Three Essays on Financial Inclusion in Africa and the Middle East

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Abstract

This thesis investigates the determinants and/or barriers to financial inclusion in Africa and the Middle East. Financial inclusion, which is defined as individuals and businesses having access to useful and affordable financial products and services that meet their needs and which are delivered in a responsible and sustainable way, remains a huge challenge facing developing regions of the world, including Africa and the Middle East. According to the Global Findex database, Africa and the Middle East remains behind the world in terms of the number of people who have access to financial services.

This study therefore examines the African and the Middle East regions where 43% and 48% of the population are characterised as financially included while nearly 98 million people are informally served. It is also estimated that approximately US $3 billion is kept under mattresses in Sub Saharan Africa (Demirguc-Kunt, Klapper, Singer, Ansar, & Hess, 2018). The main goal of financial inclusion is to improve the range, quality, and availability of financial services and products to the unserved, under-served, and financially excluded. Financial inclusion has recently attracted political attention and risen to prominence on a national, regional, and global agenda. To create a fully inclusive financial system, it is imperative to address the needs of the different users of the system in order to make financial products and services attractive. Therefore, identifying the drivers of financial products and services usage will enhance take-up of financial products, deepen the local financial industry, stimulate economic growth, and ultimately reduce poverty.

A growing body of theoretical and empirical evidence suggests that financial sector development that focuses on financial inclusion provides the poor with the tools

needed to escape poverty. To ensure sustainable access to, and use of, appropriate financial services, factors that deprive people from accessing these financial services are addressed. However, the very important factors that explicitly put barriers to financial inclusion are often ignored in the literature. This thesis therefore fills this important gap in the literature. It provides evidence on these factors by undertaking three major related studies, of which each uses variables in local contexts with global implications to determine why people are still excluded from the financial system.

To elucidate the importance of and to determine the factors that hinder the development of financial inclusion, the author used data from the Global Findex database for 2011, 2014 and 2017. Data was also drawn from the World Bank's world development indicators, world governance indicators, international telecommunication union, and research on ICT in Africa. These data sources aided the author to empirically examine the number of variables that are important for the studies in this thesis. The examination and analysis of the data and variables through various theoretical models provide important findings about the limited growth of financial inclusion in developing countries.

In the first study, the thesis examines how political instability impacts on financial inclusion in the Middle East and North Africa (MENA) region. In the wake of the political instability that engulfed the region, policy makers looked outside the region for potential guidance in order to raise economic growth and, ultimately, to resolve the instability. It provided the premise of this study's investigation of how the instability variable affects the delivery of economic targets including financial inclusion. The study asks the question: what is the effect of political instability on financial inclusion in the MENA region? Given that endogeneity and an

asymmetrical relationship could create a bias in the empirical results between political instability and financial inclusion, the study tested the asymmetrical relationship between political instability and financial inclusion using the probit model with sample selection, and a multiplicative interaction test of asymmetric models. Having satisfied the question of endogeneity, the study finds that political instability positively correlates with lower degrees of financial inclusion, indicating that political instability can lead to financial exclusion. Further, the study finds that higher incomes and higher education are associated with higher degrees of financial inclusion. A lack of documentation required by formal financial institutions proves to be a major barrier to financial inclusion in the region, considering that a greater number of the population are in the informal sector. In addition, inefficient mechanisms to determine real interest rates, corruption, oil reliance, unemployment, and religious tensions also negatively affect financial inclusion. Finally, the study proposes and calculates the political stability threshold value that will trigger financial inclusion to be -0.960 for the MENA region.

In analysing how formal financial intermediation influences the use of informal financial intermediation and cash in Africa, the findings of the second study show that financial inclusion based on the use of formal financial intermediaries strongly correlates with the use of informal financial intermediaries. The study shows a strong complementary evidence between formal financial inclusion and informal financial intermediation but indicates a negative relationship with cash preference respectively. However, governments' use of cash for poverty relief payments is found to negatively impact on financial inclusion. Informal financial intermediary groups building on long-standing traditions of revolving savings circles and credit associations that exist worldwide has contributed to the economic development of

poor people in the past. Their impact on education, healthcare, and social management is evidence that they have sustained poor people. In Africa, these intermediaries are the backbone of societies especially in rural areas. Their presence has evolved into community cooperatives that has a wider impact on their socio-economic wellbeing. ROSCAs and other forms of traditional institutions are significant devices for the poor in their attempts to diffuse the impact of shocks as well as building trust and social capital.

The third study in this thesis considers whether electricity supply and enabling regulation matter in relation to the adoption and use of mobile money to gain financial inclusion in Africa. The hypothesised research model tested context-based constructs such as the availability of electricity, enabling regulation, and rural dwellings, with the technology acceptance model (TAM) to determine how these constructs affect peoples' intentions and attitudes towards the adoption and continuous use of mobile money. Exploring these constructs using the structural equation modelling (SEM) technique, the empirical results suggest that the perceived availability of electricity is an important factor for the adoption and use of mobile money through the functionality of mobile phones. Perceived enabling regulation also shows a correlation with individuals' intention to adopt and use mobile money. However, perceived rural dwelling is found to negatively correlate with individuals' attitudes and intentions to adopt and use mobile money because of inadequate or limited network coverage in rural areas. As access to technology speeds up financial transactions, the costs for rendering financial services to the unbanked are reduced and provide better ways for the poor to manage their lives.

This thesis has policy implications in that MENA governments can reduce and eliminate political instability through greater financial inclusion of their populations,

and by working towards the political stability threshold value of -0.960 to trigger financial inclusion. Because of the informal economies of Africa, mobile money adoption, which has defied the poverty nature of the people, can be the best alternative for financial inclusion. Governments can implement measures to disallow the use of cash for its poverty reduction payments by doing these through bank accounts and mobile money to increase financial inclusion among the poor.

List of research papers

Refereed journal paper

Alhassan, A., Leon L., Krishna R., & Duppati G. (2019): The impact of formal financial inclusion on informal financial intermediation and cash preference: evidence from Africa, Applied Economics, https://doi.org/10.1080/00036846.2019.1593316

Alhassan, A. Li, L., Reddy, K and Duppati, G. (2018). The relationship between political instability and financial inclusion: Evidence from Middle East and North Africa, *International Journal of Finance and Economics*, revised and resubmitted.

Alhassan, A. Li, L., Reddy, K and Duppati, G. (2018), Attitudes and intentions to use mobile money in Africa: Do electricity supply and regulation matter? *Emerging Markets Finance and Trade,* submitted.

Refereed conference presentations

Alhassan, A. (2018). The impact of formal financial inclusion on informal financial intermediation and cash preference: Evidence from Africa. Paper presented at the 31st Australian Finance and Banking conference on the 12 – 15 December 2018 in Sydney.

Alhassan, A. (2019). Attitudes and intentions to use mobile money in Africa: Do electricity supply and regulation matter? Paper presented at the PhD Symposium session of the 23rd New Zealand Finance Colloquium 2019 in Lincoln University, Lincoln on February 13 -15, 2019.

Working papers

Pro-poor access to finance, economic inclusion and the effects of being unbanked: Evidence from MFIs in Ghana

Using path dependence theory to explain low banking development in the Middle East and North Africa

Refugees' resettlement and financial inclusion in developing countries: who benefits most?

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I cannot forget a close friend whose resilience has impacted on my life. This is an individual that I affectionately call Tom Tom (Thomas William Bryant), who is bed ridden for all his life (26 years old) because of a disability but has the greatest courage to contain the pain and remain calm and resolute in everything that he goes through daily. I have been with him for four years and have seen what he goes through minute by minute and I sometimes feel strongly that life is not fair to this gentleman. He has always come out of difficult situations stronger than he was before. The beauty is that, he is lovely and acknowledges my presence anytime I am with him. He like to be read to because he cannot speak, and he enjoy my company so much. I feel great and accomplished knowing that someone like Tom Tom is very dear to me. To his parents Mr Wayne Bryant and Mrs Averil Bryant, I say thank you for the fatherly and motherly care you have given me. I feel great and love to be part of you all the time. May God bless you all.

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Dedication

I dedicate this thesis to my mother and late father; to my lovely and dedicated wife and children; and to the Glory of God.

Declaration

I, Abidin Ali Alhassan, declare that the content of this thesis is the result of work that has been carried out by me in the University of Waikato. I further certify that except where explicit reference is made to the contribution of others, and where prior works referred to are duly acknowledged, this thesis is originally authored by me. The work has not been submitted previously, in whole or in part, to qualify for any other academic award anywhere.

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List of Abbreviations

AML-CFT	Anti-Money Laundering and Combating
ATM	Automated Teller Machine
CD	Coefficients of Determination
CFI	Comparative Fit Index
FINSAP	Financial Sector Adjustment Programme
FITF	Financial Inclusion Task Force
GDP	Gross Domestic Products
GFI	Goodness of Fit Indices
GPFI	Global Partnership for Financial Inclusion
GSMA	Groupe Spéciale Mobile) Association
ICT	Information Communication Technology
IFI	Incremental Fit Index
IMF	International Monetary Fund
IOC	Islamic Organisation Cooperating
ITU	International Telecommunication Union
KYC	Know Your Customer
MENA	Middle East and North Africa
MFIs	Microfinance Institutions
MNOs	Mobile Network Operators
M-PESA	Mobile Money
NBFIs	Non-Banking Financial Institutions
NPL	Non-Performing Loans
NTI	Normed Fit Index

OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
P2P	Person to Person
PPP	Public-Private Partnerships
RMSEA	Root Mean Square Error of Approximation
ROSCAs	Rotating Savings and Credit Associations
SAP	Structural Adjustment Programme
SEM	Structural Equation Modelling
SIM	Subscriber Identity Module
SMS	Short Messaging Services
SSA	Sub Saharan Africa
TAM	Technology Acceptance Model
TLI	Tucker-Lewis Index
TPB	Theory of Planned Behaviour
UNDP	UNDP
WB	World Bank
WDI	World Development Indicators
WGI	World Governance Indicators
WLS	Weighted Least Squares
WTP	Willingness to Pay

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Chapter 1

Introduction

1.1 The concept of financial inclusion

Financial inclusion has been extensively investigated both theoretically and empirically. Financial inclusion, which is defined conceptually as giving individuals and businesses access to useful and affordable financial products and services that meet their needs, and which are delivered in a responsible and sustainable way (Demirgüç-Kunt, Honohan, & Beck, 2008) has gained momentum from important sections of society including the G20 countries. Financial inclusion is important in finance as it promises to liberalise the formal provision of financial products and services by providing universal access to all people who are capable of using them. Financial inclusion is considered a development tool as in previous attempts through microcredit and microfinance. Given that financial empowerment leads to economic and social empowerment, policymakers and governments believe that financial inclusion will strengthen their countries' investment climate and consequently lead to economic growth.

Financial inclusion has generated considerable interest in recent times, with emphasis on some topical areas of direction for research. These areas include gender, income, education, financial literacy and mobile money adoption through network of agents and the ability to own a mobile phone. Studying financial inclusion and legal discrimination against women, Asli and Klapper Leora (2013) analyse gender differences in the use of financial services using individual-level data from 98 developing countries. Highlighting the existence of significant gender

gaps in ownership of accounts and usage of savings and credit products, they find that legal discrimination against women and gender norms may explain some of the cross-country variation in access to finance for women. For instance, legal restrictions that prevent women from becoming heads of households, working, choosing where to live, and receiving inheritances, mean that women, compared to men, are less likely to own an account as well as to save and borrow. They contend that the level of violence against women and the incidence of early marriage for women, help to explain the variation in the use of financial services between men and women (Asli & Klapper Leora, 2013). Ghosh and Vinod (2017) findings support the above. Specifically, they examine whether gender matters for financial inclusion and if so, what are the possible factors that influence this relationship. Using within-country data, their findings suggest a significant gender disparity in both access to, and the use of, financial services. On average, female-headed households are 8% less likely to access formal finance and 6% are more likely to access informal finance as compared to households that are headed by males.

Allen, Demirguc-Kunt, Klapper, and Peria (2016) in their study of the foundations of financial inclusion find that enabling environments such as lower account costs and greater proximity to financial intermediaries leads to greater ownership and use of financial accounts. They add that policies such as requiring banks to offer basic or low-fee accounts, being exempt from arduous documentation requirements, allowing correspondent banking, and using bank accounts to make government payments, could be effective among those most likely to be excluded from the financial system. Using the World Bank's Global Findex database on 37 African countries to study the determinants of financial inclusion, Zins and Weill (2016)

find that higher income, higher education, higher age brackets and being male are the factors that determine financial inclusion or use of mobile money.

Bruhn and Love (2014) provide evidence on the impact of access to finance on poverty, focusing on underserved low-income clients and those located in areas with lower pre-existing bank penetration. They find a sizeable effect of access to finance on labour market activity and income levels, drawing the implication that working individuals who have access to financial services reduce their poverty levels compared to those without access. Studying financial inclusion, poverty, and the role of relative income, Li (2018) argues that the effect of income comparisons on credit applications can be explained by either a "keeping up with the Joneses" effect, in which the poor seek financing for costly consumption so as to emulate the consumption patterns of the wealthy. This either keeps the poor in persistent poverty, or produces a "tunnel" effect, in which the poor are inspired by the economic success of the wealthy and use credit for investment. The author contends that poor households can use finance to escape poverty when they keep to the "tunnel" effect.

In investigating how financial literacy affects financial inclusion at the cross-country level, Grohmann, Klühs, and Menkhoff (2018) show that a higher degree of financial literacy has a clear beneficial effect on financial inclusion. They also find that financial infrastructure and financial literacy are mainly substitutes in terms of access to finance; however, the effect of higher financial literacy strengthens the effect of more financial depth. Berry, Karlan, and Pradhan (2018) looked at how financial education affects the youth in Ghana using the randomised control trials. They find that after nine months, the program had a positive impact on self-reported savings at school relative to the control group, but there were no

statistically significant increases in aggregate savings nor in hypothesised mechanisms such as attitudes, preferences, or knowledge.

Recent developments in the financial system call for a number of other topical issues to be examined as their impact on financial inclusion is important. For instance, little is heard about how political instability affects financial inclusion especially in the wake of the political instability in the MENA region, or the impact of formal financial intermediation on the use of informal financial intermediaries and cash preference in this financial inclusion "revolution". Other issues include how electricity supply, enabling regulation, and costs of services can affect the adoption and continuous use of mobile money for financial inclusion. These issues have been largely ignored and represent a gap in the financial inclusion literature. This thesis fills the gap by examining how the financial inclusion agenda can move forward when these issues are addressed. The first chapter of the thesis looks at the low levels of financial inclusion in the MENA region, taking into account the political situation, oil reliance, unemployment, and corruption. The second chapter then considers whether the economic infrastructure of African countries with relatively inadequate financial infrastructure serve as conduits for informal financing. Finally, the third chapter examines how factors such as the availability of electricity, income disparities, and the cost of mobile money services, enabling regulation, and rural dwelling can affect attitudes and intentions to adopt and use mobile money in Africa. These investigations are all geared towards the universal evidence that financial inclusion will lead to poverty reduction and empower people to improve their standards of living.

Levine (2005) posits that theory and evidence in the finance literature imply that better developed financial systems ease the external financing constraints faced by firms, and that

having access to finance where individuals encounter income distribution works to reduce poverty and to contribute to economic development. Levine (2005) thesis considers the impact of financial intermediation and its effects on the growth models, where financial deepening variables centre on key factors that are necessary conduits for economic growth and development through financial development. These key factors include the production of ex ante information about possible investments and the subsequent allocation of resources in the form of capital. Other key factors include the monitoring of these investments after capital allocation, and exertion of a form of corporate governance; the facilitation of trading, diversification, and management of risk; mobilisation and pooling of savings; and finally, a move to ease the exchange of goods and services for individuals and businesses. The effects of these functions at the microeconomics level saw the introduction of microcredit programmes for poverty alleviation in most developing economies. This was later transformed into micro banks called microfinance institutions (Armendariz & Morduch, 2007).

Microfinance was then widely adopted as a panacea to effectively push the inclusive growth agenda, where access to finance would drive the economic and social needs of the poor at the bottom of the pyramid (Nissanke, 2001). The implementation and monitoring of the microfinance agenda and the production of impact assessment research led development experts in conjunction with multi-lateral corporations such as the World Bank, the IMF and others to the broadening of the microfinance agenda into what is now termed financial inclusion (Robinson, 2001). In recognition of the fact that diversification of financial products and services is important for broad base inclusive growth[1] , financial services, under financial inclusion, are now diversified into savings, credit, payments, insurance and remittances. In parallel, financial service providers to the poor have expanded from credit-only microfinance institutions (MFIs) to deposit-taking MFIs,

[1] Early development experts in the 1970s and 1980s hypothesise that microcredit was the only financial service required by the poor. This according to them will eliminate poverty, as more income is available for consumption and creation of microenterprises to increase their wealth.

commercial banks, cooperatives, telecom companies, payment companies, insurance companies, and others. The legal forms of financial service providers and regulatory frameworks have also been diversified. Financial infrastructure service providers and investors are also part of the stakeholders. Consequently, the original vision of microfinance has now been extended with at least five "P's" under financial inclusion:

- **New products** beyond the original enterprise credit, to encompass all forms of credit, savings, insurance, and payments
- **New populations**, both upmarket and downmarket of the populations traditionally reached by microfinance, and including new groups largely ignored by microfinance, such as persons with disabilities and the elderly
- **New platforms**, using digital technologies to connect with people at more times and places
- **New providers**, not just traditional microfinance institutions, but a range of private and not-for-profit providers, with governments injecting some helpful impetus through G2P transfers
- All facilitated by **new policies**.

To make financial inclusion strategies workable, and to ensure that both rich and poor households have access to financial services, policy frameworks have been initiated by governments and regulators of central banks in many parts of the world. For instance, the Community Reinvestment Act (1997) of the United States of America requires banks to offer credit in all catchment areas and prohibits them from targeting only the rich neighbourhoods. Britain constituted the Financial Inclusion Task Force (FITF) in 2005 in order to monitor the development of financial inclusion. Another example worth mentioning is the German Bankers Association voluntary code (1996), which sought to provide an "everyman" current

banking account that facilitates basic banking transactions. The introduction of 'Mzansi', a low-cost bank account, in 2004 by the South African Banking Association for financially excluded people is also notable. The United Nations Development Programme's (UNDP) project, building inclusive financial sectors for development, broadly described the main goals of inclusive finance as access to a range of financial services (savings, credit, insurance, remittance and payment services) at a reasonable cost to all households and businesses (United Nations Capital Development Fund, 2006). This was a major international initiative to involve all nations of the world to focus on financial inclusion as a strategy to eliminate social and financial exclusion among individuals, households, and businesses. Multilateral organisations such as the World Bank (WB) and the International Monetary Fund (IMF) have also focussed on the issue of financial inclusion through policy prescriptions and guidelines.

Demirgüç-Kunt, Klapper, Singer, and Van Oudheusden (2015) argue that access to savings, credit, insurance, and payments instruments effectively begins with the existence of a bank account by individuals. They urge people to understand the importance of access to finance to support their socio-economic and cultural lives. This contrasts the traditional supply-led channel where microcredit was supplied to people based on their poverty situations. Financial inclusion mechanisms or strategies are designed to include all people who can and are willing to use financial services by making the costs affordable and using infrastructure and technology to underscore barriers such as distance to service points. Development finance literature posits that access to affordable financial products and services could effectively distribute income to the poor and eliminate inequality, as the distributive

income contributes to economic growth and the creation of wealth (Dabla-Norris, Ji, Townsend, & Unsal, 2015).

Accordingly, financial inclusion has several merits. It facilitates the efficient allocation of productive resources that can potentially reduce the cost of capital. It enhances efficiency and welfare by providing avenues for secure and safe financial services best practices. It provides an avenue for the protection of clients through information sharing under the guidance of a regulator. It strengthens the availability of economic resources by prompting the financial system of a country to be efficient and effective. It equips people with the tools needed to access financial services by encouraging choices and competition in the financial system. In sum, it contributes towards the progress of the economy in a consistent manner. Financial inclusion can help reduce the growth of informal sources of credit such as moneylenders, which are often found to be exploitative. It also helps in creating an avenue for the government's revenue mobilisation by identifying the tax obligations of both individuals and enterprises.

In spite of the numerous benefits that society ought to get from financial inclusion, there are still people who are excluded from financial services globally. According to the latest World Bank estimates (Demirgüç-Kunt & Singer, 2017), there are about 1.7 billion people in the world who still do not have a bank account. Of these numbers, the majority come from developing countries. Figure 1.1, which shows the levels of financial inclusion among individual characteristics, is taken from the Global Findex database for 2017.

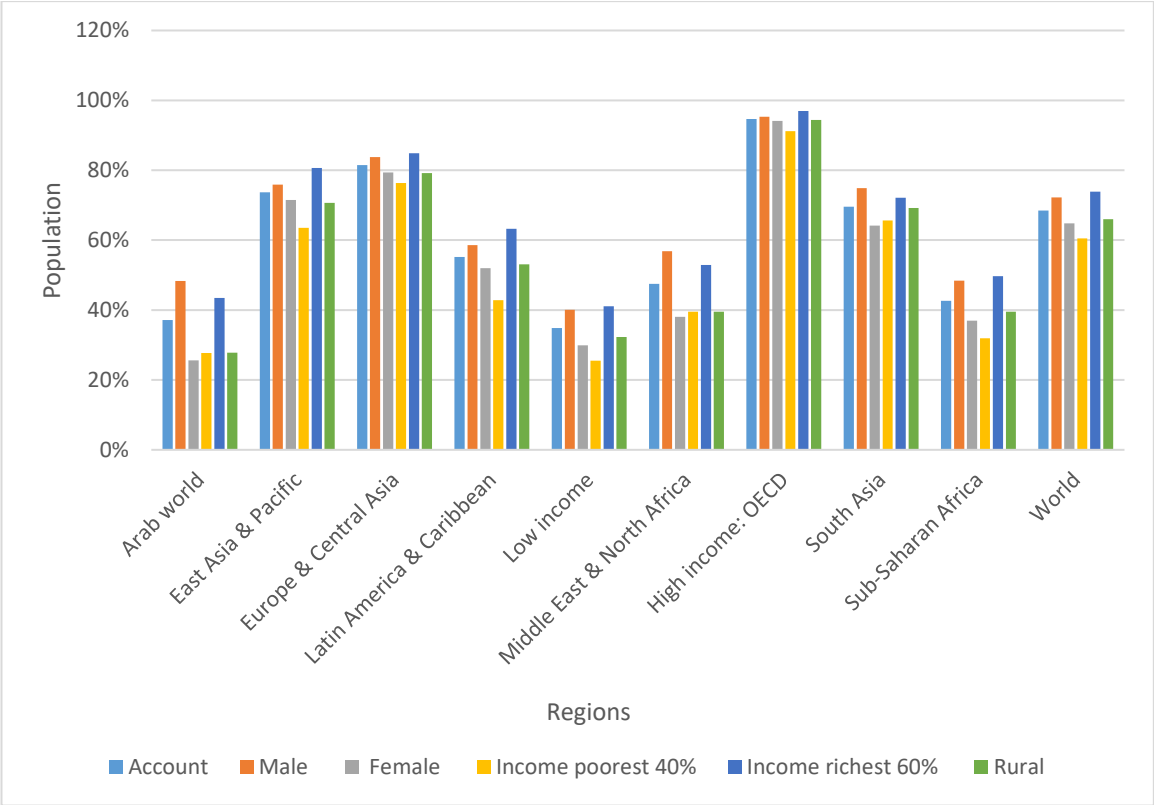


Figure 1.1 Financial inclusion among the regions of the World

Clearly, Sub-Saharan Africa and the Arab World show lower levels of financial inclusion in the world. What or who then determines financial inclusion? Researchers and development experts argue that lack of access to finance can be voluntary or involuntary. In their thesis entitled Banking services for everyone? Barriers to bank access and use around the world, Beck, Demirgüç-Kunt, and Martinez Peria (2008) contend that involuntary exclusion can be attributed to high risk clients and poor project quality, as well as high prices of financial services and discrimination. In the case of voluntary exclusion, people may not use financial services because of ethical or religious grounds, which are forms of self-exclusion (Beck, Demirgüç-Kunt, & Honohan, 2008).

Kempson and Jones (2000) argue that barriers to financial inclusion can be grouped into five concepts: the first is access barriers – physical and geographical (limited

availability of, or difficulty in securing, appropriate services) as well as risk assessment and credit scoring. The second barrier relates to the prices of financial products and services (such as charges and commissions) which makes services unaffordable especially to low income people. The third is condition barriers that is conditions attached to certain financial products, such as deposit or savings balance level requirements which can be difficult and inappropriate for some people. Fourthly, there are also marketing barriers in the form of target market (how products are promoted, their image or mode of delivery) and segmentation. Finally, there is self-imposition barriers – psychological states of people relating to experiences about using financial services (Kempson & Jones, 2000). An additional barrier is illiteracy, which prevents a substantial number of people from taking recourse in banking services, especially in developing nations (Cole, Sampson, & Zia, 2011; Xu & Zia, 2012).

Barriers to inclusion occur in most cases as a direct discrimination by mainstream banking institutions, making their products more expensive and out of reach or less attractive to certain categories of people (Beck, Demirgüç-Kunt, & Martinez Peria, 2008). The physical distance of bank branches in relation to people's settlements also poses serious challenges to accessing financial services. Expenses incurred in travelling to a bank branch to deposit an even lesser amount is uneconomical. This is particularly common among African nations where people have to travel several kilometres to transact business with a formal financial institution (Demirgüç-Kunt & Klapper, 2013; Demirguc-Kunt, Klapper, Singer, Ansar, & Hess, 2018; King, 2012). Anti-money laundering rules that have been tightened because of the upsurge in terrorist activities mean that people find it difficult to access financial services. Documentation and identity issues, which have become more pronounced

in the face of the Know-Your-Customer (KYC) requirement, also poses problems to the principle of free access for all (Anderloni & Carluccio, 2007; Kempson & Jones, 2000).

In considering the determinants of financial inclusion, it is important to understand why people may not have access to financial services, since exclusion from these services equally brings about social exclusion, which is dangerous for society (Adato, Carter, & May, 2006). The literature on barriers to, or determinants of, financial inclusion pay more attention to the involuntary aspect than the voluntary. It has been argued that those who are voluntarily excluded do not need any further policy interventions to usher them into the financial system (Beck, Demirgüç-Kunt, & Honohan, 2008). Voluntary exclusion due to idiosyncratic religious restrictions, especially the Muslim religious beliefs that restrict individuals from accessing interest based financial services, are worth of addressing. Finally, the use of technology to address barriers to financial inclusion is equally critical especially in regions where financial exclusion is endemic.

1.2 My area of focus

This thesis takes a critical look into why the lack of financial access is still pervasive in the MENA and Africa regions and therefore contributes to the literature on determinants of financial inclusion. It examines both the voluntary and involuntary actions and inactions of players in the financial system to inform policy decisions to promote broader financial inclusion. This thesis uses variables and proxies that explain these two aspects of financial inclusion determinants. It provides three studies on financial inclusion with a primary focus on Africa and the Middle East. The three essays demonstrate a careful reconsideration of constraints both at the individual and country levels on financial inclusion. The essays present a structured,

critical, empirical, and policy discourse of analysis of the factors that hinder people at the micro and macro levels. This is done not as a critique, but as a form of creating awareness to policy makers and users of financial services to understand how these factors affect them in their quest to becoming financially included.

1.2.1 Political instability and financial inclusion

The first essay (chapter two) provides evidence on the impact of political instability on financial inclusion in the MENA region. In the wake of the region's recent political instability, the central question posed is: What is the effect of political instability on financial inclusion in the MENA region? This question is answered using data for 2011, 2014, and 2017 from the Global Findex database. The study also tests the asymmetric relationship between political instability and financial inclusion. It proposes and tests a political stability threshold model that may trigger financial inclusion. Considering the politically unstable climate in the MENA region in recent times, policy makers are in need of policy direction in the form of political stability indicators that can trigger and promote financial inclusion as an alternative for faster economic growth. In addition, the study empirically explores the barriers to financial inclusion from the Global Findex database by critically examining these barriers in the context of the MENA region and selected countries of the Organisation of Islamic Cooperation (OIC). The findings of the study are robust and critical to the MENA region and other developing areas.

1.2.2 Informal financial intermediation and financial inclusion

Informal financial intermediation is also important both for financial inclusion and for economic growth. Mohieldin (2014) argues that financial cooperatives that are based on the notion of social and economic cooperation, mostly in rural communities, overcome barriers in the marketplace by grouping together. Serving

people who live on less than $2 a day (Demirgüç-Kunt & Klapper, 2013; Demirguc-Kunt et al., 2018), these financial cooperatives are currently one of the largest providers of financial intermediation to the poor. Mohieldin (2014) emphasises that overcoming their governance challenges will see them live up to their full potential, as 78 million people globally are served through these cooperatives. Given this, the third chapter critically examines the impact of formal financial inclusion on informal financial intermediation and cash preference, with a focus on Africa. The paper discusses the proposition that the use of formal financial intermediation reduces the use of cash and informal financial intermediaries in a developing world setting, using Africa as a case study. The paper explores this evidence by examining the traditional mechanisms that poor people use to meet their financial needs in the wake of global leadership attempts to expand formal financial inclusion. The paper further examines the rationale behind governments' use of cash to pay poverty alleviation beneficiaries when formal financial inclusion is a strong policy agenda. The findings of the study support the fact that cooperatives still play important roles in the financial systems of Africa. However, with different sets of rules and regulations, it becomes difficult for harmonisation and standardisation as different countries operate these cooperatives differently. Harmonisation and standardisation will ultimately lead to broader financial inclusion as informal financial intermediation positively correlates with formal financial inclusion.

1.2.3 Mobile money adoption and financial inclusion

There is a critical role for technology in expanding financial inclusion. Mobile money, electronic payments, and related technologies such as borrower identification using biometric data are revolutionising access to finance. Technological innovations significantly lower the cost of accessing financial

services, while minimising the impact of geographical isolation (Mohieldin, 2014). However, not all these benefits can be accrued if electricity (energy) costs are high. Mobile money or banking uses mobile phone devices and so requires electricity for its functionality. The upshot of this is that if people cannot be connected to the national grid because of their geographical distances, then access to mobile technology for mobile money will be undermined. This eventually leads to further financial exclusion. The fourth chapter explores this issue further by incorporating a number of constructs (through moderations and modifications in order to understand the local contexts) to drive home the factors that determine the adoption and continuous use of mobile money in Africa. The study provides preliminary results on factors that determine the adoption and use of mobile money in Africa, using data from Research ICT Africa, International Telecommunication Union, and the World Bank. The hypothesised research model tests the context-based constructs such as the availability of electricity, enabling regulation, rural dwellings, and the costs structure of mobile money with the technology acceptance model (TAM) to determine how these constructs affect peoples' intentions and attitudes towards the adoption and continuous use of mobile money. Exploring these constructs using the structural equation modelling (SEM) technique, the empirical results give interesting outcomes that are necessary for effective policy interventions in this current mobile money revolution.

The thesis is organised as follows: chapter one introduces the concept of financial inclusion and discussed how the three topics are linked together. Chapter two then looks at how political instability affects financial inclusion in the MENA region, while chapter three consider the rationale behind the use of informal financial intermediation and cash preference in the wake of the global financial inclusion

agenda in Africa. Chapter four completes the determinants of financial inclusion in Africa and the Middle East by examining how electricity supply, income, rural dwelling and enabling regulation affects the intentions and attitudes of individuals in the adoption and use of mobile money for financial inclusion in SSA. The fifth chapter then summarizes the main findings of the three chapters and discuss the contribution of the thesis to literature and policy discourse. Finally, the thesis provides an overview of the regulatory framework in Africa, under the topic: The enabling regulation for financial inclusion in Africa – issues and practices in chapter five. The brief critically examines the practices of regulatory bodies especially the Central Banks by uncovering the issues and challenges they face and suggest ways that they can deal with the challenges in order to embrace full scale financial inclusion in their various countries.

