

Firstly, the study uses cross-sectional data from a case study to confirm unequivocally that both constructed measures of financial literacy (the broad and composite measures) have a statistically significant effect on financial inclusion in Uganda. To the researcher's knowledge, this finding compares with only one recent study by Grohmann *et al.* (2018) who investigate whether financial literacy improves financial depth across countries. However, their study differs from current study in several ways. Firstly, they apply OLS regressions to the available across-country data while this study applies logistic regressions to cross-sectional survey data at a country case level. Secondly, they use macroeconomic variables in their study while current study applies demand-side indices and microeconomic variables. Lastly, their study investigates financial inclusion from an institutional supply-side perspective while this study biases towards a demand perspective. Nevertheless, both studies inform the relevance of financial literacy to financial inclusion. No other known studies specifically investigate the link between financial literacy and financial inclusion albeit several investigate some narrower aspects of this relationship (see Atkinson & Messy, 2012; van Rooji *et al.* 2009).

Secondly, this study contributes to the existing body of knowledge seeking to develop a standardized global measure for financial literacy and uses guidelines contained in the OECD (2015) toolkit for measuring financial literacy and financial inclusion together with theoretical frameworks proposed by Nanziri and Leibbrandt (2018), Atkinson and Messy (2013), Atkinson and Messy (2012), Huston (2010), Remund (2010), Hung *et al.* (2009) and Atkinson and Kempson (2008) to identify and extract using PCA, several domains that collectively estimate whether an individual is financially literate based on a behavioral and attitudinal perspective. This framework identifies several insights that are common as well as new to the body of knowledge.

First, it confirms the several financial literacy – financial inclusion hypotheses presented by Atkinson and Kempson (2008: 26) which propose that: (1) individuals who proficiently manage their day-to-day expenses are more likely to be financially

included; (2) those that manage their security and risk by financially planning for the future are likewise prone to be financially included; and (3) financially knowledgeable individuals, individuals who have a propensity to engage with financial markets for financial advice and those who make informed decisions about financial products and services, are more likely to be financially included than not. The study contends that the latter construct hereabove appears to have the most significant influence on financial inclusion suggesting that knowledge, engagement with financial institutions and knowledge about financial products and services play a crucial role in enabling financial inclusion, at least in the context of Uganda.

Secondly, it identifies another measure of financial literacy that drives financial inclusion but is uncommon to existing literature – an individual's attitude towards the evolution of technology. The study argues that this domain for Uganda may be associated with the prevalence of mobile money technology which is relatively widespread in this country. According to this theory, mobile money users appear to be more financially literate than their counterparts who do not use mobile money technology. It appears that individuals who use mobile money in Uganda are equipping themselves with the several technological requirements common to this form of financial service, so that, leveraging this technology further could potentially increase financial inclusion in the country. Similarly, a knowledge of other forms of technology like internet banking, ATM usage, deposits, transfers and remittances could be potential drivers to financial inclusion. This emphasizes a need for policy initiatives for educating and sensitizing the public about the technological aspects related to several financial products and services in Uganda.

Finally, the study contributes to the existing body of knowledge that seeks to establish a suitable measure for financial literacy consistent to the 'less educated' developing economies where knowledge of financial and numerical concepts like inflation, risk diversification, time value of money and interest rates may not necessarily indicate whether an individual is financially literate (Hung *et al*., 2009: 7). The study argues, following submissions by Kempson *et al.* (2013), Atkinson *et al.* (2013) and Huston (2010) that measuring financial literacy for developing economies should focus on appraising the knowledge and application of personal finance attributes that relate to desirable behaviors like saving, investing and others, rather than investigating

knowledge of complex financial concepts which may be uncommon knowledge to some individuals in developing economies (see Hung *et al*., 2009: 10).

This study indicates that in the context of Uganda, an individual who scores consistently well across all the financial literacy domains is 67.232 times more likely to be financially included than not. While the study acknowledges a slight model limitation due to the absence of certain supply-side factors, it nonetheless recognizes the significant contribution the index makes at predicting financial inclusion compared to the other control variables in the model.

8.5 THE LIMITATIONS OF THE STUDY

The study investigated whether financial literacy influences financial inclusion in Uganda and confirmed a statistically significant and positive relationship between the two concepts. However, these findings did not ensue without certain limitations that characterized the study. This section presents some of the theoretical and methodological shortcomings of the study and the efforts that were applied to remedy them.

First, the study followed a systematic process guided by PCA to construct a composite financial literacy index consistent with the financial behavior patterns of the bankable population of Uganda. The inputs for this index included questions from the FinScope 2018 Consumer Survey on the country, which was customized to elicit information on the financial behavior patterns and attitudes of respondents towards spending, risk management, savings, borrowings, technology, cash flow management and others. By default, this questionnaire provided adequate responses to guide the construction of a financial literacy index even though the instrument was not specifically designed to measure the concept. Therefore, the study acknowledges a minor misalignment between the purpose of the study and the available data sources. To remedy this shortcoming, the study ensured that an optimal number of items representing each of the financial literacy constructs was identified consistent with Huston, (2010: 308).

Secondly, the study applied one measure of financial inclusion (*ownership of a formal account*) due to a limitation of the survey instrument to provide other proxies for

measuring the concept. This did not constitute a limitation since the purpose of the study was to identify the fraction of individuals who own or are likely to own a formal financial account subject to their levels of financial literacy. Consequently, however, the study could not explicitly confirm the 'active use' of formal financial accounts either to save, invest, or borrow among the population since this premise was merely implied based on the ownership of a formal account. It would, therefore, be interesting to examine how this measure of financial literacy relates to other measures of financial inclusion like *account ownership for credit* and *account ownership to save.*

Thirdly, and limited by the survey instrument, the logistic output for the financial literacy – financial inclusion relationship was limited to four control variables and lacked certain supply-side determinants that account for the 'access' dimension to financial inclusion. This lack of other variables was due to low variability in the responses provided by the proxies on the one hand, and/or, the complete lack of items to represent the proxies, on the other hand. It is plausible that the inclusion of these variables could potentially increase the model-fit although the current empirical findings were credible for practical interpretation. In a nutshell, the study acknowledges that since most shortcomings were attributed to the survey instrument, the need to customize the latter to the different social and economic contexts of inquiry is imperative. It appears that the FinScope surveys and questionnaires follow a normative and internationally prescribed approach of 'one size fits all' which is not necessarily applicable to the different economic and social contexts (Alsemgeest, 2015: 157; Remund, 2010: 310). Further studies need to investigate this claim.

8.6 SUGGESTIONS FOR FURTHER RESEARCH

In conclusion and cognizant of the above findings and limitations, this study suggests areas for further research. Firstly, in the context of this study, there is a need to develop surveys that specifically investigate the link between financial literacy and financial inclusion. Such surveys need to be customized to the contexts for which they are designed to provide an accurate output cognizant of the prevailing social and economic conditions. Secondly, the empirical literature on financial literacy appears to apply two different approaches of measuring the concept; one that investigates knowledge and application of concepts like inflation, risk diversification, interest rates

and the time value of money, and another which investigates individual behavior and attitudes towards the application of financial knowledge in terms of financial planning, saving, investing and budgeting. While this study supports the latter view, there is a need to conduct further study on a comparison between the two approaches mindful of the context in which each is applied. This could further guide efforts to prescribe a universally acceptable approach to measuring financial literacy.

Thirdly, financial literacy appears to have more constructs than are currently prescribed in the literature. This study identified *monitoring economic indicators* and *attitude towards technology* as new sub-constructs uncommon to existing literature. Therefore, further study needs to investigate the possible prevalence of such constructs especially among the developing economies where the levels of technology are lower and mobile money use is higher. Lastly, this study identified a positive correlation between mobile money use and the levels of financial literacy indicating that mobile money use stimulates financial literacy. This notion could not be empirically verified using the current data sets. As such, future studies need to investigate this possible link further.

LIST OF REFERENCES

Acquah-Sam, E & Salami, K. 2013. Knowledge and participation in capital market activities: The Ghanaian experience. *International Journal of Scientific Research in Education,* 6 (2): 189 - 203.

Alhenawi, Y, & Elkhal, K. 2013. Financial literacy of US households: Knowledge vs. long-term financial planning. *Financial Services Review.* 22 (2013): 211 – 244.

Allen, F, Demirguc-Kunt, A, Klapper, L & Martinez Peria, M. (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation,* 27 (2016): 1 - 30.

Alsemgeest, L. 2015. Arguments for and against financial literacy education: Where to go from here? *International Journal of Consumer Studies.* 39 (2015): 155 - 161.

Amižić, G., Massara, A. and Mialou, A. 2014. *Assessing countries' financial inclusion standing – A new composite index.* International Monetary Fund Working paper No: 14/36, Washington DC.

Andrianaivo, M, & Kpodar, K. 2011. *ICT financial inclusion and growth: Evidence from African countries.* International Monetary Fund Working paper No: 11/73, Washington DC.

Anzoátegui, D, Demirgüç-Kunt, A. & Martinez Peria. 2014. Remittances and financial inclusion: Evidence from El Salvador, *World Development.* 54 (2013): 338 - 349.

Ardic, O., P, Heimann, M & Mylenko, N. 2011. *Access to financial services and financial inclusion around the world: A cross country analysis with a new dataset.* Policy Research Working paper no: 5537. The World Bank.

Arun, T. & Kamath, R. 2015. Financial inclusion: Policies and practices. *IMMB Management Review,* 27(2015): 267 - 287.

Assad, T. C. 2015. Financial literacy and financial behavior: Assessing knowledge and confidence. *Financial Services Review,* 24 (2015): 101 - 117.

Atkinson, A. & Kempson, E. 2008. *Measuring and improving financial capability: Designing an approach for Kenya.* Personal Finance Research Centre, University of Bristol.

Atkinson, A. & Messy, F. 2011. Assessing financial literacy in 12 countries: An OECD/INFE international pilot exercise. *Journal of Pensions Economics and Finance,* 10 (4): 657 – 665.

Atkinson, A. & Messy, F. 2012. *Measuring financial literacy: Results on OECD/INFE pilot study.* OECD Working Papers on Finance, Insurance and Private Pensions. No. 15 (2012): 1 - 73.

Atkinson, A. & F. Messy 2013. *Promoting Financial Inclusion through Financial Education: OECD/INFE Evidence, Policies and Practice*, OECD Working Papers on Finance, Insurance and Private Pensions, No. 34, OECD Publishing. http://dx.doi.org/10.1787/5k3xz6m88smp-en

Atkinson, A. McKay, S. Collard, S. & Kempson, E. 2007. Levels of financial capability in the UK. *Journal of Public Money and Management,* 27(1): 26 – 36.

Bank of Uganda 2017. *National financial inclusion strategy 2017 - 2022.* Bank of Uganda.

Bank of Uganda, 2013. *Financial inclusion project. Strategy paper on financial inclusion.* Bank of Uganda.

Basant, K & Brajaraj, M. 2011. Financial Inclusion Strategies in developing countries with special reference to India. *Vilakshan: XIMB Journal of Management.* 8 (2): 13 - 22.

Bay, C, Catasus, B & Johed, G. 2014. Situating financial literacy. *Critical Perspectives on Accounting,* 25 (2014): 36 - 45.

Beck, T & De La Torre, A. 2007. The basic analytics of access to financial services. *Financial Markets, Institutions and Instruments*, 16 (2): 79 – 117.

Beck, T & Demirgüç-Kunt, A. 2008. Access to finance: An unfinished agenda. *The World Economic Review,* 22 (3): 383 - 396.

Beck, T, Demirgüç-Kunt, A & Levine, R. 2009. *Financial institutions and markets across countries over time: Data and analysis.* Policy Research Working Paper No 4943. The World Bank.

Beck, T, Demirgüç-Kunt, A & Martinez Peria, M. 2007. Reaching out: Access to and use of banking services across countries. *Journal of Financial Economics,* 85 (2007): 234 - 266.

Beck, T, Demirgüç-Kunt, A. & Honohan, P. 2009. Access to financial services: Measurement, Impact and Policies. *The World Bank Research Observer,* 24 (2009): 119 - 145.

Beck, T. 2013. Bank financing for SMEs – Lessons from the literature. *National Institute Economic Review*, 225 (2013): 23 - 38.

Beck, T. Demirgüç-Kunt, A. & Martinez-Peria, M. 2011. Bank financing for SMEs: Evidence across Countries and bank ownership types. *Journal of Financial Services.* 39 (2011): 35 – 54.

Brace, N. Kemp, R. & Snelgar, R. 2013. *SPSS for psychologists.* 5th ed. London: Routledge.

Brown, A. Collins, M.J. Schmeiser, M & Urban, C. 2014. *State mandated financial education and credit behavior of young adults.* Federal Reserve Board Working Papers on Finance and Economics Discussion Series, No. 68 (2014): 1 – 41.

Bucher-Koenen, T & Lusardi, A. 2011. Financial literacy and retirement planning in Germany. *Journal of Pension Economics and Finance,* 10 (4): 565 - 584.

Calcagno, R & Monticone, C. 2015. Financial literacy and the demand for financial advice. *Journal of Banking and Finance,* 50 (2015): 363 – 380.

Carpena, F. Cole, S. Shapiro, J. & Zia, B. 2011. *Unpacking the causal chain of financial literacy*. World Bank Policy Research Working paper, No: 5798. The World Bank.

Chisasa, J. 2014. An empirical study of the impact of bank credit on agricultural output in South Africa. *Unpublished thesis.* University of South Africa.