Chapter 2

Political instability and financial inclusion

2.1 Introduction

Financial inclusion was adopted by the G20 as a policy goal in 2010 (GPFI, n.d.). The G20 seeks to provide poor people with 'effective' access to credit, savings, payments and insurance services through formal financial institutions (Demirguc-Kunt & Klapper, 2013) with the expected benefits of increased national growth, efficiency and welfare. To this end, the World Bank has encouraged financial inclusion as an economic emancipation tool for the poor. The starting point of financial inclusion is owning an account in a formal financial institution, as a gateway for other financial services such as savings, borrowing or purchasing an insurance policy. The benefits derived from financial inclusion include wealth creation, consumption smoothing, and increased entrepreneurship productivity (Demirgüç-Kunt et al., 2008; Dupas, Green, Keats, & Robinson, 2012); investment in education for future employability (Bruhn & Love, 2014; Demirguc-Kunt & Klapper, 2013); female empowerment (Swamy, 2014); and financial stability (Han & Melecky, 2013). However, many individuals are still not financially included (Cole et al., 2011; Demirguc-Kunt et al., 2018; Osei-Assibey, 2009). The question is why are individuals not financially included despite the many potential benefits available to them?

The literature highlights that political instability and other reasons[2] contribute to the differences in financial and economic development in the world (Cole, 2009;

[2] Other reasons include weak institutional and regulatory frameworks, lack of effective interest rates, market imperfections, underdeveloped financial infrastructure etc. (See Beck et al., 2008, Beck & De La Torre, 2007).

Honohan, 2008; Roe & Siegel, 2011). For example, Roe and Siegel (2011), who study political instability and its effects on financial development and economic inequality, report that political instability leads to financial backwardness. The data used by Roe and Siegel (2011) is for the period 1965-2003 and does not include the recent waves of political instability that have erupted in the MENA countries since 2011. Political instability involves political protest and anti-government activities that, if persisting for long periods, tend to disrupt productive activities and consequently erode economic gains.

The research examines how political instability affects people's ability to own accounts, save money, and access credit in formal financial institutions in MENA, and in selected Organisation of Islamic Cooperation (OIC) countries. As a result, a political stability value that can trigger financial inclusion is proposed. Olson (2008) argues that governments become easy prey for interest groups the longer they remain in office. Following Olson (2008), the author argues that people in the MENA region may have been financially excluded partly because the regimes in these countries have held power for long periods. In such situations, the regimes assume authoritative power, where only those within the "inner circles of power" control both the resources of the nation and the institutions and policies that regulate economic sectors. The argument is that these policies discourage internal and external investment institutions in making funds available for lending to clients. Consequently, the financial sector becomes underfunded and underdeveloped because interest groups lobby governments to make policies that benefit only a few (Dang, So, & Yan, 2017) and weaken institutional capacities (such as regulatory frameworks). The persistence of such leads to weakening financial systems and growing popular disaffection. Eventually, anti-government activities erupt.

To the best of the author's knowledge, this paper is the first to examine the link between political instability and financial inclusion in the MENA region and selected OIC countries, using the Global Findex data. Demirgüç-Kunt, Klapper, Singer, and Van Oudheusden (2015) report on the Global Financial Development and indicate that poverty and youth unemployment in the MENA region is increasing partly due to inadequate financial intermediation, which leads to lower degrees of financial inclusion.

The author investigates whether political instability in the region leads to lowered degrees of financial inclusion using the 2011 to 2017 Global Findex data. The author uses the multiplicative interaction test of asymmetric model proposed by Clark, Gilligan, and Golder (2006) and lagged variables to overcome the asymmetry and endogeneity problems identified in the study. To provide a deeper understanding of financial inclusion in the sample countries, the study also examines the individual characteristics that determine financial inclusion and identifies the barriers individuals face in their quest to become financially included. The author further proposes and tests a threshold model following Balke and Fomby (1997) by determining a minimum political stability threshold value necessary to trigger and promote financial inclusion in the MENA region. The results indicate that political instability is positively associated with lower degrees of financial inclusion indicators, formal accounts, formal savings, and formal credit. Lack of efficient mechanisms to determine interest rates is also found to impede the development of the financial sector. Finally, historical antecedents in land tenure systems (Kuran, 2008) that effectively deny legal ownership rights to property owners has affected the level of engagement in access to finance, where banks require documentary proof of legal ownership of properties as collateral.

The paper is organised as follows. Section 2 reviews the related literature. Section 3 provides the details regarding the data, variables and method used. Section 4 reports the results. Section 5 discusses the results and the robustness test. Section 6 concludes the paper.

2.2 Literature review

2.2.1 Effects of political instability on financial development

Political instability refers to the incidence of political violence in society, such as demonstrations, assassinations, and acts of terrorism and anti-government activities. Alesina, Özler, Roubini, and Swagel (1996) define political instability as the propensity for a change in executive power through constitutional or unconstitutional means. They contend that political instability results in lower economic growth. However, Easterly (2007) finds that low economic growth could also lead to political instability. In other words, both political instability and lower economic growth, measured by inequality and other indicators could have reverse causality (Engerman & Sokoloff, 2002; Roe & Siegel, 2011).

In his theory of institutional sclerosis, Olson (2008) argues that political stability offers opportunities for special interest groups or institutions to become corrupt over time, as they tend to practise rent seeking. This slows the ability of governments to reform as they feed on the wealth of society and fail to adapt to competitive markets. Resistance to change can lead to instability, as people become impatient for political and institutional change. In a stable environment, governments build relationships with banks by financing and funding them. This leads to less risk taking and eventually less stability in the banking system when these governments become unstable (Jou, Chen, & Tsai, 2017).

A number of empirical studies focus on political instability and its relationship with economic growth and development. To demonstrate how political capital influences the impact of bank lending on innovation in different political environments, Cumming, Rui, and Wu (2016) study the impact of the interaction between political instability and loans on innovation investment and find that political instability negatively affects the role of loan capital on innovation investment. Nel (2003) studies income inequality, economic growth, and political instability in Sub-Saharan Africa. He reports that political instability may indirectly lower growth prospects because although high levels of inequality do not necessarily determine political instability, the overall perception of inequality has a negative effect on potential investors. Roe and Siegel (2011) find that political instability leads to weak and lower financial development. Alesina et al. (1996) look at political instability and economic growth globally. They find significant low economic growth in countries that exhibit a high propensity for government collapse. They add that with some caveats, lower economic growth is likely to endanger a government and result in a *coup d'etat*. Using a four-equation model to investigate the effects of political instability on savings in Sub-Saharan Africa, Gyimah Brempong and Traynor (1996) find that political instability has a detrimental impact on the savings rate both directly and indirectly through a reduction in investment and growth. Easterly and Levine (1997) increase the number of economic growth variables in their study of Africa's tragic growth failure. They conclude that low growth and low income is associated with low schooling, political instability, underdeveloped financial systems, distorted foreign exchange markets, high government deficits, and inadequate infrastructure. They contend that ethnic diversity explains cross-country differences in public policy and political stability.

This lends support to notions that interest group polarisation leads to rent seeking behaviour and reduces the consensus for public goods, limiting long-run growth. Allen et al. (2016) identify country characteristics that positively influence financial inclusion, such as high-quality institutions, efficient legal rules, strong contract enforcement, and political stability.

2.2.2 Degrees of financial inclusion

Account ownership is a key measure of financial inclusion because essentially all formal financial activities begin with account ownership (Demirgüç-Kunt et al., 2015). The number of adults who own formal accounts increases annually. Reports from the Global Findex database (2014) indicate that the number of individuals who own accounts in formal financial institutions has increased at least 10% from 2011 to 2014. Figure 1 reports the percentage of individuals who own accounts, savings, or who have reported borrowing money from a formal financial institution.

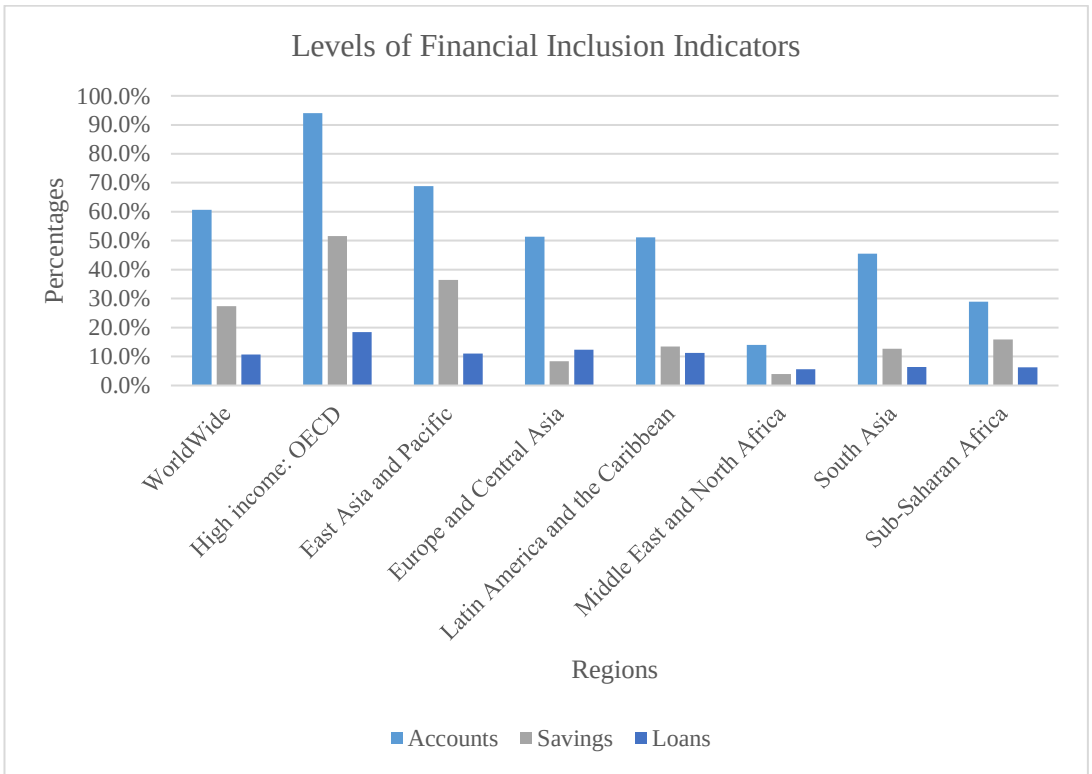


Figure 2.1 Degrees of Financial Inclusion Indicators in the World: The Global Findex 2017

From Figure 2.1, it is clear that the MENA region lags behind the rest of the world in terms of access to account ownership, savings and credit. Mohieldin, Iqbal, Rostom, and Fu (2011) report that about 700 million of the world's poor live in predominantly Muslim-populated countries.

Barriers to financial services can be voluntary or involuntary. Voluntary barriers to the use of formal financial services are usually characterised by cultural and religious reasons or in circumstances when individuals do not need the services (Allen et al., 2016; Demirgüç-Kunt et al., 2008; Demirgüç-Kunt et al., 2015). The cultural and religious settings in the MENA region are intertwined with politics and the economy being controlled by the state, leaving little room for private intervention (Dalacoura, 2012). With respect to involuntary barriers or exclusion, problems arise because of high risks involving female discrimination, documentation issues, lack of information, weak contract enforcement, product features, and price barriers due to market imperfections.

Despite the economic growth and increase in the per capita household income in MENA, the 2011 "Arab Spring" events reveal that good economic growth had not translated into shared prosperity and better livelihoods for the majority. Expanding access to financial services could mobilise greater household savings and enable more people to invest in themselves and their families (Triki & Faye, 2013).

2.3 Development of Hypothesis

The literature points out that political instability, insufficient education, poverty, and high costs of financial services contribute to lower growth prospects in countries that have a high propensity for regime collapse. It reveals that instability negatively correlates with investments and subsequently lower savings rates.

Overall, political instability affects financial development. Demirgüç-Kunt et al. (2015) indicate that the MENA region has lower levels of financial inclusion indicators i.e., formal account ownership, formal savings accounts, and formal credit accounts.

To the best of the author's knowledge, no studies that link political instability and financial inclusion in the MENA region have been undertaken. Some studies examine political instability, financial development and economic growth (Alesina et al., 1996; Roe & Siegel, 2011) using different data, and are not specifically focussed on the MENA region. The use of recent Global Findex data to explore how political instability in MENA affects the degrees of financial inclusion has only started to gain momentum. From the literature the author derives the following: as increases in perception on the propensity for a change in executive power rises, the confidence citizens have in the executive reduces. Moreover, if this perception persists, people may take to the streets in mass protest and may use radical approaches such as violence and suicide bombings to express their displeasure with the executive power. In such situations, the economic means of the people become uncertain as property rights and individual liberties are less likely to be protected. Consequently, investments in the financial sector are curtailed as less people have access to financial services.

Exploring the relationship between political instability and financial inclusion is therefore important so as to understand the effects that are associated with political instability in a region that is reported to have rising levels of poverty and youth unemployment. The first hypothesis is

H_1*:* Political instability negatively affects financial inclusion.

The issue of low financial inclusion is further explored by examining individual characteristics that affect people's ability to be financially included. This deepens understandings of financial inclusion by empirically testing the perceived reported barriers to financial inclusion by the World Bank. For example, Demirgüç-Kunt et al. (2015) reports that 59% of people who do not have accounts in formal financial institutions cite a lack of money as the main reason. Other reasons that limit accounts ownership include the cost of financial services (Beck, Demirgüç-Kunt, & Martinez Peria, 2008), mistrust of financial institutions (Karlan, Ratan, & Zinman, 2014) and failure to possess necessary documentation such as identification cards, wage slips, birth certificates and utility bills (Demirgüç-Kunt et al., 2015). For the Muslim variable, Demirguc-Kunt, Klapper, and Randall (2014) study 64 economies by analysing the impact of being a Muslim and the uptake of an account. They find that being a Muslim negatively affects account ownership significantly. The Global Findex database captures all these variables as determinants of financial inclusion.

The general understanding is that these barriers to financial inclusion are widespread because of the economic and political situation in the region. The author argues that the perceived barriers are a consequence of political instability that creates lower economic growth prospects which invariably underpins the economic and social variables that determine financial inclusion. This leads to individuals' inability to pay for financial services because of the high costs and poverty. It may also lead to inadequate possession of the necessary documents for opening new accounts and accessing bank credit because of a general lack of political will towards institutional independence to reverse the arbitrary taxation and outright expropriation of properties (land ownership) that threatened peoples' livelihood.

Finally, people will not trust financial institutions because property and legal rights do not function well and as such, principal-agency problems are likely to remain unresolved. Accordingly, the second hypothesis is:

H_2: Individual levels barriers can lead to lower levels of financial inclusion

2.4 Data and Method

2.4.1 Data

The author obtained data for this study from the Global Findex database, which has data for 2011, 2014, and 2017 drawn from surveys conducted by the World Bank through Gallup Inc. The surveys cover more than 150,000 respondents from more than 143 countries and 140 languages, thus providing a randomly selected and nationally representative sample of at least 1000 individuals in each economy. The data contains cross-sectional information, which allows for all income levels in both developed and developing economies to participate. Respondents are adults, aged 15 years and above who shared their individual level experiences of banking and personal financial behaviours. These include variables covering demographic data (age, gender, income, and education), account penetration (accounts, savings and credit) and barriers to financial inclusion. In total, 33,284 individuals from 41 countries[3], provide data that is included in the observations. However, the author acknowledges that the sample is unbalanced with missing data for eight countries[4].

[3] The sample includes the following 26 countries from the MENA Region: Afghanistan, Algeria, Bahrain, Chad, Comoros, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, Turkey, United Arab Emirates, West Bank and Gaza, and Yemen.
In addition 15 countries from the Organisation of Islamic cooperation (OIC) were included: Benin, Burkina Faso, Cameroon, Cote D'ivoire, Gabon, Guinea, Mali, Mauritania, Mozambique, Niger, Nigeria, Senegal, Sierra Leone, Togo, and Uganda.

[4] The missing data is as follows: 2011 missing data for Libya; 2014 missing data for Comoros, Djibouti, Libya, Morocco, Oman, Qatar and Syria; 2017 missing data for Comoros, Djibouti, Oman, Qatar, Somalia, Sudan, Syria and Yemen.

Following the proxies for financial inclusion established in the literature, the author focuses on three main measures.

(i) Formal account measures whether an individual has an account either at a formal financial institution (bank, MFI, credit union) or through a mobile money provider.

(ii) Formal saving denotes that the individual saved money using an account at a formal financial institution in the past 12 months.

(iii)Formal credit refers to the individual having borrowed money from a formal financial institution in the past 12 months.

The higher the number of individuals who responded "yes" to the questionnaire, the higher the degree of financial inclusion in a given economy. In addition, the Gallup Inc. survey gathered data on the reasons why individuals did not have a formal bank account. Specifically, their question sought to explore the barriers to financial inclusion[5] by asking: *"Please tell me whether each of the following is a reason why you, personally, DO NOT have an account at a bank, credit union or other financial institution".*

To estimate the political instability variable, the author obtained data from the Worldwide Governance Indicators (WGI) (Kaufmann, Kraay, & Mastruzzi, 2011). The WGI summarises the views of respondents such as enterprises, citizens and experts in industrial and developing countries. The WGI posits political stability and the absence of violence and terrorism as a variable that measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. The author included this variable to determine whether the

[5] More information can be obtained from the Global Findex Database at http://www.worldbank.org/globalfindex

lower degrees of financial inclusion in the MENA region is partly emanating from its political climate.

2.4.2 Method

2.4.2.1 Econometric Model

In order to evaluate and analyse the relationship between political instability and financial inclusion in MENA, the author performs probit estimations with sample selection following Van de Ven and Van Praag (1981). The assumption that a relationship exists between political instability and financial inclusion is given by the equation:

$$y^*_{1ij} = X_{1ij}\beta + Z_{1ij}\delta + \mu_{1ij} \quad (2.1)$$

where y^*_{1ij} is a vector of the outcome variable defined as whether the individual is financially included or not, that is assumed to be latent, *i* and *j* denotes individual and country respectively, β and δ are vectors of coefficients, X_1 is a matrix of covariates indexing country level variables, Z_1 is a vector of individual level characteristics, with μ_1 as the error term. The financial inclusion variable therefore assumes a binary function such that:

$$y_{1ij} = \alpha = (y^*_{1ij} > 0) \quad (2.2)$$

where α is an indicator variable of whether the specific condition is met, so that

$$\alpha = 1 \text{ if } y^*_{1ij} > 0$$
$$0 \text{ if } y^*_{1ij} \leq 0 \quad (2.3)$$

For observations that depend on y^*_{1ij}, running a selection model gives us

$$y^*_{2ij} = (X_{2ij}\beta + Z_{2ij}\delta + \mu_{2ij} > 0) \quad (2.4)$$

where $\mu_{1ij} \sim N(0, 1)$

$\mu_{2ij} \sim N(0, 1)$

If μ_{1ij} and μ_{2ij} are correlated, i.e. Corr ($\mu_{1ij, \mu_{2ij}}$) $\neq$ 0, then the presence of y_{1ij}depends on structural factors, which affect the outcome variable y^*_{1ij}. X_{2ij} and Z_{21j} are vectors that affect the selection process. The probability of an outcome is assumed to be determined by the probit cumulative distribution function.

2.4.2.2 Empirical Specification

The probit estimation for determining the relationship between political instability and degree of financial inclusion is specified as follows:

$$FI_{ij} = \alpha + \beta * \ Pinstability_j + Islam_j + \theta * Female_{ij} + \delta_{1ij} * Age_{ij} + \delta_{1ij} * Age_{ij}^2 + \sum_{i=1}^{n=5} Income_{ij} + \sum_{i=1}^{n=3} Education_{ij} \ + \varepsilon_{ij} \quad (2.5)$$

where FI_{ij} is the financial inclusion variable for individuals *i* in a country *j*. The FI_{ij} measures three proxies, which includes *Formal Account, Formal Savings* and *Formal Credit*, which takes the value 1 if a respondent has either an account in a formal financial institution, saved in a formal financial institution in the past 12 months, and/or borrowed from a formal financial institution in the past 12 months, respectively or 0 otherwise. $Pinstability_j$ is the political instability variable in a country *j*. The $Pinstability_j$ variable measures public perceptions of the likelihood of an unstable government caused by politically motivated violence, including terrorism. The WGI measure for political stability and absence of violence and terrorism ranges from +2.5, as being a politically stable country to -2.5 as being politically unstable. $Islam_j$ is the socio-religious and cultural variable that defines a country to be Islam if at least 50% of the population are Muslims.

The individual characteristics are as follows; $Female_{ij}$ is a dummy variable equal to 1 if the individual is a female and 0 otherwise. Age_{ij} has two measures, one with the number of years (Age) and the other is age squared(Age_{ij}^{2}). The latter measure is used to control for a possible nonlinear relation between age and financial inclusion in line with other studies (Allen et al., 2016; Demirgüç-Kunt et al., 2015). In relation to $Income_{ij}$, the author uses four dummy variables (poorest 20%, second 20%, third 20% and fourth 20%). The fifth is the omitted dummy variable and represents the richest quintile. The four dummy variables take the value 1 if individuals report their income in the first 20% income quintile, second 20% income quintile and so on or 0 otherwise. Concerning $Education_{ij}$, the author uses two dummy variables: Primary and Secondary education, with Tertiary education as the omitted variable. The choice of the education variable is in line with political stability theory that states that where citizens are highly educated, they are less likely to engage in protests, coup d'état or extreme anti-government activities (Hibbs, 1973). The tertiary educated group represents the elite in society, who have investments and economic means which they will want to protect rather than engage in anti-government activities. Table 2.1 sets out the variables used in the study and their descriptions.

The author postulates that political instability outcomes such as income inequality, lack of investments in the economy to create wealth, employment, and smooth consumption could affect individual characteristics of the financially excluded. Individuals who report idiosyncratic reasons as barriers to financial inclusion may do so because of the political environment that affects them directly or indirectly. In other words, reported barriers leading to financial exclusion is a function of instability within national governance, broad economic indicators, and socio-

cultural variables. The author estimates the barriers reported by respondents in accessing financial products and services as follows:

$$Barriers_{ij} = \alpha_{ij} + \beta_{ij} * Female_{ij} + \varphi_{1ij} * Age_{ij} + \varphi_{2ij} * Age_{ij}^{2} + \emptyset_{ij} * \sum_{i=1}^{n=5} Income_{ij} + \theta_{ij} * \sum_{i=1}^{n=3} Education_{ij} + \varepsilon_{ij} \quad (2.6)$$

where $Barriers_{ij}$ represents the barriers as reported by individuals *i*, in a country *j*, and α, β, φ , $\emptyset$ and θ are vectors of coefficients to be estimated. $Female_{ij}$,Age_{ij}, $Income_{ij}$ and $Education_{ij}$ are a set of individual level characteristics as explained in (5). ε_{ikj} indexes the error term.

Table 2.1 Description of variables and sources

Variable	Description	Sources
Main indicators of financial inclusion		
Formal account	Dummy equal to 1 if the respondent has an account at a bank, credit union, cooperative, or microfinance institution, 0 otherwise	G.Findex
Formal savings	Dummy equal to 1 if the respondent has saved or set aside money in the past 12 months using an account at a bank, credit union, cooperative, or microfinance institution, 0 otherwise	G.Findex
Formal credit	Dummy equal to 1 if the respondent has borrowed money in the past 12 months from a bank, credit union, cooperative, or microfinance institution, 0 otherwise	G.Findex
Individual level variables		
Female	Dummy that takes the value 1 if the respondent is female and 0 otherwise.	G.Findex
Age and age squared	Age in years, squared	G.Findex
Income: poorest 20%	Dummy that takes the value 1 if the respondent falls in the lowest income quintile and 0 otherwise.	G.Findex
Income: second 20%	Dummy that takes the value 1 if the respondent falls in the second lowest income quintile and 0 otherwise.	G.Findex
Income: Third 20%	Dummy that takes the value 1 if the respondent falls in the middle-income quintile and 0 otherwise.	G.Findex
Income: fourth 20%	Dummy that takes the value 1 if the respondent falls in the second highest income quintile and 0 otherwise.	G.Findex
Income – richest 20%	Dummy that takes the value 1 if the respondent falls in the highest income quintile and 0 otherwise.	G.Findex
Primary education	Dummy variable equal to 1 if the respondent has completed primary school or less, 0 otherwise	G.Findex
Secondary education	Dummy variable equal to 1 if the respondent has completed secondary education, 0 otherwise	G.Findex
Tertiary education	Dummy variable equal to1 if the respondent has completed tertiary education or more, 0 otherwise	G.Findex
*Reported barriers to financial inclusion (*reasons why a respondent does not have an account at a bank, credit union, or other financial institution.)		
Too far away	Dummy equal to 1 if the respondent answered yes to “They are too far away”, 0 otherwise	G.Findex
Too expensive	Dummy equal to 1 if the respondent answered yes to “They are too expensive”, 0 otherwise	G.Findex
Lack of documents	Dummy equal to 1 if the respondent answered yes to “You don’t have the necessary documentation (ID, wage slip)”, 0 otherwise	G.Findex
Lack of trust	Dummy equal to 1 if the respondent answered yes to “You don’t trust them”, 0 otherwise	G.Findex
Lack of money	Dummy equal to 1 if the respondent answered yes to “You don’t have enough money to use them”, 0 otherwise	G.Findex
Religious reasons	Dummy equal to 1 if the respondent answered yes to “religious reasons”, 0 otherwise	G.Findex
Family member has an account	Dummy equal to 1 if the respondent answered yes to “A family member has an account”, 0 otherwise	G.Findex

Country level variables		
Political instability	Political instability index measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism (range from -2.5 weak, to 2.5 strong).	WGI
Islam	Dummy equal to 1 if the population of Moslems in a country is 50% and more, 0 otherwise	Pew Centre
GPD pc growth	GDP per capita growth in a country.	World Bank
Religious tensions	A measure arising from the domination of society and/or governance by a single religious group in a way that replaces civil law with religious law.	PRS/ICRG
Unemployment	Total number of people who are unemployed as a percentage of the total labour force (modelled with the ILO estimate).	WDI
Corruption	Corruption index measures perceptions of the extent to which people and governments use public institutions for private gain (range from -2.5 weak, to 2.5 strong).	WGI
Rule of law	The rule of law index measures how society has confidence in the judicial system to enforce contracts and property rights (range from -2.5 weak, to 2.5 strong).	WGI
Gini index	Gini coefficient measures the quality of income distribution (range from 0 to 100, where 0 means equal distribution and 100 is unequal distribution or inequality).	HDI
Oil reliance	Measured by the value of fuel-based exports divided by GDP.	World Bank
Agriculture	Measured as the share of total agricultural production as a percentage of GDP.	World Bank

2.5 Results

2.5.1 Global account ownership

An analysis of the trend in global formal account ownership using data from the Global Findex 2011, 2014 and 2017 indicates that growth in account ownership increased by 7% between 2014 and 2017, compared to 11% between 2011 and 2014. Account ownership 51% (2011) increased to 62% (2014) and reached 69% (92017)[6]. Demirguc-Kunt et al. (2018) argue that account owners use banks, microfinance institutions, or other types of regulated financial institutions. However, the introduction of mobile money in Sub Saharan Africa (SSA) has added a new dimension of formal account ownership.

More adults in high-income economies (94%) hold accounts than adults in developing economies (63%). The 2017 Findex data shows a wide gap between males and females in account ownership. Globally, 72% of men have accounts whilst only 65% of women have accounts. This inequality in account ownership also exists among the rich and the poor. For instance, the richest 60% of households hold 74% of the accounts while among the poorest 40% of households, only 61% do. Demirguc-Kunt et al. (2018) argue that this difference also exists in developing economies, and that neither gap has changed meaningfully since 2014.

Among all regions of the world, MENA has consistently recorded lower numbers of account ownership and other auxiliary financial services (CGAP, 2017). In the MENA region, 52% of men have accounts compared to only 35% of women. This is the largest gender gap of any region. At the same time, approximately 20 million unbanked adults in the region send or receive domestic remittances using cash or

[6] The comparison shows that about 700 million new accounts were opened between 2011 and 2014, decreasing the unbanked population by 20% while 515 million adults opened accounts between 2014 and 2017.

an over-the-counter service, of which 7 million unbanked adults are in the Arab Republic of Egypt (Demirguc-Kunt et al., 2018).

The summary statistics (Table 2.2) shows that about 39% of the sample countries own bank accounts in formal financial institutions. Of these, 50% report they have saved with an account and 41% report they have borrowed.

Table 2.2 Summary statistics for all variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Main indicators of financial inclusion					
Formal account	33,284	0.389686	0.487686	0	1
Formal savings	33,214	0.506255	0.499968	0	1
Formal borrowing	33,087	0.41223	0.492243	0	1
Individual level variables					
Female	33,284	0.532135	0.498973	0	1
Age	33,165	35.33699	15.03273	15	99
age2	33,165	1474.68	1299.206	225	9801
Income – poorest 20%	33,284	0.169998	0.375636	0	1
Income – second 20%	33,284	0.176885	0.381577	0	1
Income – third 20%	33,284	0.188319	0.390972	0	1
Income – fourth 20%	33,284	0.208819	0.40647	0	1
Income – richest 20%	33,284	0.255979	0.436416	0	1
Primary education	41,284	0.439994	0.496393	0	1
Secondary education	33,284	0.432138	0.49538	0	1
Tertiary education	33,284	0.127869	0.333948	0	1
Barriers to financial inclusion					
Too far away	28,950	0.229089	0.420255	0	1
Too expensive	28,950	0.295764	0.456395	0	1
Lack of documentation	28,950	0.223626	0.416683	0	1
Lack of trust	28,950	0.161079	0.367612	0	1
Lack of money	28,950	0.212117	0.408816	0	1
Religious reasons	28,950	0.619214	0.48559	0	1
Family member has an account	28,950	0.150821	0.357882	0	1
Country level Variables					
Political instability	41	-0.91332	0.95783	-2.76	1
Islam	41	0.784563	0.411131	0	1

Female respondents make up 53% of the sample. The average age of respondents is 35 years. The poorest respondents in the sample countries is 17% (first 20% quintile), and the richest make up 25% (fifth quintile). The mean of the $Pinstability_j$ variable in the sample countries that are politically unstable is 91%, with other unstable countries such as Syria (-2.76) reporting above the threshold of -2.5. A Muslim majority (78%) exists in the population of the sample countries.

2.5.2 Test of financial inclusion in oil and non-oil countries in MENA

Table 2.3 presents the results of the probit estimations in oil producing countries in MENA for the main indicators of financial inclusion. *Formal account, formal savings and formal credit* are the dependent variables.

Table 2.3 Financial inclusion indicators as predicted by political instability and individual characteristics in oil producing countries in MENA

	(1)	(2)	(3)
Variables	Formal Account	Formal Savings	Formal Credit
Country fixed effects	yes	yes	yes
Pinstability	-0.081***	-0.102**	-0.114**
	(0.024)	(0.022)	(0.041)
Islam	-0.201**	-0.079***	-0.101***
	(0.041)	(0.112)	(0.057)
Female	-0.035***	-0.013**	-0.043**
	(0.002)	(0.001)	(0.003)
Age	0.014***	0.012***	-0.014***
	(0.000)	(0.013)	(0.011)
Age2	-0.000***	-0.000***	-0.000***
	(0.011)	(0.224)	(0.210)
Income – poorest 20%	-0.121***	-0.130***	-0.044***
	(0.002)	(0.006)	(0.004)
Income – second 20%	-0.140***	-0.098***	0.015***
	(0.003)	(0.006)	(0.004)
Income – third 20%	-0.122***	-0.042***	-0.013***
	(0.005)	(0.004)	(0.002)
Income – fourth 20%	-0.100***	-0.030***	-0.014***
	(0.004)	(0.002)	(0.014)
Primary education	-0.221***	-0.084***	-0.040***
	(0.005)	(0.005)	(0.006)
Secondary education	-0.134***	-0.112***	-0.012***
	(0.005)	(0.024)	(0.005)

This table presents the probit estimations of the indicators of financial inclusion, political instability, Islam and a set of individual characteristics. *Formal account, formal savings* and *formal credit* are

the dependent variables. Two omitted variables are the richest 20% and tertiary education. The marginal effects and standard errors are shown in parentheses. * Significance at the 10% level, ** Significance at the 5% level and ***Significance at the 1% level.

Table 2.4 Financial inclusion indicators as predicted by political instability and individual characteristics in non-oil producing countries in MENA

Variables	(1) Formal Account	(2) Formal Savings	(3) Formal Credit
Country fixed effects	yes	yes	yes
Pinstability	-0.042***	-0.084**	-0.102**
	(0.040)	(0.025)	(0.029)
Islam	-0.112**	-0.026***	-0.081***
	(0.031)	(0.021)	(0.022)
Female	-0.041***	-0.051**	-0.054**
	(0.012)	(0.040)	(0.013)
Age	0.013***	0.0100***	-0.016***
	(0.022)	(0.011)	(0.011)
Age2	-0.000***	-0.000***	-0.000***
	(0.000)	(0.020)	(0.010)
Income – poorest 20%	-0.100***	-0.121***	-0.023***
	(0.002)	(0.016)	(0.024)
Income – second 20%	-0.120***	-0.052***	0.013***
	(0.014)	(0.011)	(0.011)
Income – third 20%	-0.091***	-0.044***	-0.012***
	(0.013)	(0.014)	(0.032)
Income – fourth 20%	-0.104***	-0.026***	-0.012***
	(0.029)	(0.102)	(0.011)
Primary education	-0.162***	-0.042***	-0.044***
	(0.004)	(0.004)	(0.032)
Secondary education	-0.104***	-0.122***	-0.011***
	(0.015)	(0.021)	(0.033)

This table presents the probit estimations of the indicators of financial inclusion, political instability, Islam and a set of individual characteristics. Formal account, formal savings and formal credit are the dependent variables. Two omitted variables are the richest 20% and tertiary education. The marginal effects and standard errors are shown in parentheses.
* Significance at the 10% level, ** Significance at the 5% level and ***Significance at the 1% level.

The marginal effects of the estimates as shown in Tables 2.3 and 2.4 indicate that political instability significantly correlates with all indicators of financial inclusion in the MENA oil producing countries. The value of the coefficients show that there is an inverse relationship between political instability and the financial inclusion proxies, where a percentage increase in political instability leads to 0.08%, 0.10% and 0.11% reduction in formal account ownership, savings and credit respectively

for Table 2.3. The author juxtaposes this inverse political instability relationship with MENA countries that do not produce oil[7] and the effect is the same (Table 2.4), with political instability having negative outcomes with all three indicators. An unstable state disrupts all economic indicators including financial inclusion (Alesina et al., 1996; Easterly & Levine, 1997; Roe & Siegel, 2011).

Potentially, the negative coefficients for political instability could be attributed to religious reasons (i.e., the domination of religion at the state level or cultural belief systems that impose restrictions on individuals so that they do not access financial services that do not adhere to the tenets of their religion, Islam). However, these coefficients are persistent with the same signs when the author includes all 41 countries in MENA and OIC countries[8] (Table 2.5), where the Muslim population in some of the countries are less than 15%. The MENA region consists of countries that have low scores in the political stability index rating. Accordingly, the author confirms the first hypothesis (H_1*: Political instability negatively affects financial inclusion*).

2.5.3 Test of financial inclusion in OIC countries

Significant relationships exist between the individual characteristics and the three indicators of financial inclusion. The probability of having a formal account or savings and credit significantly reduces for females. A nonlinear relation exists for the Age variable, and all adults are more likely to have accounts and savings in financial institutions than to borrow. Significantly, all the sample countries report low numbers of individuals accessing loan products from formal financial

[7] The author considers countries to be non-oil producing if the per capita oil production in a country is less than 5000 people.
[8] A separate regression without Islam as a variable still supports the study's stance. This result is available upon request.

institutions except Bahrain, Kuwait, Turkey and the UAE. The study finds significant coefficients for all income quintiles in the estimation, indicating that greater income is associated with higher levels of financial inclusion. Using the fifth richest income quintile as a base, the author observes in reducing order negative relations with all indicators of financial inclusion. For the education variables, the author observes negative coefficients for formal account, formal savings and formal credit. The omitted variable is tertiary education.

Within the sample of 41 OIC countries, the author's estimation indicates that political instability is likely to affect the ownership of bank accounts, savings and credit after controlling for country fixed effects. This result supports Allen et al. (2016) who find that countries that are politically stable are likely to hold higher degrees of financial inclusion.

Table 2.5 Financial inclusion indicators as predicted by political instability and individual characteristics in Selected 41 OIC countries

Variables	(1) Formal Account	(2) Formal Savings	(3) Formal Credit
Country fixed effects	yes	yes	yes
Pinstability	-0.102***	-0.095**	-0.111**
	(0.059)	(0.080)	(0.044)
Islam	-0.170***	-0.124***	-0.182***
	(0.620)	(0.022)	(0.064)
Female	-0.183***	-0.021***	-0.088***
	(0.048)	(0.011)	(0.017)
Age	0.022***	0.042***	-0.034***
	(0.012)	(0.051)	(0.040)
Age2	-0.000***	-0.000***	-0.000***
	(0.031)	(0.0022)	(0.091)
Income – poorest 20%	-0.201***	-0.134***	-0.145***
	(0.014)	(0.015)	(0.206)
Income – second 20%	-0.182***	-0.115***	0.056***
	(0.006)	(0.019)	(0.002)
Income – third 20%	-0.120***	-0.101***	-0.114***
	(0.015)	(0.028)	(0.031)
Income – fourth 20%	-0.104***	-0.080***	-0.045***
	(0.016)	(0.015)	(0.108)
Primary education	-0.207***	-0.212***	-0.411***

	(0.107)	(0.012)	(0.005)
Secondary education	-0.122***	-0.181***	-0.034***
	(0.003)	(0.004)	(0.022)

This table presents the probit estimations of the indicators of financial inclusion, political instability, Islam and a set of individual characteristics. Formal account, formal savings and formal credit are the dependent variables. The marginal effects and standard errors are shown in parentheses.
* Significance at the 10% level, ** Significance at the 5% level and ***Significance at the 1% level.

2.5.4 Barriers to financial inclusion in MENA and OIC countries

To examine the characteristics that are attributable to financial exclusion, the author tests how individual characteristics impact on peoples' access to financial services. Barriers to financial services can be voluntary or involuntary. For involuntary barriers, problems arise because of high costs of financial services, lack of information, product features, and female discrimination. Voluntary barriers are self-exclusion from the use of formal financial services, usually characterised by cultural and religious reasons (Demirguc-Kunt et al., 2014). Table 2.6 reports the results of the estimations.

The reported barriers are the dependent variables in their negative form. Females are likely to report *costs*, *lack of money*, *lack of necessary documents*, *lack of trust of financial institutions and distance to financial institutions* as barriers to financial inclusion in most of the sample countries. However, in situations where a *family member has an account in a financial institution*, females see this as an incentive to own accounts. Females therefore can be considered as self-excluding in the ownership of formal accounts and in the use of financial services, as the reasons given for the exclusion are idiosyncratic in nature.

Barriers to inclusion are more likely to occur among the following: low income individuals where asset holdings are low, individuals who are *too far away* from the location of access, and individuals who cannot afford bank fixed charges (*too expensive*) or who are unable to comply with *documentary requirements*. Contrary

to the results from female respondents, low-income individuals report that having a *family member who owns an account* may render it unnecessary for those individuals to have their own accounts (which is self-imposed exclusion). Further, low-income individuals who report the *costs (too expensive)* of having a bank account as a barrier, may benefit indirectly from family members' access to bank accounts. Access is then shared, and an account may not appear to be necessary.

Primary and secondary school education are negatively associated with almost all barriers to financial inclusion. Yet, in instances where a *family member has an account*, this factor appears to serve as a motivation for not having an account. Income and education play important roles in financial inclusion. Demirgüç-Kunt et al. (2015) report that 59% of adults who do not have accounts cite lack of money as the key reason.

In Table 2.7, the study reports the barriers at the national level. In all our sample countries, the major barrier reported is a lack of necessary *documentation* to facilitate the process of accessing credit with a financial institution. The result is in line with the underdeveloped property and land tenure system (Kuran, 2008; Ziadeh, 1993), where entrepreneurs are without legal entitlements that are required by formal banks as proof for collateral requirements. The result is also in line with the evidence given by CGAP (2017) which reports that 92 million borrowers (mostly women, low-income people, and youth) do so from the informal sector. Because of the high informal sector participation in the economy, there are difficulties associated with proper accounting of cash flows which are necessary for formal banks' borrowing.

Another reason could be traced to the worldwide fight against money laundering, and terrorism, where the "know-your-customer" (KYC) requirement for financial institutions has been tightened. Further, where individuals report that a *family member has an account* in a financial institution, having their own account does not appear necessary. These findings are important because the region has the lowest levels of financial inclusion indicators in the world. The author confirms the second hypothesis (H_2*: Individual levels barriers can lead to lower levels of financial inclusion).*

Table 2.6 Reported barriers to financial inclusion for 26 MENA countries

Variables	(1) Too far away	(2) Too expensive	(3) Lack of necessary documents	(4) Lack of trust	(5) Lack of money	(6) Religious reasons	(7) Family member has an account
Country fixed effects	yes	yes	yes	yes	yes	yes	yes
Female	0.003***	0.007***	0.044***	0.008	0.002***	0.053***	-0.042***
	(0.004)	(0.022)	(0.001)	(0.007)	(0.011)	(0.010)	(0.001)
Age	-0.001	0.000	0.001	0.210	-0.220	-0.000	0.001*
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age2	1.050***	0.054**	1.022***	1.041	-0.320	-0.021***	0.030
	(0.068)	(0.020)	(0.400)	(0.020)	(0.201)	(0.082)	(0.050)
Income – poorest 20%	0.021**	0.080***	0.023***	-0.081**	0.090***	-0.043**	0.017***
	(0.009)	(0.004)	(0.006)	(0.035)	(0.001)	(0.018)	(0.021)
Income – second 20%	0.018**	-0.045**	0.016***	-0.043	0.056***	-0.020*	0.041*
	(0.012)	(0.031)	(0.021)	(0.022)	(0.011)	(0.014)	(0.006)
Income – third 20%	0.031	-0.033	-0.014	-0.041***	-0.024***	0.051**	-0.031
	(0.006)	(0.036)	(0.004)	(0.018)	(0.018)	(0.008)	(0.054)
Income – fourth 20%	0.034	-0.025	-0.011**	-0.005	-0.007**	-0.044**	-0.017**
	(0.025)	(0.042)	(0.023)	(0.034)	(0.010)	(0.021)	(0.023)
Primary education	-0.027*	0.039**	0.012***	-0.023***	0.018***	0.050	0.042***
	(0.016)	(0.060)	(0.003)	(0.042)	(0.015)	(0.009)	(0.008)
Secondary education	0.023***	0.012*	0.0211***	-0.064**	-0.016**	0.025	-0.105***
	(0.004)	(0.020)	(0.018)	(0.073)	(0.015)	(0.031)	(0.024)
Observations	24,133	24,133	24,133	24,133	24,133	24,133	24,111

This table presents the probit estimations of the determinants of barriers to financial inclusion in the MENA region. The barriers, presented at the top of each column, are the dependent variables expressed in their negative form. The number of observations reflects individual respondents who do not have accounts. The author reports the marginal effects with standard errors in parentheses. *Significance at the 10% level, **Significance at the 5% level and ***Significance at the 1% level.

Table 2.7 Country level determinants of barriers to financial inclusion for 41 selected OIC countries

Variables	(1) Too far away	(2) Too expensive	(3) Lack of necessary documents	(4) Lack of trust	(5) Lack of money	(6) Religious reasons	(7) Family member has an account
Country fixed effects	yes	yes	yes	yes	yes	yes	yes
Female	0.025***	0.022***	0.018***	0.040***	0.002***	0.022***	-0.090***
	(0.008)	(0.016)	(0.008)	(0.002)	(0.003)	(0.004)	(0.010)
Age	-0.002	0.001***	-0.002***	0.001**	0.410***	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.0001)	(0.001)	(0.001)	(0.001)
Age2	0.064	-0.083***	0.220***	-0.300**	0.240	-0.080*	0.062**
	(0.040)	(0.090)	(0.430)	(0.082)	(0.067)	(0.063)	(0.050)
Income – poorest 20%	0.050***	0.021**	0.020***	0.003**	0.008***	0.012***	0.008
	(0.004)	(0.006)	(0.006)	(0.004)	(0.006)	(0.005)	(0.000)
Income – second 20%	0.031**	0.014*	0.018***	-0.004	0.007**	0.028***	0.240
	(0.029)	(0.017)	(0.008)	(0.008)	(0.003)	(0.006)	(0.003)
Income – third 20%	0.026***	-0.012	0.018***	0.010	-0.006**	0.031***	0.008*
	(0.061)	(0.005)	(0.006)	(0.005)	(0.005)	(0.008)	(0.006)
Income – fourth 20%	0.018**	-0.014**	-0.012***	-0.007	-0.012**	0.045***	0.048
	(0.005)	(0.004)	(0.012)	(0.016)	(0.004)	(0.007)	(0.003)
Primary education	0.180***	0.082***	0.054***	0.023)**	0.007***	0.033***	-0.061***
	(0.040)	(0.011)	(0.020)	(0.010)	(0.012)	(0.021)	(0.020)
Secondary education	0.062***	0.020*	0.012**	-0.016	0.009**	-0.009	-0.006***
	(0.008)	(0.008)	(0.010)	(0.000)	(0.023)	(0.016)	(0.011)
Observations	28,950	28,950	28,950	28,950	28,950	28,950	28,950

This table presents the probit estimations of the determinants of barriers to financial inclusion in the MENA region. The barriers, presented at the top of each column, are the dependent variables expressed in their negative form. The number of observations reflects individual respondents who do not have accounts. The author reports the marginal effects with standard errors in parentheses. *Significance at the 10% level, **Significance at the 5% level and ***Significance at the 1% level.

2.6 Robustness checks

2.6.1 The issue of endogeneity

Endogenous problems are a major concern in empirical testing, especially when researchers use coetaneous dependent and independent variables. The author posits that endogeneity bias could be present in this study's estimations. Lower financial inclusion outcomes, which lead to poverty and marginalisation, could influence the propensity for political instability and financial exclusion. Engerman and Sokoloff (2002) contend that severe economic inequality can trigger political instability, which in turn can weaken financial development. In their studies of economic shocks and civil conflict, using an instrumental variable approach in SSA, Miguel, Satyanath, and Sergenti (2004) acknowledge the growing number of studies that highlight the association between economic conditions and civil conflict without adequately addressing the endogeneity of economic variables to civil war. Consequently, those studies fail to convincingly establish a causal relationship. Further Miguel et al. (2004) ague that omitted variables may drive both economic outcomes and conflict, and thereby produce misleading cross-country estimates.

The instrumental variables methods use only a portion of the variability in key variables to estimate the relationships of interest. If the instruments are valid, the portion used is unrelated to the omitted variables (Angrist & Krueger, 2001). Instrumental variables estimate using two stage least squares or weighted averages are not unbiased because they involve a ratio of random quantities, for which expectations need not exist nor have they a simple form. Since instrumental variables estimates are consistent, but not unbiased, researchers using

instrumental variables should work with large samples to increase the statistical power of the coefficients (Angrist & Krueger, 2001).

Political theorists also argue that countries with oil exports have a tendency to hinder progress towards democracy. They argue that several factors attest to the oil-impedes-democracy claim. Factors such as a rentier effect, a repression effect, a modernisation effect[9] and geography are responsible for anti-democracy or political instability, especially in the MENA region (Ross, 2001). Similarly, other factors such as corruption, unemployment, religious tensions, and the compulsion to adhere to religious edicts can have effects on stability. Therefore, unobserved variables may have effects on both financial inclusion and political stability, rather than only the variables the author has incorporated in the model.

To model the instrumental variables[10] estimation, the author uses gdppcg, which measures the percentage of GDP per capita growth; the Gini coefficients for each country[11]; and religious tensions, which measures the dominant (state) religion in a country and whether it leads to religious tensions. Unemployment caters for the number of people without employment in a country. Oil reliance captures whether oil money makes governments autocratic because of the use of income from oil exports to increase 'internal security' and to deter dissidence. This is measured by the value of oil-based exports divided by GDP or oil rents as a percentage of a country's GDP. Agriculture measures the share of total agricultural production as

[9] The rentier effect is the use of low taxes by governments to relieve pressure from accountability; the repression effect requires the use of state resources to boost internal security and to deter dissidents. Finally, the modernisation effect holds that growth of the economy based on oil and other minerals fails to boost social and cultural changes needed to produce democratic governance (Ross, 2001).

[10] The author acknowledges the difficulty of identifying and estimating instruments, especially in the matter of financial inclusion indicators. The aim is to show that political instability is consistently associated with lower degrees of financial inclusion outcomes.

[11] Gini coefficient is a measure of the deviation of the distribution of income among individuals or households within a country from an equal distribution, where a value of zero represents absolute equality, and a value of a hundred as absolute inequality.

a percentage of GDP, replacing the geography proxy. The corruption variable measures the perception that public officials use public office for private gains. The gdppc and unemployment variables are interacted to serve as proxies for the Gini coefficient, which is dropped because of missing data.

To effectively minimise and eliminate the endogeneity problem, the author includes lag variables to instruments that will account for the reverse causal correlation between independent causal parameters. In addition, by including all the three streams of the Global Findex data (2011, 2014 and 2017), the author is able, as proposed by Angrist and Krueger (2001), to control for the consistency and biasedness of the instrumental variables in the study. Furthermore, fixed effects are also used to capture time-invariant country characteristics that may be related to political instability and to capture additional variations. These measures have ultimately resolved the endogeneity problem in the study.

The author set up the instruments with the following probit models, where (2.8) is a function of the instrumented instability measure in (2.7):

$$Pinstability_j = \beta_0 + \beta_1 Gdppcg_j + \beta_2 GDP_{unemploy_j} + \beta_3\, oil\ reliance_j + \beta_4 Corruption_j + \beta_5 Unemployment_j + \beta_6 Agriculture_i + \beta_7 Religious\ tentions_j + \beta_8 Lags_j + \mu_i \quad (2.7)$$

The $Pinstability_j$ in a country *j* is determined by gdppcg, oil reliance, agriculture, GDP per capita growth interacted with unemployment, state religious tensions, corruption and lagged variables.

The author uses both probit and two-stage least squares (2SLS) models to demonstrate that the instruments chosen are consistent and robust, and by using

lagged variables, the author mitigates the problem of simultaneity. The results of the IV (instrumented instability variables) in columns (1) to (5) from Table 2.8 are significant. They explain the fact that economic variables can have an effect on the stability of a country.

The coefficients of column (5) of Table 2.8 is used as the instrumented political instability to determine its association with the financial inclusion indicators in equation (2.8). From the results of the instrumented estimation in Table 2.9, the author finds that Pinstability* remains negatively associated with the indicators of financial inclusion. The results are robust.

Table 2.8 Estimation of IV political instability indicator as predicted by country level exogenous variables

$$PI_j = \beta_0 + \beta_1 Gdppcg_j + \beta_2 GDP\_unemploy_j + \beta_3\, oil\ reliance_j + \beta_4 Corruption_j + \beta_5 Unemployment_j + \beta_6 Agriculture_i + \beta_7 Religious\ tentions_j + \beta_8 Lags_j + \mu_i$$

	(1)	(2)	(3)	(4)	(5)
Country fixed effects	yes	yes	yes	yes	yes
Variables	Pinstability	Pinstability	Pinstability	Pinstability	Pinstability
Gdppg	-0.026**	-0.019**			-0.033**
	(0.042)	(0.050)			(0.021)
GDP_unemployment			0.013***	0.004***	-0.002***
			(0.210)	(0.050)	(0.010)
Oil reliance	0.019***	0.005***		0.014***	-0.004***
	(0.002)	(0.010)		(0.002)	(0.001)
corruption	0.088***			0.201***	0.021***
	(0.065)			(0.005)	(0.003)
Unemployment		0.023***	0.030**		0.019***
		(0.043)	(0.050)		(0.022)
Agriculture	-0.240***	-0.180***		-0.210***	-0.320***
	(0.070)	(0.030)		(0.040)	(0.053)
Religious tensions		0.305***		0.270***	0.164**
		(0.022)		(0.060)	(0.092)
Lagged variables					
$gdppg_{t-1}$	-0.017***	-0.033***			-0.021***
	(0.025)	(0.038)			(0.221)
$Gdp\_unemploy_{t-1}$			0.023**	0.041***	0.056***
			(0.190)	(0.045)	(0.012)
$Oil\ reliance_{t-1}$	0.006***	0.018***		0.011***	-0.012***

	(0.000)	(0.025)		(0.032)	(0.020)
Corruption_{t-1}	0.182***			0.112***	0.231***
	(0.009)			(0.052)	(0.041)
$\text{Unemployment}_{t-1}$		0.012***	0.060**		0.011***
		(0.002)	(0.040)		(0.031)
Constant	0.245***	0.194***	-0.091***	0.201***	-0.150***
	(0.022)	(0.015)	(0.008)	(0.014)	(0.054)
R-squared	0.542	0.446	0.610	0.636	0.594

This table presents the linear probability model estimations of the instrumental variables, where Gdppcg, oil reliance or export, corruption, unemployment, agriculture, religious tensions, and the proxy for inequality (gdp_unemployment), determine political instability. The author presents linear probabilities in columns (1) to (4), and column (5) reports the 2SLS. Standard errors are shown in parentheses. * Significance at the 10% level, ** Significance at the 5% level and ***Significance at the 1% level.

2.6.2 Test for an asymmetric relation using a variable interaction modelling approach

According to Woodside (2013, p. 464) "Reality usually includes more than one combination of conditions that lead to high values in an outcome condition; thus, reality usually indicates that any insightful combination of conditions has an asymmetrical relationship with an outcome condition and not a symmetrical relationship". In other words, symmetry refers to necessary and sufficient causes for which a variable causes an outcome, whereas asymmetry refers to causes that are either necessary or sufficient but not both (Clark et al., 2006). This means that political instability may have the necessary causal effects on low levels of financial inclusion but not a sufficient parameter to cause the low levels of financial inclusion. Accordingly, asymmetric claims are more difficult to falsify than those of symmetry (Lieberson, 1987). The author postulates that more variables could be attributed to the low levels of financial inclusion in the MENA region and, as such, their relationships could be asymmetric.

Since social and economic processes of interest are not caused by single variables, testing for the presence of heteroscedasticity may not be appropriate to evaluate asymmetric relationships because of omitted variable bias. If the heteroscedasticity in this study's data is caused systematically by additional variable(s) that may correlate with the independent (and dependent) variable of interest, then the generated coefficients by a purely stochastic process will lead to biased inferences about the relationship of interest. In these cases, a multi-causal approach is required.

The MENA region, having enjoyed political stability for a long time before the 2011 Arab Spring, has recorded low access to financial services (Creane, 2004). Causes of this low access has been attributed to the lack of enabling regulation, the

lack of efficient mechanisms to determine interest rates, informality, and high levels of unemployment (Caprio & Klingebiel, 2002; Claessens, Demirgüç-Kunt, & Huizinga, 2001; Creane, 2004). The effects of the Arab Spring however, deteriorated the already abysmal performance of financial access in the region. Realising that the relationship between political instability and low levels of financial inclusion could be asymmetric, the author follows Clark et al. (2006) in proposing the use of a multiplicative interaction test of asymmetry model to understand the causal effects of political instability on lower levels of financial inclusion. A multiplicative interaction test of asymmetry model is a conditional specification test where multivariate causal interaction is associated with outcome variables. The conditional application assumes that each individual explanatory variable is either necessary or sufficient to cause low levels of financial inclusion in the MENA region, but none can be necessary and sufficient at the same time.

To estimate the asymmetric relationship between political instability and low levels of financial inclusion, the author introduces a variable that the literature considers to be one the many causes of low levels of financial inclusion in MENA before the 2011 Arab Spring (Caprio & Klingebiel, 2002; Claessens et al., 2001; Creane, 2004). The author uses the presence of a bond market as a dummy variable to capture the lack of effective interest rates regime before 2011. The author posits that it retards investment for economic growth at least in the financial sector. The dummy interest rate variable is then interacted with the political instability variable to see the effect on the outcome variable, i.e., low levels of financial inclusion. In this case, if the effect of the interaction between political instability and interest rates are "reinforcing", then their coefficient should be positive. Political instability and interest rates can be considered as individually sufficient, but complementary,

to cause the low levels of financial inclusion, given the standard assumption that the author has the correct and fully specified model.

Consider the following probit linear multiplicative interaction model in (2.8), where X_{1j} (political instability) and X_{2j} (interest rates) are thought to be alternative causes of $Prob(y_{1ij}^{*} = 1|X|)$, the low levels of financial inclusion.

$$Prob(y_{1ij}^{*} = 1|X|) = \beta_0 + \beta_1 X_{1j} + \beta_2 X_{2j} + \beta_3 X_{1j} X_{2j} + C_{1ij} + \mu_{1ij} \quad (2.8)$$

where C_{1ij} is a number of control variables. To ascertain the consequence of changes in the explanatory variable of X_{1j} on the outcome variable, $Prob(y_{1ij}^{*} = 1|X|)$, it is necessary to take the first derivative of (2.8) with respect to this variable to obtain the marginal effect as a composite coefficient estimate:

$$\frac{\partial}{\partial X_{1j}} Prob(y_{1ij}^{*} = 1|X|) = \beta_3 X_{2j} \quad (2.9)$$

This demonstrates the effect of levels of X_{1j} on the outcome variable, $Prob(y_{1ij}^{*} = 1|X|)$ is intrinsically tied to specific levels of X_{2j}: the marginal contribution of X_{1j} is conditional on X_{2j} and vice versa (Tsai & Gill, 2013). The overall marginal effect of X_{1j} and X_{2ij} on $Prob(y_{1ij}^{*} = 1|X|)$ is given as:

$$\partial(y_{1ij}^{*} = 1|X|)\big|X_{1j}X_{2j} = \beta_3 \quad (2.10)$$

The coefficient β_3, if positive, explains that the low levels of financial inclusion in MENA can effectively be caused by both political instability and a lack of effective determination of interest rates. Table 2.9 reports the result of the asymmetric multiplicative model.

The following empirical model is used for the multiplicative interaction test of the asymmetric model:

$$FI_j = \beta_0 + \beta_1 instrumented\ Pinstability_j + \beta_2\ Interest_j + \beta_3\ Pinstability_j * interest_j + \beta_4\ Gdppcg_j + \beta_5\ Corruption_j + \beta_6 Religious\ tensions_j + \varepsilon_i \quad (2.11)$$

Table 2.9 Financial inclusion indicators as predicted by instrumented political instability and interaction between political instability and interest rates

$$FI_j = \beta_0 + \beta_1 instrumented\ Pinstability_j + \beta_2\ Interest_j + \beta_3\ Pinstability_j * interest_j + \beta_4\ Gdppcg_j + \beta_5\ Corruption_j + \beta_6 Religious\ tensions_j + \varepsilon_i$$

Variables	(1) Formal Account	(2) Formal Savings	(3) Formal Credit
Country fixed effects	yes	yes	yes
Control for individual-level characteristics	yes	yes	yes
Pinstability*	-0.078***	-0.052**	-0.055***
	(0.022)	(0.010)	(0.018)
Interest	-0.091***	-0.004***	-0.041**
	(0.210)	(0.002)	(0.020)
Pinstability*interest	0.056***	0.004***	0.040**
	(0.014)	(0.030)	(0.011)
Gdppcg	0.081***	0.075***	0.101***
	(0.044)	(0.003)	(0.063)
corruption	-0.022**	-0.005**	-0.032**
	(0.140)	(0.005)	(0.025)
Religious tensions	-0.090***	-0.010***	-0.201***
	(0.230)	(0.020)	(0.101)
Constant	-0.151***	-0.203***	0.202***
	(0.016)	(0.024)	(0.018)
R-squared	0.695	0.713	0.680

This table presents the probit estimations of the indicators of financial inclusion, instrumented political instability, interest, gdppcg, corruption, religious tensions, and interaction of political instability and interest rates. *Pinstability** is the IV of column (5) in Table 2.8. *Formal account, formal savings* and *formal credit* are the dependent variables. Standard errors are shown in parentheses. * Significance at the 10% level, ** Significance at the 5% level and ***Significance at the 1% level.

The interaction variable with coefficient β_3 (0.056) is positive, indicating that the low levels of financial inclusion is caused by a lack of political stability post the Arab Spring and a lack of effective determination of interest rates before and after the 2011 Arab Spring.

2.6.3 Test for an asymmetric relation using the threshold model approach

The proposition that political instability is prevalent in the MENA political culture is not tenable. This is because until the 2011 Arab Spring, the MENA region had enjoyed stability. This political stability, however, could not have happened without tight security measures by the non-democratic regimes (whereby the expected costs of challenging the regime outweigh the expected benefits of widening or replacing the narrow base of power). Unfortunately, although the region might experience stability, it did not translate into overall economic growth and financial inclusion.

The author hypothesises that there is a political stability threshold that would trigger financial inclusion. The stability of the region prior to 2011 could be below this threshold[12]. In the political party system, a threshold of representation as opined by Szalai, Petrella, and Rokkan (2016) is the condition set by election managers and political parties in democratic regimes by which parties have to meet in order to obtain seats in the legislature or for a party to win an election (Szalai et al., 2016). In the financial sector, a similar concept exists: exchange rates have target zones. Exchange rates are allowed to fluctuate freely within a given zone, but, when they move outside the target zone, central banks intervene to stabilise the market (Balke & Fomby, 1997). An economic threshold for an oil price impact is the size of the price increase beyond which an economic impact on production and stock prices is noticeable (Huang, Hwang, & Peng, 2005). When an oil price change or its volatility exceeds the threshold level, its impact on the economy may well be negative.

[12] Threshold values or magnitudes are those that must be met or exceeded for a condition to be manifested.

Although economic threshold values may vary from country to country depending on the natural endowment of the economy, a political stability threshold could marginally be the same in MENA due to the political system that exists. Estimating this threshold value is essential to provide policymakers with an indicator to target and to promote financial inclusion.

To estimate the threshold function, the author follows Balke and Fomby (1997) and Hansen and Seo (2002), and sets out a simultaneous quadratic equation that measures a threshold variable as an indicator for political stability in two regimes, i.e. before the 2011 Arab Spring and after the 2011 Arab Spring, where

$$Prob(y^*_{1ij} = 1) \;=\; FI_{1j} = \beta_1 + \; PS^*_{1j} + I\,(S_{1j} > \gamma\,) + \mu_{1ij} \qquad (2.12)$$

$$Prob(y^*_{2ij} = 1) \;=\; FI_{2j} = \beta_2 + PS^*_{2j} \; + I\,(S_{2j} \geq \gamma\,) + \mu_{2ij} \qquad (2.13)$$

where,

S_j is defined as a political stability threshold variable whose critical value serves as a cut-off point below which political instability (stability) impacts on economic activities and financial inclusion is noticeable, γ denotes the threshold parameter, and *I*(.) is the indicator function. This means that the financial inclusion variable, y^*_{ij} increases (decreases) for the i^{th} individual and j^{th} country when γ is above or equal to S_j.