Claessens S. 2006. Access to financial services: A review of issues and public policy objectives. *World Bank Research Observer,* 21 (2): 207 – 240.

Claessens, S. & Tzioumis, K. 2006. *Measuring firms' access to finance. Access to finance: Building Inclusive Financial Systems.* The World Bank. Washington DC.

Cohen, M & Nelson, C. 2011. *Financial literacy: A step for clients toward financial inclusion.* Commissioned Working Paper, Global Microcredit Summit, Valladolid, Spain.

Cole, S. & Shastry, K. 2009. *Smart money: The effect of education, cognitive ability and financial literacy on financial market participation.* Harvard Business School working paper, No. 71(2009): 1 - 39.

Cole, S. Sampson, T & Zia, B. 2009. *Prices or knowledge? What drives the demand of financial services in emerging markets?* Harvard Business School Working paper, No. 117. Harvard University.

Cole, S., Sampson, T. & Zia, B., 2011. Prices or knowledge? What drives demand for financial services in emerging markets? Journal *of Finance*, 66 (6): 1933 -1967.

Cox, D. R. & Snell, E. J. 1989. *Analysis of binary data.* 2nd ed, London: Chapman and Hall.

Creswell, J. W. 2003. *Research design: qualitative, quantitative and mixed methods approaches.* 2nd ed. London: Sage publications.

Dahmen, P. & Rodriguez, E. 2014. Financial literacy and the success of small businesses : An observation from a Small Business Development Center, *Numeracy,* 7 (1) : 1 – 11.

Demirgüç-Kunt, A., & L. Klapper. 2012. *Financial Inclusion in Africa:* An Overview Policy Research Working Paper No 6088. World Bank, Washington, D.C.

Demirgüç-Kunt, A, & Klapper, L. 2013. Measuring financial inclusion: Explaining variation of use of financial services across and within countries. *Brookings Papers on Financial Activity,* 1 (2013). pp. 279-340.

Demirgüç-Kunt, A. 2014. Financial inclusion: Presidential address. *Atlantic Economics Journal.* 42 (2014): 349 - 356.

Demirgüç-Kunt, A. & Maksimovic. V. 1998. Law, finance and firm growth. *Journal of Finance.* 53 (6): 2107 - 2137.

Demirgüç-Kunt, A., Beck, T & Honohan. 2008. *Finance for all: Pitfalls and policies in expanding access.* World Bank Policy Research Report, (2008):1-235. The World Bank.

Dev, M., S. 2006. Financial inclusion: Issues and challenges. *Economic and Political Weekly,* 41(41): 4310 – 4313.

Efobi, U. Beecroft, I & Osabuohein, E. 2014. Access to and use of banking services in Nigeria: Micro-econometric evidence. *Review of Development Finance,* 4 (2): 104 – 114.

Fanta, A. B. Mutsonziwa, K & Naidoo, D. 2016. *Financial literacy and financial inclusion in the SADC region: Evidence using FinScope surveys.* FinMark Trust Policy Working Paper No: 02/2016. FinMark Trust South Africa.

Fernandes, D. & Lynch, J. G. 2014. Financial literacy, financial education and downstream financial behaviors. *Journal of Management Science,* 60(8): 25 - 46.

Ireland, Department of Finance. 2011. *Strategy for financial inclusion: Final Report.* Ireland.

Finlit Foundation Uganda, 2012. *Results of national financial literacy baseline survey in Uganda*. The Public Sector Foundation Uganda.

FinScope, 2013. *FinScope III survey key findings : Unlocking barriers to financial inclusion.* Available from: http://www.finscope.co.za/Uganda. Accessed: March 2016.

FinScope, 2018. *Topline findings report on Uganda.* Available from: http://www.finscope.co.za/Uganda. Accessed: January 2019.

Fungacova, Z. & Weill, L. 2014. Understanding financial inclusion in China. *Chinese Economic Review*. 34 (2015): 196 – 206.

Gable, G. G. & Sedera, D. 2009. *Formative and reflective measurement and validation mismatch in survey research: An archival analysis of information systems success constructs*. International Conference on Information Systems Working Paper.

Galor, O & Zeira, J. 1993. Income distribution and microeconomics. *A Review of Economic Studies.* 60(1) : 35 - 52.

Goldsmith, R.W. 1969. *Financial structure and development.* New Haven, CT: Yale University Press.

Greene, W. H. 2008. *Econometric analysis.* 6th ed. New York: Prentice Hall.

Grohmann, A. Kluhs, T & Menkhoff, L. 2018. Does financial literacy improve financial inclusion ? Cross-country evidence. *World Development.* 111(2018) : 84 - 95.

Guiso, L & Viviano, E. 2015. How much can financial literacy help ? *A Review of Finance,* 19 (4) : 1347 - 1382.

Guiso, L. & Jappelli, T. 2005. Awareness and stock market participation. *Review of Finance.* 9 (4) : 537 - 567.

Guiso, L., Sapeinza, P. & Zingales, L. 2004. Does local financial development matter? *The Quarterly Journal of Economics*, 119 (3): 929 - 969.

Gujarati, D & Porter D. 2010. *Basic Econometrics.* 2nd ed. London: McGraw Hill.

Gujarati, D. 2011. *Econometrics by example.* London: Palgrave-Macmillan.

Hair, J. F., Celsi, M. W., Money, A. H., Samouel, P. & Page, M. J. 2011. *Essentials of business research methods.* 2nd ed. New York: M. E. Sharpe.

Hair, J. F., William, C. B., Babin, B. J & Anderson, R. E. 2014. *Multivariate data analysis.* 7th ed. London: Pearson.

Hallebone, E. & Priest, J. 2009. *Business and management research: Paradigms and practices.* New York. Palgrave Macmillan.

Hastings, J.S., Madrian, B. C. & Skimmyhorn, W.L. 2012. Financial literacy, financial education and financial outcomes. *Annual Review of Economics,* 5(2013) : 347 - 373.

Heyer, A & King, M. 2015. *Kenya's financial transformation in the 21st Century*. Financial Services Deepening. Kenya.

Hilgert, A. M. & Horgath, J. M. 2003. Household financial behavior : The connection between knowledge and behavior. *Federal Reserve Bulletin,* 89 (8) : 309 – 322.

Honohan, P & Beck, T. 2007. *Making finance work for Africa*. The World Bank.Washington DC.

Honohan, P. 2008. Cross country variation in household access to financial services. *Journal of Banking and Finance,* 32 (2008): 2493 – 2500.

Hsaio, Y. & Tsai, W. 2018 Financial literacy and participation in derivatives markets. *Journal of Banking and Finance.* 88 (2018) : 15 - 29.

Hung, A. Parker, A. M. & Yoong, J. 2009*. Defining and measuring financial literacy*. RAND Working Paper No 708.

Huston, S. J. 2010. Measuring financial literacy. *Journal of Consumer Affairs*, 44 (2): 296 - 316.

Johnson, E & Sherraden, M., S. 2007. From financial literacy to financial capability among the youth. *Journal of Sociology and Social Welfare,* 34 (3): 119 – 145.

Johnson, S. 2016. Competing visions of financial inclusion in Kenya: The rift revealed by mobile money transfer. *Canadian Journal of Development Studies.* 37 (1) : 83 – 100.

Kempson, E & Whyley, C. 1999a. *Kept out or opt out? Understanding and combating financial exclusion.* Personal Finance Research Centre. University of Bristol.

Kempson, E. 2009. *Framework for the development of financial literacy baseline surveys: A first international comparative analysis.* OECD Working Papers on Finance, Insurance and Private Pensions. No.1 OECD publishing.

Kempson, E. & Whyley, C 1999b. Understanding and combating financial exclusion. *Insurance Trends.* 21(1999): 18 - 22.

Kempson, E. Atkinson, A & Pilley, O. 2004. *Policy level response to financial exclusion in developed economies: Lessons for developing countries.* The Personal Finance Research Centre, University of Bristol.

Kempson, E. Perotti, V. & Scott, K. 2013. *Measuring financial capability: A new instrument and results for low- and middle-income countries.* The World Bank. Washington DC.

Kempson, E., Artkinson, A. & Pilley, O. 2004. *Policy level response to financial exclusion in developed economies: Lessons for developing countries*. The Personal Finance Research Centre. University of Bristol.

Kempson, E., Perotti, V. & Scott K. 2013. *Measuring financial capability: A new instrument and results from low-and middle-income countries.* Financial Literacy and Education. World Bank: Washington DC.

Kendall, J., Mylenko, N & Ponce, A. 2010. *Measuring financial access around the world*. World Bank Policy Research Working Paper no. 5253. The World Bank.

Kim, D., Yu, J & Kabir, M. 2018. Financial inclusion and economic growth in OIC countries. *Research in International Business and Finance.* 43 (2018): 1 - 14.

King, R.G. & Levin, R. 1993. Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics,* 108 (3): 717 - 737.

Klapper, L, Laeven, L & Rajan, R. 2006. Entry regulation as a barrier to entrepreneurship, *Journal of Economics*. 82 (3): 591 - 629.

Klapper, L. Lusardi, A & Panos, G. 2013. Financial literacy and its consequences: Evidence from Russia during the financial crisis. *Journal of Banking and Finance,* 37 (2013): 3904 – 3923.

Klapper, L. Lusardi, A & van Oudheusden, P. 2016. *Financial Literacy Around the World: Insights from the standard and poor's rating services global financial literacy survey.* The World Bank. Washington DC.

Kleinbaum, D. G. & Klein, M. 2002. *Logistic regression: A self-learning text.* 2nd ed. New York: Springer.

Levshina, N. 2015. *How to do Linguistics with R: Data exploration and statistical analysis.* Philadelphia: John Benjamins Publishing.

Leyshon, A & Thrift, N. 1995. Geographies of financial exclusion: Financial abandonment in Britain and the United States. *Transactions of the Institute of British Geographers,* 20 (3): 312 – 341.

Lusardi, A & Mitchel, O. S. 2006. Financial literacy and retirement preparedness: Evidence and implications for financial education, *Business Economics,* 1 (2007): 35 – 44.

Lusardi, A & Mitchel, O. S. 2007. Financial literacy and retirement preparedness: Evidence and implications for financial education, *Business Economics,* 1 (2007): 35 – 44.

Lusardi, A & Mitchell, O., S. 2014. The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature.* 52 (1): 5 - 44.

Lusardi, A. & Mitchel O. S. 2011. *Americans' financial capability.* National Bureau of Economic Research Working Paper, No. 17103.

Lusardi, A. & Mitchel, O. S. 2007. *Financial literacy and retirement planning: New evidence from the Rand American Life Panel.* Michigan Retirement Research Centre working paper, No. 157.

Lusardi, A. & Tufano, P. 2009. *Debt Literacy, financial experiences and overindebtness.* National Bureau of Economic Research Working Paper, No. 14808.

Lusardi, A. 2012. Numeracy, financial literacy and financial decision-making. *Numeracy*, 5 (1): 1 – 12.

Lusardi, A. Mitchell, O. S. & Curto, V. 2010. Financial literacy among the young. *Journal of Consumer Affairs,* 44 (2): 358 – 380.

Lusardi, A. Mitchell, O. S. & Curto, V. 2014. Financial literacy and financial sophistication in the older population. *Journal of Pension Economics and Finance,* 13 (4): 347 – 366.

Mahdzan, N. S. & Tabiani, S. 2013. The impact of financial literacy on individual saving: An exploratory study in the Malaysian context. *Transformations in Business and Economics,* 12 (1): 41 – 55.

Mahendra, D, S. 2006. Financial Inclusion: Issues and challenges. *Economic and Political Weekly.* 41(41): 4310 - 4313.

Makina, D. 2012. Determinants of return migration intentions: Evidence from Zimbabwean migrants living in South Africa. *Development Southern Africa,* 29 (3): 365 – 378.

McCommick, M. H. 2009. The effectiveness of youth financial education: A review of the literature. *Journal of Financial Counselling and Planning,* 20 (1): 1 – 23.

McKinnon, R.I. 1973. *Money and capital in economic development*. Washington, DC: The Brookings Institution.

Mitton, L., 2008. *Financial inclusion in the UK: Review of policy and practice*. Joseph Rowntree Foundation. www.jrf.org.uk.

Monticone, C. 2010. How much does wealth matter in the acquisition of financial literacy, *Journal of Consumer Affairs.* 44 (2): 403 – 422.

Mouna, A. & Anis, J. 2017. Financial literacy in Tunisia: its determinants and its implications on investment behavior. *Research in International Business and Finance,* 39 (2017): 568 - 577.

Munongo, S. 2019. *Social media and mobile money adoption: Comparative evidence from South Africa and Zimbabwe*. Unpublished thesis.

Nanziri, E. L. & Leibbrandt, M. 2018. Measuring and profiling literacy in South Africa. *South African Journal of Economic and Management Sciences,* 21 (1): 1 – 17.

Norusis, M., J. 2007. *SPSS 15.0 Advanced statistical procedures companion.* New York: Prentice Hall.

OECD/INFE, 2011*. Measuring financial literacy: questionnaire and guideline notes for conducting an internationally comparable survey of financial literacy*. Paris, OECD.

OECD/INFE, 2013*. Financial literacy and financial inclusion: Result of the OECD/INFE survey across countries and gender.* Russia Trust Fund for Financial literacy and Education. Paris: OECD.

OECD/INFE, 2015. *Toolkit for measuring financial literacy and financial inclusion*. Paris: OECD.

OECD/INFE, 2016. *International survey of adult financial literacy competencies.* Paris: OECD.