Estimating the threshold parameter (i.e. γ in (2.12)) is one of the difficulties highlighted in operating the threshold models. The author follows Balke and Fomby (1997) in designing grid-search procedures to determine and estimate the threshold parameter[13].

[13] The author first arranges the PS^*_j (political stability) in ascending order. After the threshold value is defined and determined, in a form of an average the author then follows this procedure to

The empirical model is as follows:

$$FI_{ij} = \alpha + \beta * \ Pinstability_{jt-5} + Interest_j + Islam_j + Controls_{ij} + e_j \quad (2.14)$$

$$FI_{ij} = \alpha + \beta * \ Pinstability_{jt+5} + Interest_j + Islam_j + Controls_{ij} + e_j \quad (2.15)$$

where $Pinstability_{jt-5}$ (Regime I) and $Pinstability_{jt+5}$ (Regime II) capture incidents of political stability five years before and after the 2011 Arab Spring.

To find the minimum political stability threshold level that will trigger financial inclusion, the author asks the question: *'what level of political stability will allow full private participation in the economic and financial sectors without any interference from the governing elites*?' This stability threshold level will allow for the market variables of demand and supply to determine where economic resources are needed and by who and to whom. It is the level at which individual liberties are sanctioned while rent seeking, corruption, and obstruction of justice is curtailed. Following Balke and Fomby (1997), the author determines the minimum political stability threshold level that will trigger financial inclusion to be equal to *-0.960* for the region of MENA. This means that countries that meet this political stability threshold level should have high levels of financial inclusion and vice versa[14].

determine the real threshold value. (1) The series of arranged PS_j^* , y^*_{ij} *and* $I(.)$ variables in Equation (12) are established and PS_j^*, y^*_{ij} *and* $I(.)$ are ordered according to the value of S_j . (2) By obtaining the average to serve as the initial value of γ, the series of arranged PS_j^**and* y^*_{ij} are then split into two different regime periods: regime I (2011_{t-5}) against regime II (2011_{t+5}) to account for the 5 year period before the 2011 Arab Spring and the 5 year period after the Arab Spring. (3) The regression of (12) is estimated for each regime and the residual sum of square (RSS) is calculated and saved. (4) The value of γ is increased using one grid with a very small value of 0.01, and the above step (3) is then repeated for the new values of γ. (5) Steps 3 and 4 are repeated and the RSS value is derived for each value of γ; γ with the minimum RSS then chosen.

[14] However, due to asymmetry, some within-country level coefficients do not follow this observation (see Table 2.11). This suggests that although political instability may be high, other economic fundamentals are equally high and therefore might be responsible for the high levels of financial inclusion in those countries.

From Table 2.10, in regime I, the author observes that the coefficient of political instability (-0.982) before the 2011 Arab Spring is below the stability threshold of (-0.960). However, the coefficient for regime II (-1.106) is also lower compared to that of regime I (-0982 > -1.106). The result is consistent with the stability of the region before and after the 2011 Arab Spring (where political stability was considered to be higher before the 2011 Arab Spring). The result indicates that an asymmetric relationship between political instability and low levels of financial inclusion is not widely seen in the region when using panel data (as all coefficients are below the minimum stability threshold level, supporting the proposition that political instability leads to low levels of financial inclusion). However, analysing the country-level data clearly shows that asymmetric relationships exist between political instability and financial inclusion within countries. Table 2.11 depicts the real issue, where some countries have higher levels of financial inclusion even though those countries also have high levels of political instability. Overall, the results indicate that a level of political stability threshold is important for financial inclusion. This is reflected by the results from Table 2.11, where countries with appreciable levels of political stability also have higher levels of financial inclusion.

Table 2.10 Financial inclusion indicators as predicted by instrumented political instability and interaction between political instability and interest rates

$$\boldsymbol{FI_{ij}} = \alpha + \beta * \boldsymbol{Pinstability_{jt-5}} + \boldsymbol{Interest_j} + \boldsymbol{Islam_j} + \boldsymbol{Controls_{ij}} + \boldsymbol{e_j}$$

Country fixed effects			Yes
Control for individual-level characteristics			Yes
Variables	Coefficient	Standard error	*P-value*
Regime I (2011_{t-5}*), political stability before 2011 Arab Spring, where* $S_j \geq$ *-0.960*			
PS^*_{t-5}	-0.982	0.221	0.002***
interest	-0.001	0.094	0.000***
Islam	1.044	0.060	0.026**
Constant	0.037	0.025	0.000***
Regime II (2011_{t+5}*), political stability after 2011 Arab Spring, where* $S_j \leq$ *-0.960*			

PS^{*}_{t+5}	-1.106	0.245	0.006***
Interest	-0.042	0.103	0.004***
Islam	0.082	0.422	0.034**
Constant	-0.006	0.041	0.000***
RSS (Residual sum of squares)	$3.914 * 10^{5}$		
R-squared	0.686	0.686	0.686

This table presents the threshold model estimations of financial inclusion, political stability and interest rates. * Significance at the 10% level, ** Significance at the 5% level and ***Significance at the 1% level.

*Note political stability range: 2.5 = stable – unstable = -2.5 (Kaufmann et al., 2011)

Table 2.11 Financial inclusion as predicted by political stability with threshold political stability variable in MENA

$S_j \geq$ -0.960: Regime I versus $S_j \leq$ -0.960: Regime II

Regime	I			II		
	2011_{t-5}			2011_{t+5}		
	Threshold value = -0.982			Threshold value = -1.106		
Country	Coefficient	Standard Error	*P-value*	Coefficient	Standard Error	*P-value*
Afghanistan	-1.908	0.143	0.000***	-2.050	0.210	0.000***
Algeria	-1.020	0.023	0.004***	-0.983	0.054	0.010**
Bahrain	0.042	0.003	0.000***	0.157	0.034	0.000***
Chad	-0.170	0.086	0.004***	-1.030	0.105	0.032**
Comoros				-0.993	0.104	0.250
Djibouti				-0.100	0.087	0.103
Egypt	-0.981	0.102	0.051*	-0.101	0.076	0.001***
Iran	0.970	0.003	0.012**	0.083	0.102	0.000***
Iraq	-1.102	0.104	0.000***	-1.074	0.210	0.004***
Jordan	-0.969	0.043	0.036**	-0.955	0.065	0.010**
Kuwait	0.034	0.009	0.000***	0.005	0.040	0.000***
Lebanon	-0.102	0.050	0.054*	-0.985	0.067	0.011**
Libya				-0.122	0.024	0.011**

Morocco	0.562	0.103	0.054*	0.102	0.004	0.013**
Oman				0.066	0.021	0.000***
Pakistan	-0.201	0.104	0.000***	-0.223	0.301	0.003***
Qatar				0.032	0.002	0.000***
Saudi Arabia	0.085	0.004	0.002***	0.005	0.021	0.000***
Somalia				-0.192	0.094	0.000***
Sudan	-0.134	0.241	0.001***	-0.201	0.044	0.000***
Syria				-0.224	0.046	0.000***
Tunisia	0.022	0.035	0.034*	0.053	0.007	0.010**
Turkey	-0.962	0.047	0.044*	-0.980	0.049	0.012**
United Arab Emirates	0.006	0.000	0.000***	0.005	0.001	0.000***
West Bank and Gaza	-0.104	0.032	0.004***	-0.106	0.102	0.000***
Yemen	-0.120	0.130	0.943	-0.230	0.106	0.000***
RSS (Residual sum of squares) $3.911 * 10^5$						

This table presents the effects of political stability on financial inclusion in two regimes. Regime I represent political stability before the 2011 Arab Spring, while regime II represents political stability after the 2011 Arab Spring. Coefficients are compared with the threshold stability level of -0.960. Countries with coefficients higher than or equal to the stability threshold level should have higher levels of financial inclusion and vice versa. * Significance at the 10% level, ** Significance at the 5% level and ***Significance at the 1% level.

2.7 Summary and conclusion

In this paper, the author examines the link between financial inclusion and political instability in the MENA region. In the wake of recent political instabilities around the world, financial development is perceived to be negatively affected by political instability more than most institutional features. Roe and Siegel (2011), Alesina et al. (1996), and Engerman and Sokoloff (2002) demonstrate how political instability can impede financial development.

The author subjected the data from MENA and variables of interest through a number of tests in the form of robustness checks in order to determine why the MENA region grapples with low levels of financial inclusion. For instance, a test

for an asymmetric relationship was completed, where a dummy interest rates variable was introduced to capture the presence of omitted variables in the model. Using this technique and IV with lagged variables, the endogeneity problem associated in the sample was eliminated. In this regard, the author reported that political instability correlates with lower levels of financial inclusion.

In addition, the author estimated a political stability threshold value as an essential component that can trigger and promote financial inclusion in the MENA region. In the wake of the political instability, governments and policymakers are in urgent need of guidelines to stabilise their countries through financial access and economic growth. Establishing a political stability threshold value is important to provide policymakers with an indicator to target and promote financial inclusion. Following Balke and Fomby (1997), the author determined the political stability threshold level that will trigger financial inclusion to be equal to *-0.960* for the MENA region (given the unstable political environment and country level score of the WGI index, this value is the most appropriate for stability). The author then argued that governments that seek to open up and diversify their economies, especially in the financial services sector and allow enabling regulation and ease other structural bottlenecks, effectively require political stability in that direction. Roe and Siegel (2011) indicate that political instability impacts developing nations, with the more stable ones developing better financial markets.

The author also examined the basis behind the low levels of financial inclusion among individuals in the MENA region and in selected OIC countries by analysing the barriers to financial inclusion data from the Global Findex database from 2011 to 2017. By examining the perceived barriers to financial inclusion in the MENA region, the author found that a lack of proper documentation is widely reported to

be a barrier to FI. The informal economy in the MENA region is estimated to be around 50% of the GDP and a significant amount of people have no payslips. Furthermore, another major barrier to obtaining loans in the region is the lack of proper documentation to present to banks. For example, despite the fact that the borrower might have enough land or real estate properties to cover the loan, the proof of ownership does not meet the formal institutions' requirements (Kuran, 2008; Ziadeh, 1993). The result of this study supports the CGAP (2017) finding that 92 million of borrowers in the region do so from the informal sector.

In summary, the author's results indicate that political instability has the tendency to lower financial inclusion in the region. The results also indicate that Islam is negatively associated with financial inclusion indicators. The lack of an efficient mechanism to determine real interest rates, which prevents the efficient allocation of financial resources, is also found to impede the development of financial inclusion. However, GDP per capita growth and agriculture are seen as essential components in promoting financial inclusion, whilst corruption, oil reliance, unemployment, and religious tensions negatively affect financial inclusion in the region. The lack of proper documents is also found to hinder progress in financial inclusion. Because of the high informal sector participation in the economy, there are difficulties associated with proper accounting of cash flows which are necessary for formal banks' borrowing. The above summary confirms the author's hypotheses, H_1*:* Political instability negatively affects financial inclusion, and H_2*:* There is a positive relationship between individual characteristics and financial inclusion.

In conclusion, the author contributes to the extant literature by establishing that the unstable political environment within the MENA region does not support financial

sector development and economic growth. The author shows that policies which limit individual liberties and aspirations can trigger political instability and are also detrimental to financial inclusion. To foster financial inclusion, limitations on government control of financial institutions should be encouraged. In addition, policy makers should endeavour to achieve the political stability threshold value that will trigger and promote financial inclusion by allowing easy entry into, and exit from, the financial sector. A lack of documentation required by formal financial institutions is a major barrier to financial inclusion. Through identifying the main obstacles individuals face in their quest to becoming financially included, countries may effectively implement measures that reduce and eliminate those obstacles.

This research has identified two key future research themes. First, a survey might be conducted to assess the level at which political instability disrupts financial inclusion and economic growth in the MENA region. Second, in order to promote and facilitate financial inclusion and economic growth, steps could be identified which serve to incorporate the over 50% proportion of the informal sector in the region that lack proper documents (needed by banks).

Chapter 3

Informal financial intermediation and financial inclusion

3.1 Introduction

In most African countries, policymakers, despite being aware of the existence of a significantly large informal financial sector, have tended to direct economic policy without due consideration of how the policy will be affected by the informal sector activity (Aryeetey & Gockel, 1991). The relative importance of financial inclusion (formal financial intermediation) in overall financial markets and the implication for financial market development, monetary policy, and efficiency in the financial system, are mostly prioritized over informal intermediaries. It has been argued that formal financial intermediation will increase the capacity of countries to leverage their domestic financial resources, strengthen their respective investment climates, and improve their asset management (Aryeetey & Gockel, 1991; Beck, Demirgüç-Kunt, & Martinez Peria, 2008). To raise the levels of inclusion, policymakers and financial regulators give priority to entry thresholds, such as geographical barriers, affordability, accessibility and eligibility that have previously excluded socially vulnerable individuals (Armendariz & Morduch, 2007; Beck, Demirgüç-Kunt, & Martinez Peria, 2008; De Koker & Jentzsch, 2013; Otero & Rhyne, 2006).

However, extant literature argues that financial intermediation in developing countries, especially Africa, are characterised by dualism (Bell, Srinivasan, & Udry, 1997; Collins, Morduch, Rutherford, & Ruthven, 2009; Jain & Mansuri, 2003). Observable evidence shows the existence of both formal and informal financial markets, and usage of either one is not mutually exclusive (Alvi & Dendir, 2009; Grimard, 1997). Because of weak institutional frameworks and market imperfections, formal financial intermediaries are disadvantaged when serving

people with low incomes (Aryeetey, 2008). As a result, the role of informal financial intermediaries in resource mobilization and allocation is quantitatively significant (Kedir & Ibrahim, 2011), as shown by the number of people who engage in the informal economy. The author argue that informal financial intermediation is a strong complement, rather than a substitute, for formal financial intermediation.

The widely asserted hypothesis is that informal financial intermediation is exploitative and does not aid investment beyond consumption smoothing (Nissanke & Aryeetey, 2008). In this paper, the author questions this hypothesis in the context of Africa, arguing that informal financial intermediaries are relevant especially in resource mobilization through family and friends, and informal savings clubs. Again, because of the informal nature of the African economy, use of cash for economic activities cannot be downplayed. In addition, financially excluded people use informal intermediaries for their financial needs. Taking into consideration these factors, the author examines whether the use of formal financial intermediaries (i.e., account ownership) reduces the use of informal financial intermediaries and cash holding. Earlier studies (Aryeetey & Gockel, 1991; Aryeetey & Udry, 1995; Besley & Levenson, 1996; Buckley, 1997; Christen, Lyman, & Rosenberg, 2003; Christensen, 1993; El Qorchi, Maimbo, & Wilson, 2003) have given attention to informal intermediation in Africa. However, few studies have empirically examined how this can function as a trade-off or complementary action. Minimal attention has also been paid to the nature of the linkage between informal intermediaries and cash preference in the African economy, an oversight that needs to be addressed especially in this era of financial inclusion. The study fills this gap by considering whether people use formal

financial intermediaries, informal financial intermediaries and cash preference as either substitutes or complements.

Financial services in the formal sector need to be more competitive and agile relative to informal alternatives, by providing easy access, low transaction costs, and adequate financial services that help address people's needs. In the context of the developing world, and especially in Africa, as one of the most important emerging markets in the world, formal financial intermediation has not been entirely feasible. Lack of easy access because of geographical constraints, documentation problems because of money laundering and the financing of terrorism, low-income clients, transaction costs, and information asymmetry have all become enormous challenges for formal financial intermediaries. The primary issue is that the transacted sums involved are often too small for a formal institution because the cost of advancing a loan or accepting a deposit is independent of the size of the transaction. Often, the cost to formal institutions of opening branches in villages and remote areas is not justified by the business that can be generated (Seibel & Parhusip, 1990).

This study contributes to knowledge by providing empirical evidence on the impact of formal financial intermediation on the use of informal financial intermediation and cash preference in Africa. The results of the study indicate that formal financial intermediation has a positive impact on the use of informal financial intermediaries and that informal employment increases the use of informal financial intermediaries (such as moneylenders and store credit). Moreover, the empirical results reveal that enhancing the formal financial infrastructure has the potential to reduce the use of cash for economic activities. This result is essential for the African continent, where

evidence of informal intermediation is widespread across villages and towns and its contribution to GDP and financial inclusion cannot be underestimated.

This paper progresses as follows: Section 2 reviews relevant literature; Section 3 explains the research methods and describes the use of variables, measurements, and the empirical model; Section 4 describes the data, reports the results, control for mobile money and discusses policy implications; and Section 5 concludes the paper.

3.2 Literature review

3.2.1 Theories

Two schools of thought in the literature of informal financial intermediation exist regarding why the informal sector continues to endure despite the growth of the formal financial sector. The first school of thought is based on a financial repression model originating from the seminal works of McKinnon (1973) and Shaw (1973). They contend that informal financial agents operate because of excessive regulation of the formal sector, where monetary policy intervention in the areas of directed credit, preferential credit allocation by governments, and interest rate ceilings overshadow the free market (McKinnon, 1973). This results in the distortion of the real economy and in government debt crowding out private sector investments, which leads to graft among government officials and the financial sector (Shaw, 1973). As these issues persist, the cost of providing funds to the poor, rural dwellers, and small and medium-sized enterprises (SMEs) becomes excessively high, which eventually accentuates the development of the informal financial intermediation sector. According to McKinnon (1973), liberalization of the financial sector will widen competition and lead to financial deepening, which in turn improves efficiency and wipes out the less efficient informal financial sector. However,

evidence within the informal financial market seems to counter these arguments, as according to (Aryeetey, 2008), there are signs of formal financial intermediaries borrowing ideas from the informal sector in order to better serve clients.

The alternative school of thought attributes the existence of the informal financial sector to factors beyond economics (Hugon, 1990). It is contended that informal financial intermediation is subordinate to the formal system, where the market is segmented not because of regulation, but because it serves other social goals (Hugon, 1990). An example is the redistribution of income among community members and the provision of social security by meeting their fluctuating liquidity needs (Besley & Levenson, 1996). Furthermore, expressions of solidarity among members based on kinship, ethnicity, culture, and religion are equally important (Aryeetey & Udry, 1995).

Extant studies have shown that informal financial intermediaries are popular among rural and urban dwellers (Aryeetey, 2008; Gugerty, 2007; Guirkinger, 2008). For instance, in Bolivia, it is reported that formal financial employees are members of Rotating Savings and Credit Associations (ROSCAs) (Adams & Fitchett, 1992). Studies show that in Cameroon, Ghana, India, Sri Lanka, and most other developing countries, professionals and others with relatively high incomes often participate in most informal financial arrangements (Gugerty, 2007). The popularity of informal financial intermediaries among low and middle-income groups shows that people like to save and borrow, even under trying circumstances (Allen, Qian, & Xie, 2018). The primary driver of people to ROSCAs is that they want to save more and to feel that membership in such associations prompted them to do so (Gugerty, 2007).

It is imperative to note that informal financial intermediation is not an illegal business and does not operate exclusively in isolation. Lack of regulation does not mean illegality because most financial intermediaries are under the control of the "Cooperative Acts" of their home countries. Many financial transactions that occur within the informal sector end up in the hands of formal financial intermediaries, suggesting important linkages. The First National Bank in South Africa has been offering special *stokvel* bank accounts for group savings since 2002 (Mashigo & Schoeman, 2012). Seibel and Parhusip (1990) find links between informal deposit collectors and banks in West Africa and in other developing nations. In addition, commercial banks and other formal financial intermediaries in developing countries are exploring risk-return trade-offs (Giné, 2011) in the financial market for non-traditional clients, where credit is extended to groups and associations against deposit balances kept in formal bank accounts (Aryeetey, 2008).

3.2.2 Importance of informal financial intermediation

Aryeetey and Gockel (1991) describe the term "informal financial intermediation" as participation in all commercial saving and lending activity that takes place outside of formal or established financial institutions. In poor developing economies, where formal financial intermediaries are lacking or government social interventions are insufficient, households are particularly inclined to make use of informal relationships to cater for their extra income needs and to absorb risks. According to Alvi and Dendir (2009), households need to smooth consumption as a result of their precarious situations. They argue that in rural areas, for instance, informal capital accumulation is important due to weather calamities that negatively affect crop production, and which expose rural households to income shocks as prices are adversely affected. During periods of

illness, when the head or working members of a household are unable to work, financial uncertainty looms in the family too. In the case of urban areas, unemployment, medical expenses, and a decline in business income are likely to induce income swings (Alvi & Dendir, 2009).

Informal finance, through the traditional knowledge systems, seems to be better equipped and structured to reduce high transaction costs and the need for collateral in the provision of credit to poor households (Lee & Persson, 2016). Its success lies in its structure (Nissanke & Aryeetey, 2008), which is embedded in the informal financial arrangements that the households make to provide for their financial needs. (Aryeetey, 2008) argues that inadequate infrastructure, information asymmetry, and market distortions create barriers for formal financial institutions to reach low-income households and rural dwellers. Also, non-corporate borrowers rarely have collateral acceptable to banks. Their creditworthiness resides in their human capital, which is difficult for formal intermediaries to gauge (Buckley, 1997). To this end, informal intermediaries become the best options to provide the financial linkage for the bulk of the population. Kedir and Ibrahim (2011) suggest the positive impact of informal financial intermediaries, concluding that "as indigenous sources of working capital, saving mobilisation via ROSCAs should not be neglected in favour of the formal financial sector, which already failed to serve the majority of urban dwellers in Sub-Saharan Africa (Kedir & Ibrahim, 2011, p. p.1013)" Furthermore, informal intermediaries (such as moneylenders and those providing store credit) are primarily crucial for certain classes of entrepreneurs whose capital requirements exceed family resources but are not eligible to borrow from the formal sector (Grimard, 1997; Otero & Rhyne, 2006).

A counter-argument to the positive roles played by informal financial intermediaries also appears in the literature. Aryeetey and Udry (1995), for example, are of the view that informal financial intermediaries are not sufficiently sophisticated to scale up to appropriate volumes of businesses as needed. Another effect is the lack of institutional frameworks for regulation and, in particular, when debtors fail to honour their indebtedness, the disposal of collaterals can be unrestrained (Christensen, 1993). Informal financial intermediaries are often regarded as exploitative and serve only consumption, rather than investment, purposes (Nissanke & Aryeetey, 2008). However, Lee and Persson (2016) contend that the argument against informal intermediation is unfounded. They argue that the majority of informal finance comes from family and friends; these sources are not exploitative by nature and may even encourage entrepreneurial growth.

As the relative importance of financial inclusion stems from the use of formal financial intermediaries, these counter arguments against informal financial intermediation strengthen the principles underlying strategies for formal inclusion. However, it is also argued that the informal financial sector is larger than the formal financial sector in terms of outreach as the former can be found in both rural and urban centres in all developing countries (Lee & Persson, 2016), making them accessible to most socioeconomic and solidarity groups (Aryeetey, 2008). The importance of the informal sector is seen in instances wherein the education and healthcare needs of individual family members are met, as are social solidarity requirements. Financial inclusion efforts need not discourage the use of informal financial intermediaries, as the informal nature of the economies of developing countries acts as conduits for their use.

Evidence of inadequate access to formal finance, where demand 'spill-over' effects create incentives for the use of informal finance, is widely acknowledged in the literature (Bell et al., 1997; Hoff & Stiglitz, 1997). Jain and Mansuri (2003) find that both microfinance institutions and informal moneylenders exist in Bangladesh, with the latter thriving from the strict repayment instalments schedules imposed on loan seekers immediately after loans are granted by formal institutions. Similarly, Collins et al. (2009) show that because of their income swings, poor people typically use more than one type of financial intermediary to smooth their consumption patterns.

3.2.3 Overview of informal financial intermediaries in Africa

Cultural and traditional age-long arrangements that have sustained the integrity of the people and which bond them together are still relevant today. Arrangements in the form of self-help groups in which members contribute both in cash and in kind to help one another to overcome difficulties in areas such as farm labour, inputs, and enterprise start-ups have been efficient (Aryeetey, 2008; Buckley, 1997; Grimard, 1997). Through these arrangements, informal financial intermediation has developed among rural dwellers.

Informal finance, premised on traditional knowledge systems, seems to be better equipped and structured to reduce high transaction costs and the need for collateral in the provision of credit to poor households (Alvi & Dendir, 2009). Its success lies in its structure, which is embedded in the informal financial arrangements that the households make to provide for their financial needs (Kedir & Ibrahim, 2011).

Informal financial intermediation, which encompasses a wide range of financial activities that go beyond formal financial systems, are usually based on personal relationships and socio-economic activities (Besley & Levenson, 1996). They are common mostly within the rural poor but have now become a common arrangement in urban areas because of rural-urban migration (Grimard, 1997). In addition to family and friends, who provide a large

percentage of the loans, informal financial intermediaries consist of professional moneylenders, pawnbrokers, tradespeople, and associations of acquaintances (Alvi & Dendir, 2009). They are available in different forms and provide one form of service or a combination in some instances. They are known as susu or esusu in West Africa, tontines in francophone countries, hawala in the Maghreb of Africa, and stokvels in South Africa. Professional moneylenders provide an average of 12% of the total informal intermediation services in Africa.

In West Africa, susu or esusu or savings collectors provide savings services and possible access to credit (Buckley, 1997). In the susu arrangement, a saver agrees to deposit a specific amount determined in consultation with the collector for an agreed period of time (usually a month). At the end of the period, the susu collector renders the accumulated savings to the client, keeping one day's savings as commission.

Tontines, rotating savings and credit associations (ROSCAs), accumulating savings and credit associations (ASCRAs), and savings clubs all serve the same purpose in different parts of Africa (Grimard, 1997). Although they may vary in size and practices, the principles that define them are the same (Aryeetey & Udry, 1995). They are a prominent means to pool resources, in which members contribute fixed amounts into a pool, usually on a weekly or monthly basis. At the end of each collection period or at meetings, the pool of collected money is given to one member. This practice is then repeated until all members in the group have had their turns. At any time during a full cycle of dealings, members who are waiting their turn are creditors to the tontine or ROSCA (net savers) and those who have received a pool of money are debtors (net borrowers) (Besley & Levenson, 1996; Christensen, 1993; Nissanke & Aryeetey, 2008; Seibel & Parhusip, 1990). As the ROSCA moves through a cycle, these positions are rotated (Buckley, 1997). Members usually know each other and are bound by a common bond such as location, ethnic group, approximate income level, or type of enterprise activity (Buckley, 1997). All these attributes strengthen

social control and serve as risk management tools through their group solidarity, which ensure efficient management and continuity (Hoff & Stiglitz, 1997).

Hawala is a traditional means of transferring funds across borders and within countries. It finds it roots in the Arabian Peninsula, as a means for financing long-distance trade around the emerging capital trade centres in the early medieval period (El Qorchi et al., 2003; Passas, 2003). It is popular in the Middle East and the Maghreb of Africa, especially in Somalia. The hawala system transfers funds by means of a network of hawala brokers called "hawaladars", who charge a fee, or an exchange rate spread in exchange for their services (El Qorchi et al., 2003). The strength of the hawala system is that it is fast, cheap, confidential and easily available (El Qorchi et al., 2003).

Stokvels are savings, credit, capital generating clubs, and funeral associations found in South Africa (Mashigo & Schoeman, 2012), with similar principles to the Tontines and ROSCAs schemes. Stokvels find their origins from the term "stock fairs" which largely constituted rotating cattle auctions around the Eastern Cape in the 19th century (Pronyk et al., 2008). Members meet weekly or monthly and deposit a certain amount of money into a common fund. The accumulated amount is then paid out to one of the members on a rotating basis. Stokvels have constitutions that guide their operations, making them highly efficient (Pronyk et al., 2008). It is estimated that one in every two indigenous people in South Africa are members of a stokvel (Mashigo & Schoeman, 2012). There are different types of stokvels, such as family stokvels, savings or contribution stokvels, purchasing stokvels, investment stokvels, and borrowing stokvels that operate and pool funds which are normally kept in the bank. As a result, in 2002, the First National Bank in South Africa began to offer special stokvel bank accounts for group savings (Mashigo & Schoeman, 2012).

Funeral insurance arrangements are a common stokvel product of community-based informal insurance associations within what is called a burial society (Mashigo & Schoeman, 2012), aimed at ensuring that enough funds are available to cover funeral

expenses. An estimated 28% of the population in South Africa and 21% in Southern African Customs Union (SACU) are part of a burial society based on the contributions of its voluntary subscribers (Pronyk et al., 2008).

In Figure 1, the author shows the use of formal and informal financial services, taken from the Global Findex database for African countries. Figure 1 indicates that the use of informal financial intermediaries is highly prevalent in Africa. Appendix 1 shows the full list of countries included in this figure. The percentages for the informal borrowing comprise borrowings from family and friends as well as borrowings from private moneylenders.

3.3 Research questions, measurement of variables and methods

3.3.1 Development of research questions

Development finance literature has given significant attention to the issue of lending risks that arise because of opaque information, particularly in the context of formal financial intermediation. Due to information asymmetry, resulting from ex-ante and post ante moral hazard and adverse selection (Hoff & Stiglitz, 1997), formal financial intermediation is a practice that is unable to compete effectively in rural areas of developing countries. Informal financial customers, who are compounded with problems such as low incomes and a lack of collateral will be inclined to consider trade-offs or complementarity in the use of formal financial intermediaries.

Individuals can decide whether to use formal or informal financial intermediation if they know all the costs and benefits involved (De Koker & Jentzsch, 2013). The decision-making processes of the poor can be more complicated than their counterparts above the poverty line: they are not financially illiterate, and they constantly weigh up choices based on the reality of their poverty (Armendariz & Morduch, 2007). There are specific factors that influence the individual decision to

either use formal or informal intermediation. These factors include income, convenience, and ease of use, transactions costs, preference for cash usage because of the informal nature of the economy, and social solidarity (Karlan et al., 2014). However, given the lack of appropriate data to empirically test these variables, the author used the World Bank Global Findex data that captures information such as formal account ownership, informal financial intermediaries, and the use of cash for transactions and payments[15].

The individual factors (income, convenience, ease of use, transactions costs, and preference for cash usage) are validated by imposing certain conditions. These conditions are assumptions about the structure of preferences, such that if an individual who has an account in a formal financial intermediary realises that there are additional costs (such as inconvenience, lack of social solidarity and a preference to use cash), that individual may choose an alternative, resulting in a trade-off or complementary action. The continual process of trade-offs involves weighing choices based on the reality of one's poverty and a continual battle to stabilize and raise income while reducing vulnerability (Henderson, 1996).

Group members who may be constrained in accessing credit on individual bases for lack of collateral find it extremely important to be part of a ROSCA. According to Besley, Coate, and Loury (1993), savings clubs or ROSCAs provide a means of accumulating savings to purchase an indivisible good or starting a business more quickly than can be done in autarky. The social solidarity that drives individuals to

[15] The data provides proxies on formal financial intermediation, income quintiles, types of informal financial intermediation, and preference for use of cash for domestic remittances and payments. See Demirgüç-Kunt, A., Klapper, L. F., Singer, D., & Van Oudheusden, P. (2015). The global findex database 2014: Measuring financial inclusion around the world.

save then becomes an important preference for a trade-off. The research addresses two main questions:

(1) Does ownership of bank accounts reduce the use of informal financial intermediaries such as family and friends, ROSCAs and moneylenders? and

(2) Does the informal nature of African economies serve as a conduit for cash preference in financial and business transactions?

3.3.2 Measurement of financial inclusion variables

3.3.2.1 The use of formal intermediaries

The study uses the ownership of a bank account as a proxy for formal financial intermediation as a key independent variable. To be financially included, an individual needs an account (transaction account) from which other financial services can be offered. In the sample, the author tests a number of proxy variables for formal financial intermediation using a formal account (account ownership) in its generic form. These proxies include variables such as savings, borrowings, mobile money accounts, receipt of wages, receipt of government poverty relief transfers, and receipt of agricultural produce payments through the bank (see Table 3.1 for details).

The proxies allow us to determine whether informal financial intermediaries are substitutes or complements to formal financial intermediation by regressing the dependent informal proxies[16] against the formal financial proxies. Using data from Demirgüç-Kunt et al. (2015), the author are able to determine the nature of the trend.

[16] Informal financial intermediation denotes four separate variables describing how individuals engage in resource mobilization. These include informal savings clubs (ROSCAs), family and friends, moneylenders and store credit. These and the other variables used can be obtained from ibid.

To examine the trade-off or complementarity in savings among adults in the sample, the author posed the following question:

> *In the PAST 12 MONTHS, have you, personally, saved or set aside any money by…? A. Using an account at a bank or another type of formal financial institution, B. Using an informal savings club (like ROSCA), or a person outside the family*.

Table 3.3 column 2, shows that on average, 15.8% of adults in the sample report saving with an informal intermediary, such as a savings club or ROSCA, while only 21.3% saved in formal financial intermediaries. Sub-Saharan Africa (SSA) statistics (see Table 3.2) provides the highest number of adults using informal financial intermediaries.

Table 3.1 Variables description and sources

Variable	Description	Source
Individual level characteristics		
Female	Dummy that takes the value 1 if the respondent is female and 0 otherwise	Global findex 2014
Age	Age in years	Global findex 2014
Income: poorest 20%	Dummy that takes the value 1 if the respondent falls in the lowest income quintile and 0 otherwise.	Global findex 2014
Income: second 20%	Dummy that takes the value 1 if the respondent falls in the second lowest income quintile and 0 otherwise.	Global findex 2014
Income: Third 20%	Dummy that takes the value 1 if the respondent falls in the middle-income quintile and 0 otherwise.	Global findex 2014
Income: fourth 20%	Dummy that takes the value 1 if the respondent falls in the second highest income quintile and 0 otherwise.	Global findex 2014
Income – richest 20%	Dummy that takes the value 1 if the respondent falls in the highest income quintile and 0 otherwise.	Global findex 2014
Primary education	Dummy variable equal to 1 if the individual has completed primary school or less, 0 otherwise	Global findex 2014
Secondary education	Dummy variable equal to 1 if the individual has completed secondary education, 0 otherwise	Global findex 2014
Tertiary education	Dummy variable equal to1 if the individual has completed tertiary education or more, 0 otherwise	Global findex 2014

Urban	Dummy that takes the value 1 if the respondent lives in an urban area and 0 otherwise	Global findex 2014
Formal financial outcomes		
Formal account	Dummy that takes the value 1 if respondent reported to have an account at a bank, credit union, cooperative, or microfinance institution, 0 otherwise	Global findex 2014
Saved money using account	Dummy equal to 1 if respondent reported to have saved or set aside money in the past 12 months using an account at a bank, credit union, cooperative, or microfinance institution, 0 otherwise	Global findex 2014
Borrowed money from bank	Dummy equal to 1 if respondent reported to have borrowed money in the past 12 months from a bank, credit union, cooperative, or microfinance institution, 0 otherwise	Global findex 2014
Received wages from account	Dummy equal to 1 if respondent reported to received wage payment from employment through an account from a formal financial intermediary, 0 otherwise	Global findex 2014
Received gov't transfer into account	Dummy equal to 1 if respondent reported to have received government transfers through an account or a card from a formal financial intermediary, 0 otherwise	Global findex 2014
Received agric pay into account	Dummy equal to 1 if respondent reported to have received payment for agricultural produce through an account from a formal financial intermediary, 0 otherwise	Global findex 2014
Sent or received domestic remittance using account	Dummy equal to 1 if respondent reported to have sent or received domestic remittance using an account from a formal financial intermediary, 0 otherwise – identical variables with similar responds	Global findex 2014
Paid utility or school fees using account	Dummy equal to 1 if respondent reported to have paid utility bills or school fees using an account from a formal financial intermediary – identical variables with similar responds	Global findex 2014
Informal financial outcomes		

Saved: informal savings club	Dummy equal to 1 if respondent reported to have saved or set aside money in the past 12 months using an informal savings club (ROSCA), 0 otherwise	Global findex 2014
Borrowed: family and friends	Dummy equal to 1 if respondent reported to have borrowed money in the past 12 months from family members or friends, 0 otherwise	Global findex 2014
Borrowed: moneylender	Dummy equal to 1 if respondent reported to have borrowed money in the past 12 months from a moneylender (private lender), 0 otherwise	Global findex 2014
Borrowed: store credit	Dummy equal to 1 if respondent reported to have had credit from a store in the past 12 months, 0 otherwise	Global findex 2014
Preference for cash		
Sent or received domestic remittance using cash	Dummy equal to 1 if respondent reported to have sent or received domestic remittance using cash only, 0 otherwise – identical variables with similar responds	Global findex 2014
Paid utility or school fees using cash	Dummy equal to 1 if respondent reported to have paid utility bills or school fees using cash only – identical variables with similar responds	Global findex 2014
Received wages in cash	Dummy equal to 1 if respondent reported to received wage payment from employment in cash only, 0 otherwise	Global findex 2014
Received gov't transfer in cash	Dummy equal to 1 if respondent reported to have received government transfers in cash only, 0 otherwise	Global findex 2014
Received agric pay in cash	Dummy equal to 1 if respondent reported to have received payment for agricultural produce in cash only, 0 otherwise	Global findex 2014

3.3.2.2 Informal financial intermediaries

The information that corresponds to informal borrowing is derived from the following question:

> *In the PAST 12 MONTHS have you, by yourself or together with someone else, borrowed any money from any of the following sources? A. Have you borrowed from a bank, or another type of formal financial institution? This does NOT include credit cards. B. Have you borrowed from a store by using instalment credit or buying on credit? C. Have you borrowed from family, relatives, or friends? D. Have you borrowed from another private lender (for example, a loan shark, payday lender, or pawnshop)?"*

From the sample, individuals within Sub-Saharan Africa (SSA) report that they borrow from mostly family and friends. This is common compared to other regions of Africa, as reported by Demirgüç-Kunt et al. (2015). On average, about 11.5% of adults from the sample report borrowing from family and friends, compared with only 6.9% who borrow from banks (Table 3.3 column 2).

The most common phenomenon within the sample was the use of a private lender, such as moneylenders, which constituted 34.6% of the borrowings. South Africa, as well as West African countries, report significant figures in the use of moneylenders and pawnbrokers with the sample. Another trend that emerged from the sample is that in North African countries, adults report borrowing from a store as oppose to borrowing from a financial institution. Overall, about 7.4% within the sample reported to have borrowed from a store, which involves the use of instalment credit or buying on credit.

3.2.3 Preference in the use of cash

To test the use of cash in the domestic economy of Africa, the author measures the following variable proxies: sending and or receiving domestic remittance using cash only, payment for utility and or school fees using cash only, receipt of wages in cash only, receipt of government poverty relief transfers in cash only, and receipt of payment for agricultural produce in cash only. These variables are explained in Table 3.1. In terms of domestic remittances, the preference for cash and other methods in domestic money transfers is ascertained through the following question:

> *In the PAST 12 MONTHS, have you, personally, GIVEN or SENT money to a relative or friend living in a different area in any of the following ways? A. You handed cash to this person or sent cash through someone you know, B. You sent money through a bank or another type of formal financial institution (for example, at a branch, at an ATM, or through direct deposit into an account), C. You sent money through a mobile phone, D. You sent money through a money transfer service.*

On average, 30.1% of adults in the sample reported sending cash, while 37.4% received cash for domestic remittances. Comparatively, 19.1% reported using a formal financial intermediary to send money (Table 3.3 column 2). It is noted that those who reported using cash for the domestic remittances are adults with accounts in formal financial institutions (Demirgüç-Kunt et al., 2015). Similarly, those who reported using cash to pay utility bills and school fees in the sample also reported having accounts in formal financial institutions. On average, 31% of adults reported using cash to pay utilities while 29.2% reported paying school fees with cash.

In the sample, the number of reported cash receipts in wage payments for public employees and government transfers is relatively high. Because of the informal nature of the African economy, it is common practice for private employers to pay wages in cash. However, those who reported receiving government transfers in

cash raised questions about the use of cash by government departments. On average, 21.4% of adults in the sample reported receiving cash transfers from governments, compared to only 6.9% who did so from accounts in formal financial institutions (Table 3.3 column 2). This raised the question: what was the driving factor for a government decision to pay transfers in cash?

The sample also reports the receipt of cash payments for the sale of agricultural produce. In SSA, where most adults work in the agriculture sector, payments in cash is 36.2% compared with the 28.9% of adults who get paid through the bank. In contrast, most adults in North Africa are not engaged in the agricultural sector as an economic activity

3.2.4 Control variables

A set of individual-level covariates are included in this study. The interest is to understand what drives people to make choices in the use of a financial intermediary -- formal or informal -- and the author hypothesized that individual characteristics might affect outcomes (Allen et al., 2016). The literature, for instance, contends that females make up the majority membership of most informal financial intermediaries (Aryeetey & Gockel, 1991; Aryeetey & Udry, 1995; Kedir & Ibrahim, 2011). In the study, female respondents are expected to have a positive sign in the regression. Age is a linear variable and the author expected that age would complement the use of both formal and informal financial intermediation. Older adults are most likely to use formal financial intermediaries than young adults.

Each country income quintile is expected to show a positive association with the use of financial intermediaries, where a higher income corresponds with formal financial intermediaries, and a lower income corresponds with informal financial intermediaries. For convenience, the income quintiles have five categories, which

are all dummy and which range from the poorest 20% to the richest 20%. The author proxies the income quintiles to denote convenience of use of financial intermediaries, where a trade-off is expected to occur. The author hypothesized that being rich or poor influences the choice of financial intermediaries, in that richer people are inclined to use formal financial intermediaries, whereas poor people are more comfortable using informal intermediaries.

The author added the educational qualification of respondents as a further variable to determine if levels of education related to the use of financial intermediaries. The author divided this variable into three categories, primary, secondary, and tertiary levels of education and the author expect that primary levels would show a correspondence with informal and cash preferences, while secondary and tertiary education levels would show an association with formal financial intermediaries. All three categories are dummy variables that took the value of one if a respondent reported completing primary, secondary or tertiary education respectively, or zero otherwise. Table 3.1 summarizes the definitions of the variables used (all variables are taken from Global Findex 2014).

3.3 Empirical model

3.3.1 Test on informal financial intermediation

Consider the following binary outcome model where the dependent variable y_{itj} takes the value 1 if an individual, *i* uses an informal financial intermediary at time *t* in a country *j* or 0 otherwise:

$$\left[P\left(y_{itj}=1\right)>0\right]=\{\left[\beta_1+\beta_2 Z_{it}+\beta_3 X_{it}+\beta_4 C_{it}+\varepsilon_{it}\right]>0\} \quad (3.1)$$

where Z_{it} denotes the individual ownership of a bank account that may or may not correlate with $[P(y=1)>0]$. X_{it} is a set of varying individual covariates, and

includes proxies such as income quintiles, and age, while C_{ij} represents the preference for cash in an economy. β_1 β_2 β_3 and β_4 are parameters to be estimated, while ε_{it} is the error term. Model (1) represents the factors that may drive an individual to use informal financial intermediaries despite owning an account in a formal financial intermediary.

3.3.2 Test on preference in the use of cash

The author postulates a second model (3.2) to understand the use of cash in the African economy. The model is represented in the following equation:

$$\left[P\left(C_{ij}=1\right)>0\right]=\{\left[\beta_1+\beta_2 Z_{it}+\beta_3 X_{it}+\varepsilon_{it}\right]>0\} \quad (3.2)$$

where C_{ij} represents the probability of the use of cash for economic purposes, denoted by a positive correlation between the dependent variable C_{it} and the variable of interest, Z_{it}. Because of informal employment, the individual covariates and cash preference are also perceived to produce positive outcomes. The dependent variable C_{ij} represents a set of varying variables that the research set out to test. These include using cash for the following items: sending and receiving remittances, payments for utilities, payments of school fees, wage payments, payments for government livelihood reliefs, and payment for agriculture produce.

3.4 Data and empirical results

3.4.1 Data

The data for the empirical analysis comes from the Global Findex database of the World Bank 2014 (Demirgüç-Kunt et al., 2015), which reports the levels of penetration of financial intermediaries among a number of individual covariates such as gender, income quintiles, educational qualification, and age. The data are

cross-sectional covering more than 150,000 individuals from over 140 countries, of which the 37 SSA and North African countries are used in the research. The data contains information on the number of people who use formal financial intermediaries, as well as the frequency of usage denoted by the number of deposits and withdrawals made per month. It also contains information on the use of informal financial intermediaries such as family and friends, savings clubs, private moneylenders, and store credit.

Data on the preference of cash, however, is used cautiously as the survey questions did not directly ask the reasons why people prefer the use of cash over formal banks. The potential attributes for the use of cash may be the informal nature of the economies of developing countries, convenience of use as a result of the income levels of individuals, lack of financial education, or lack of formal financial infrastructure, which could have limited people's choices and provided no alternatives. In any case, the data provides us with useful information in understanding why financial inclusion strategies need both financial infrastructure and commitment from various suppliers in developing countries. The data provides us with information on the number of people who prefer to use cash for payments rather than formal financial intermediaries.

In Table 3.2, the author provides the use of formal and informal financial services, taken from the Global Findex database for African countries. Columns 1 to 4 provide information on the active use of formal financial intermediation and those who are formally banked, thus providing the percentage of the population with accounts in a country and those excluded from the formal financial system (see column 4 in Table 3.2). Column 5 provides information on the portion of the total population that uses informal financial intermediaries. On average, the percentage

of individuals who are formally included in the financial system are 30.4%, while 69.6% are without a bank account in any financial institution. Regarding informal financial services, 62.5% of individuals save or borrow informally; this includes individuals who save and borrow through savings clubs and credit associations such as ROSCAs, Tontines, and Stokvels.

Table 3.2 Active use of formal and informal financial intermediation (%)

Country	Active Formal Savings	Active Formal Borrowing	Formally Banked	Formally Excluded	Informal Savings	Informal Borrowing
	(1)	(2)	(3)	(4)	(5)	(6)
Algeria	13.1	2.2	50.5	49.5	3.4	14.7
Angola	14.9	2.8	29.3	71.7	11.9	22
Benin	7.1	7.6	16.6	83.4	36.8	26.9
Botswana	26.6	13	52	48	35.4	70.3
Burkina Faso	8.7	5	14.4	85.6	18	32.9
Burundi	4	1.5	7.1	92.9	8.1	51.9
Cameron	7.7	1.9	12.2	81.8	34.6	43.8
Chad	4.6	2.4	12.4	81.6	20.1	27.6
DRC-Congo	4.7	2.4	17.5	82.5	15.4	46.9
Congo	9.8	4.4	17.1	82.9	24.1	30
Cote d'voire	8.9	2.3	34.3	65.7	22.9	36.3
Egypt	4.1	6.3	14.1	85.9	11.8	24
Ethiopia	13.6	7.4	21.8	78.2	29.8	26.6
Gabon	18	4.3	33	67	24.7	38
Ghana	18.6	8.1	40.5	59.5	21.5	25.9
Guinea	2.9	2	7	93	18.7	40.7
Kenya	30.2	14.9	74.7	25.3	39.9	67.8
Madagasca	3.3	2	8.6	91.4	1.4	54.3
Malawi	7.1	6	18.1	81.9	28	58.3

Mali	2.9	2.7	20.1	79.9	23.5	35.4
Mauritania	10.6	7.7	22.9	77.1	11.6	34.9
Mauritius	35.5	17.1	82.2	17.8	5.9	3.7
Namibia	26.7	6.9	58.8	41.2	9.5	32.4
Niger	2	1.4	6.7	93.3	27.9	57.5
Nigeria	27.1	5.3	44.4	55.6	23	39.2
Rwanda	25.5	8.2	42.1	57.9	24.1	38.5
Senegal	6.6	3.5	15.4	84.6	28.6	43.9
Sierra Leone	10.9	4	15.6	84.4	39.3	49.3
Somalia	2.8	2	38.7	61.3	15.1	50
South Africa	32.7	12.1	70.3	29.7	30.6	87.8
Sudan	7.5	4.2	15.3	84.7	21.9	39.6
Tanzania	9	6.5	39.8	60.2	13.1	46.5
Togo	6.7	3.7	18.3	81.7	18.7	19.3
Tunisia	10.3	8	27.4	72.6	1.3	19.4
Uganda	16.8	15.7	44.4	55.6	36.7	75.7
Zambia	16.8	4.8	35.6	64.5	24.3	59.6
Zimbabwe	5.2	4	32.4	67.6	17.8	60.2
Average	**12.5**	**5.8**	**30.4**	**69.6**	**21.1**	**41.4**
***SSA average**	**15.9**	**6.3**	**34.2**	**65.8**	**23.9**	**46.6**

Source: World Bank Global Findex Database 2014. *Sub Saharan Africa.

Table 3.3 Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Individual level Characteristics					
Female	37,102	0.493	0.500	0	1
Age	37,073	34.952	15.317	15	99
Age Squared	37,073	1456.213	1324.506	225	9801
Income: Poorest 20%	37,102	0.165	0.371	0	1

Income: Second 20%	37,102	0.173	0.379	0	1
Income: Third 20%	37,102	0.186	0.389	0	1
Income: fourth 20%	37,102	0.211	0.408	0	1
Income: Richest 20%	37,102	0.264	0.441	0	1
Primary education	37,100	0.535	0.499	0	1
Secondary education	37,100	0.411	0.492	0	1
Tertiary education	37,100	0.054	0.226	0	1
Rural	37,102	0.476	0.408		
Formal financial Outcomes					
Formal account	37,102	0.350	0.477	0	1
Savings with account	37,102	0.213	0.409	0	1
Received wages: Account	37,102	0.134	0.475	0	1
Gov't transfer: Account	33,588	0.069	0.495	0	1
Agriculture pay: Account	37,102	0.289	0.297	0	1
Borrowed from bank	37,102	0.069	0.253	0	1
Sent rem.: Account	37,102	0.191	0.458	0	1
Received rem.: Account	37,102	0.335	0.441	0	1
Paid School fees: Account	37,102	0.261	0.369	0	1
Paid utility: Account	37,102	0.232	0.382	0	1
Informal financial Outcomes					
Saved: Informal	37,102	0.158	0.364	0	1
Borrowed: family/friends	37,102	0.115	0.320	0	1
Borrowed: Moneylender	37,102	0.346	0.476	0	1
Borrowed: Store credit	36,102	0.074	0.262	0	1
Preference for Cash					
Agriculture pay: Cash	37,102	0.362	0.480	0	1
Received wages: Cash	37,102	0.072	0.480	0	1
Gov't transfer: Cash	33,588	0.214	0.261	0	1
Sent remittance: Cash	34,152	0.301	0.459	0	1
Received remittance: Cash	34,234	0.374	0.484	0	1
Paid School fees: Cash	34,118	0.292	0.454	0	1
Paid utility: Cash	34,594	0.310	0.462	0	1

Overall Table 3.2 shows that the informal sector dominates the savings and borrowings activities and 69.6% of the population is formally excluded from using formal financial intermediaries. Further, the SSA averages reveal that formal intermediaries are used more for savings (15.9%) than for borrowings (6.3%), and the reverse applies to the use of informal intermediaries, which are used twice as much for borrowing (46.6%) when compared to saving (23.9%). Additionally, the author note that the percentage of population formally excluded from use of formal financial intermediaries varies greatly. For example, Burundi appears to be financially under-developed or underused as 92.9% are financially excluded, whereas in Mauritius, only 17.8% do not have active formal savings or borrowing accounts. However, the range of activity also varies considerably across the 37 countries (see Table 3.4 below). Based on this data, the author argue that informal financial intermediaries are prevalent in Africa.

Table 3.4 Saving and borrowing activities using formal and informal intermediaries

	Formal		**Informal**	
Activity	Low	High	Low	High
Savings	2.0%	35.5%	1.3%	39.9%
Borrowings	1.4%	17.1%	3.7%	87.9%

Source: Global Findex 2014.

3.4.2 Financial inclusion and informal financial intermediation

The model from Table 3.5 examines whether formal financial inclusion, in the form of savings and credit accounts ownership in banks, lowers the use of informal financial intermediaries in Africa, vis-à-vis trade-offs or complementarity. Table 3.5 column 1 indicates ownership of formal bank accounts positively correlates

with the use of informal financial intermediaries such as savings clubs and ROSCAs in Africa. This increases the likelihood of the use of informal financial intermediaries by 22.8% for every 1% increase in account ownership and by 7.9% if individuals have active savings accounts in formal financial institutions. These results are significant at the 0.01 significance level. The results also indicate that women and young adults are more likely to use informal financial intermediaries than men or older adults. However, an increase in income and educational levels decreases the likelihood of individuals using informal financial intermediation. Wealthy individuals and people who attain higher education levels are less inclined to choose informal finance relative options over formal financial intermediaries.

Table 3.5 Probit model on the impact of financial inclusion on informal savings and borrowing in 37 African countries

$$\left[P\left(y_{itj}=1\right)>0\right]=\{\left[\beta_1+\beta_2 Z_{it}+\beta_3 X_{it}+\beta_4 C_{it}+\varepsilon_{it}\right]>0\}$$

Variables	(1) Informal Savings Club	(2) Borrowings: Family and Friends	(3) Store Credit	(4) Moneylender
Country Fixed Effects	Yes	Yes	Yes	Yes
Formal Account	0.228***	0.052***	0.067***	0.016***
	(0.003)	(0.004)	(0.002)	(0.005)
Female	0.009***	0.006**	0.004	-0.014***
	(0.003)	(0.003)	(0.002)	(0.005)
Age	0.005***	0.005***	0.004***	0.010***
	(0.000)	(0.000)	(0.000)	(0.000)
Age Squared	-4.650***	-5.081***	-3.720***	-0.000***
	(6.240)	(6.130)	(4.710)	(9.120)
Income: Poorest 20%	-0.047***	0.027***	-0.007*	0.001
	(0.006)	(0.005)	(0.004)	(0.008)
Income: Second 20%	-0.055***	0.034***	-0.003	-0.014*
	(0.005)	(0.005)	(0.003)	(0.007)
Income: Third 20%	-0.045***	0.024***	-0.002	-0.016**
	(0.004)	(0.005)	(0.004)	(0.007)
Income: Fourth 20%	-0.028***	0.019***	-0.006**	-0.023***
	(0.004)	(0.004)	(0.003)	(0.007)
Primary Education	-0.084***	-0.062***	-0.012**	-0.084***
	(0.007)	(0.008)	(0.005)	(0.010)
Secondary Education	-0.048***	-0.049***	-0.009**	-0.070***
	(0.007)	(0.008)	(0.005)	(0.010)
Formal Savings	0.079***			

	(0.003)			
Formal borrowing		0.091***	0.166***	0.048***
		(0.005)	(0.002)	(0.009)
Cash preference	0.034***	0.079***	0.012***	0.092***
	(0.001)	(0.004)	(0.023)	(0.002)
Observations	37,071	37,071	36,073	37,071
Pseudo R2	0.489	0.335	0.390	0.403

Each column represents the estimation results of a regression of financial inclusion on informal financial intermediation, a set of individual characteristics and country fixed effects. Column (1) is informal savings club and Columns (2), (3) and (4) represent informal borrowings. Marginal effects are reported, whiles the omitted variables are the richest 20% and tertiary education. Standard errors are in parentheses and are clustered at the country level. * Significance at 10% level, ** significance at 5% level and ***significance at 1% level.

In Table 3.5, columns 2, 3 and 4, the probability of individuals borrowing from family and friends, accessing credit from the store, and using moneylenders for their financial needs increase significantly when they have accounts in formal financial institutions, i.e., an increase by 5.2%, 6.8%, and 1.6% respectively. The results also indicate that women, as compared with men, are more likely to borrow from family and friends and less from moneylenders. Women may be deterred by the mechanisms used by moneylenders to influence repayments for their loans. Having a formal loan gives a strong indication of the use of informal finance in Africa. Repayment arrangements wherein borrowers are forced to start repaying their loans immediately after receiving the loan encourages borrowers to use informal finance mechanisms in order to satisfy the repayment schedules and avoid being tagged as poor creditworthy persons. The author confirms the findings by Jain and Mansuri (2003) who examine why people make parallel use of microfinance institutions and moneylenders for their financial needs.

Table 3.5 shows that an increase in income levels of individuals significantly increases the likelihood of borrowing from family and friends (column 2) but not from a store (column 3). Short-term revenue disparities where enterprise owners need money to pay for goods and services at short notice may be a reason why

borrowing from family and friends become efficient. The use of moneylenders also decreases with higher levels of income. Use of informal finance negatively correlates with levels of educational attainment, where a 1% increase in education leads to a 6.2% reduction in the use of informal finance (borrowing from family and friends). Similarly, individuals with higher educational qualifications are less likely to borrow from moneylenders.

3.4.3 Financial inclusion and cash preference

The results of the preference of cash for transactions instead of bank-based mechanisms is shown in Table 3.6. Columns 2 to 4 reveal a strong negative correlation between account ownership in formal financial intermediaries and the resultant preference for cash transactions. The results indicate that individuals who have bank accounts are less likely to use cash for domestic remittances and to pay for utility and school fees (if these services provide account-based payments services). The author observes that individuals who have used banks for domestic remittance services may also have a strong desire to use cash for the same purpose. These results are consistent with the literature that attribute the use of cash for domestic remittances to the under-developed payment systems across Africa (Alvi & Dendir, 2009).

Table 3.6 Probit model on the impact of financial inclusion on cash preference in domestic remittance, and payments for utility and school fees in 37 African countries.

$$\left[P\left(C_{itj}=1\right)>0\right]=\{\left[\beta_1+\beta_2 Z_{it}+\beta_3 X_{it}+\beta_4 C_{it}+\varepsilon_{it}\right]>0\}$$

Variables	(1) Domestic Remittance (Sending cash)	(2) Domestic Remittance (Receiving Cash)	(3) Utility Bills Payment (Cash)	(4) School Fees Payment (Cash)
Country Fixed Effects	Yes	Yes	Yes	Yes
Formal Account	-0.001	-0.012***	-0.018***	-0.039***
	(0.003)	(0.003)	(0.004)	(0.005)
Female	0.002	-0.001	-0.001	-0.008***
	(0.003)	(0.002)	(0.002)	(0.003)
Age	-0.001**	-0.001**	-0.000	0.001
	(0.001)	(0.000)	(0.000)	(0.000)
Age Squared	1.050	8.070	4.870	-7.610
	(7.190)	(5.131)	(4.560)	(5.751)
Income: Poorest 20%	-0.012*	-0.006	0.000	0.003
	(0.007)	(0.004)	(0.004)	(0.005)
Income: Second 20%	-0.0102*	-0.015***	-0.000	0.005
	(0.006)	(0.005)	(0.003)	(0.004)
Income: Third 20%	-0.005	-0.008**	0.004	0.002
	(0.00)	(0.003)	(0.003)	(0.004)
Income: Fourth 20%	-0.006	-0.005*	0.005*	0.003
	(0.004)	(0.003)	(0.002)	(0.004)
Primary Education	0.040***	0.043***	0.007*	0.010**
	(0.007)	(0.007)	(0.004)	(0.005)
Secondary Education	0.025***	0.032***	0.005	0.003
	(0.007)	(0.008)	(0.003)	(0.005)
D.Remit: Account	0.025***	0.026***		
	(0.003)	(0.003)		
Utility Payment: A/c			-0.001	
			(0.003)	
Fees Payment: A/c				0.004
				(0.003)
Observations	10,101	12,731	10,475	9,738
Pseudo R2	0.356	0.494	0.356	0.299

Each column represents the estimation results of a regression of financial inclusion on cash preference, a set of individual characteristics and country fixed effects. Columns (1) and (2) are domestic remittance (sending and receiving cash), and Columns (3) and (4) represent utility and school fees payments by cash. Marginal effects are reported, whiles the omitted variables are the richest 20% and tertiary education. Standard errors are in parentheses and are clustered at the country level. * Significance at 10% level, ** significance at 5% level and ***significance at 1% level.

The author surmise, however, that the trend is changing because of the introduction of mobile money in most parts of the region (Asongu, 2015). Increasing income

levels can reduce the inclination to use cash in domestic remittances and bills payments, but the same does not apply to education levels. About 45% of domestic remittances in Africa are from urban centres to the hinterlands. This is because educated family members who gain employment in urban centres often remit money for family upkeep in villages and towns; where there is no viable money transfer infrastructure, the use of cash is widespread (Aker, Boumnijel, McClelland, & Tierney, 2016; Asongu, 2018).

Table 3.7 reports the results of the estimation for individuals preferring cash for the following: receipts of wage payments by public employees, government transfers in the form of livelihood relief for families and individuals, and the receipts of payments for the sale of agricultural produce. In all columns, the probability for cash inclination relative to bank account ownership strongly reduces by a margin of 2.8%, 21.4% and 0.08% for public employees' wage payments, government transfers, and agricultural payments respectively. A reduction is also recorded for income and education.

Table 3.7 Probit model on the impact of financial inclusion on cash preference for receipt of wages, government transfers and agricultural payments in 37 African countries.

$$\left[P\left(C_{itj}=1\right)>0\right]=\{\left[\beta_1+\beta_2 Z_{it}+\beta_3 X_{it}+\beta_4 C_{it}+\varepsilon_{it}\right]>0\}$$

Variables	(1) Receiving Wage Payment by Cash	(2) Gov't Transfers by Cash	(3) Agriculture Payment by Cash
Country Fixed Effects	Yes	Yes	Yes
Formal Account	-0.028**	-0.214***	-0.008***
	(0.012)	(0.018)	(0.002)
Female	0.003	-0.025**	-0.002**
	(0.010)	(0.013)	(0.001)
Age	0.008***	-0.000	-9.631
	(0.002)	(0.002)	(0.000)
Age Squared	-6.070**	-4.320	1.030
	(2.620)	(1.941)	(2.450)

Income: Poorest 20%	-0.055***	-0.061***	0.001
	(0.019)	(0.021)	(0.002)
Income: Second 20%	-0.057***	-0.074***	0.001
	(0.017)	(0.020)	(0.002)
Income: Third 20%	-0.041***	-0.033*	0.000
	(0.015)	(0.018)	(0.002)
Income: Fourth 20%	-0.020	-0.025	0.002
	(0.013)	(0.016)	(0.002)
Primary Education	-0.200***	0.041*	3.090
	(0.018)	(0.024)	(0.002)
Secondary Education	-0.064***	-0.015	-0.002
	(0.016)	(0.023)	(0.002)
Wage Receipt: A/c	-0.266***		
	(0.009)		
Gov. Transfer: A/c		-0.209***	
		(0.014)	
Agric. Payment: A/c			0.007***
			(0.001)
Observations	7,619	2,554	11,936
Pseudo R2	0.432	0.329	0.238

Each column represents the estimation results of a regression of financial inclusion on cash preference, a set of individual characteristics and country fixed effects. Column (1) is receipt of employee cash wage payment, (2) is receipt of cash gov't transfer, and (3) denote receipt of cash agricultural produce payment. Marginal effects are reported, whiles the omitted variables are the richest 20% and tertiary education. Standard errors are in parentheses and are clustered at the country level. * Significance at 10% level, ** significance at 5% level and ***significance at 1% level.

The above results are, however, more suggestive than conclusive, because the Global Findex survey does not specifically ask respondents about their preference for using cash instead of bank accounts in their day-to-day financial and business transactions. Consequently, the author is cautious about the use of proxies to effect causations.