Paiella, M. 2016. Financial literacy and subjective expectations questions. *Journal of Research in Economics,* 70 (2016): 360 – 374.

Pallant, J. 2011. *SPSS survival manual: A step by step guide to data analysis using SPSS.* 4th ed. Melbourne: Allen & Unwin.

Pearce, J. & Ferrier, S. 2000. Evaluating the predictive performance of habitat models developed using logistic regression. *Ecological Modelling,* 133 (2000): 225 - 245.

Rajan, R. & Zingales, L. 1998. Financial dependence and growth. *American Economic Review,* 88(3): 559 - 586.

Rajan, R. & Zingales, L. 2003. The great reversals: the politics of financial development in the twentieth century. *Journal of Finance,* 55 (1): 5 - 50.

Ramakrishnan, 2011. Financial literacy – the demand side of financial inclusion, *26th SKOCH Summit on Swabhiman-Inclusive Growth and Beyond.* Mumbai India, 2th -3th June 2012.

Ramakrishnan. R. 2012. Financial literacy and financial inclusion, *29th SKOCH Summit on Fuelling Growth.* Mumbai India, 8th -9th June 2012.

Ramji, M. 2009. *Financial Inclusion in Gulbarga: Finding usage in access.* Institute of Financial Management and Research. Working papers on Microfinance. No 26. Centre of Micro Finance: http://ifmr.ac.in/cmf/eomf6financialinclusion.html.

Remund, D. L. 2010. Financial literacy explicated. The case of a clearer definition in an increasingly complex economy. *Journal of consumer affairs,* 44 (2): 276 - 295.

Rhine, W., S & Greene, W., H. 2006. The Determinants of Being Unbanked for.US immigrants. *Journal of Consumer Affairs,* 40 (1): 21 – 40.

Robb, C. A. 2012. Coming to terms with financial literacy. In *Consumer Knowledge and Financial Decisions: Lifespan Perspective*s. Edited by Lamdin D. New York: Springer.

Sabri, F.M. & Juen, T. T. 2014. The influence of financial literacy, saving behavior, and financial management on retirement confidence among Women Working in the Malaysian public sector. *Asian Social Science*, 10 (14): 40 – 51.

Sam, Y. Geetha, C. & Mohidin, R. 2012. What were the factors that influence the financial management behavior of undergraduates ? *International Journal of Business Trends and Technology,* 2 (1) : 1 – 18.

Sangmi, M. 2013. Financial inclusion strategies in developing countries with special reference to India. *Journal of Public Administration, Finance and Law,* 4 (4): 97 - 107.

Sarma, M & Pais J. 2011. Financial inclusion and development. *Journal of International Development,* 23 (2011): 613 - 628.

Sarma, M. 2012. *Index of financial inclusion – A measure of financial sector inclusiveness.* Money, Finance, Trade and Development Working paper No 07/2012. Berlin.

Sarma, M. 2015. Measuring financial inclusion. *Economics Bulletin,* 35 (1): 604 – 611.

Sayinzoga, A. Bulte, E. H. & Lensink, R. 2014. Financial literacy and financial behavior: Experimental evidence from rural Rwanda. *The Economic Journal,* 126 (2014): 1571 - 1599.

Schmeiser, M. D. & Seligman, J. S. 2013.Using the right yardstick: Assessing financial literacy measures by way of financial well-being. *Journal of Consumer Affairs,* 47 (2): 243 – 262.

Servon L., J. & Kaestner, R. 2008. Consumer financial literacy and the impact of online banking on the financial behaviour of lower-income bank consumers. *Journal of Consumer Affairs,* 42 (2): 271 - 305.

Sherraden, M. S. 2013. Building blocks of financial capability. In *Financial Capability and Asset Development: Research, Education, Policy and Practice.* Edited by Birkenmaier, J. Curley, J & Sherraden, M. Oxford Scholarship Online.

Shim, S. Xiao, J. Barber, B. & Lyons, A. 2009. Pathways of life success: A conceptual model of financial well-being for young adults. *Journal of Applied Developmental Psychology,* 30 (1): 708 – 723.

Silgoner, M. Bettina, G. & Weber, R. 2015. Financial literacy gaps of the Austrian population. *Monetary Policy and the Economy,* 2 (2015): 43 – 50.

Steel, W., Areyeetey, E., Hettige, H and Nissanke, M. 1997. Informal financial markets under liberalization in four African countries. *World Development.* 25 (5): 817 - 830.

Swamy, V. 2014. Financial inclusion, gender dimension and economic impact on poor households. *World Development,* 20 (2013): 1 – 15.

Tabachnick, B. G. & Fidell, L. S. 2007. *Using multivariate statistics.* 5th ed. New York: Pearson.

Trexler, J. C. & Travis, J. 1993. Non-traditional regression analyses. *Ecology*, 74 (6): 1629 - 1637.

Triki, T. & Faye, I. 2013. *Financial inclusion in Africa.* African Development Bank Group, Accra.

Von Gaudecker, V. H. 2015. How does household portfolio diversification vary with financial literacy and financial advice ? *The Journal of Finance,* 70 (2) : 489 – 507.

Van Ooijen, R. & Van Rooji, M. 2016. Mortgage risks, debt literacy and financial advice. *Journal of Banking and Finance,* 72(2016): 201 - 217.

Van Rooji, M. Lusardi, A. & Alessie, R. 2009. *Financial literacy and retirement planning in the Netherlands.* De Nederlandsche Bank, Working Paper No. 231(2009):1 - 23.

Vitt, L. Reichbach, G. M. Kent, J. L. & Siebenthaler, J. K. 2015. *Goodbye to complacency: Financial literacy education in the United States*. Institute of Socio-Financial Studies AARP.

Wooldridge, J. M. 2010. *Econometric analysis of cross-section and panel data.* 2nd ed. London: MIT Press.

World Bank, 2009. *A case of financial literacy in developing countries: Promoting access to finance by empowering consumers*. The World Bank. Washington DC.

World Bank, 2013. *Making sense of financial capability surveys around the world: A review of financial capability and literacy measurement instruments.* The World Bank. Washington DC.

World Bank, 2014, *Global financial development report 2014: Financial Inclusion,* World Bank: Washington DC.

World Bank. 2012. *Financial inclusion strategies: Reference framework.* World Bank, Washington DC.

World Bank. 2014. *Global Development Report on Financial Inclusion.* The World Bank, Washington DC.

World Bank. 2017. *Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution.* The World Bank, Washington DC.

World Bank. 2014. *Global survey on consumer protection and financial literacy: Oversight frameworks and practices in 114 economies.* The World Bank, Washington DC.

World Bank. 2017. UFA2020 Overview. Universal Financial Access by 2020. The World Bank. Washington DC www.worldbank.org/en/topic/financialinclusion .

Xia, T. Wang, Z & Li, K. 2014. Financial literacy, over confidence and stock market participation. *Journal of Social Indices Research,* 119 (2014): 1233 - 1245.

Yuan, Y & Xu, L. 2015. Are poor able to Access the informal credit market? Evidence from rural households in China. *China Economic review*, (2015): 1 - 43.

Zakaria, N. F. & Sabri, M. F. 2013. Review of financial capability studies. *International Journal of Humanities and Social Science,* 9 (3): 197 - 203.

Zins, A & Weill, L. 2016. The determinants of financial inclusion in Africa. *A Review of Development Finance,* 6 (1): 45 - 57.

APPENDICES

APPENDIX A: FINAL QUESTIONNAIRE FINSCOPE UGANDA 2018

Final Questionnaire at https://fsduganda.or.ug/finscope-2018-survey-report/

SECTION A: Interview detail

a.	**HH Serial number from listing form**	
b.	**EA name**	
c.	**EA number**	
d.	**Please re-enter EA number**	
e.	**Official Name of Household Head**	
f.	**Common Name of the Household Head**	

Section AB Interview Information: Interviewer: Complete section

AB1	Date	**__ __ /__ __/ 2018**	**AB5**	Interviewer Number	
AB2	Start Time (24 hours)	__ __: __ __	**AB6**	Supervisor Name	
AB3	End Time (24 hours)	__ __: __ __	**AB7**	Supervisor Number	
AB4	Interviewer Name		**AB8**	Interviewer Gender	**1=Male** **2=Female**

INTRODUCTION

Good morning/afternoon/evening. My name is ……and I work for an independent market research company called IPSOS based in Uganda. Today, we are conducting research about how people get money, and how they manage their money – what kind of services they use and need to help them manage their money. This information will help policy makers and financial service providers to improve on the products and services they offer. Your household has been randomly selected to participate in the study, among a total of 3200 households all over Uganda. I have a questionnaire that will take about 40-60 minutes to complete. As the research targets those 16 years or older, anyone of this age from your household may be randomly chosen to participate in the interview. It is my hope that an adult member of your household will agree to share their views with me. There are no right or wrong answers – we are just interested in hearing your views. Our discussion will be treated confidentially. May I have your permission to interview one of the adult members of your household?

Yes	1	***Continue to select the respondent/hh roster***
No	2	***RECORD REASON AND CLOSE***

- **Definition of household (INTERVIEWER, IF TWO OF THE THREE CHARACTERISTICS ARE TRUE CONSIDER IT A HOUSEHOLD): All those who (1) share the same food pot, (2) share the same roof or (3) have a common decision maker**
- **Definition of adult: All those aged 16 years and above.**

RECORD APPROPRIATE REASON FOR NOT BEING ABLE TO CONDUCT INTERVIEW AT THIS HOUSEHOLD**.**

DO NOT READ OUT. SINGLE ANSWER.	
No one at home during visits	1
Entire household absent for extended period of time	2
Refused	3
Other (specify)	96

SECTION B: Selection of the RESPONDENT

ASK All. First, I need to randomly choose who to interview from this household. Can you give me the names and ages of all members who live in this household at the moment and are 16 year or older? Please tell me one by one and start from the oldest.

INTERVIEWER: LIST EVERYONE WHO BELONGS TO THIS HOUSEHOLD (16 YEARS OR OLDER) REGARDLESS OF WHETHER THEY ARE AT HOME AT THE TIME OF THE VISIT.

SECTION B: Selection of the RESPONDENT					
B1	**How many adults 16 or older in this household?**				
	Name of HH member	**Age/ age range**	**Gender** *1=Male; 2=Female*	**Available during the time of interviewing?** *1=Yes; 2=No* ***If Yes continue, otherwise record reason***	**Reason?** 1= *Travelled for a long period of time; 2=Student in boarding school; 3= Away for work; 4=Incapacitated;* 96=Others specify
1.1					
1.2					
1.3					
1.4					
1.5					
1.6					
1.7					
1.8					
1.9					
1.10					
	Script will allow enough space for more members of the hh based on number of 16 in B1				

NAME OF SELECTED RESPONDENT:

NAME:																								

INTERVIEWER:

AFTER THE RESPONDENT HAS BEEN SELECTED, ASK IF THEY ARE IN THE HOUSEHOLD. IF THE PERSON SELECTED IS WITHIN THE HOUSEHOLD, ASK TO SPEAK TO THEM.

IF SELECTED RESPONDENT IS 18 YEARS OF AGE AND ABOVE, ASK FOR PERMISSION TO PROCEED WITH THE INTERVIEW. IF SELECTED RESPONDENT IS 16 TO 17 YEARS OF AGE, GET PERMISSION FROM THE PARENT/ GUARDIAN BEFORE BEGINNING THE INTERVIEW. USE THE CONSENT FORM BELOW.

- **IF PERMISSION IS GRANTED GO TO, (SECTION C: DEMOGRAPHICS)**
- **IF PERMISSION IS NOT GRANTED CLOSE & THANK AND GO TO B2 AND RECORD AS REFUSAL (CODE 03) FOR THE RESULT OF INTERVIEW. THEN REFER TO THE SUBSTITUTION PROCESS IN THE INTERVIEWER GUIDE.**

Introduction to Selected Respondent

Good morning/afternoon/evening. My name is ……and I work for an independent market research company called IPSOS based in Uganda. Today, we are conducting research about how people get money, and how they manage their money – what kind of services they use and need to help them manage their money. You have been selected to participate purely by chance. Thank you for taking part in this study. I have a questionnaire that will take about 40-60 minutes to complete, and targets those above 16 years of age, anyone above this age may be randomly chosen to participate in the interview. It is my hope that an adult member of your household will agree to share their views with me. There are no right or wrong answers, and our discussion will be treated confidentially. May we proceed? Please feel free to interrupt me if you have any questions and you may say 'pass' if you do not feel comfortable answering a question.

Parent/guardian Consent Form (for respondents who are 16 – 17 years old)

Name and Address Date

Dear Sir/Madam,

RE: FSDU | FinScope Survey 2018

Thank you for agreeing to have your daughter/son take part in this survey. Please note that your daughter/son is **NOT** allowed to take part in the survey if we do not have your consent in the form of a signature below. Please do sign below.

I have read and understood the entire document (which has further been explained to me) and have agreed to have my daughter/son participate in the research conducted by Ipsos Uganda

Refused Consent	1	Thank & Close
Granted Consent	2	Complete Signature Section Below

Parent/Guardian Name.....

Relation to Minor..... ID.....

Signature..... Date.....

B2: RESULT OF INTERVIEW FOR THE SELECTED RESPONDENT

DO NOT READ OUT. SINGLE ANSWER.	
Refused by guardian	1
Refused by respondent	2
Incapacitated	3
Other (specify)	96

SECTION D: Money Generating Activities and Main Expenses

Thank you for your responses, now we are going to talk more about your expenses and how you get money to cover these expenses.