3.4.4 Control for mobile money

The focus of this study is to understand how formal financial inclusion in the form of owning bank accounts in formal financial institutions affects the use of informal financial intermediaries in Africa. However, the 2014 Global Findex database that underpins this study defines ownership of a bank account to include mobile money accounts. Technological advancements in financial services delivery, particularly the introduction of mobile money in Africa, means that the fundamentals of financial inclusion have expanded, and formal account ownerships are no longer

sourced from formal financial intermediaries exclusively. According to the Global Findex data 2014, "the definition of a mobile money account is limited to services that can be used without an account at a financial institution. Adults using a mobile money account linked to their financial institution are considered to have an account at a financial institution" (Demirgüç-Kunt et al., 2015, p.4). In analyzing the data, the author found that a number of countries have more mobile money accounts than traditional formal bank accounts and some of these accounts are used for savings and borrowings. Again, because of the dichotomous nature of most of the variables, respondents who report having used mobile money sparingly (at least once in 12 months) are likely to be excluded in the dataset. This means that some respondents could be inadvertently excluded from the sample when in fact Sub-Saharan Africa is the leader in mobile money technology (Demirguc-Kunt et al., 2018; Demirgüç-Kunt et al., 2015).

To ensure that the reported results on the impact of financial inclusion on informal savings, informal borrowings, and cash preference remained robust in the context of mobile money, the author removed the observations with mobile money accounts. This reduced the number of observations in the sample from 37,071 to 33,015. The results are shown in Table 3.8. After excluding the observations of mobile money, the impact of financial inclusion on informal savings and informal borrowings is still positive and significant (coeff. = 0.240 with p-value < 0.01 and 0.026 with p-value < 0.01, respectively), which is consistent with Table 3.4[17]. Moreover, the

[17] In Table 3.4, the informal borrowing variable has three categories (family and friends, store credit and moneylenders) which are all forms of informal borrowings. In Table 3.7 however, the author put them together as one variable of informal borrowing. This is because the study is interested in the overall impact of formal financial inclusion on informal financial intermediation (informal borrowing).

impact of financial inclusion on cash preference is significantly negative (coeff. = -0.011 with p-value < 0.01), which is consistent with Table 3.5 and Table 3.6[18].

Table 3.8 Probit regression results (censored data) on the relationship between financial inclusion and informal savings, informal borrowings, and cash preference.

$$y_{it} = \beta_{it} + \beta_1 Z_{it} + \beta_2 C_{it} + \beta_3 R_{it} + \varepsilon_{it}$$

Variables	(1) Informal savings clubs	(2) Informal borrowings	(3) Cash preference
Country Fixed Effects	Yes	Yes	Yes
Formal Account	0.240***	0.026***	-0.011***
	(0.004)	(0.005)	(0.021)
Female	0.011***	0.001***	0.001***
	(0.005)	(0.013)	(0.001)
Age	0.030***	0.020***	0.060***
	(0.001)	(0.000)	(0.000)
Age Squared	-0.250***	-4.010***	7.120***
	(3.020)	(2.021)	(5.210)
Income: Poorest 20%	0.016***	0.024***	0.030***
	(0.001)	(0.004)	(0.054)
Income: Second 20%	0.002**	0.011***	-0.010**
	(0.003)	(0.024)	(0.000)
Primary Education	0.002***	0.048***	0.002*
	(0.011)	(0.015)	(0.011)
Secondary Education	0.018**	0.027**	0.029*
	(0.002)	(0.007)	(0.023)
Formal Savings	0.020***		
	(0.008)		
Formal borrowings		0.032***	
		(0.008)	
Wage Receipt: A/c			-0.013***
			(0.021)
Gov. Transfer: A/c			-0.044***
			(2.013)
Agric. Payment: A/c			0.028***
			(0.081)
D.Remit: Account			0.001***
			(0.003)
Utility Payment: A/c			-0.001**
			(0.105)
Fees Payment: A/c			0.022***
			(0.043)
Observations	33,015	33,015	14,221
Adjusted R2	0.447	0.338	0.367

[18] Tables 5 and 6 have several variables of cash preference with their corresponding formal financial institutions accounts ownerships that help us to define which activity involves the use of cash or banks. However, in Table 3.7 column 3, the author chose a generic title to represent all the cash preference variables for simplicity, but regress each form of cash preference against their corresponding bank accounts ownership forms as reported in column 3 of Table 3.7.

The probit regression accounts for the censored data set of the number of respondents who report to have formal financial institutions bank accounts, excluding mobile money accounts at the country level. Each column represents the estimation results of a regression of informal savings, informal borrowing and cash preference, on financial inclusion (bank accounts), a set of individual characteristics and country fixed effects. The omitted variables are the richest 20% and tertiary education. Standard errors are in parentheses and are clustered at the country level. * Significance at 10% level, ** significance at 5% level and ***significance at 1% level.

Having ensured that the sample without mobile money observations still holds with the null hypothesis that formal financial intermediation correlates positively with informal financial intermediation, the author then reran the regression with mobile money accounts as an additional control variable. This test was essential to understand whether accounting for mobile money accounts would alter the significant relationships between the variables of interest or not. The results are listed in Table 3.9. First, the coefficient on the variable of mobile money accounts is positive and significant, which indicates the importance of mobile money accounts, and supports the current finding in the literature (Kate & Mann, 2016). Importantly, the variable of formal account is positive and significant for the regression of informal savings and informal borrowings (coeff. = 0.261 with p-value < 0.01 and 0.045 with p-value < 0.01, respectively), which is consistent with Table 3.4. Furthermore, consistent with Table 3.5 and Table 3.6, the coefficient on formal account is negative and significant for the regression of cash preference (coeff. = -0.015 with p-value < 0.01). In sum, the author finds that the impact of financial inclusion on informal savings, informal borrowings, and cash preference, as addressed in the study, is robust after controlling for the issue of mobile money.

Table 3.9 Probit regression results (uncensored full data) on the relationship between financial inclusion and informal savings, informal borrowings, and cash preference.

$$y_{it} = \alpha_{it} + \beta_1 Z_{it} + \beta_2 C_{it} + \beta_3 R_{it} + \beta_4 M_{it} + \varepsilon_{it}$$

	(1)	(2)	(3)
Variables	Informal savings clubs	Informal borrowings	Cash preference
Country Fixed Effects	Yes	Yes	Yes
Formal Account	0.261***	0.045***	-0.015***
	(0.008)	(0.006)	(0.005)
Mobile money Account	0.221***	0.009***	0.029***
	(0.102)	(0.022)	(0.0211)
Female	0.010***	0.002***	0.013***
	(0.008)	(0.052)	(0.005)
Age	0.001***	0.020***	0.001***
	(0.000)	(0.000)	(0.000)
Age Squared	-0.310***	-2.000***	5.010***
	(5.011)	(1.044)	(2.002)
Income: Poorest 20%	0.019***	0.021***	0.025***
	(0.013)	(0.010)	(0.009)
Income: Second 20%	0.024**	0.025***	-0.051**
	(0.013)	(0.095)	(0.009)
Primary Education	0.150***	0.019***	0.062*
	(0.009)	(0.005)	(0.006)
Secondary Education	0.015**	0.068**	0.014*
	(0.021)	(0.010)	(0.017)
Formal Savings	0.021***		
	(0.011)		
Formal borrowings		1.083***	
		(0.006)	
Wage Receipt: A/c			-0.069***
			(0.248)

Gov. Transfer: A/c			-0.079***
			(2.064)
Agric. Payment: A/c			0.032***
			(0.001)
D.Remit: Account			0.049***
			(0.008)
Utility Payment: A/c			-0.024**
			(0.005)
Fees Payment: A/c			0.021***
			(0.026)
Observations	37,071	37,071	18,731
Pseudo R2	0.485	0.342	0.323

The probit regression accounts for the uncensored data to allow for unbiased coefficients of the independent variables. The mobile money account is a control variable that test the relative relationship of the dependent and independent variable of interest (informal financial intermediation and formal financial institutions bank accounts respectively). Each column represents the estimation results of informal savings, informal borrowings and cash preference, on financial inclusion (bank accounts and mobile money), a set of individual characteristics and country fixed effects respectively. Marginal effects are reported, whiles the omitted variables are the richest 20% and tertiary education. Standard errors are in parentheses and are clustered at the country level. * Significance at 10% level, ** significance at 5% level and ***significance at 1% level.

3.4.5 Discussion and policy implication

In order to design appropriate instruments that serve to strengthen financial inclusion and raise efficiency, it is essential to understand the various reasons why households use both formal and informal financial intermediaries. Understanding local contexts is an essential element for the effective design of an inclusive financial system that can stand the test of time.

Incentives for the complementary use of formal and informal financial intermediation dwell in the features of the services offered. Affordability, social solidarity, eligibility, and accessibility frontiers are particularly important when choosing to use a financial service (Armendariz & Morduch, 2007; Beck, Demirgüç-Kunt, & Martinez Peria, 2008). In the case of affordability, individuals consider factors such as the costs of maintaining savings accounts, interest charges

for credits, and fees paid in money transfers (such as mobile money). Social solidarity relates to the social capital and interactions that serve as norms for effective behaviours within savings and loans groups, such as the ROSCAs, Tontines, and savings clubs. Eligibility determines whether an individual can make use of particular services, while accessibility involves questions of ease or difficulty in reaching the location of a service point (Aryeetey & Gockel, 1991; Aryeetey & Udry, 1995; Otero & Rhyne, 2006). A trade-off, therefore, occurs if marginal utility (preferences) in satisfying a need is found to be more in one intermediation or both when preferences are complementary.

Informal financial intermediaries, especially ROSCA's and moneylenders, need to be included in the regulation of financial services. The literature and available data indicate that informal financial intermediaries serve much of the population in Africa. Therefore, regulating the informal financial sector will have a more significant impact on the number of people who will be financially included. A number of countries, such as Ghana, South Africa, and Kenya, have initiated this process; however, more needs to be done in terms of coverage, implementation, monitoring, and evaluation to be consistent with current changes and trends. One of the major problems faced by regulators in Africa is the use of 'one-size-fits-all' regulation mechanisms that group different forms of financial intermediaries with minimal consideration of their differing roles and structures. Regulatory frameworks, however, need to be context and situation-based if they are to be effectively and efficiently implemented. Policymakers need to prioritise this issue in order to harness the benefits that come with financial inclusion.

Technological advancement in financial services delivery has changed the landscape of the financial system of Africa and other parts of the world. Mobile

money has been seen as a good alternative for financial inclusion, with its uptake defying the scale and depth of poverty in Africa. Statistics show that Sub-Saharan Africa has become the hub of mobile money accounts ownership (Demirguc-Kunt et al., 2018). Rural Africa, where more informal financial intermediation occurs, can take advantage of mobile money to gain financial inclusion.

3.5 Conclusion

The research set out to examine if ownership of bank accounts reduces the use of informal financial intermediaries and if a preference for using cash in financial and business transactions existed in Africa. Data was drawn from the World Bank Global Findex 2014 for 37 countries in Sub-Saharan Africa and employed approximately 37,000 observations.

The research supports the findings of Demirgüç-Kunt et al. (2015) which showed that the population of Africa widely accesses informal financial services. The theoretical literature explains why individuals use informal financial intermediaries when formal financial intermediaries are available. Credit rationing, high interest rates, and a reliance on collaterals to avert risks make formal credit more expensive. Insufficient collateral may force people out of formal credit markets. Comparatively, informal lenders, due to their information advantages and proximity, can substitute effective screening and monitoring for collateral (Hoff & Stiglitz, 1993). Kochar (1995) suggests that the informal sector may also be the sector of choice, arguing that informal loans, particularly those from family and friends, may be cheaper than formal loans and thus preferred by borrowers.

The empirical results from the research indicate that using formal financial intermediaries positively correlates with the use of informal financial intermediation. These findings confirm the argument of De Koker and Jentzsch

(2013) that the use of formal banking does not translate into a reduction in the use of informal finance. Collins et al. (2009) conclude that individuals who own bank accounts in South Africa also use informal financial arrangements, especially if there is a mismatch between individual preference and the products and services provided by banks. Kate and Mann (2016) also find complementary evidence of the links between mobile money and informal financial intermediation in Africa. Regarding savings, the results show that individuals who own accounts in formal financial institutions are members of savings clubs and ROSCAs. A 1% increase in formal account ownership leads to a 22.8% increase in the use of savings clubs and ROSCAs. The argument that the informal sector is used as a last resort for loans cannot be sustained.

The widespread use of cash in trade, attributed to the informal nature of the economies of Africa, is recorded in the literature. The Global Findex 2014 survey does not specifically ask respondents about their preference for using cash in their day-to-day financial transactions. The author use proxies to estimate this variable; consequently, the author are cautious in interpreting the results regarding the preference for cash. However, the estimations show that where formal financial intermediaries are available, preference for cash reduces. Growth in the formal financial infrastructure could trigger economic growth by mobilizing excess liquidity in the form of cash that is outside the banking sector. It is clear that financial inclusion has the potential to reduce the use of cash in the African economy. The author suggest that future research opportunities may lie in the following topics:

- why households use both formal and informal financial intermediaries, incorporating an examination of the local context of their decision;
- what driving factors exist for a government decision to pay transfers in cash;
- why households access one particular form of financial intermediary; and
- why households prefer cash-based transactions over bank-based transactions.

The author recommends that efforts be made to ensure that a greater proportion of those who are currently in the financially excluded category are introduced to, and catered for by, the various financial intermediaries within the financial system with a particular reference to mobile money. Regulation mechanisms should reflect the different forms, roles, and structures of both formal and informal financial intermediaries. Regulatory frameworks need to be context and situation-based. Policies that affect how financial intermediation should be regulated need to be broadened to cover the informal sector.

The author conclude that ownership of bank accounts is complemented by the use of informal financial intermediaries and a preference for using cash in financial and business transactions in Africa tends to exist when formal financial intermediaries are not available. At the same time, it appears that the individual country context is essential. More research is needed to ascertain the individual country characteristics and individual variables that determine the broad range in statistical outcomes.

Chapter 4

Mobile money adoption and financial inclusion

4.1 Introduction

Mobile money is considered by many as the new service frontier for financial inclusion, especially in Africa. This innovation has created tremendous opportunities for both service providers and users. Prior research states that only 23% of adults in Sub Saharan Africa (SSA) living below 2 USD per day possess a formal bank account (Demirgüç-Kunt et al., 2015). The mobile phone is offering opportunities for financial access to previously unbanked segments of the population. The increased penetration of mobile phones for MM among the poor of Africa has concerned policymakers and development experts, especially in respect to the poverty level of the people and the drivers for mobile money penetration (Aker & Mbiti, 2010).

The findings of prior researchers have provided some understanding of the key drivers of consumer adoption and acceptance of mobile money in Africa, with key reference to the M-PESA of Kenya. These observations, in particular, include factors such as networks of agents, poor financial infrastructure development, and vigorous marketing, leading to the explosive adoption of mobile money. The high number of consumers adopting mobile money since the inception of the Kenyan M-PESA in 2007 provides assurance that consumers are willing to engage. The issue that needs to be addressed is "*whether post-adoption attitudes and intentions will allow users to continue to use this innovation in the future"*, as in traditional financial inclusion models[19]. Given the significance of mobile money usage, it is

[19] Empirical evidence of poor take up and inadequate continuous use of bank accounts in randomised control trials (RCTs) research provide evidence of the consequences of failing to address context based factors before interventions and innovations are rolled out. More details can be found in Dupas,

necessary to identify the factors that affect continuous usage of mobile money in Africa. This proposition is the motivation for conducting this research.

This study contributes to literature by providing empirical evidence on critical context-based factors (modelled using TAM) that leads to long-term, adoption and continuous usage of mobile money, especially in rural Africa. To the best of the author's knowledge, this is the first piece of research that critically examines context-based factors in the African region. Given the high practical relevance of prior empirical work, this research develops and tests an integrative model of factors determining consumers' adoption and use of mobile money services. Mobile money costs that comprise service pricing, supply of electricity for mobile phone functionality, mobile network infrastructure development, regulation, and income disparities are essential determinants of current and future adoption and usage patterns beyond the endogenous factors of agent networks and marketing. An in-depth study that includes these factors may lead to greater consumer acceptance when the cost implication of this innovation is relatively lower than traditional alternatives such as money transfer through banks and informal mechanisms through bus drivers in the long run (Schierz, Schilke, & Wirtz, 2010). The preliminary results show that electricity availability, which denotes ubiquity, is a significant factor for the adoption and continuous usage of mobile money in Africa, and that perceived cost of mobile money is still in the agreed threshold compared to traditional money transfer mechanisms, such as banks and informal systems. Moreover, perceived income disparity is not a significant factor that determines the

P., Green, S., Keats, A., & Robinson, J. (2012). *Challenges in Banking The Rural Poor: Evidence From Kenya's Western Province*. National Bureau of Economic Research, Karlan, D., Ratan, A. L., & Zinman, J. (2014). Savings By and For The Poor: A Research Review and Agenda. *Review of Income and Wealth, 60*(1), 36-78.

continuous adoption and usage of mobile money in Africa. The results suggest that enabling mobile money regulation is a significant factor for mobile money adoption in Africa.

The rest of this paper is formulated as follows: Section 2 reviews the relevant literature and provides an account of the state of mobile money in Africa; Section 3 provides the hypotheses development, research model and method for testing these hypotheses in this study; Section 4 describes the data, measurement, and the empirical results; Section 5 discusses the results and policy implications; and Section 6 provides the conclusion.

4.2 Literature review

4.2.1 Review of related literature

Dermish, Kneiding, Leishman, and Mas (2011) observed that financial inclusion is the main reason for the introduction of mobile money because financial transactions take place without the use of a bank account. Ideally, mobile money enables easy transfer of e-money in a secure, convenient and economical way. This is likened to the creation of a "pseudo account" when a person purchases e-money from an agent (Aker & Mbiti, 2010). Donner and Tellez (2008) contend that mobile transactions in developing countries enable users to do three main things: store value in an account, convert cash into and out of the bank account, and transfer stored value between accounts. Donovan (2012) states that the use of technology to extend financial services to the poor has become an urgent challenge, owning to the fact that over 1.5 billion individuals and households are reported to be without bank accounts. The use of innovative technology, especially mobile money, is considered a "quick fix" because of the easy adoption of mobile phones by the poor. A lack of access to instruments and to a means through which the poor can improve their lives

has been identified as hampering their efforts to escape poverty. For instance, exclusion from the financial system is seen as an impediment for the poor to improve their lives (Demirgüç-Kunt et al., 2008).

The adoption of mobile money has helped in the generation of employment opportunities; created platforms for other businesses to grow; improved production; and efficiency gains have lowered the costs of transactions and operations. It also serves as a platform for bill payment. Innovation in bill payments can become a huge relief for utility providers in Africa, where bill payments are characterised by inefficiency and long queues that completely lower productivity. In addition, rural areas that lack the traditional financial infrastructures can benefit from the transformational innovative ability of mobile money to extend financial services to them (Aker et al., 2016; Aker & Mbiti, 2010; Evans & Pirchio, 2014; Gencer, 2011; Jack & Suri, 2014). The public-private partnerships (PPPs) policy of African governments can help further development in extending the telecommunication infrastructure to rural areas.

Mobile money as a new innovation can empower poor people to improve their lives and to escape poverty. Studies have demonstrated how mobile money innovation has helped to stabilise and secure the domestic money transfers for improved standards of living. Jack and Suri (2014) find that households that adopt M-PESA are better able to absorb shocks and experience improved consumption than their peers who do not use it. This is because they receive more remittances and lose less in terms of transaction costs, compare to those who receive money transfers in the traditional and informal forms. Aker et al. (2016) compare the use of mobile money and physical cash remittances in a drought crisis in Niger. In randomly selected households, they find that those who use mobile money to send and receive money

enjoy lower variable costs, better diets, and depletion of fewer assets compared to those households that send physical cash. Asongu (2015) empirically verified the impact of mobile phone penetration on African income re-distribution at the macroeconomic level and found that mobile penetration is pro-poor, as it correlates positively with income equality effects.

Empirical studies on the adoption of mobile money have recently grown in the literature. For instance, Murendo, Wollni, De Brauw, and Mugabi (2018), in their study of social network effects on mobile money adoption in Uganda, find that mobile money adoption is positively influenced by the size of the social network with which information is exchanged, controlling for correlated effects and other information sources. In addition, they find that the effect of the social network is particularly pronounced for non-poor households. Gosavi (2018), who looks at mobile money and firms' access to finance in Eastern Sub-Saharan-Africa (SSA), indicates that firms that adopt and use mobile money are more likely to obtain loans or lines of credit after controlling for a large number of firm-level characteristics and using a newly introduced measure to identify the access-to-finance status of firms. (Gosavi, 2018) also shows that the firms that use mobile money are more productive than other firms in the region.

Hanafizadeh, Behboudi, Koshksaray, and Tabar (2014) look at mobile-banking adoption by Iranian bank clients and find that adaptation with lifestyle and trust are the most significant antecedents in explaining the adoption of mobile banking. A study that looks at alternative banking services provision for the poor by Hinson (2011) argues that the poor can be offered banking services through the use of mobile technologies if the traditional financial setting does not allow the poor access to financial services. By proposing a mobile banking model, Hinson (2011)

conceptualised the key ways by which mobile phone technology can be used to increase pathways to banking access for poor people. Alalwan, Dwivedi, and Rana (2017) study the factors influencing adoption of mobile banking by Jordanian bank customers using an extended UTAUT2 with trust. The results show that behavioural intention is significantly and positively influenced by performance expectancy, effort expectancy, hedonic motivation, price value and trust. They maintain that a successful implementation of mobile banking largely depends on the extent to which customers are fully motivated to adopt mobile banking. Chaouali, Souiden, and Ladhari (2017) find in their study that intentions to adopt mobile banking is determined by attitudes toward mobile banking, which in turn is determined by attitudes toward success, attitudes toward failure, and attitudes toward learning to use mobile banking, in which the last three attitudes are significantly influenced by general self-confidence and cynicism.

Evidence of high costs leading to slow uptake of mobile money has been documented (Evans & Pirchio, 2014; Gencer, 2011). For instance, in Botswana, the cost per transaction is $1.07 while in Ghana it is $0.25. When the costs of transactions become lower, it translates directly into significant savings for the poor. This, coupled with its safety and fast delivery, becomes for the poor a better alternative to traditional forms. In addition to extending financial services to the poor, mobile money is expected to improve productivity by increasing efficiency, lowering the cost of transactions, improving security, generating new employment opportunities, and creating a platform on which other businesses can grow.

Another factor that influences the adoption and growth of mobile money in Africa is the flow of rural-urban migration. The informal structure of the economy of

Africa always sees a drift of rural dwellers seeking employment and other opportunities in cities. This creates a latent demand for money transfers because it is often the male household heads who move and who have the obligation to remit the members of their households for their sustenance. Mas and Morawczynski (2009) contend that poor alternatives to domestic remittances (where the majority of low-income Kenyans use informal methods to send money home) and the lack of technology-driven alternatives create a gap in the Kenyan domestic remittance market. The introduction of M-PESA fills this gap, owning to its growth. Mobile money also enables privacy and autonomy, where women are able to have personal savings without seeking permission from their husbands (Mas & Morawczynski, 2009). Because mobile money or e-money is less visible than cash, it also gives women a means to own property.

The mobile money system as an electronic device can only function if there is electricity. Therefore, national grid coverage becomes an important component to the continuous use of mobile phones for financial services. As mobile phone hardware costs continue to drop, the share of spending on energy for its functionality increases. High energy costs become a barrier to low-cost financial access. According to Rubin (2017), the expansion of digital technologies is fundamentally changing when and where energy is needed. Most of these devices need constant, reliable electricity, and increasing demand for mobile network coverage is particularly pronounced in rural and remote areas, which require electricity services to reach beyond the traditional grid. The findings of the Internet Inclusion Summit panel, which the World Bank joined recently, nicely put it: "without electricity, the internet is just a black hole".

Regulatory frameworks of mobile money ensure effective competition and availability of recourse for customers and players. Although first adopters of mobile money such as M-PESA in Kenya did not think of regulatory frameworks in the beginning, subsequent adopters have begun to see the need for regulation as it encourages competition. Competition in the section has brought efficiency, effectiveness of service provision, and associated costs for recourse (Aker & Mbiti, 2010; Jack & Suri, 2011, 2014). Blind (2012) shows that regulation can either influence or obstruct innovation activities. Regulation has a tendency to restrict technological innovation because it reduces market competition by increasing market entry requirements, thus leading to price increases.

Although a number of studies have empirically looked at mobile money adoption using different variables and constructs, none have attempted to consider how the energy needs of mobile phones can directly influence the adoption of mobile money, especially in SSA. This study uses this variable and others to critically understand how context-based factors influence the adoption and intention to use mobile money in Africa.

4.2.2 Mobile Money in Africa

Mobile money (or digital money) is a mobile payments system based on the use of a mobile phone. It consists of accounts held by a mobile network operator (MNO) and is accessible from subscribers' mobile phones. A network of agents helps to convert cash into electronic value (and vice versa). All transactions are authorised and recorded in real-time using short messaging services (SMS). The generic idea behind mobile money is to facilitate the transfer of cash from P2P and or in merchant payments in a cheap, fast, easy, secure and safe manner. However, mobile money has evolved into other uses such as bill payments, savings and credit services,

insurance and bulk disbursements, while other new services are still being developed. Aker and Mbiti (2010, p. 208) quoted Paul Kagame, the president of Rwanda at the 2007 "Connect Africa" summit, that "in ten short years, what was once an object of luxury and privilege, the mobile phone has become a basic necessity in Africa". Demombynes and Thegeya (2012) observed that Kenya has revolutionised the use of mobile phones for financial payments and savings services. According to them, in the 1990s, less than 3% of Kenyan households owned a telephone and less than one in 1,000 Kenyan adults had a mobile phone service. Towards the end of 2011, about 93% of Kenyan households owned a mobile phone, and 73% are M-PESA customers, with 23% of them using it at least once a day. These trends cut across Africa, with mobile phone SIM subscriptions reaching more than 734 million people, according to data from GSMA (2016).

The growth of mobile money in Africa has been phenomenal, where more than 48% of the adult population in Africa are actively using mobile money as at the end of 2017. According to the African Development Bank, the growth of mobile money accounts has surpassed traditional bank accounts within 10 years of deployment. For instance, between 2006 and 2016, mobile money accounts have reached 277 million compared to the all-time peak of 178 million bank accounts in 2016. In Sub Saharan Africa (SSA), bank accounts per 1000 adults is 334.5, indicating improvement in financial inclusion after 40 countries in Africa have deployed mobile money. For instance, in 2006, there were only 2 instances of mobile money deployed in SSA but by the end of 2017, there were as many as 144 instances of mobile money deployment. Globally, only 7 instances of mobile money were deployed in 2006 and by the close of 2017, the number has increased to 277. Furthermore, the percentage of mobile money adoption by gender is also important

for financial inclusion. According to statistics from GSMA, adoption of mobile money by women in SSA has seen a significant increase compared to the other regions of the world. In SSA, the percentage gap in mobile money adoption for women has reduced to 19.5%, whereas the Middle East has the highest at 81%. South Asia has 66.6% and Latin America and the Caribbean have 41%. East Asia and the Pacific also have a 29% female gap. The challenge currently facing the SSA is how to mobilise and encourage the 225 million female non-users to adopt mobile money to improve their standards through financial inclusion.

The desire to extend the delivery of financial services to the unbanked through the medium of mobile money has seen more countries launching different financial services using the mobile phone. For example, as at the end of 2017, 17 countries in SSA have deployed mobile money for insurance, while 10 more countries started savings schemes using mobile money. For example, in Ghana, MTN, a MNO, offers a life-insurance product called Mi-Life which is linked to its mobile money accounts. For about $0.23 a month, users get cover of around $100. Safaricom, which started M-PESA in 2007 in Kenya, have also launched a savings account facility called M-Shwari that pays interest on mobile money accounts that are in credit. Weather insurance products provided by Econet (in Zimbabwe) and Acre Africa (in East Africa), offer farmers "index insurance" for their crops. Farmers will be paid out automatically to a mobile money account, without the need to put in a claim, if, say, a rainfall index drops below a certain level. The mobile money accounts can also be used to harvest data to widen access to financial services for people with little or no history in the formal financial sector. Mobile money-based loans schemes such as M-Shwari in Kenya and the Tanzanian counterpart, M-Pawa, are reported to be doing well in terms of loan payments and recovery. M-Shwari,

for instance, has lower non-performing loans (NPL) of 1.92% with a total loan amount of USD 1.3billion, compared to the traditional bank NPL of 5.3% as at the end of 2016.

As of 2017, more than 30 countries in SSA have either enacted regulations pertaining to mobile money or have draft versions. The need for interconnection and interoperability is important for mobile money to become universal. Interoperability will enable traditional banks and MNOs to facilitate transfers of funds between individuals and merchants and vice versa, without the need for third parties. This will also enable effective competition and allow for operators to share information such as the creditworthiness of mobile money users for onward credit disbursements. As regulation is key for effective implementation and monitoring of all the activities of operators, it is ideal that enabling regulation is put in place to ensure that the system has rules and regulations that govern their operations.

Usage of mobile money in SSA has also generated positive externalities according to data gathered from GSMA (2016). For example, payments for school fees using mobile money has improved in Cote D'voire. Bill payments for water and sanitation in Tanzania have increased by 38%, while solar energy customers in Kenya, Uganda, and Tanzania can pay for services through M-KOPA. Vodafone has promoted farmer alliances in Tanzania and Kenya, in helping farmers to network for extension services and marketing.

To effectively deal with financial exclusion and build people's capacity for economic empowerment, mobile money must be universally available across a greater range of digital transactions. Issues such as lower levels of adoption by women and rural coverage (as adoption of mobile money is concentrated in urban

areas) are still important problems to tackle in order to expand financial inclusion, economic development, and inclusive growth. Rural coverage can only be achieved if infrastructure such as national grids, effective regulation, good pricing, and mobile networks are available.

4.3 Methods and hypotheses development

4.3.1 Theoretical perspectives

Davis (1985) argues that technological system user motivation can be used to predict the use of the system, which in turn is directly influenced by an external stimulus consisting of the actual system's features and capabilities. He proposed the technology acceptance model (TAM) which can be considered the most influential extension of the theory of reasoned action (TRA) and the theory of planned behaviour (TPB). Fishbein and Ajzen (1975) posit that behavioural intention is often predicted using models that have multiple attributes, such as those based on users' beliefs about technology. In this case, the TAM can also be predicted in the same way using multi-attributes such as user-friendliness and usefulness to predict users' intentions in the use of technology. Accordingly, TAM has five attributes or concepts that help to predict the acceptance of a system by an individual. These include perceived ease of use, perceived usefulness, attitudes toward use, intention to use, and actual use. Davis (1989) defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320), whereas perceived ease of use (user-friendliness) is "the degree to which a person believes that using a particular system would be free of efforts" (p. 323). Other concepts of TAM were derived from the works of Fishbein and Ajzen (1975), in which attitudes toward use is defined as "an individual's positive or negative feelings about performing the target

behaviour" (p.216). Intention to use is based on the definition of behavioural intention: "the strength of one's intention to perform a specified behaviour" (Fishbein & Ajzen, 1975, p.288). TAM replaces variables related to attitude and behavioural control in TRA and TPB with technology acceptance measures (Bagozzi, 2007).

According to Bagozzi (2007), the TAM model is too parsimonious and should be expanded by factors particularly relevant to the specific technology under investigation. Also, integrating variables from related theoretical perspectives can provide a better understanding of consumer acceptance (Nysveen, Pedersen, & Thorbjørnsen, 2005). Thus, consistent with other studies, the author regards the TAM as a starting point of the research and extends it with additional constructs important to mobile money acceptance (Schierz et al., 2010). In this way, the author broadens the research agenda by the addition of context-based variables and allows for further research using similar variables in order to explain user acceptance of mobile money in Africa and in other developing economies.

The author believes that costs of mobile money is an important component in the adoption and continuous usage of mobile money in Africa. These costs can be substantial in developing countries where financial systems and infrastructure are underdeveloped, and energy development for charging mobile phones is inadequate. With mobile money systems, costs associated with phone functionality (electricity for charging the phones), and transaction costs for money transfers can be substantial over time and rational consumers who see these costs rise will have diminishing returns since the costs may be higher compared to the associated benefits.

The fundamental idea of value is tied to willingness to pay, which is also affected by income. Thus, wealthier individuals have the ability to pay for mobile money, but for poor people, it is a sacrifice and so the return value or benefits should be more than the costs.

4.3.2 Research model and hypothesis development

Davis (1989) refined the TAM by suggesting that the user's motivation can be explained by three factors: perceived ease of use, perceived usefulness, and attitude towards using the system. He hypothesised that the attitude of a user towards a system was a major determinant of whether the user will actually adopt or reject the system, defined as the degree to which using a technology is positively or negatively valued by an individual. Behavioural intention to adopt the system is modelled as a function of attitude. Attitude in turn positively affects consumers' adoption and usage intentions (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). In the model, the author uses the percentage of subscribers per 100 inhabitants as the proxy for attitude towards the use of mobile money. This proxy is important in the sense that the percentage of people who actually subscribe to any mobile company will determine their attitudes to adopt and use the system. In this case, higher subscription percentages are considered as stronger attitudes towards adoption and lower subscription percentages demonstrate weaker attitudes. Given the positive relation between attitudes towards use and intention to adopt (Luarn & Lin, 2005), the author proposes the first hypothesis:

$\boldsymbol{H_1}$: There is a positive relationship between individual attitude towards continuous adoption and the intention to use mobile money.

The attitude of the user in turn was considered to be influenced by two major beliefs: perceived usefulness and perceived ease of use, with perceived ease of use having a direct influence on perceived usefulness. Kleinrock (1996) argues that most

people are “nomads” when it comes to technology and this can be identified with mobile phones and Africans who are always on the “go” for economic activities. A person who leads a busy life such that he/she is always on the move will be more likely to adopt a mobile money technology compared to one who leads a sedentary lifestyle. Mobile money effectiveness therefore relies on it ubiquity (Kleinrock, 1996), and this can only happen if the functionality of the mobile phone, such as having electricity to charge it, is available. As electricity generation is well below full capacity in most parts of Africa, it is important to consider how this factor can affect the functionality of mobile phone usage. Rural dwellers who have no electricity will find it difficult to adopt and use mobile money, compared to those in urban areas. Therefore, the mobility-related needs that serve as the driver for adopting mobile money (Kakihara & Sorensen, 2002) may affect its usage if the national grid is unavailable. Mobile money signifies the value arising from the mobility of the new medium and therefore requires power to charge the instruments (mobile phones) that help in providing the mobile money services. According to Rubin (2017), the expansion of digital technologies is fundamentally changing when and where energy is needed. This thinking can be likened to the perceived usefulness of mobile money, defined as how well consumers believe mobile money can be integrated into their daily mobile activities. Perceived usefulness, which is believed to be directly influenced by perceived ease of use, means that mobile money services are available for everyday activities anytime, anywhere. In accordance with this line of reasoning, the author argues that mobile money can obtain a dominant position in product/service categories for financial inclusion, where the use of mobile applications offers customers indisputable mobile value by grasping the very essence of the combination of mobility, technology and lifestyle

(Kakihara & Sorensen, 2002), but only if electricity is available to charge the technology (Rubin, 2017). The author therefore uses the percentage of people with access to electricity as proxy for perceived usefulness (ability to use mobile phone and mobile money at anytime and anywhere). The ubiquity of the mobile money system can only be possible if electricity availability matches the use of mobile devices for financial services. Based on this, the author proposes the second hypothesis:

$\boldsymbol{H_{2a}}$: There is a positive relationship between perceived usefulness (ubiquity/grid) and attitudes towards continuous adoption and usage of mobile money.

$\boldsymbol{H_{2b}}$: There is a positive relationship between perceived usefulness (ubiquity/grid) and intention to adopt and use mobile money.

To model for perceived ease of use, the author takes inspiration from the work of Swanson (1982), who provided evidence that perceived ease of use and perceived usefulness of technology were both important behavioural determinants. Swanson hypothesised that potential users will select and use information reports based on a trade-off between perceived information quality and associated cost of access. Information quality relating to perceived usefulness construct, and cost of access similar to perceived ease of use construct. Comparatively, Mathieson, Peacock, and Chin (2001) and Luarn and Lin (2005) find that perceived financial resources (costs) are important behavioural intentions to use an information service (IS) and mobile banking respectively. Venkatesh, Thong, and Xu (2012) argue that the cost and pricing structure may have a significant impact on consumers' technology use. They define ***price value*** as the consumer's cognitive trade-off between the perceived benefits of the technologies and the monetary cost of using them. The perceived benefits of using a technology are greater when the price value is more, and the perceived monetary cost is less, or vice versa. In the model used in this study, the

author considers the price value to be the prices of prepaid mobile voice as the cost of mobile money in Africa.[20] This is used as the proxy for perceived ease of use (perceived costs), defined as the extent to which a person believes that using mobile money will cost money (Luarn & Lin, 2005). The author proposes that financial costs can influence the behaviour and intention to adopt and use mobile money in Africa, especially if costs continue to rise. Based on the above, the author proposes the next hypotheses:

$\boldsymbol{H_{3a}}$: There is a negative relationship between perceived costs and attitudes towards continuous adoption and usage of mobile money.

$\boldsymbol{H_{3b}}$: There is a negative relationship between perceived costs and intention to adopt and use mobile money.

According to Field and Field (1997), several pricing studies have found that customer characteristics may influence willingness to pay (WTP), which in turn can influence attitudes and intentions towards adoption of mobile money. These differences in WTP may depend on demographic or behavioural characteristics. The demographic variables include age, gender, income, marital status, education, and geographical location as well as psychographic variables such as activities, interests, opinions and lifestyle. In addition, Venkatesh et al. (2012) contend that facilitating conditions influences technology use directly based on the idea that consumers can vary significantly across application vendors, technology generations, mobile devices, and so on. In this context, facilitating conditions will act more like perceived behavioural control in the theory of planned behaviour (TPB) and influence both intention and behaviour (Fishbein & Ajzen, 1975). Specifically, a consumer who has access to a favourable set of facilitating

[20] The author is sure that using the voice prices will be closer to the MM transfer costs and is a necessary proxy due to the unavailability of consolidated mobile money transfer prices,.

conditions is more likely to have a higher intention to use a specific technology. All things being equal, a consumer with a lower level of facilitating conditions will have lower intentions to use mobile money. Venkatesh et al. (2012) emphasise that the effect of facilitating conditions on behavioural intentions can be moderated by age, gender, and experience. As such, this study proposes that facilitating conditions and WTP for adopting and using mobile money can be affected by gender, age, income disparity, experience (education) and rural dwelling as argued by Field and Field (1997). Older consumers tend to face difficulties in processing information or in using technology and thus may require more support compared to young consumers. In the same way, females are likely to require more support than men to adapt to technology, in light of the emphasis on societal gender roles which incline men to be task-oriented (Venkatesh et al., 2012). In terms of income disparities, richer consumers will be more likely than poor consumers to adopt mobile money due to their greater purchasing power and WTP. With experience (education), this can also moderate the relationship between facilitating conditions such as regulation and attitudes toward adoption. Greater experience can lead to greater familiarity with the technology and better knowledge structures to facilitate user learning, thus reducing user dependence on external support. Finally, the lack of mobile network infrastructure and electricity in rural areas can moderate attitudes to adopt mobile money. As such, the author hypothesises the following:

$\boldsymbol{H_4}$: There is a negative relationship between perceived female and attitudes towards adoption of mobile money.

$\boldsymbol{H_5}$: There is a negative relationship between perceived old age and attitudes towards adoption of mobile money.

$\boldsymbol{H_{6a}}$: There is a positive relationship between perceived income disparity (rich) and attitudes towards adoption of mobile money.

$\boldsymbol{H_{6b}}$: There is a positive relationship between perceived income disparity (rich) and the perceived usefulness (ubiquity) of mobile money.

$\boldsymbol{H_{6c}}$: There is a negative relationship between perceived income disparity (poor) and attitudes to adopt and use mobile money.

$\boldsymbol{H_{7a}}$: There is a positive relationship between perceived education levels and attitudes to adopt and use mobile money.

$\boldsymbol{H_{7b}}$: There is a positive relationship between perceived education levels and enabling regulation to use mobile money.

$\boldsymbol{H_{7c}}$: There is a positive relationship between perceived education levels and perceived income disparity (rich) to use mobile money.

$\boldsymbol{H_{8}}$: There is a negative relationship between perceived rural dwelling and attitudes to adopt and use mobile money.

Liu, Kauffman, and Ma (2015) argue that market competition, cooperation, and regulation act as key accelerators or decelerators of industry changes, while innovations in new mobile payments have the potential to transform it. As accelerators, certain businesses (new technology services innovations, and the emergence of new strategic thinking from high-tech firms that become financial institutions themselves) gain advantage by using a judicious mixture of cooperation with suppliers, customers and firms producing complementary or related products. On the other hand, the decelerators arise from the defensive behaviour of existing firms in the market, and from the increased complexity and uncertainty when multiple firms offer different technology solutions in the absence of regulatory guidance and technology standards (Liu et al., 2015). These are likely to lead to market entry deterrence to prevent innovators from participating, as well as to damage due to fierce competition that can impair the health of the payments sector in the financial services industry. Regulation regarding competition policy, pricing, market entry, natural monopoly and public utilities plays an important role in shaping technology and innovation evolution (Blind, 2012). Stricter regulations seem to have had a negative influence on services innovation in certain industries

(Prieger, 2002). In the financial services sector, financial institutions are closely connected to consumer welfare, so regulators are extremely cautious about how disruptive technological innovations may change the market (Dewatripont & Tirole, 1994). Silber (1983) analysed financial innovations and showed that about 30% were induced by regulation. On the other hand, when regulation offers support for a technology standard in some way, or provides a roadmap for a specific technology innovation, market uncertainty will be diminished, and its development will be accelerated. From this, the author states the final hypotheses:

$\boldsymbol{H_{9a}}$: There is a positive relationship between perceived enabling regulation and attitudes towards adoption and usage of mobile money.

$\boldsymbol{H_{9b}}$: There is a positive relationship between perceived enabling regulation and the intention to adopt and use mobile money.

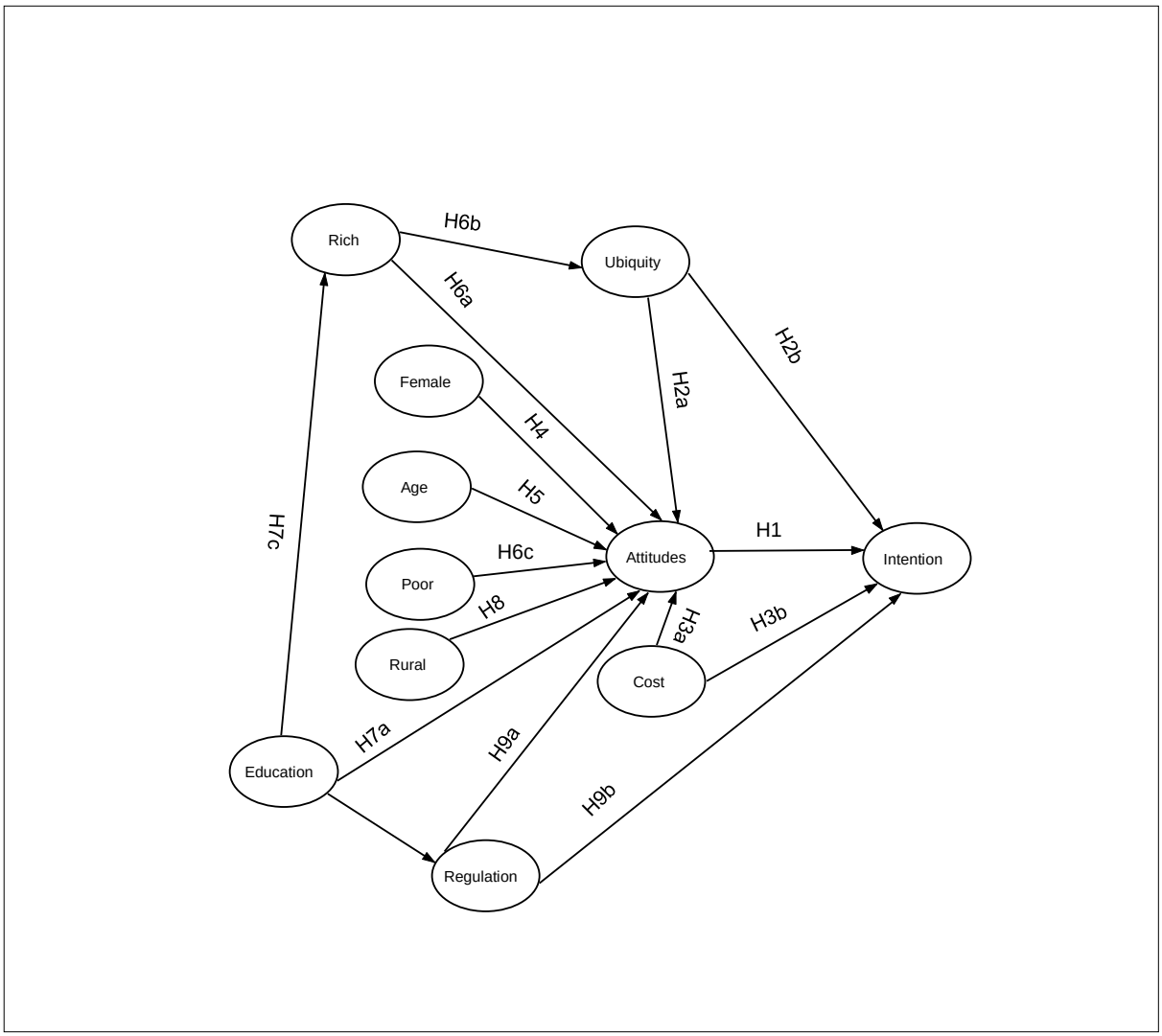


Figure 4.1 Research model: The hypothesised research model indicating the direction of mediation

4.3.3 Research method

Two of the most widely used statistical methods to test mediated effects in secondary data are multiple regression analysis and structural equation modelling (SEM) analysis. Multiple regression analysis uses methods such as stepwise regression and progressive adjustment to detect mediation effects. Baron and Kenny (1986) argue that the tendency to include variables in multiple regression analysis rests on assumptions that variables should be normally distributed, and that measurement errors and multicollinearity are absent when two or more explanatory

variables are dealt with. Furthermore, all variables included in a multiple regression analysis must be observed measures. These assumptions cannot be supported with the type of data the author is using for his studies. Because not all of the data are directly observed in a survey, the author cannot guarantee that the data is free from measurement errors or that there is no multicollinearity present in the explanatory indicators.

For these reasons, the author proposes to use SEM for the empirical estimation. SEM analysis is arguably the most effective way to test mediated effects when data requirements are met. As multiple indicators are used, SEM constructs measurement models for the theoretical concepts hypothesised (Li, 2011) and allows for multiple indicators of latent variables which are a more realistic representation of the variables under study (Schierz et al., 2010). When measurement error is a concern as in the data, SEM uses multiple indicators to overcome it. Equally, discrete measures in SEM using secondary data has been observed to be problematic where observed and latent variables are not continuous (Li, 2011). One way of overcoming this issue is to estimate the data using the weighted least squares (WLS) method with polyserial correlations as proposed by Jöreskog, Sörbom, and Du Toit (2001). For this study, all the constructs were estimated using SEM with maximum likelihood. The rationale for this is that each explanatory and dependent variable may be associated with measurement errors in contrast to OLS regression, which is based on the assumption that variables are measured perfectly (Bollen, 1987).

4.4 Data, measurement and empirical results

4.4.1 Data

Data on the percentage of the total population with electricity consists of the percentage of the country's population that are connected to the national grid, taken from ITU and the World Bank. Energy development has not kept pace with rising demand in Africa, placing a large strain on the continent's existing resources. Although some African countries export energy to their neighbouring countries, most lack the basic infrastructure and systems to generate and consume electricity. In light of this, mobile money, which is dependent on mobile phone technology, may fail to induce economies of scale if the current supply of electricity remains as it is. The electricity variable is important for understanding how adoptions are scaling up in the midst of an inadequate supply of energy needed for mobile phones, especially in the rural areas of Africa.

The data for the study is taken from the Research ICT Africa (RIA) Network, a non-profit organisation based in South Africa. RIA conducts research on ICT policy and regulation and facilitates evidence-based and informed policy making for improved access, use, and application of ICT for social development and economic growth**.** The data on prices is gathered from mobile network operators across Africa on a quarterly basis and standardised using the OECD mobile pricing measurement (cheapest prepaid mobile voice product by country (in USD)). The prices are based on 50 minutes of 30 calls based on users split between networks and peak / off-peak / off-off peak times; and 100 Short Messaging Services (SMS). For a typical mobile money transaction, it involves the transfer of cash into e-money via a text message or SMS. This e-money value is stored and can be retrieved (transferred back to cash) via a mobile phone and designated network agent, bank or ATM. Customers pay

(by buying airtime) for the use of the voice and SMS services through their mobile phones but also pay additional commissions for any amount sent or received through mobile money.

Data relating to the percentage of mobile cellular subscribers for every 100 inhabitants and the percentage of population covered by a mobile cellular network were taken from the International Telecommunications Unit (ITU). These data were cross checked with data from the World Bank and the differences are only in decimals, which are negligible. The author also used data on regulation of mobile money in Africa but proxied this variable with data from the World Governance Indicators (WGI). Although about 40 countries in Africa have an enabling regulation for mobile money, the author used the regulatory quality indicator from WGI. The WGI regulatory quality indicator reflects public perceptions of the government's ability to formulate and implement sound policies and regulations that permit and promote private sector development. Data on the individual characteristics of mobile money customers (proxy for facilitating conditions) were taken from the Global Findex database. These comprise age, gender (female), income, and education. Finally, the author obtained data for the rural variable from the World Bank's development indicators (WDIs).

4.4.2 Measurement of variables

The measurement items were formulated based on theory and reviewed literature and were modified to reflect the assumptions, propositions, and hypotheses of context-based themes. The items to measure attitudes towards continuous adoption and intentions to adopt and use mobile money were drawn from work by (Davis, 1989; Davis et al., 1989; Luarn & Lin, 2005) and used as a proxy in order to understand mobile money in the African context. Items for perceived ease of use

(costs) and perceived usefulness (ubiquity) were taken from earlier validated studies (Luarn & Lin, 2005; Rubin, 2017; Swanson, 1982; Venkatesh et al., 2012) and were modified to fit the specific technology under study. With items based on facilitating conditions, the author follows the studies of Field and Field (1997) and Venkatesh et al. (2012) on behavioural intentions to adopt mobile services. These facilitating conditions include individual covariates such as age, gender (female), income disparities, and experience (education). Lastly, the proposed regulation item is taken from (Liu et al., 2015), in line with the modification strategy. The full list of items used in this study and their corresponding modifications are listed in Table 4.1.

Table 4.1 Variable description and source

Variable/ construct	Description/Measurement	Source
Intention to use mobile money	Given the opportunity the respondent will use mobile payment services, measured (proxy) as percentage of population with a mobile network in a country	(Davis, 1989), (ITU, RIA, World Bank, 2017)
Attitude towards adopting mobile money	Degree to which using a technology is positively or negatively valued by an individual, measured (proxy) as the percentage of mobile subscribers per 100 inhabitants	(Davis, 1989), (ITU, RIA, World Bank, 2017)
Perceived usefulness (ubiquity/grid)	How well consumers believe mobile money can be integrated into their daily mobile activities (ability to use mobile phone and mobile money at anytime and anywhere), measured (proxy) as percentage of population with electrification (national grid)	(ITU, RIA, World Bank, 2017), (Kakihara & Sorensen, 2002), (Rubin (2017)
Perceived cost	Extent to which a person believes that using mobile money will cost money, measured (proxy) as price of prepaid mobile voice and SMS	(Luarn & Lin, 2005), (RIA, 2017)
Perceived female	Likelihood that females may require more support to adapt to technology use than men, measured (proxy) as percentage of women with mobile money accounts	(Venkatesh et al., 2012), (Field and Field (1997), (WDI, 2017)
Perceived old age	Likelihood that older consumers may face difficulty in processing information or using technology, measured (proxy) as percentage of population aged 65 and above out of the total population	(Field and Field (1997), (Venkatesh et al., 2012) (WDI, 2017)
Perceived income disparity (rich)	Willingness to pay (WTP) for mobile money due to price value, measured (proxy) as percentage of mobile account ownership by the richest 60%	(Field and Field (1997) (WDI, 2017)

Perceived income disparity (poor)	Willingness to pay (WTP) for mobile money due to price value, measured (proxy) as percentage of mobile account ownership by the poorest 40%	(Field and Field (1997) (WDI, 2017)
Perceived education	Better knowledge structures to facilitate user learning of mobile money, measured (proxy) as primary school completion rate as percentage of total population	(Field and Field (1997), (Venkatesh et al., 2012), (WDI, 2017)
Perceived rural dwelling	Lack of mobile network infrastructure and electricity measured (proxy) rural population as percentage of total population	(Field and Field (1997), (WDI, 2017)
Perceived regulation	Enabling regulation offering support for mobile money standards, competition and innovation, measured (proxy) as ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	(Liu et al. (2015), (WDI, 2017)

Note: ITU = International Telecommunication Union, RIA = Research ICT Africa, and WDI = World Development Indicators.

4.4.3 Empirical results

To begin with, the author conducted analysis of a hybrid model of the structural model, incorporating the measurement models and all of the paths specified in Figure 1. A set of goodness-of-fit indices (GFIs) was generated, indicating that the theoretical model accurately predicted the observed and latent input matrix (Li, 2011). The goodness-of-fit measures for the structural model show satisfactory values as follows: Goodness of fit index (GFI) = 0.98, Root mean square error of approximation (RMSEA) = 0.061, the Bentler-Bonett normed fit index (NFI) = 0.95, the Tucker-Lewis index (TLI) = 0.96, the comparative fit index (CFI) = 0.92, the incremental fit index (IFI) = 0.92, and the coefficient of determination (CD) = 0.93, which are within accepted values (Bollen, 1987).

Having satisfied questions about of the appropriateness of the model, the author shows preliminary results on the context-based factors that determine the continuous use of mobile money in Africa. Following Bollen (1987) approach on direct, indirect and total models in SEM, the author shows the direct paths among the key theoretical constructs in which items or factors in the hypothetical model in Figure 4.1 are either confirmed or rejected. In Figure 4.2, only the significant key

theoretical constructs are included in the model. The indirect effects can be computed by multiplying all of the direct links from one variable to another. The total effect is then the sum of the direct and indirect effects. The study shows the standardised coefficients in Figure 4.2 and in Tables 4.2 and 4.3 for easy comparison of magnitudes as the measurement of the variables were done on different scales. The standardised coefficients for each path closely approximate the effective magnitude usually shown by beta weights in regression. Thus, low coefficients have limited substantive effect (Hair, Anderson, Tatham, & Black, 1995).

In support of H_1, the author finds a significant and positive relationship between individual attitude towards continuous adoption of mobile money and intention to use mobile money in Africa (β = .41; $p \leq .01$). Hypotheses H_{2a} and H_{2b} investigate the role of the availability of power (electricity or grid) with the construct name ubiquity, themed as an item for the perceived usefulness of mobile money on individuals' attitudes and intentions for the adoption and usage of mobile money in Africa. The estimation results show that there is a positive and significant relationship between ubiquity and individuals' attitudes towards the continuous adoption of mobile money and intention to use mobile money, thus confirming hypotheses H_{2a} and H_{2b} respectively (β = .42; $p \leq .01$, β = .60; $p \leq .01$). Similarly, hypotheses H_{3a} and H_{3b} specifically tested the role of perceived costs of mobile money, (construct for perceived ease of use) as a predictor of individuals' attitudes and intentions towards the continuous adoption and usage of mobile money in Africa (β = .01; $p \leq .05$, β = .03; $p \leq .05$). The result predicted positive significant coefficients of weaker magnitudes contrary to the hypothesised constructs in the model. By this, the estimation confirmed that perceived costs of mobile money in

Africa are still in the lower thresholds compared to traditional costs for money transfers via banks and informal intermediaries. Using the number of females with mobile money accounts as a construct for females' attitudes towards continuous adoption of mobile money, the author finds an insignificant relationship between being female and attitudes towards adopting mobile money, thus rejecting hypothesis H_4 (β = .00; p > .05).

The structural link from perceived age to the attitude towards continuous adoption of mobile money is negative and significant (β = -.04; $p \leq .01$), supporting H_5. Hypotheses H_{6a} to H_{6c} related to the effect of income on two theoretical constructs, serving as a mediator for perceived attitude towards adopting mobile money, and perceived usefulness (ubiquity). However, their coefficients were not significant enough to support the relationships (β = - .04; p > .05, β = .02; p > .05, β = -.01; $p \leq .05$) respectively. The author therefore rejects hypotheses H_{6a} to H_{6c}. Hypotheses H_{7a} to H_{7c} tested whether perceived education (experience) is positively related to other constructs in the model, including perceived attitude towards continuous adoption of mobile money, perceived enabling regulation for mobile money, and the perceived income disparity (rich 60%). The results supported two constructs with statistical significance (attitude and enabling regulation) and rejected the third mediating construct between education and income disparity (rich 60%) (β = .40; $p \leq .01$, β = .02; $p \leq .01$, β = .01; p > .05) respectively. The author therefore confirmed H_{7a} and H_{7b}. The relationship between perceived rural dwelling and attitude towards adopting and using mobile money was supported with a statistically significant negative coefficient of -.36, confirming that adoption of mobile money in Africa is significantly concentrated in urban centres (β = -.36; $p \leq .01$). H_8 is thus confirmed. Finally, the theoretical construct of perceived enabling regulation

assessing the relationship between perceived attitude towards adoption of mobile money and intention to adopt and use mobile money are both positive and significantly supported ($\beta = .05$; $p \leq .01$, $\beta = .35$; $p \leq .01$) respectively.

To provide for the stability of the results, the author tested the correlation of the exogenous variables (see Table 4.4) to deduce the presence of multicollinearity. Berry, Berry, Feldman, and Stanley Feldman (1985) argue that for any specific empirical analysis, multicollinearity, which is correlation among explanatory variables, can affect the stability of the empirical results. They suggest that, to avoid this, as a rule of thumb, correlation among the explanatory variables should be below 0.8. The correlation table (see Table 4.4) shows that the items are within the cut-off value of 0.8, indicating that multicollinearity is not a problem in the sample.

Given that the sample is small, it is possible that the measurement scale could affect the results of the estimation if items are found to be highly correlated with each other. In order to address this effect, the author tested the scale of reliability for the consistency of the data and items in the sample by looking at the detailed information of the Cronbach's alpha of the 11 items used. From Table 4.5, the author sees that the item-test correlation and the item-rest correlation all produce figures that are within limits of 0.8 for all the items. The overall α of 0.8 is an indication that items in the model are reliable and consistent to provide stable results.

Table 4.2 Mediation effects on individual attitudes towards adoption of Mobile Money in Africa.

Note: SEM coeff = Structural equation model coefficient, t-values for standardised path coefficients are described in parentheses. The degree of freedom of 1 indicate that all constructs are unidimensional. SEM coeff = Structural equation coefficient

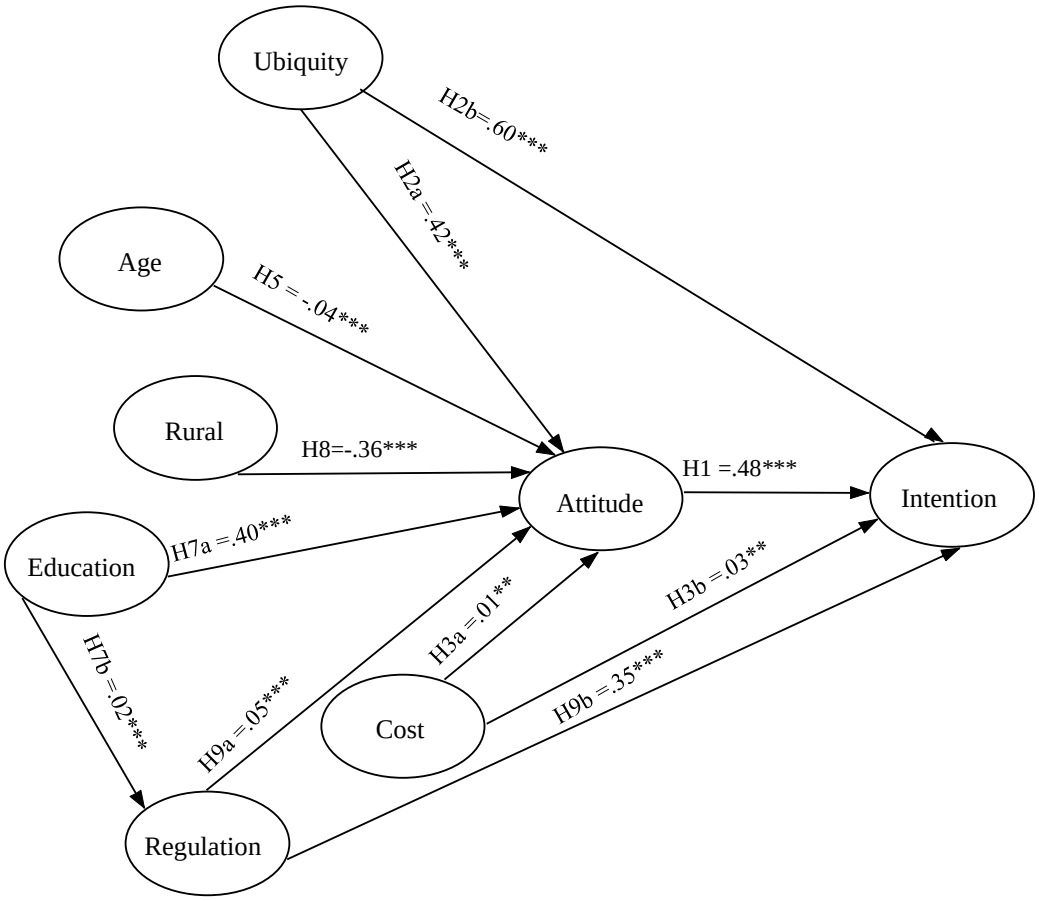
Variable	SEM coeff	Chi-statistics
Intention to use mobile money	0.48***	$\chi 2$= .72
	(7.73)	*df* = 1, *p* = .000
Perceived usefulness (ubiquity/grid)	0.42***	$\chi 2$= .79
	(7.01)	*df* = 1, *p* = .000
Perceived cost	0.01**	$\chi 2$= .49
	(-1.14)	*df* = 1, *p* =
Perceived age	-0.04***	$\chi 2$= .59
	(5.46)	*df* = 1, *p* = .000
Perceived regulation	0.05***	$\chi 2$= .68
	(3.56)	*df* = 1, *p* = .000
Perceived education	0.40***	$\chi 2$= .61
	(4.35)	*df* = 1, *p* = .000
Perceived income 60%	-0.04	$\chi 2$= .37
	(-0.42)	*df* = 1, *p* = .641
Perceived income 40%	-0.01	$\chi 2$= 33
	(-0.2)	*df* = 1, *p* = .871
Perceived female	0.00	$\chi 2$= .21
	(0.07)	*df* = 1, *p* = .948
Perceived rural dwelling	-0.36***	$\chi 2$= .69
	(-6.77)	*df* = 1, *p* = .000
Observations	40	
Overall R^2	.62	

Table 4.3 Mediation effects on the individual intentions to use Mobile Money in Africa.