I WOULD ONCE AGAIN LIKE TO REMIND YOU THAT I AM ASKING ABOUT YOUR PERSONAL EXPENSES AND WHERE YOU GET MONEY FROM FOR YOUR EXPENSES. IM NOT TALKING ABOUT THE MONEY OF OTHER HOUSEHOLD MEMBERS OR THEIR EXPENSES

Again, feel free to seek clarification on any question which is not clear and take time to think through before you respond.

D1	**EXCLUDING buying food and clothing, during the past 12 months, what was most important for you to pay or to do first when you get money?** ***Don't read out; Single mention***	
	Rent	*1*
	Electricity bill	*2*
	Water bill	*3*
	Telephone bill/air time	*4*
	Medical expenses	*5*
	School/tuition fees	*6*
	Fuel for household purposes– Charcoal Wood / Paraffin	*7*
	Transport/Fuel for transport such as Petrol/Diesel	*8*
	Save/savings contributions	*9*
	Pay back money I borrowed/loan repayment	*10*
	Entertainment/social activities/leisure/sport activities	*11*
	Other, specify	*12*
	Don't have ANY expenses ***Please probe carefully and if NONE then D2.1=10 and Go to next section***	*13*
D2.1	**Different people have different ways of getting money, please tell me how you get the money you spend?** ***Read out; Multiple mention possible*** ***Interviewer: If the respondent doesn't have expenses – please probe access to money for personal use carefully! Explain to the respondent that he/she has to report on ALL the different ways he/she gets money (even when getting this from parents or others); if he/she does not spend ANY money – probe who buys his/her food/clothes etc.***	
D2.2	**For each money source ask: How often do you receive the money you get from ……?** ***Read out; Single mention*** *1=Daily; 2=Weekly; 3=More than once a month but not weekly; 4=Monthly; 5= Every 2 months; 6=Annually;* *7=Seasonally; 8= Occasionally - no particular schedule; 9=Upon completion of job; 10=Other*	
D2.3	**For each money source ask: How do you usually receive the money you get from ….?** ***Read out; Single mention per source*** *1=Cash in hand; 2=Into a bank account; 3=On your phone; 4=Through a money transfer service such as Western Union, MoneyGram and Swift Cash; 5=Other* ***Interviewer: If the respondent reports that he/she gets the money on his/her phone, probe to understand if he/she gets a SMS to collect their money somewhere such as Western Union (code=4) or whether the money goes into his/her phone and he/she can keep it there until he/she needs it (code 3).***	
D2.4	***Only for those with more than one source of money:*** **You said you get money from […]** ***Read out money sources mentioned by the respondent in 2.1*** **On which of these sources do you rely most to cover your expenses?** ***Single mention***	

		2.1	**2.2**	**2.3**	**2.4**
	Salaries/wages	*1*			
	Money from trading/selling	*2*			

	Anything you produce/grow/raise/make/collect/buy with the intention of selling				
	Money from providing a service – i.e. such as transport, hairdressing, processing, hospitality services (food & accommodation)	*3*			
	Piece work/Casual labor/Occasional jobs	*4*			
	Rental income	*5*			
	Interest from savings, investments, stocks, unit trusts etc.	*6*			
	Pension	*7*			
	Social welfare money/grant from Government	*8*			
	Someone else/others give/send me money	*9*			
	Don't get money – someone else pays my expenses ***Single response IF D2.1=10, go to D10***	*10*			
	Other, specify	*11*			

D3.1	***Only for those with D2.4=1*** **You said you get a salary/wages. Who do you work for?** ***Read out. Single mention*** ***(if more than one – choose the source where respondent spends MOST of his/her time)***	
	Government	*1*
	NGO or church	*2*
	Private company/business	*3*
	Individual who owns his own business	*4*
	Small scale farmer	*5*
	Commercial farmer	*6*
	Work for individual/household e.g. security guard, maid etc.	*7*
D3.2	***Only for those with D2.4=1*** **Do you work …?** ***Read out. Single mention.***	
	Full-time throughout the year	*1*
	Part-time throughout the year	*2*
	Seasonal/part of the year	*3*
	Once in a while/from time to time	*4*
D4	***Only for those with D2.4=2*** **You said you get money from selling things – what kind of things do you MAINLY sell (get most money from)?** ***Don't read out; Probe. Single mention***	
	Crops/produce you grow	*1*
	Products I get from livestock	*2*
	Livestock	*3*
	Fish you catch yourself/aquaculture	*4*
	Things you buy from others – agricultural products	*5*
	Things you buy from others – non-agricultural products	*6*
	Things you make (clothes, art, crafts)	*7*
	Things you collect from nature (stones, sand, thatch, herbs)	*8*
	Things you process (honey, dairy products, flour)	*9*
	Other, specify	*10*
D5	***Only for those with D2.4=3*** **You said you get money from providing a service – what kind of services do you MAINLY provide (get most money from)?** ***Don't read out. Single mention***	
	Personal services (hairdressers, massage, etc.)	*1*
	Telecommunications/IT	*2*
	Financial services e.g. Moneylender, mobile money agent	*3*

	Transport	*4*
	Hospitality – Accommodation, restaurants, etc.	*5*
	Information/research	*6*
	Technical – mechanic, etc.	*7*
	Educational/child care	*8*
	Health services – traditional healer etc.	*9*
	Legal services	*10*
	Security	*11*
	Other, specify	*12*
D6.1	***Ask D6.1 and D6.2 only for those with D2.4=2 or 3*** **How many people other than yourself do you employ? I would like to know the number of full-time and the number of part-time employees?** ***Not referring to unpaid workers/unpaid family members***	
6.1.1	*Total* ***if 0 go to D8***	
6.1.2	*Full-time*	
6.1.3	*Part-time*	
D6.2	**Who do you mainly sell your goods/services to?** ***Don't read out. Single mention***	
	Government	*1*
	Co-operative	*2*
	Organisations such as schools, hospitals, NGOs	*3*
	Wholesaler	*4*
	Neighbors/public	*5*
	Processor	*6*
	Other retailers	*7*
	Middlemen	*8*
	Other, specify	*9*
D7	***Ask those for whom D2.4= 9 or D2.1= 10*** **You said that you rely on others for money or to pay your expenses. Who do you rely mostly on?** ***Don't read out. Single mention***	
	Household member (e.g. spouse, parent/child/other relative)	*1*
	Relative/family who is not part of the household	*2*
	Someone who is not part of the household and who is not a family member	*3*
	Other	*4*

D8 ***Ask ALL except if D2.1=10***

You said that you get money from […] ***Read out all sources.***

Can you tell me approximately how much you get from […]? You can give me an average either per day or month or per annum? ***Read out each source.***

Source	Daily	Monthly	Per Annum
Don't know	***997***	***997***	***997***
Refused	***998***	***998***	***998***

D9.1	**During the past 12 months, did you get or do anything to help you to get more money in future to cover your regular expenses?** ***I'm asking if you have done something in order to increase your REGULAR INCOME such as buying land and renting it out or you bought something that you can USE to generate more income (e.g. sewing machine, boda-boda)***	
	Yes	*1*
	No ***Go to D10***	*2*
D9.2	**What did you get/do?** ***Don't read out. Multiple mention possible***	

	Bought/got agricultural land to start farming/increase farming activities	*1*
	Bought/got agricultural equipment to increase/improve farming activities	*2*
	Bought/got livestock to generate more money	*3*
	Bought/started a business to help me make more money	*4*
	Bought/got business equipment to increase/improve business	*5*
	Bought/get a vehicle to take goods to market	*6*
	Bought/got fishing equipment/boat	*7*
	Bought/got a vehicle to use as a taxi/transport goods for others	*8*
	Bought/built property/house/apartment to rent out	*9*
	Other, specify	*10*
D10	**How many members of the household brings money into the household? With this I mean – how many members get money on a regular basis?**	

	SECTION E: Planning, Cash Flow and Risk Management **I would now like us to talk about how you manage your money and how you plan ahead for the future. Like I said early on your answers will be kept confidential and there is no wrong or right answer. Thank you**	
E1.1	**Do you have money of your own that you can do with as you wish?** ***If YES go to E2 , If NO continue***	
	Yes	*1*
	No	*2*
E1.2	**Why don't you have money of your own?** ***Don't read out. Multiple mention possible***	
	Money goes into household expenses	*1*
	Have to give my money to household member/family member	*2*
	Don't get an income	*3*
	Other, specify	*4*
E2	**In different households, different people make the decisions about how to manage money. Are you involved in your household's financial decisions?** ***By this I mean who makes decisions about the purchasing of goods and services for the household and how and where to save and spend money for the household.***	
	Respondent is involved	*1*
	Respondent not involved	*2*
E4.1	**Do you sometimes ask somebody for advice regarding money matters?** ***If YES go to E5 If NO continue***	
	Yes	*1*
	No	*2*
E4.2	**Why don't you ask for advice? Please give me the main reason?** ***Don't read out. Single mention***	
	Don't have anybody I can ask	*1*
	Don't need to	*2*
	Don't want to	*3*
	Don't trust the advice of others	*4*
	Other, specify	*5*
E5	***Ask only if E4.1=YES*** **Who do you usually ask?** ***Don't read out. Single mention***	
	A household member	*1*
	Another family member or friend	*2*
	Employer	*3*

	Bank		*4*
	Microfinance institution such as FINCA or PRIDE		*5*
	Savings and credit cooperative (SACCOS)		*6*
	Financial advisor/consultant		*7*
	Farmers association		*8*
	Business association		*9*
	Savings group		*11*
	Moneylender in community		*12*
	Government official		*13*
	Village elder/elder in community		*14*
	Other specify		*15*
E6	**Do you agree with the following statements?** ***Interviewer: Read out statements***		
E6.1	*You keep track of money that you receive and spend*	*Yes*	*No*
E6.2	*You know how much money you spent last week*	*Yes*	*No*
E6.3	*You adjust your expenses according to the money you have available*	*Yes*	*No*
E7	***Ask only if D2.1 NOT= 10*** **When you see that you are going to run out of money, how do mostly you ensure that you money lasts until you get money again?** ***Don't read out, single mention***		
	Use savings		*1*
	Borrow money		*2*
	Ask family/friends to assist		*3*
	Cut down on meals		*4*
	Take children out of school		*5*
	Cut down on regular expenses		*6*
	Visit relatives/Stay with relatives		*7*
	Don't repay debt		*8*
	Don't travel/cut down on social activities		*9*
	Work more/do more work		*10*
	Other, specify		*11*
E8	***Ask only if D2.1 NOT= 10*** **If you should have unexpected expenses tomorrow, how will you cope?** ***Don't read out. Single response***		
	Sell an asset bought for this purpose		*1*
	Sell livestock/poultry I keep for this purpose		*2*
	Use savings/money I put aside		*3*
	Use insurance cover		*4*
	Will do casual work/work more		*5*
	Borrow from savings group/SACCO		*6*
	Borrow from moneylender		*7*
	Will borrow money from family/friends		*8*
	Sell crops or other products from farming such as milk eggs etc.		*9*
	Sell an asset that was not meant for this purpose		*10*
	Other, specify		*11*
	Don't know/Have not yet thought about how/where I would get the money for this purpose		*12*

E9	**1. Did you experience any of the following during the past 12 months?** ***Read out statements E9 1.1 to E9.1.4*** **2.** ***For those who experienced an event, ask:*** **How did you mainly cope when this happened?** ***Do not read out; Single mention*** *1=Used savings; 2=Borrowed money; 3=Sold an asset/something obtained for this purpose; 4=Sold asset/something not obtained for this purpose; 5=Cut down on expenses; 6=Worked more/did casual jobs; 7=Claimed insurance/policy pay-out; 7=Sold agriproducts/livestock/harvest; 8=Nothing; 9=Others*			
		9.1		***9.2***
E9.1.1	*You had large unforeseen expenses?* *If yes, Can you tell me what these were?* ***Specify***	*Yes*	*No*	
E9.1.2	*You received no money/less money than you expected If yes – please tell me what happened?* ***Specify***	*Yes*	*No*	
E9.1.3	*Harvest/crop failure/loss of livestock* ***Only for those with D2.1=2 and D4<5***	*Yes*	*No*	
E9.1.4	*Loss of income as a result of an unexpected drop in the price you get for produce/harvest/ products you sell* ***only for those who sell? D2.1=2***	*Yes*	*No*	
E10.1	**The following are major events in most people's lives. Which do you think is the most costly?** ***Read out. Single mention If E10.1=7 go to E11***			
	Birth of a child			*1*
	Introduction			*2*
	Wedding			*3*
	Children's education			*4*
	Religious ceremonies such as child baptism and holy communion			*5*
	Cultural ceremonies such as male circumcision or last funeral rites			*6*
	Do not know ***(Do not read out)***			*7*
E10.2	**How/where will you get most of the money to pay for [read responss from E10.1] if you have to?** ***Do not read out. Single mention***			
	Savings			*1*
	Borrow			*2*
	Rely on family and friends for gifts/money			*3*
	Rely on the community for gifts/money			*4*
	Sell something that I bought for this purpose			*5*
	Sell something not intentionally bought for this purpose			*6*
	Cut back on expenses			*7*
	Cut back on meals			*8*
	Take children out of school			*9*
	Rely on insurance			*10*
	Other, specify			*11*
	Don't know/ Have not yet thought about how/where I would get the money for this purpose			*12*
	I don't have to pay for this			*13*
E11	***Ask only to respondents 55 or younger*** **How will you mainly ensure that you have money to meet your needs when you are old and cannot work?** ***Do not read out; Single response***			
	Savings			*1*
	Children will take care of me			*2*
	Money from friends/relatives			*3*

	Land/property that I can sell			*4*
	Own business			*5*
	Rental income			*6*
	Dividends from shares			*7*
	Farming/agriculture/livestock			*8*
	Pension			*9*
	Insurance policy			*10*
	Don't know/Have no plans/Have not yet thought about how/where I would get the money for this purpose			*11*
	Other specify			*12*
E12.1	**We all have things that we would like to get for ourselves or our families in the future. Can you think about something you want to buy that you cannot afford right now but you would like to buy if you have the money? Can you tell me what that is?** ***Don't read out. Single response.***			
	Car/other vehicle			*1*
	Land/farm			*2*
	House			*3*
	Business			*4*
	Large household appliances			*5*
	Farming equipment			*6*
	Education			*7*
	Other, specify			*8*
	Have not thought about this yet ***Go to E13***			*9*
E12.2	**What have you done to make sure you will be able to get this in the future?** ***Don't read out. Single response.***			
	Bought an asset to sell later when I need the money			*1*
	Bought/started a business to make extra money			*2*
	Engaged in farming activities to make extra money			*3*
	Invested in property to rent out			*4*
	Saving/putting money aside			*5*
	Other, specify			*6*
	Nothing/Have not yet thought about how/where I would get the money for this purpose			*7*
E13	**In your community, if someone passes away, who pays most of the funeral costs?** ***Don't read out; Single mention***			
	The community			*1*
	The family members/relatives			*2*
	People have insurance			*3*
	They belong to a savings group/burial society that will cover the costs			*4*
	Don't know			*5*
	Other, specify			*6*
E14	**Which of the following do you agree with?** ***Read out statements***			
E14.1	*You have people in the community that you can turn to for help if you need to*		*Yes*	*No*
E14.2	*You would rather turn to strangers than people in the community if you need financial hel*		*Yes*	*No*
E14.3	*People in your community rely on each other for support*	*Yes*	*No*	*DK*
E14.4	*There is a tendency in your community where you live to form groups*	*Yes*	*No*	*DK*
E14.5	*The crime rate in the your community is low*	*Yes*	*No*	*DK*

	SECTION F: Saving **Thank you once again for your responses…. I would now like us to talk about savings**		
F1	**Which of the following statements do you agree with?** ***Read out each statement***		
F1.1	*You sometimes don't buy things that you want in order to save money*	*Yes*	*No*
F1.2	*You save or put money away for a specific purpose but you end up using it for something else before you used it for that purpose*	*Yes*	*No*
F1.3	*You get information about different ways of savings before you decide where/how to save*	*Yes*	*No*
F1.4	*You try different savings options to find the one where you can get the most interest*	*Yes*	*No*
F1.5	*You buy things as a means of saving- such as land, livestock, farming/fishing inputs or equipment or business stocks – SPECIFY*	*Yes*	*No*
F2	**Please tell me with which of the following do you feel that your SAVINGS are the SAFEST?** ***Read out; Single response***		
	Bank		*1*
	SACCOs		*2*
	On your phone		*3*
	Savings group/Village Savings and Loan Associations		*4*
	Family members/friends		*5*
	At home		*6*
F3	***I would now like you to think about putting aside or saving some of your money. Everyone keeps some cash at home for everyday expenses – this is not what I am referring to. I am talking about money that you are putting away over time with the intention to keep doing so to ensure that the amount increases over time and you have it available for future use.*** **In the past 12 months – did you save or put money aside for this purpose?**		
	Yes ***Continue***		
	No ***Go to F7***		
F4	**1. Please tell me which of the following did you use for saving or keeping money you put away in the past 12 months?** ***Read out*** *1=Yes; 2=No* **2.** ***For each mechanism a respondent has ask:*** **How often did you save/put money in […]** ***Read out each option in 5.1. Single mention per mechanism*** *1=Less than once a month; 2=Once a month; 3=More than once a month* **3.** ***For each mechanism a respondent has ask:*** **When did you last use … to save? Would you say it was …?** ***Read out; Single mention per mechanism*** *1=Yesterday/today; 2=In the past 7 days; 3=In the past 30 days; 4=In the past 90 days; 5=More than 90 days ago but less than 6 months ago; 6=6 months or longer ago* ***4. If more than one mechanism ask otherwise go to F5*** **Which of these [read from F4.1] serves your saving needs best?** ***(Single mention)*** ***5.*** **Why did you choose to save with …. (response in 4.4)?** *1=It is the safest; 2=Quickest access to savings; 3=Gives the best interest; 4=Most convenient(proximity); 5=Lowest charges/cost; 6= I've just always used it; 7= Other*		

		4.1	4.2	4.3	4.4	4.5
F4.1.1	*Bank*					
F4.1.2	*Microfinance institution like PRIDE, BRAC, BAYPORT*					
F4.1.3	*Savings and credit cooperatives (SACCOs) – including shares*					
F4.1.4	*Cooperative*					
F4.1.5	*On your mobile phone*					

F4.1.6	*Give to employer*					
F4.1.7	*Savings group/VSLA*					
F4.1.8	*ROSCA/merry-go-round*					
F4.1.9	*Investment club*					
F4.1.10	*Another community group or church*					
F4.1.11	*Keep cash at home or in a secret hiding place and you are not using it for everyday living expenses*					
F4.1.12	*Give to a household or family member or friend to keep safe for you*					
F4.1.13	*Give to someone else in the community for safe keeping (not a family member/friend) e.g. Forex bureau*					
F4.1.14	*Buy Treasury Bills or Government Bonds, Unit Trusts, Shares on the stock exchange*					
F4.1.15	*Pension fund*					
F4.1.16	*Any other form of CASH savings that I have not mentioned that you have or used to have? If yes, Please tell me what this is?*					

F5	**Thinking about the money you saved. What did you mainly save for? Would you say this *Read out; Single mention*** **was mostly for …?**	
	To help you with regular expenses ***Go to F5.1***	*1*
	To help you cope with unexpected expenses ***Go to F5.2***	*2*
	Social ceremonies/celebrations	*3*
	Buying a bicycle, motorcycle, car, truck or other means of transport for personal use	*4*
	Buying household goods such as a fridge or stove or other asset	*5*
	Buy residential land/house or building a house to live in/renovate home	*6*
	Business purposes ***Go to G5.3***	*7*
	farming/fishing purposes ***Go to G5.4***	*8*
	Buying property such as a house or land to rent out	*9*
	Money for when I'm old	*10*
	Other, specify	*11*
F5.1	***Ask only if F5=1*** **You said you saved mainly to help you cope with regular expenses. What kinds? of expense *Don't read out; Single mention***	
	Education or education related costs	*1*
	Living expenses	*2*
	Paying off debt	*3*
	Saving group contribution	*4*
	Other, specify	*5*
F5.2	***Ask only if F5=2*** **You said you saved mainly to help you cope with unexpected expenses. What kind of expenses? *Don't read out; Single mention***	
	Medical expenses	*1*
	Funeral expenses	*2*
	Other, specify	*3*
F5.3	***Ask only if F5=7*** **You said you saved mainly for business purposes. What was this for? *Don't read out; Single mention***	

	Startup costs such as registration, etc. or buying a business	*1*
	Buying inputs, stocks	*2*
	Buying land or property for business purposes	*3*
	Buying business equipment such as a printer or sewing machine etc.	*4*
	Buying a bicycle, motorcycle, car, truck or other means of transport for business use	*5*
	Covering production/processing/marketing costs	*6*
	Other, specify	*7*
F5.4	***Ask only if F5=8*** **You said you mainly saved to help you with for farming/fishing expenses. or?** **What was this f *Don't read out; Single mention***	
	Buying inputs like seeds, fertilizer or for land preparation	*1*
	Buying/renting land for farming purposes	*2*
	Buying livestock	*3*
	Buying farming equipment or implements/fishing equipment such as nets or boats	*4*
	Buying a bicycle, motorcycle, car, truck, tractor or other means of transport for ɔoses farming pur	*5*
	Covering production/processing/marketing costs	*6*
	Other, specify	*7*
F6	**How much money did you save/put away the last time you saved/put money away?**	
	Ugandan shillings	
	Refused	*997*
	Can't remember	*999*
F7.1	**Do you have a pension fund? (e.g. NSSF)**	
	Yes ***Continue*** ***Probe for those who are employed D3.1= 1 or 2***	*1*
	No ***Go to F8***	*2*
	Don't know ***Go to F9.1***	*9*
F7.2	**Which of the following is true for you? *Read out; Single mention***	
	You have to belong to a pension fund – your employer requires it	*1*
	You decided on your own to belong to a private pension fund	*2*
F7.3	**Since when have you been a member of a pension fund?**	
	Up to six months ago	*1*
	Between 6 months and a year ago	*2*
	Over a year ago, but less than 2 years ago	*3*
	2 years or more ago but less than 5 years ago	*4*
	5 years ago or more	*5*
	Go to F9.1	
F8	**Only if F7.1=2** **Why don't you have pension? *Do not read out; Single mention***	
	Don't know what pensions are	*1*
	Have never thought about it	*2*
	Not employed/Don't have a job	*3*
	Not employed in the formal sector	*4*
	I don't know of any pensions funds/products	*5*
	Don't know where to get it	*6*

	Don't know how to get it		*7*
	Don't trust pension funds		*8*
	Have other ways of getting money when I'm old		*9*
	No specific reason		*10*
	Other, specify		*11*
F9.1	**In the past 12 months, have you bought/built/started anything with the intention to SELL in the future for a profit?** ***Interviewer: this does not refer to traders selling their goods/products for a profit – we want to measure INVESTMENT***		
	Yes ***Continue***		*1*
	No ***Go to F10***		*2*
F9.2	**What was the last thing you bought/built/started for this purpose?** ***Do not read out; Single mention***		
	Bought land/farm/property		*1*
	Bought/built house		*2*
	Bought household appliance such as a fridge/TV/stove		*3*
	Bought/started a business		*4*
	Bought livestock		*5*
	Bought jewelry/coins		*6*
	Shares, Treasury bonds, Unit Trusts		*7*
	Other, specify		*8*
F9.3	***Ask only if D2.1=2*** **Have you, in the past 12 months, kept some of your stock/produce to sell later at a higher price?**		
	Yes		*1*
	No		*2*
F10.1	**Do you belong to any group where you contribute/save money on a regular basis?** ***If Yes continue, if no go to next section***	*Yes*	*No*
F10.2	**Thinking about the group(s) you belong to, do you belong to a ….?** ***Read out***		
F10.2.1	*Savings group/VSLA* ***Interviewer: Not referring to merry-go-rounds***	*Yes*	*No*
F10.2.2	*Rotating savings group where members take turns in getting the contribution of all the members (ROSCA/merry-go-round)*	*Yes*	*No*
F10.2.3	*Burial society*	*Yes*	*No*
F10.3	***Ask only if F10.2.1=YES otherwise go to F11*** **You said you belong to a savings group/VSLA. Were any of these ….?**		
F10.3.1	*Established by an agency such as CARE/PLAN*	*Yes*	*No*
F10.3.2	*Established under a Government programme*	*Yes*	*No*
F10.3.3	*Established by members themselves*	*Yes*	*No*
F11	**What is the main reason you belong to the group(s)?** ***Don't read out; Single mention***		
	To get a lump sum of money at pay-out/when it is my turn		*1*
	To socialise or meet friends/to network		*2*
	They give financial advice		*3*
	They give information on matters such as education, health, etc.		*4*
	Can turn to them when in financial need		*5*
	Can get access to money in case of loss or emergency/access the social fund		*6*
	To borrow money		*7*
	To save money		*8*
	I trust the members with my money		*9*
	Inherited membership		*10*
	It is compulsory/expected of me		*11*

	It forces me to save			*12*
	To access government grants/loans			*13*
	Other, specify			*14*
F12	**When did you first join a group? *Don't read out; Single mention***			
	Up to six months ago			*1*
	Between 6 months and a year ago			*2*
	Over a year ago, but less than 2 years ago			*3*
	2 years or more ago but less than 5 years ago			*4*
	5 years ago or more			*5*
F13.1	**What services do you use with the group(s)? Do you ….? *Read out***			
F13.1.1	*Save with the groups*		*Yes*	*No*
F13.1.2	*Buy shares*		*Yes*	*No*
F13.1.3	*Borrow from the groups – with interest*		*Yes*	*No*
F13.1.4	*Borrow from the groups – without interest*		*Yes*	*No*
F13.1.5	*Go to the groups for money when you have an emergency or a social event such as weddings and funerals*		*Yes*	*No*
F13.6	*Members sell their products/produce together*		*Yes*	*No*
F13.7	*Do you use any other services offered by a group that I haven't mentioned, specify*		*Yes*	*No*
F14	**Still thinking about the groups you belong to, does any of them offer the following services? Does any of the groups …..? *Read out***	***Yes***	***No***	***DK***
F14.1	*Contribute towards funerals or other emergencies of group members and their families*	*1*	*2*	*3*
F14.2	*Contribute towards social events of group members e.g. weddings, birth of a child*	*1*	*2*	*3*
F14.3	*Have a joint income generating activity e.g. brick making, basket making*	*1*	*2*	*3*
F14.4	*Buy assets for the group/individual members*	*1*	*2*	*3*
F14.5	*Have a registration number? i.e. do you belong to a group that is registered?*	*1*	*2*	*3*
F14.6	*Have a constitution*	*1*	*2*	*3*
F14.7	*Have a bank account where the savings of members are kept*	*1*	*2*	*3*
F14.8	*Use mobile money to store members' money*	*1*	*2*	*3*
F14.9	*Use mobile money services to receive members' money from members*	*1*	*2*	*3*
F14.10	*Have a loan from a bank*	*1*	*2*	*3*
F14.11	*Have insurance– **I'm not referring to the social fund, I'm referring to insurance services from an insurance company***	*1*	*2*	*3*
F15	**How many groups do you belong to in total?**			
F16.1	**How often do you contribute to groups? Would you say it is …? *Read out*** ***If respondent belongs to more than one group – please ask them to think about the group that they contribute to most often***			
	Every day			*1*
	Every week			*2*
	Twice a month			*3*
	Once a month			*4*
	Other, specify			*5*
F16.2	**On average, how much do you contribute to groups in total in a month?** ***Ugandan shillings***			
	Refused			*997*
	Don't know			*998*

F17.1	***Only those who borrow from the group – F13.3 or F13.4=YES*** **Thinking about all the groups you belong to, how often do you borrow from these groups? Would you say it is …?** ***Read out***	
	Once or twice a year	*1*
	More than once or twice year but not every month	*2*
	Monthly	*3*
	More than once a month	*4*
F17.2	***How much did you borrow the last time you borrowed from a group*** ***Ugandan shillings***	
	Refused	*997*
	Can't remember	*998*
F18.1	***Only those with a social fund F13.4=YES*** **You told me the group(s) you belong to contribute to emergencies and/or social events of members. How often have they contributed to an emergency/social event for you? Would you say it was …?** ***Read out*** ***IF F18.1=1 then go to F19***	
	Never	*1*
	Once or twice a year	*2*
	More than once or twice year but not every month	*3*
	Monthly	*4*
	More than once a month	*5*
F18.2	**How much did you get the last time you got money for this purpose?** ***Ugandan shillings***	
	Refused	*997*
	Can't remember	*998*
F18.3	**What did you use the money for?** ***Don't read out. Multiple mention***	
	Living expenses	*1*
	Medical expenses	*2*
	Funeral	*3*
	School fees	*4*
	Farm inputs	*5*
	Social occasion	*6*
	Unexpected travel	*7*
	Other, specify	*8*
F19.1	**When was the last time you received a payout from any of the groups you belong to?** ***Now I'm referring to a lump sum based on your contributions to the group IF F19.1=1 then go to F20***	
	Never	*1*
	In the past month	*2*
	Between 1 and 3 months ago	*3*
	Between 3 and 6 months ago	*4*
	More than 6 months ago	*5*
F19.2	**How much did you get the last time you got money for this purpose?** ***Ugandan shillings***	
	Refused	*997*
	Can't remember	*998*
F19.3	**What did you use the money for?** ***Don't read out. Multiple mention***	
	Living expenses	*1*

	Medical expenses		*2*
	Education		*3*
	Bought land to live on		*4*
	Bought farming land		*5*
	Bought/built a house/made renovations to home		*6*
	Bought livestock		*7*
	Bought farming/fishing equipment		*8*
	Bought farming/fishing inputs		*9*
	Bought business equipment		*10*
	Bought business inputs		*11*
	Other, specify		*12*
F20	***If F4.1.5=1 then make F20=YES – continue*** **Have you ever saved electronically? By electronic I mean you didn't handle the cash – you saved on your phone or by transferring money between accounts.**	*Yes*	*No*

SECTION G: Borrowing

Let's talk about borrowing money. Remember there are no wrong or right answers. There is no need to rush so you can take time to think through your answers before responding

G1	**Do you agree with the following statements?** ***Interviewer read out statements***	**Yes**	**No**	**D/K**
G1.1	*You avoid borrowing money if you can*	*1*	*2*	*3*
G1.2	*You prefer to save money for something rather than borrow to pay for it*	*1*	*2*	*3*
G1.3	*If you borrow money it is okay to pay it a bit later than agreed*	*1*	*2*	*3*
G1.4	*It is okay to borrow money to pay back outstanding debt*	*1*	*2*	*3*
G1.5	*It is better to remain with debt than to sell something to pay it*	*1*	*2*	*3*
G1.6	*It is better to keep savings than to use it to pay off debt*	*1*	*2*	*3*
G1.7	*Being able to borrow money when you need it is more important than the amount you have to pay back when interest is charged*	*1*	*2*	*3*
G2	**Please tell me which of the following would you feel most confident to deal with regarding borrowing money?** ***Read; Single mention***			
	Banks			*1*
	MFIs			*2*
	SACCOs			*3*
	Mobile money operators			*4*
	Savings groups / VSLAs			*5*
	Money lenders in the community			*6*
	Family members/friends			*7*
G3.1	**Did you borrow money from anybody or any institution during the past 12 months?**			
	Yes ***Continue***			*1*
	No ***Go to G4.1***			*2*
G3.2	**Did you borrow more than once?**			
	Yes			*1*
	No			*2*
G3.3	**When was the last time you borrowed?** ***Read out; Single mention***			
	Yesterday/today			*1*

	In the past 7 days	*2*
	In the past 30 days	*3*
	In the past 90 days	*4*
	More than 90 days ago but less than 6 months ago	*5*
	6 months or longer ago	*6*
G3.4	**How much money did you borrow the last time you borrowed?**	
	Ugandan shillings	
	Refused	*1*
	Can't remember	*2*

G4.1	**Have you, in the past 12 months, been paying back money that you borrowed from anybody or any institution before the past 12 months?**	
	Yes	*1*
	No	*2*
G4.2	**During the past 12 months, did you get any goods/services in advance and had to pay for them later?**	
	Yes	*1*
	No	*2*
G5.1	***Ask only if G3.1=Yes or G4.1=Yes or G4.2=Yes*** **Do you currently still owe any money?** ***Interviewer: Respondent has to include all money that he/she has to pay back including the value of goods that he/she might have taken on credit***	
	Yes	*1*
	No ***If G3.1=NO go to G14; otherwise go to G6***	*2*
	Refused ***If G3.1=NO go to G14; otherwise go to G6***	*9*
G5.2	***Ask only if G5.1=YES*** **Approximately how much money do you owe?** ***Ugandan shillings***	
	Refused	*997*
	Can't remember	*998*
	If G3.1=YES go to G6; otherwise go to G14	

G6	***Ask only in Only if G3.1=YES*** **1. Please tell me from which of the following did you borrow money in the past 12 months? Did you borrow money from …..?** ***Read out.*** *1=Yes; 2=No* **2.** ***For each product a respondent has ask:*** **How did you/are you paying back this money?** *1=Regular payments over time; 2=Had to/have to pay everything back at once (lump sum) within a given period; 3=Payment in kind (goods/services); 4=Other* ***Read out; Single mention*** **3.** ***If respondent has borrowed from more than one source, ask:*** **Who did you borrow the most money from?** ***Read out responses in Q6.1 Single mention If only one lender*** **6.3=6.1**			
		6.1	**6.2**	**6.3**
G6.1.1	*Bank*			
G6.1.2	*Microfinance institution such as PRIDE, BRAC BAYPORT etc.*			
G6.1.3	*SACCO*			
G6.1.4	*Credit institution*			
G6.1.5	*A Government Scheme/Institution e.g. Youth Fund*			
G6.1.6	*A mobile money service provider*			
G6.1.7	*A pension fund*			

G6.1.8	*Cooperative*			
G6.1.9	*Your employer*			
G6.1.10	*Family/friends that you had to pay back*			
G6.1.11	*Family/friends that you did not have to pay back*			
G6.1.12	*Savings group/VSLA* ***If G6.1.12=1 and F10.1=NO please do consistency check –*** ***You said you are not a group member, yet you borrowed from a group – is this correct?*** ***If Yes, continue otherwise go back to F10.1***			
G6.1.13	*Burial society*			
G6.1.14	*Someone in the community who lends money to others (moneylender)*			
G6.1.15	*A religious organisation other community-based organisation that you belong to*			
G6.1.16	*Did you borrow money from a source I have not mentioned above? From whom/where?*			

G7	**What is the main reason why you borrowed from […]? *(Read out response in G6.3)* *Do not read out; Single mention***	
	Proximity – convenient access	*1*
	Easy/simple to use	*2*
	Quickest access to the money	*3*
	Repayment terms suit me	*4*
	Trust	*5*
	Interest rates are low	*6*
	Have to be able to ensure nobody knows about it/Confidentiality	*7*
	Other, specify	*8*
G8	**Did you get information about different lenders such as the interest they charge etc. before you decided who to borrow from?**	
	Yes	*1*
	No	*2*
G9	**Thinking about the money you borrowed from [….] *(Read out response in G6.3)* What was most of this money for? Would you say this was for mostly …? *Read out; Single mention***	
	To help you with regular expenses ***Go to G9.1***	*1*
	To help you cope with unexpected expenses ***Go to G9.2***	*2*
	Social ceremonies/celebrations	*3*
	Buying a bicycle, motorcycle, car, truck or other means of transport for personal use	*4*
	Buying household goods such as a fridge or stove or other asset	*5*
	Buy residential land/house or building a house to live in/renovate home	*6*
	For business purposes ***Go to G9.3***	*7*
	For farming/fishing purposes ***Go to G9.4***	*8*
	Buying property such as a house or land to rent out	*9*
	Other, specify	*10*
G9.1	***Ask only if G9=1*** **You said you borrowed most money to help you cope with regular expenses. What kind of expenses?** ***Don't read out; Single mention***	
	Education or education related costs	*1*
	Living expenses	*2*
	Paying off debt	*3*
	Saving group contribution	*4*

	Other, specify		*5*
G9.2	***Ask only if G9=2*** **You said you borrowed most money to help you cope with unexpected expenses. What kind of expenses?** ***Don't read out; Single mention***		
	Medical expenses		*1*
	Funeral expenses		*2*
	Other, specify		*3*
G9.3	***Ask only if G9=7*** **You said you borrowed most money for business purposes. What was this for?** ***Don't read out; Single mention***		
	Startup costs such as registration, etc. or buying a business		*1*
	Buying inputs, stocks		*2*
	Buying land or property for business purposes		*3*
	Buying business equipment such as a printer or sewing machine etc.		*4*
	Buying a bicycle, motorcycle, car, truck or other means of transport for business use		*5*
	Covering production/processing/marketing costs		*6*
	Other, specify		*7*
G9.4	***Ask only if G9=8*** **You said you borrowed most money for farming/fishing purposes. What was this for?** ***Don't read out; Single mention***		
	Buying inputs like seeds, fertilizer or for land preparation		*1*
	Buying/renting land for farming purposes		*2*
	Buying livestock		*3*
	Buying farming equipment or implements/fishing equipment such as nets or boats		*4*
	Buying a bicycle, motorcycle, car, truck, tractor or other means of transport for farming purposes		*5*
	Covering production/processing/marketing costs		*6*
	Other, specify		*7*
G10	**Thinking about the money you borrowed from [….]** ***(Read out response in G6.3)*** **how long did it take before you got the money?** ***Don't read out; Single mention***		
	Same day		*1*
	Less than a week		*2*
	More than a week, but within 2 weeks		*3*
	More than 2 weeks but within a month		*4*
	More than a month but within 3 months		*5*
	More than 3 months		*6*
G11	***Ask G11 only if G6.1 =FORMAL provider (i.e. 1 to 8)*** **You said you borrowed from ….** ***(read response in G6.1)*** **Please tell me about your (most recent) experience with regard to taking a loan with these institutions? Which of the following statements are true?** ***Read out statements***	***True***	***False***
G11.1	*You were given a written contract*	*1*	*2*
G11.2	*The loan agreement was explained to you*	*1*	*2*
G11.3	*You were told about all the costs before you took the loan*	*1*	*2*
G11.4	*You understood what all the costs would be before you took the loan*	*1*	*2*
G11.5	*The regular instalment was about the amount you thought it would be*	*1*	*2*
G11.6	*You could easily get the documents needed to apply for the loan*	*1*	*2*
G11.7	*You were required to provide security/collateral*	*1*	*2*
G11.8	*You were required to make a deposit before you got the loan*	*1*	*2*
G12.1	***Ask G12 only if G6.1 =FORMAL provider (1 to 8)*** **Was the loan in your own name or did you receive the loan as part of a group?**		

	Own name		*1*
	Group		*2*
	Both		*3*
G12.2	***Ask only for those with G12.1=Group/Both i.e. 2,3*** **Please tell me which of the following applied to the loan?**		
G12.2.1	*Did everyone in the group get a share of the loan or did the GROUP use the loan?*	*Group*	*Individuals shared*
G12.2.2	*The group had to provide collateral* ***Continue if YES skip to Q12.2.4 if NO***	*Yes*	*No*
G12.2.3	*If you failed to repay the group lost its collateral*	*Yes*	*No*
G12.2.4	*If you failed to pay the group was liable for your repayment amount*	*Yes*	*No*
G13.1	**Many people cannot always make the payments on the money they have borrowed. In the past 12 months have you missed making a payment when it was due?**		
	Yes		*1*
	No ***Go to next section***		*2*
G13.2	**What was the main reason for you missing a payment?** ***Do not read out; Single mention***		
	The provider of the loan did not contact me to receive payment, so I decided not to pay		*1*
	I had unexpected expenses and could not pay		*2*
	I did not think I needed to pay the loan back at this time		*3*
	I forgot to pay		*4*
	I thought I would try and see if the provider of the loan would forget		*5*
	I could not get transport		*6*
	My employer did not give me my salary		*7*
	People/institution I supply goods to did not pay me		*8*
	I lost my job		*9*
	I lost my crop/harvest/livestock		*10*
	I did not get a good price for my crop/harvest		*11*
	My business was not doing well/failed		*12*
	I was looking after a family member who was sick		*13*
	I was sick		*14*
	Other specify		*15*
	Refused		*16*
G14.1	**Have you ever applied for a loan electronically? i.e. you applied online/by phone?**	*Yes*	*No*
G14.2	**Have you ever received a loan disbursement/payout electronically? i.e. you borrowed and you received the money directly into an account or on your phone?** ***Interviewer: This is NOT referring to airtime***	*Yes*	*No*
G14.3	**Have you made a loan payment electronically?** ***By this I mean you transferred money from an account or your phone to make a loan payment – you didn't make the payment in cash***	*Yes*	*No*
Go to next section			
G14	***Only ask if G3.1 NO:*** **What is the main reason why you have not borrowed money in the past 12 months?** ***Don't read out; Single mention***		
	Didn't need to borrow money, my income is enough to cover all necessary expenses		*1*
	Don't want to borrow money/don't believe in borrowing money		*2*
	Worried would not be able to pay back the money		*3*
	Interest charged on borrowed money is too high		*4*
	Against my religion to pay interest		*5*

	Do not know where to borrow money from	*6*
	Do not know how to apply for a loan	*7*
	Do not have security or collateral	*8*
	Cannot get a loan because of my credit history	*9*
	Do not have the right documentation	*10*
	Not allowed to borrow money by spouse, by family or other	*11*
	Tried to borrow, but have been refused	*12*
	Still paying off a loan	*13*
	Other, specify	*14*

SECTION H: Payments

Everybody has to pay for the things they need – some use cash, some use their phones and some have somebody else (like their parents, husbands, wives) who pay for the things they need. I am now going to ask you a few questions about the payments you have to make.

H1	**Please tell me which of the following statements are TRUE for you? *Read out statements*.**	***True***	***False***	***DK/NA***
H1.1	*You do not like carrying large amounts of cash*	*1*	*2*	*3*
H1.2	*You would rather deal with people face to face than with machines such as ATMs even if the machines are quicker*	*1*	*2*	*3*
H1.3	*You are prepared to learn how to use new technology*	*1*	*2*	*3*
H1.4	*You prefer to pay cash rather than paying by phone or with cards or through machines*	*1*	*2*	*3*
H1.5	*You prefer to use cash because everybody uses cash*	*1*	*2*	*3*
H1.6	*It is more risky to carry cash than using cards and machines for payments*	*1*	*2*	*3*
H2.1	**Have you ever transferred money to another person/business/government electronically? In other words have you ever sent money to someone using your phone or sent from your account to their account?**		*Yes*	*No*
H2.2	**Have you ever received money electronically from another person/government/your employer? In other words they sent it to your phone or paid it into an account for you?**		*Yes*	*No*

HPP: Person to Person Remittances

HPP1	**In the past 12 months, have you sent money to someone in a different place within the country or outside of Uganda?**	
	Yes ***Continue***	*1*
	No ***Go to HPP4***	*2*
HPP2	**1. Who did you send money to in the past 12 months?** ***Don't read out; Multiple mention possible*** **2.** ***For each mention in HPP2.1 ask:*** **Where did you send money to for …..?** ***Read out; Multiple mention*** *1= Rural village; 2=Urban community; 3=Outside of Uganda* **3.** ***Only if HHP2.2=3 Please refer to the last time you sent money outside the country***	

	Which country did you send the money to*?* *1=Kenya; 2=Tanzania; 3=Rwanda; 4=South Africa; 5=DRC; 6=South Sudan; 7=Other, specify* **4.** ***If HPP2.2=1 or 2*** ***Which region did you send the money to? Please refer to the last time you sent to elsewhere in the country*** **5. How often did you send money to ……..? *Read out; Single mention*** *1=Weekly; 2=Fortnightly; 3=Monthly; 4=Seasonally; 5= Several times a year; 6=Only once off/Once a year; 7= When you can; 8= When they ask you to/in an emergency* **6. How do you mostly send the money to…….? *Don't read out; Single mention*** *1=Bank transfer/Pay into bank account; 2=Through the Post Office; 3=Through Western Union/Money gram/Swift cash; 4=Through mobile phone/mobile money; 5=Send cell phone top-up/airtime vouchers; 6=Bus/taxi driver takes it there; 7=Friends or family takes it there; 8=Other* **7. What is most of the money intended for that you sent to …..? *Don't read out; Single mention*** *1=Household/everyday use; 2=Education (school fees, transport, uniforms, books); 3=Farming expenses;* *4=Business expenses; 5=Building/renovation/expansion; 6=Purchase of land; 7=Purchasing a house; 8=Hospital/medical expenses; 9=Funeral expenses; 10=Social event; 11=Payment of utility bills; 12=Other*

		2.1	2.2	2.3	2.4	2.5	2.6	2.7
	Spouse	*1*						
	Child	*2*						
	Parent	*3*						
	Other family member	*4*						
	Friend	*5*						
	Someone I borrowed money from	*6*						
	Other, specify	*7*						

HPP3.1	**When was the last time you sent money? *Single mention***	
	Yesterday/today	*1*
	In the past 7 days	*2*
	In the past 30 days	*3*
	In the past 90 days	*4*
	More than 90 days ago but less than 6 months ago	*5*
	6 months or longer ago	*6*
HPP3.2	**The last time you sent money, how much money did you send?** ***Ugandan shillings***	
	Refused	*997*
	Can't remember	*998*
HPP4	**In the past 12 months, have you received money from someone in a different place within the country or from outside the country?**	
	Yes ***Continue***	*1*
	No ***Go to Next Section***	*2*

HPP5

1. **Who did you receive money from in the past 12 months?** ***Don't read out; Multiple mention possible***
   For each mention in HPP5.1 ask:
2. **Where did you receive money from?** ***Read out; Multiple mention***
   1= Rural village; 2=Urban community; 3=Outside of Uganda
3. ***Only if HPP5.2=3:*** **From which country?** ***Please refer to the last time you received from outside the country***
   1=Kenya; 2=Tanzania; 3=Rwanda; 4=South Africa; 5=DRC; 6=South Sudan; 7=Other specify **4.** ***If HPP5.2 =1 or 2***
   Which region did you receive the money from?
   Please refer to the last time you received from elsewhere in the country
5. **How often does … send you money?** ***Read out; Single mention***
   1=Weekly; 2=Fortnightly; 3=Monthly; 4=Seasonally; 5= Several times a year; 6=Once a year/once off; 7=When they can; 8= When you ask them/in an emergency
6. **How does … mostly send the money to you?** ***Read out; Single mention***
   1=Bank transfer/Pay into bank account; 2=Through the Post Office; 3=Through Western Union/Money gram/Swift cash; 4=Through mobile phone/mobile money; 5=Send cell phone top-up/airtime vouchers; 6=Bus/taxi driver brings it; 7=Friends or family bring it; 8=Other
7. **What do you use most of the money you receive for?** ***Don't read out; Single mention***
   1=Household/everyday use; 2=Education (school fees, transport, uniforms, books); 3=Farming expenses; 4=Business expenses; 5=Building/renovation/expansion; 6=Purchase of land; 7=Purchasing a house; 8=Hospital/medical expenses; 9=Funeral expenses; 10=Social event; 11=Payment of utility bills; 12=Other

	5.1	5.2	5.3	5.4	5.5	5.6	5.7
Spouse	*1*						
Child	*2*						
Parent	*3*						
Other family member	*4*						
Friend	*5*						
Someone who borrowed money from you	*6*						
Other, specify	*7*						

HPP6.1	**When did you last receive money?** ***Read out; Single mention***
	Yesterday/today — *1*
	In the past 7 days — *2*
	In the past 30 days — *3*
	In the past 90 days — *4*
	More than 90 days ago but less than 6 months ago — *5*
	6 months or longer ago — *6*

HPP6.2	**The last time you received money, how much money did you receive?** ***Ugandan shillings***	
	Refused	*997*
	Can't remember	*998*

HPB: Person to Business

HPB1

1. **How do you usually pay for groceries?** ***Do not read out; Single mention***
2. **How do you usually pay for school fees?** ***Do not read out; Single mention***
3. **How do you usually pay for medical treatment?** ***Do not read out; Single mention***

	1.1	1.2	1.3
By using cash	*1*	*1*	*1*
By cheque	*2*	*2*	*2*

	Pay over the counter into a bank account of the business/education/medical facility	*3*	*3*	*3*
	Bank transfer from my account to their account	*4*	*4*	*4*
	By debit card/ATM card	*5*	*5*	*5*
	By credit card	*6*	*6*	*6*
	Mobile money services	*7*	*7*	*7*
	I have medical insurance – don't pay			*8*
	Other, specify	*9*	*9*	*9*
	I do not buy/pay this because somebody buys/pays it for me	*10*	*10*	*10*
	I don't buy this because I never use this/I don't have to pay for this	*11*	*11*	*11*
HPB2	**In the past 12 months, how often did you use the following for purchases of goods and/or services?** ***Read out; Single mention*** *1=Daily; 2=Weekly; 3=Monthly; 4=Less often than monthly; 5=Never*			
HPB2.1	*Cash*			
HPB2.2	*ATM / Debit card*			
HPB2.3	*Credit card*			
HPB2.4	*Bank transfer*			
HPB2.5	*Mobile money*			
	HGP: Government to persons			
HGP1	**Ask this section only if section D2.1=8** **You indicated earlier that you get money from Government, please tell me which of the following do you get?** ***Read out; Multiple mentions possible***			
1.1	*Senior Citizens Grant/Elderly*			*1*
1.2	*Vulnerable Family Grant*			*2*
1.3	*Other, specify*			*3*
HGP2	**Please tell me which of the following problems do you experience with these payments?** ***Read out***			
HGP2.1	*Payment was late*		*Yes*	*No*
HGP2.2	*You had to give money to an official*		*Yes*	*No*
HGP2.3	*Money didn't come at all*		*Yes*	*No*
HGP2.4	*You received less money than should have*		*Yes*	*No*
HGP2.5	*Your household not on the register*		*Yes*	*No*
HGP2.6	*You were not able to go to the collection point and you didn't get the payment*		*Yes*	*No*
HGP2.7	*You didn't have proof of identity and didn't get the money*		*Yes*	*No*
HGP2.8	*Can you describe any other problems you encountered?*			
HGP3	**The last time you received money, how much money did you receive?** ***Ugandan shilling***			
	Refused			*997*
	Can't remember			*998*
	HBP: Bill payments			
HBP1	**Do you personally have to pay utility bills on a regular basis? I'm talking about bills like electricity bills, bills for water, TV, DSTV, Star times, etc.?** ***Interviewer: Please note I am not referring to business bills only personal bills that the respondent has to pay***			
	Yes			*1*
	No ***Go to Next Section***			*2*
HBP2	**In the past 12 months, how often did you use the following for bill payments?** ***Read out; Single mention*** *1=Daily; 2=Weekly; 3=Monthly; 4=Never*			

HBP2.1	*Cash*	
HBP2.2	*ATM / Debit card*	
HBP2.3	*Credit card*	
HBP2.4	*Bank transfer*	
HBP2.5	*Mobile money*	

Section J: Insurance				
J1	**Thinking about the past 3 months, how often did you need medical attention/treatment? Which of the following describes your situation best?** ***Read out; Single mention***			
	More than once a month			*1*
	At least once a month			*2*
	Not every month but more than once or twice in the past 3 months			*3*
	Once or twice in the past 3 months			*4*
	Did not need medical advice/treatment in the past 3 months			*5*
J2	**When you are ill, and you need medical attention, where do you mostly go to be treated?** ***Spontaneous; Don't read. Single mention***			
	Public health care facility			*1*
	Private health care facility/consult private doctor/clinic			*2*
	Pharmacy			*3*
	Traditional healer/Herbalist			*4*
	Village health team			*5*
	Other specify			*6*
	Do not take treatment/take care of myself			*7*
J3	**Do you have any insurance? This can also mean you are contributing to a scheme (not a savings group) that helps you with medical expenses.** ***Interviewer: Explain to respondent that this could be in his/her own name or they could be covered by insurance that is in somebody else's name.***			
	Yes ***Continue***			*1*
	No ***Go to J7***			*2*
	Don't know ***Go to Next section***			*3*
J4	**1. Please tell me which of the following you have?** ***Read out; Multiple mentions possible*** *1=Yes; 2=No* **2.** ***For each product the respondent has, ask:*** **Is this in your name or are you covered by someone else's insurance?** ***Single mention*** *1=Own insurance; 2=Someone else's insurance* **3.** ***For each product the respondent has and J4.2=1, ask:*** **How did you get this insurance?** ***Read out; Single mention*** *1=Insurance broker/agent; 2=Mobile phone; 3=Bank; 4=Employer; 5=Church; 6=Joined community scheme; 7=Other, specify*			
		4.1	**4.2**	**4.3**
J4.1.1	*Health insurance*			
J4.1.2	*Community health scheme*			
J4.1.3	*Life insurance*			
J4.1.4	*Vehicle third party*			
J4.1.5	*Motor comprehensive*			
J4.1.2	*Loan protection*			

J4.1.6	*Trading goods insurance*			
J4.1.7	*Crop/livestock insurance*			
J4.1.8	*Any other insurance product not mentioned here? Specify*			
J5.1	**When did you last use/claim from your insurance? *Read out; Single mention***			
	Yesterday/today			*1*
	In the past 7 days			*2*
	In the past 30 days			*3*
	In the past 90 days			*4*
	More than 90 days ago but less than 6 months ago			*5*
	6 months or longer ago			*6*
	*I have never used it/claimed **Go to J6.1 if J5.1=7***			*7*
J5.2	**Was the claim successful? Did they pay out/pay for your medical expenses?**	*Yes - paid*	*In process*	*No*
J6.1	**Have you ever made an insurance payment electronically?**		*Yes*	*No*
J6.2	**Have you ever received an insurance payout electronically?**		*Yes*	*No*
J7	***Ask only if J3=2*** **What is the main reason you don't have insurance? *Don't read out; Single mention***			
	Does not know the benefits of insurance			*1*
	Does not know how it works			*2*
	Does not know how to get it/where to get it			*3*
	Does not trust it or the companies that provide			*4*
	Protects self in other ways – don't need it			*5*
	Does not want to think about bad things happening			*6*
	Cannot afford it			*7*
	They don't want to pay out when you claim			*8*
	Other specify			*9*

SECTION K: SERVICE PROVIDERS			
K1	**1. Please remind me again which of the following do you sometimes use?** *1=Yes; 2=No* ***Read out*** ***After entry if K1.1=NONE of these services go to K3*** **If K1.1 only one option=YES go to next section** **2. Thinking about [*response in K1.1*], which of these do you value most in terms of the services they off *Single response*** **er?**		
		1.1	**1.2**
K1.1.1	*Banks*		
K1.1.2	*Microfinance institutions*		
K1.1.3	*Micro lenders/formal moneylenders*		
K1.1.4	*SACCOS*		
K1.1.5	*Cooperatives*		
K1.1.6	*Mobile money services*		
K1.1.7	*Insurance services*		

K1.1.8	*Pension services*		
K1.1.9	*Savings groups/VSLAs/Merry-go rounds*		
K1.1.10	*Moneylenders in community*		
K2	**Why do you say that? *Don't read out; Single mention***		
	Helps me save		*1*

APPENDIX B: ETHICAL CLEARANCE

06 April 2016

Ref 2016/CEMS/DFRB/009
Name of applicant: Mr J Kasozi
Student 34397981
Supervisor: Prof D Makina
Staff 1123698

FINANCE, RISK MANAGEMENT & BANKING RESEARCH ETHICS REVIEW

Dear Mr J Kasozi,

Decision: Ethics Approval
Name: Mr J Kasozi, kasozjs@@unjsa.ac.za, 084 020 1724
Supervisor: Prof D Makina, makind@unisa.ac.za; 012 429 4832
Proposal: The effect of financial literacy on financial inclusion: Evidence from Uganda
Qualification: PhD

Thank you for the application for research ethics clearance by the Department of Finance, Risk management and Banking Research Ethics Review Committee for the above-mentioned research. Final approval is granted for the duration of the project.

For full approval: The application was reviewed in compliance with the Unisa Policy on Research Ethics by the DFRB RERC 06 April 2016.

The proposed research may now commence with the proviso that:

1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the department of Finance, Risk Management and Banking Ethics Review Committee. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.
3) The researcher will ensure that the research project adheres to any applicable

national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.
Note:

The reference number 2016/CEMS/DFRB/009 should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the [DFRB] RERC.

Kind regards,

Prof Ashley Mutezo

Prof Thomas Mogale

Chair: CEMS DFRB Research Ethics Review Committee
Executive Dean: CEMS 0124294595/muteza@unisa.ac.za

University of South Africa
Preller Street, Muckleneuk Ridge. city of Tshwane
PO Box 392 UNISA 0003 South Africa Telephone. +27 12 429 3125
Facsimile. +27 12 429 4! SO mvw.unisa.ac.za

From: Joseph Lutwama [mailto:jlutwama@fsduganda.or.ug]
Sent: 30 August 2018 03:55 PM
To: Kasozi, Jason <kasozjs@unisa.ac.za>
Subject: RE: SAVE THE DATE: Practitioner Lab Climate Finance Uganda 19 June 2018

Jason,

Find attached the final dataset and the Questionnaire.

Joseph Lutwama
Head of Business Environment

fsduganda
Financial Sector Deepening

Tel: +256 414 231 260/2
Mobile: +256 782 304 601
+256 773 241 952
Skype: joseph.lutwama1
Twitter: @jlutwama
Web: www.fsduganda.or.ug
Plot 7A, John Babiiha Avenue, Kololo.
P.O. Box 608 Kampala, Uganda

APPENDIX C: MAPPING CONSTRUCTS AND INDEX CONSTRUCTION OUTPUT

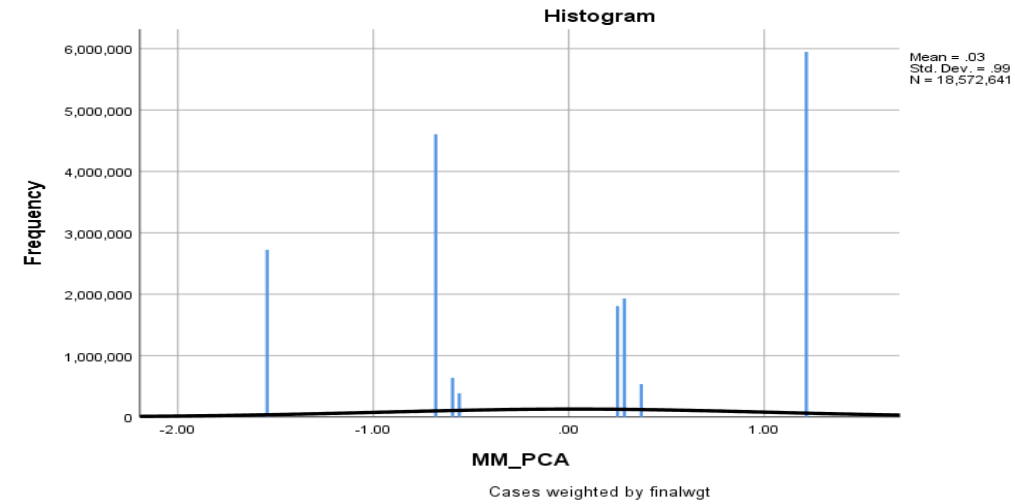
MAPPING CONSTRUCTS

MM	Notes	PA	Notes	CFP	Notes	SI	Notes
E2_bin	LMC (PCA)	D9_1_bin	PA_1	E4_1_bin	CFP	E4_1_bin	SI_1
E6_1_bin	MM	F1_1_bin	LOW LOADING	F1_3_bin	CFP	F1_4_bin	SI_1
E6_2_bin	MM	F1_3_bin	PA_2	G2_bin	LOW NUMBERS	F2_bin	SI_2
E6_3_bin	MM	F1_4_bin	PA_2	G8_bin	CFP	F9_3_bin	SI_1
		F1_5_bin	PA_1	J3_bin	LOW NUMBERS	G8_bin	SI_1
		F9_1_bin	PA_1			H1_3_bin	SI_2
		F9_3_bin	PA_1			H1_6_bin	SI_2
		J3_bin	Exclude due to low	numbers			
		PA_1	Number of items=4			SI_1	Number of items=4
		[0 - 1]	Alpha=0.714			[0 - 1]	Alpha=0.447
			IIC=0.401				IIC=0.170
		PA_2	Number of items=2			SI_2	Number of items=3
		[0 - 1]	Alpha=0.673			[0 - 1]	Alpha=0.409
			IIC=0.510	`			IIC=0.189
MM	Number of items=3	PA	Number of items=2	CFP	Number of items	SI	Number of items=2
[0 - 1]	Alpha=0.616	[0 - 1]	Alpha=0.400	[0 - 1]	Alpha=0.473	[0 - 1]	Alpha=0.369
	IIC=0.334		IIC=0.257		IIC=0.236		IIC=0.233
FinLit	Number of items=4	Control variables					
[0 - 1]	Alpha=0.725	Age	C7				
	IIC=0.436	Gender	C8				
		Income	D8				
		Education	D9				

INDEX CONSTRUCTION OUTPUT

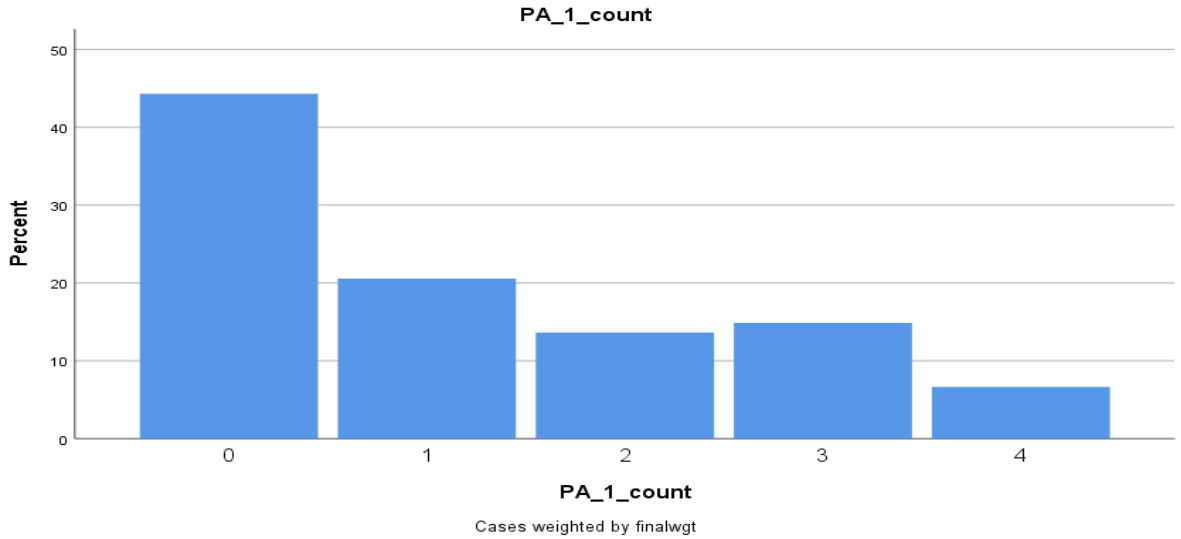
Communalities		
	Initial	Extraction
E2_bin	1,000	0,109
E6_1_bin	1,000	0,642
E6_2_bin	1,000	0,602
E6_3_bin	1,000	0,397
Extraction Method: Principal Component Analysis.		

Communalities		
	Initial	Extraction
E6_1_bin	1,000	0,681
E6_2_bin	1,000	0,631
E6_3_bin	1,000	0,388
Extraction Method: Principal Component Analysis.		



Statistics		
MM_PCA		
N	Valid	18572641
	Missing	0
Mean		0,0277
Median		0,2509
Mode		1,22
Std. Deviation		0,98996
Minimum		-1,54
Maximum		1,22

Statistics			
		PA_1_PCA	PA_2_PCA
N	Valid	18572641	18572641
	Missing	0	0
Mean		0,0802	-0,0151
Median		-0,3078	-0,6033
Mode		-0,71	-0,79
Std. Deviation		1,02997	0,99813
Minimum		-1,02	-1,34
Maximum		2,50	1,83



Correlations					
		PA_1_PCA	PA_1_count	PA_2_PCA	PA_2_count
PA_1_PCA	Pearson	1	.981**	-.002**	.126**
	Sig. (2-tailed)		0,000	0,000	0,000
	N	18572641	18572641	18572641	18572641
PA_1_count	Pearson	.981**	1	.154**	.262**
	Sig. (2-tailed)	0,000		0,000	0,000
	N	18572641	18572641	18572641	18572641
PA_2_PCA	Pearson	-.002**	.154**	1	.983**
	Sig. (2-tailed)	0,000	0,000		0,000
	N	18572641	18572641	18572641	18572641
PA_2_count	Pearson	.126**	.262**	.983**	1
	Sig. (2-tailed)	0,000	0,000	0,000	
	N	18572641	18572641	18572641	18572641
**. Correlation is significant at the 0.01 level (2-tailed).					

Correlations

		FinInclusion Financial inclusion [K1_1]	MM_count_s	PA_count_s	CFP_count_s	SI_count_s
FinInclusion Financial inclusion [K1_1]	Pearson Correlation	1	.167**	.327**	.327**	.372**
	Sig. (2-tailed)		0,000	0,000	0,000	0,000
	N	3002	3002	3002	3002	3002
MM_count_s	Pearson Correlation	.167**	1	.236**	.199**	.285**
	Sig. (2-tailed)	0,000		0,000	0,000	0,000
	N	3002	3002	3002	3002	3002
PA_count_s	Pearson Correlation	.327**	.236**	1	.661**	.590**
	Sig. (2-tailed)	0,000	0,000		0,000	0,000
	N	3002	3002	3002	3002	3002
CFP_count_s	Pearson Correlation	.327**	.199**	.661**	1	.644**
	Sig. (2-tailed)	0,000	0,000	0,000		0,000
	N	3002	3002	3002	3002	3002
SI_count_s	Pearson Correlation	.372**	.285**	.590**	.644**	1
	Sig. (2-tailed)	0,000	0,000	0,000	0,000	
	N	3002	3002	3002	3002	3002

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

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	2859	95,2
	Missing Cases	143	4,8
	Total	3002	100,0
Unselected Cases		0	0,0
Total		3002	100,0

a. If weight is in effect, see classification table for the total number of cases.