Variable	SEM coeff	Chi-statistics
Attitude towards adopting mobile money	0.48***	$\chi 2$= .72
	(7.73)	*df* = 1, *p* = .000
Perceived usefulness (ubiquity/grid)	0.60***	$\chi 2$= .87
	(7.01)	*df* = 1, *p* = .000
Perceived cost	0.03**	$\chi 2$= .41
	(-1.14)	*df* = 1, *p* =
Perceived age	-0.04***	$\chi 2$= .59
	(5.46)	*df* = 1, *p* = .000
Perceived regulation	0.35***	$\chi 2$= .72
	(3.56)	*df* = 1, *p* = .000
Perceived education	0.40***	$\chi 2$= .61

	(4.35)	*df* = 1, *p* = .000
Perceived income 60%	-0.04	$\chi 2$= .37
	(-0.42)	*df* = 1, *p* = .641
Perceived income 40%	-0.01	$\chi 2$= 33
	(-0.2)	*df* = 1, *p* = .871
Perceived female	0.00	$\chi 2$= .21
	(0.07)	*df* = 1, *p* = .948
Perceived rural dwelling	-0.36***	$\chi 2$= .69
	(-6.77)	*df* = 1, *p* = .000
Observations	40	
Overall R^2	.62	

Note: SEM coeff = Structural equation model coefficient, t-values for standardised path coefficients are described in parentheses. The degree of freedom of 1 indicate that all constructs are unidimensional.



Note: *** = p ≤ .01, ** = p≤ .05

Figure 4.2 Results of the relationships in the research model

Table 4.4 Correlations among the exogenous variables

Item	Perceived intention	Perceived attitude	Perceived usefulness (ubiquity)	Perceived cost	Perceived regulation	Perceived rural	Perceived age	Perceived female	Perceived rich	Perceived poor	Perceived education
Perceived intention	1.00										
Perceived attitude	.72	1.00									
Perceived ubiquity	.73	.74	1.00								
Perceived cost	-.20	-.09	-.18	1.00							
Perceived regulation	.64	.62	.43	-.29	1.00						
Perceived rural	-.60	-.71	-.63	-.14	-.15	1.00					
Perceived age	.57	0.59	.75	-.20	.42	-.42	1.00				
Perceived female	-.02	-.02	-.03	-.06	.30	.21	.13	1.00			
Perceived rich	.09	-.01	-.06	-.16	.14	.13	-.24	.02	1.00		
Perceived poor	.05	.01	-.01	-.13	.10	.11	-.22	-.13	.78	1.00	
Perceived education	.54	052	.61	-.40	.45	-.24	.52	.16	.06	.08	1.00

The test from this table suggests that multicollinearity is not a problem among the constructs. All constructs are below the cut-off figure of .80.

Table 4.5 Scale reliability test of standardised items

Item	Obs	Sign	Item-test correlation	Item-rest correlation	Inter item correlation	Alpha
Perceived intention	40	+	.79	.72	.23	.75
Perceived attitude	40	+	.72	.76	.23	.75
Perceived usefulness (ubiquity)	40	+	.71	.75	.23	.75
Perceived cost	40	+	.52	.56	.28	.74
Perceived regulation	40	+	.64	.54	.25	.77
Perceived rural	40	-	.58	.46	.26	.78
Perceived age	40	+	.78	.73	.23	.75
Perceived female	40	+	.24	.08	.31	.82
Perceived rich	40	-	.30	.14	.30	.81
Perceived poor	40	-	.32	.17	.30	.81
Perceived education	40	+	.68	.58	.25	.77
Test scale					.26	.80

This table measure the internal consistency of the 11 items, showing how closely related the items are as a group. Item-test and Item-rest correlations show values below .8 are reliable and consistent. The alpha of .8 suggest that the items have high internal consistency.

4.5 Discussion and policy implications

4.5.1 Discussion of results

The author follows Bollen (1987) in examining the total effect of, and establishing a ranking among, the factors that determine the people's continuous adoption and intention to use mobile money in Africa. This is done by multiplying the coefficients along the paths (see Figure 4.2 and Table 4.6). As an example, the total effect for the intention to adopt and use mobile money when a person is educated, is calculated through the indirect effects (paths) of perceived regulation and perceived attitude towards adoption (.02*.05*.48 + .4*.48 = .19).

The highest ranked determinant of mobile money in Africa is perceived usefulness, which relates to its mobile and ubiquitous nature. In the model, the proxy for the perceived usefulness is the percentage of the total population connected to the national grid. In other words, the author looks at the percentage of the population who have electricity to ascertain the functionality of the mobile phone device. This is particularly important for the fact that mobile money cannot function well if people do not have electricity to charge their phones. African people are known to be mobile (Kakihara & Sorensen, 2002; Kleinrock, 1996), in search for economic opportunities. The adoption and use of mobile money may allow them to facilitate financial transactions without needing to physically visit bank branches. However, if access to electricity is limited (Rubin, 2017), it can affect the number of people who may adopt and use mobile money. The costs involved in securing access to electricity may be high especially for the inhabitants of towns and villages that are not connected to the national grid. This happens when mobile phone users who are keen on making their mobile devices functional have to travel long distances in order to access electricity to charge their phone devices.

The author finds that a person's attitudes towards mobile money is an important factor for the continuous adoption of, and intention to use, mobile money in Africa. This factor is ranked second and confirms that the proxy for perceived attitude (percentage of mobile subscribers per 100 inhabitants) is a good measure. The data also provides evidence to this effect. For instance, the data for perceived attitude towards mobile money for South Africa, Mauritius, and Ghana are 147.13%, 143.73% and 135.8% respectively. The attitudes people hold towards mobile money may reflect the success of the marketing strategies employed by the MNOs in emphasising the easy, secure, and fast nature of mobile money transactions. To some extent, this also reflects the inadequate and underdeveloped nature of current payment systems in Africa.

Perceived age is the third ranked factor in the model. The result is consistent with the hypothesis for perceived age which postulates that adults aged 65 years and over are less likely to adopt mobile money because of the technical knowledge associated with it. Also, age restrictions for SIM card purchases in most of African countries may also hinder intentions to adopt and use mobile money (Zimmerman & Arnold, 2013). It effectively excludes people younger than 18years from the mobile money system, even if they may have access to mobile phones.

Perceived enabling regulation (Liu et al., 2015) is another factor that is significant to the intention to adopt and continuously use mobile money. When mobile money was first introduced in Africa (M-PESA), regulation was not considered to be of importance (Jack & Suri, 2011). However, because of reported consumer concerns about abuse by agents and operators, regulation has become paramount for parties to be able to have recourse and protection in times of abuse. The evident significance of enabling regulation in influencing public intentions to use mobile

money also relates to the fact that mobile money is a provision of financial services and, as such, cannot happen without proper regulations in place as in other traditional financial systems (GSMA, 2016). Regulation ensures that governments generate revenue, that taxes are properly secured, and that there is effective market competition in order to keep the prices of mobile money services low for everybody.

The experience of people with the intention to adopt and use mobile money is as significant as the other factors. Education, which is the proxy for individual perceived experience, is modelled to reflect the hands-on experience of the individual's mobile phone use and their subsequent intention to adopt and use mobile money. User experience relates to the individual facilitating conditions and shifts the emphasis away from user dependence on external support to adopt and use mobile money (Venkatesh et al., 2012). This factor is pertinent when a comparison is undertaken for mobile money usage between educated people and their non-educated counterparts in Africa.

The sixth ranked factor for the determinants of mobile money is perceived rural dwelling. The result supports the hypothesis and the literature that mobile money adoption and usage is concentrated in cities and urban centres (Aker et al., 2016; Aker & Mbiti, 2010; Asongu, 2015; Donovan, 2012). Although rural adoption of mobile money is showing encouraging signs of uptake, a comparison with urban centre adoption yields significant percentage differences. One could interpret this result as a reflection of the underdeveloped and limited mobile network infrastructure, and the lack of electricity in rural Africa (Mas & Kumar, 2008; Rubin, 2017).

Finally, perceived costs rank seventh in terms of determinants associated with the intention to adopt and use mobile money in Africa. A comparison of the transaction costs associated with mobile money services with that of traditional money transfer systems in Africa indicates that mobile money has advantages (Aker & Mbiti, 2010; Jack & Suri, 2014). The fast and secure nature of mobile money services can also be attributed to reduction in cost, where the benefits far outweigh the costs of transactions and use of informal systems (Aker et al., 2016; GSMA, 2016; Jack & Suri, 2011; Mas & Kumar, 2008).

The other constructs in the model that did not produce significant coefficients to warrant inclusion in the final model include perceived income disparity (60% rich), perceived income disparity (40% poor), and perceived female. These items were measured by the percentage of rich people (60% rich) who have mobile money accounts, percentage of poor people (40% poor) who also have mobile money accounts, and the percentage of females with mobile money accounts respectively. However, according to the model estimation, their coefficients have larger *p* values that defy the empirical assumptions to justify their inclusion in the final research model. Of course, a possible reason for these results may be measurement errors and an inclusion of these items to observe their effects may be undertaken in future research projects.

Table 4.6 Total effect of factors on the intention to adopt and use mobile money

Factor	**Total effect on intention to adopt and use** mobile **money**
Perceived usefulness (ubiquity)	.80
Perceived attitude	.48
Perceived age	.44
Perceived regulation	.37
Perceived education	.19
Perceived rural	.12
Perceived cost	.03

This table calculates the total effect among the constructs. This is done by adding the direct and indirect paths. The construct with the highest value is ranked first in that order.

4.5.2 Policy implications

While the empirical results are preliminary, they have policy implications that are important for mobile money services in Africa. Firstly, the findings indicate that perceived usefulness (ubiquity) that serves as a proxy for the availability of electricity to enable the functionality of mobile phones is an important factor as far as mobile money is concerned. The ability of people to charge their mobile phones to enable them to use it anytime and anywhere is an important first step towards public intentions to adopt and use mobile money. This means that energy infrastructure is a necessary component for the expansion of mobile money services to areas that are yet to connect to such services. When power or energy is available, it may cut the cost of travel and the risk involved by rural dwellers who use mobile money but who lack the electricity to charge their mobile phone devices. Rubin (2017) emphasises that policy frameworks are gathering momentum in the international scene around the build-once approach to infrastructure development. Examples of the build-once approach for Africa through the PPPs are electric

companies and MNOs sharing towers for their wires and coordinating with each other to lay wires under new roads. This policy framework will direct future ICT and energy transformation projects that have the capacity to further lower the costs of energy and subsequently support the functionality of technology and mobile money services.

Enabling regulation is important for mobile money services. Since the introduction of M-PESA in 2007, mobile money services in Africa have gone through tremendous transformations in terms of services provision and competition, consumer protection protocols, government and central banks' monetary policy frameworks, and government revenue mobilisation efforts through tax payments. As all these variables have implications for mobile money operations, it is only necessary that there is enabling regulation to facilitate smooth mobile money operations. Enabling regulation also implies that MNOs act in accordance with rules and regulations that govern their operations and seek to give the consumer the needed protection in terms of redress of grievances. Central banks have the obligation to ensure that there are enough enabling regulations for the ever-evolving and expanding field of mobile money, given that technology continues to transform across time. Mobile money interoperability is still in its infant stages for several African countries that have rolled out mobile money technology. The challenge of interoperability relates to the failure of enabling regulations being sufficiently complex and robust to match the evolving technology. For policy makers and regulators, broader consultation that involves all stakeholders in the system is necessary to move forward.

4.6 Conclusion and future research

This research sought to understand the context-based factors that are necessary for the adoption and continuous use of mobile money in Africa. With data from different sources, including the RIA, ITU, and the World Bank, the author presented the preliminary results for individual intentions and attitudes towards adopting and using mobile money.

The research model adopted the TAM with modification of local context factors to determine how these factors affect the adoption and continuous use of mobile money. Using the SEM, the results show that perceived usefulness (ubiquity/electricity) is an important factor to adopt and use mobile money. However, the ability of mobile money to be available anytime, and anywhere depends on the availability of electricity to charge the mobile phone used for mobile money. As such, people who do not have electricity may be denied the opportunity to adopt mobile money. While this consumer characteristic cannot be influenced entirely by the consumer at all times, partnerships between MNOs and the government can help to improve the electricity infrastructure, especially for rural inhabitants.

The attitudes of consumers can be influenced by MNOs through their marketing and agent networks. The preliminary empirical results for the attitude construct (proxy: percentage of subscribers per 100 inhabitants) indicate that peoples' attitudes toward their intention to adopt and use mobile money are effective determinants of mobile money in Africa. MNOs can identify reference groups who can play an important role in the diffusion of mobile money. Thus, MNOs need to identify early adopters and to stimulate their usage of mobile money services, so

that these adopters can help with the diffusion of mobile money networks in the future.

Age was also identified as a factor that influences intentions to adopt and use mobile money. As technology evolves, older people may struggle to embrace the technical capabilities of the mobile phone and so will be directly affected in adopting and using mobile money. With younger generations, government restrictions on access to SIM cards for people under 18 years may affect their ability to adopt and use mobile money. MNOs can lobby to influence policy recommendations to effect changes for those belonging in this age group. This is critical given that early adoption and use of mobile money can have long-term impacts on the business models of MNOs.

The establishment of enabling regulation is another important factor in influencing intentions and attitudes towards the adoption and use of mobile money. Once people are aware that there are enough regulations that guide MNOs in their mobile money operations, people may be more inclined to trust the system and to use mobile money. On the other hand, a lack of proper regulation will hinder the progress made in the diffusion of mobile money in Africa.

Finally, the lack of infrastructure (mobile network and electricity) presents an obstacle to the diffusion of mobile money in rural areas. Since the majority of Africans continue to live in rural areas, it is only prudent that MNOs collaborate with governments to improve these infrastructures for shared prosperity.

There are several directions for future research that this study offers. First, the data used in this study is secondary, with its attended measurement errors. Future research projects could use primary data to test the model further and confirm the

preliminary empirical results gathered in this research. Second, there may exist other context-based factors that could further explain public attitudes and intentions towards the adoption and use of mobile money. A fruitful direction for additional research would be to examine the earlier stages of the adoption process and to incorporate additional data to capture the responses of those individuals who may discontinue the use of mobile money after initially trying it. Finally, the results of this study pertain only to the African society, which is characterised by a very high penetration rate of mobile phones that defies the local lack of infrastructure and poverty levels. With availability of data, further empirical studies that include cross-cultural settings (with similar characteristics such as poverty, low electricity coverage, and lack of regulation) could widen the knowledge of the near future market potential for value-added services of mobile money.

Chapter 5

Conclusion and recommendation

5.1 Summary of main findings and policy prescriptions

Demirguc-Kunt et al. (2018) contend that about 1.7 billion adults remain unbanked globally, where they have no accounts at a financial institution or through a mobile money provider. Of this total, 95% are from developing economies. This constitutes an overwhelming number of people who are trapped in a vicious cycle of poverty from which they struggle to escape. The promise of financial inclusion is that when people avail themselves of it, they liberate themselves from poverty by equipping themselves with the necessary tools that aid them to overcome poor income levels and other seasonal shocks (Demirgüç-Kunt & Singer, 2017). For instance, the availability of financial services enables people to accumulate savings and to increase their spending on necessities such as food and shelter. It also facilitates investments in health, education, and businesses (Armendariz & Morduch, 2007; Collins et al., 2009; Demirguc-Kunt et al., 2018; Jack & Suri, 2011). Given these obvious advantages, a question arises: why will people do not avail themselves of these benefits?

This study has identified a range of plausible reasons. Access to finance is usually hampered by the consumer's lack of money, distance to service frontiers, and costs of delivery. Other factors include the consumer's lack of required documentation (which includes rigid Know-Your-Customer rules), religion, and cultural complexities about the roles of gender in society. Low educational qualifications and unemployment are other key reasons. In terms of digital financial services provision, the lack of technological infrastructure, dwelling in rural areas, and illiteracy are factors that reduce the intentions of people to adopt and use digital

financial services such as mobile money (Allen et al., 2016; Beck, Demirgüç-Kunt, & Honohan, 2008; Beck, Demirgüç-Kunt, & Martinez Peria, 2008; Demirguc-Kunt et al., 2018; Donovan, 2012).

The three essays set out to determine the reasons why people are still out of the formal financial system when available evidence shows that they are better off with financial inclusion. Each essay focused on the following topics respectively in relation to financial inclusion: political instability, informal financial intermediation, and mobile money adoption. The main empirical findings of the thesis are:

5.1.1 The relationship between political instability and financial inclusion

Evidence from the Middle East and North Africa indicates that political instability positively correlates with lower degrees of financial inclusion with higher levels of persistence. A lack of documentation required by formal financial institutions is a major barrier to financial inclusion. Inefficient mechanisms to determine real interest rates, corruption, oil reliance, unemployment and religious tensions also negatively affect financial inclusion. Finally, the proposed political stability threshold level that will trigger financial inclusion in the MENA region is -0.960

5.1.2 The impact of formal financial inclusion on informal financial intermediation and cash preference.

Evidence from Africa suggests that financial inclusion, based on the use of formal financial intermediaries, strongly correlates with the use of informal financial intermediaries. This association is complementary rather than one being a substitute for the other; that is, the use of formal financial inclusion does not reduce the use of informal financial intermediaries such ROSCAs and family and friends.

However, the use of formal financial intermediaries significantly reduces the preference for holding cash in financial and business activities. A further empirical investigation finds that governments of Africa (especially those within the SSA) pay cash to poverty relief support beneficiaries instead of using bank accounts or mobile money.

5.1.3 Does electricity supply and regulation affect people's attitudes and intentions to use mobile money in Africa?

The thesis finds that the availability of electricity is an important factor for the functionality of mobile phones and affects people's attitudes and intentions to adopt and use mobile money. Enabling regulation also has a significant correlation with individuals' attitudes and intentions to adopt and use mobile money. The thesis also finds that inexpensive service costs positively correlates with peoples' attitudes and intentions to use mobile money. However, rural dwelling is found to be negatively correlated with individuals' attitudes and intentions to adopt and use mobile money because of limited infrastructure in rural areas.

The empirical findings of this thesis suggest the following prescriptions for policy:

1. The evidence from the aforementioned discussion on the possible causes of political instability in the MENA region indicates that there are numerous variables with which to contend. The limited variables used in this thesis include economic issues such as unemployment, especially among the youth, over-dependence on oil and other petrochemical exports to the neglect of other economic activities, social change in terms of globalisation and religious extremism, governance issues, and corruption. If left unaddressed, all these variables can lead to popular disaffection and protests with extreme consequences (Hibbs, 1973; Ross, 2001). Although these variables cannot be resolved in the short term, a long-term strategic direction and plan is needed, where each issue is prioritised according to the degree of danger it

poses to the wellbeing of society and the plans drawn to tackle them at the grassroots level. An example is the long-term conscious effort to tackle the development of young minds through the curriculum by instilling positive mindsets about the need to be economically self-independent. This, together with a range of medium term endeavours tackle unemployment and open up the economy, free people's interactions and associations, and allow market forces to determine the prices of goods and services are through which "economic development for all" can be achieved. When these objectives are achieved, there is a greater likelihood of political stability, which will foster financial inclusion and ultimately lead to economic development.

2. Informal financial intermediation is a cultural phenomenon that has a long history of resilience and success. Informal financial intermediation has become part of the cultural fabric of people in Africa, especially those living in rural areas (Aryeetey & Udry, 1995). People form cooperatives based on their social and religious needs, and modernisation and technology (such as banks and mobile money respectively) should enhance these cooperatives rather than eliminate them. Evidence shows that cooperatives such as family and friends, ROSCAs and savings clubs, Tontines, various stokvels, and moneylenders have contributed to the economic wellbeing of rural Africa through education, health and shelter. The common problem of cooperatives is that they are not standardised and harmonised. This thesis therefore recommends that policy makers should place greater efforts toward understanding how these cooperatives work and to take steps toward standardising and harmonising their operations in the interests of extending financial inclusion.

3. Digital payments offer a feasible solution to problems of corruption when African governments make cash payments. Muralidharan, Niehaus, and Sukhtankar (2016)

find that in in the state of Andhra Pradesh in India, the leakage of funds for pension payments dropped by 47% when the payments were made through biometric smart cards rather than in cash. Currently, governments of Africa are still handing cash out to poverty relief beneficiaries despite the availability of mobile money technologies throughout the African region. The pervasiveness of cash payments allows corruption to thrive and to enrich the elites to the detriment of the beneficiaries. Corruption costs African governments billions of dollars each year while hampering economic growth and development, and, in turn, the living standards of citizens. The improved accountability of digital payments may offer governments of Africa an answer to combat corruption while still providing financial relief to the poor and the vulnerable.

4. The issue of energy supply must be resolved to facilitate the diffusion of mobile money, especially in rural areas of Africa. Overhead costs in rural Africa, where the national grid system is unavailable, are higher than in regions that have access the national grid and energy. Evidence of the distances people travel to charge their mobile devices for mobile money indicates that travel expenses increase their overhead costs per use. Coupled with the lack of mobile network infrastructure, this can become a disincentive for adopting and using mobile money. The thesis recommends that policy makers and private providers of mobile money can come together to adopt the "build-once approach", where they lay wires under new roads and share poles and pylons for their wires that carry electricity and mobile networks.

5. Regulation is also paramount for financial inclusion. Effective regulation of financial institutions and mobile money providers provide people with the trust and stability they require to subscribe to these institutions. As enabling regulation provide avenues for clients-providers redress, it is imperative for policy makers to

"watch the watcher" in a positive and independent environment without unnecessary interference so that the stability of the financial system will be enhanced. Third world countries such as African nations constantly and unnecessarily interfere in the conduct of monetary policy regulations that has led to undesired consequences of bank runs, lack of trust in and the instability of the financial system, which leads to the financial exclusion of previously included people. This thesis contends that African politicians should not interfere unnecessarily in the monitoring and supervision functions of central banks in order to allow those mandated to ensure the stability of the financial system to do so in a free and independent environment.

6. Financial inclusion also entails financial education and better protection of consumers. Financial institutions need to understand that financial education of clients is part of their investment, not an expense. The major part of financial inclusion is for people to understand how banks and all providers work and how products and services work. This will lead to better clients who will pay their loans and offer to be part of other financial services. Financial inclusion is "not just about opening a savings or deposit account"; many accounts of poor and low-income people opened in response to new initiatives across most developing countries have since remained inactive. Hence, such one-off actions do not contribute to effective financial inclusion. Central to this is a better understanding of what clients need and how financial services can be made available to them in ways that align with how they live their lives. This calls for paradigm shift and approaches that put clients at the centre of financial inclusion. Clients will not only access services but also use them continuously and effectively to improve their lives.

5.2 Summary of hypotheses

The thesis tested a number of hypothesis especially in chapters two and four, which were either confirmed or rejected depending on the estimation analysis conducted. In this section, the hypotheses are summarised in Table 5.1 and indicated whether a particular hypothesis is either confirmed or rejected. If an estimation result and analysis signify that the coefficients of some hypotheses are not significant, these hypotheses are rejected as well. In chapter two, there were two hypotheses that were tested and confirmed without any rejection. For chapter four, there were a total of sixteen hypotheses for which ten were confirmed, three outright rejections and three others whose coefficients were not significant and therefore rejected. Table 5.1 contains all the summary of the hypotheses and the final confirmation or rejection.

Table 5. 1 Summary of hypotheses

Chapter	hypothesis	Accepted	Rejected
Two	$\boldsymbol{H_1}$: political instability negatively affects financial inclusion	✓	
	$\boldsymbol{H_2}$: Individual levels barriers can lead to lower levels of financial inclusion	✓	
Four	$\boldsymbol{H_1}$: There is a positive relationship between individual attitude towards adoption and the intention to use mobile money.	✓	
	$\boldsymbol{H_{2a}}$: There is a positive relationship between perceived usefulness (ubiquity/grid) and attitudes towards adoption and usage of mobile money.	✓	
	$\boldsymbol{H_{2b}}$: There is a positive relationship between perceived usefulness (ubiquity/grid) and intention to adopt and use mobile money.	✓	
	$\boldsymbol{H_{3a}}$: There is a negative relationship between perceived costs and attitudes towards continuous adoption and usage of mobile money.		×
	$\boldsymbol{H_{3b}}$: There is a negative relationship between perceived costs and intention to adopt and use mobile money.		×
	$\boldsymbol{H_4}$: There is a negative relationship between perceived female and attitudes towards adoption of mobile money.		

H_5 : There is a negative relationship between perceived old age and attitudes towards adoption of mobile money.		
H_{6a} : There is a positive relationship between perceived income disparity (rich) and attitudes towards adoption of mobile money.	NS - ×	
H_{6b} : There is a positive relationship between perceived income disparity (rich) and the perceived usefulness (ubiquity) of mobile money.	NS - ×	
H_{6c} : There is a negative relationship between perceived income disparity (poor) and attitudes to adopt and use mobile money.	NS - ×	
H_{7a} : There is a positive relationship between perceived education levels and attitudes to adopt and use mobile money.	✓	
H_{7b} : There is a positive relationship between perceived education levels and enabling regulation to use mobile money.	✓	
H_{7c} : There is a positive relationship between perceived education levels and perceived income disparity (rich) to use mobile money.		×
H_8 : There is a negative relationship between perceived rural dwelling and attitudes to adopt and use mobile money.	✓	
H_{9a} : There is a positive relationship between perceived enabling regulation and attitudes towards adoption and usage of mobile money.	✓	
H_{9b} : There is a positive relationship between perceived enabling regulation and the intention to adopt and use mobile money.	✓	

Note: NS = not significant

5.3 Thesis contributions

This thesis explores three empirically related topics, seeking to unravel the determinants of financial inclusion in Africa and the Middle East. It adds to the body of research on financial inclusion by reiterating the important factors that determine financial inclusion and which increase inclusive economic growth. The following are the main contributions made to the extant literature on the

determinants of financial inclusion in Africa, which are applicable to other developing regions of the world.

1. Using a unique global dataset developed by the World Bank for financial inclusion, political instability, and other variables respectively, Chapter Two of the thesis sought to understand the impact of political instability on financial inclusion in the MENA region. The findings from the chapter reveal that political instability does lower the levels of financial inclusion in the region after being able to resolve the issue of endogeneity of the variables of interest. This is a unique finding as it is the first paper to directly study how the political instability in the region affects economic variables, including financial inclusion. The chapter calculated the political stability threshold value that will trigger financial inclusion and economic development in the region to be -0.960. The chapter concludes that unemployment, religious tensions, corruption, and the regime's grip of political and economic powers are the possible causes of political instability in the MENA region.

2. The third chapter of the thesis reveals how the use of formal financial inclusion affects the use of informal financial intermediation and cash preference in Sub Saharan Africa. The paper attempts to understand why people use informal financial intermediation and questioned the asserted hypothesis (Nissanke & Aryeetey, 2008) that informal financial intermediation is exploitive and does not go beyond consumption. After careful consideration of the data and variables of interest, the findings reveal that the asserted hypotheses were not supported, and that formal financial intermediation complements the use of informal financial intermediation. The chapter further reveals that governments of Africa use cash to pay poverty relief beneficiaries instead of bank accounts or mobile money, which invariably defeats efforts for financial inclusion.

3. The fourth chapter provides evidence of why attitudes and intentions to adopt and use mobile money may not grow if electricity supply does not correspondingly improve. This is another unique contribution to the adoption literature that is silent about the functionality of phone devices used for mobile money vis-à-vis the supply of electricity. The findings reveal that in the end, the costs per unit use of mobile money may escalate, especially for rural dwellers who lack an adequate supply of electricity and need to travel long distances to charge their mobile phones. The chapter also finds that regulation is an important factor to consider when adopting mobile money for financial inclusion. The combination of innovation and sound regulation in financial services enables the private sector to improve economic opportunity and well-being for poor people in many countries. This is evidenced by the impact of mobile money on the poor of Africa. Effective regulation builds the trust of providers and users of the financial system and has the potential to enhance financial inclusion in Africa.

4. Finally, the author looks at how enabling regulation and strategy can effectively lead to wider financial inclusion in Africa. The submission of the thesis is that local contexts and constant and efficient engagement with all stakeholders of the financial system are important factors to consider if effective financial inclusion in Africa, the Middle East and other developing regions of the world is to be achieved.

5.4 Limitations of the thesis and directions for future studies

Every research project comes with certain challenges that in one way or the other limited the full implementation of the initial design of the studies. These come in the form of methodological challenges, data limitations and prior studies that could have helped the researcher in his/her review of literature in order to lay the

foundations for the problems under investigation. The acknowledgment of these limitations is an overall appraisal of the research project and their impact on the initial design. This does not in any way negate the results of the project but allow future projects with similar designs to improve on the quality of their investigations. The following are some of the limitations encountered from the initiation to the final report of findings of the research project and future research directions are addressed after appraising these limitations.

The issue of endogeneity and instrumental variables selection. The estimation of the first essay (chapter two) was not without the issue of endogeneity. Endogeneity refers to the condition in which an explanatory (endogenous, e.g. political instability) variable correlates with the error term, or at least one of the regressors is correlated with the residual and therefore cause inconsistent estimates (Wooldridge, 1995). This problem becomes apparent especially when researchers use coetaneous dependent and independent variables. Importantly, endogeneity issues can have different origins, and different methods exist to address them to ensure that results from the analysis are robust and statistically tenable. To resolve the endogeneity problem in the essay two of this thesis, the author resort to the use of instrumental variables (IVs) selection. However, working with secondary data poses the difficulty in the selection of instruments for some variables. For instance, there was the issue of selecting instruments for the political instability variable and the author has to spend a lot of time trying to get the appropriate instruments that would satisfy all the assumptions in instrumental variable selection. The recommendation states that (1) an IV must be correlated with the endogenous variable and at the same time uncorrelated with unobserved factors that affect the residual or dependent variable. (2) that when the IV changes, the endogenous

variable changes accordingly while the error term remains zero in average, so that the change in the residual would be useful information for inferring the coefficients of the endogenous variable. Though the IVs selected met these criteria and results are robust, there is a need for further analysis in the selection of IVs.

Lack of direct prior research on the relation between mobile money and electricity was another limitation of the thesis. Prior research allows a review of what has been done in a particular study. This makes it easier to lay a foundation for understanding the research problem you are investigating. This applies to the fourth essay that investigated the attitudes and intentions of adopting mobile money and how electricity and regulation are important in this regard. Lack of prior research on the relation between electricity and mobile money adoption posed a challenge as to how to formulate hypotheses and constructs to reflect this current study. Nevertheless, the preliminary results provide the basis for future researches that wants to understand the drivers of mobile money in Africa and other developing countries vis-à-vis electricity and network infrastructure.

The use of secondary data limited the investigation of some particular variables that provides important information about the issues under investigation. Data inhibited the author's ability to conduct a thorough analysis of the results in some of the studies. For instance, one of the problems the second study looked at was the preference of cash use for economic transactions. The study needed an understanding of respondents' experiences about why they may prefer to use cash for economic transactions instead of using accounts in formal financial institutions. However, the use of secondary data can only proxy for this experience and as such limit the author's interpretation of the results. In essay four, similar data limitation was encountered. The construction of the instruments for analysis in the

Technology Acceptance Model (TAM) was constraint by a lack of appropriate data for several variables. For instance, the study would have wished to use a survey data that reflect actual responses about the cost of mobile money, the availability of electricity and how it impacts on mobile money adoption, the perceived east of use of mobile money platform with respect to education and the overall perceived usefulness of mobile money to promote financial inclusion. However, for lack of data, proxies were used with the limited data gathered through secondary sources. This in a way limited the author's ability to thoroughly conduct analysis and report causal relations among the key variables of interest.

Future research directions coming from the appraisal of the limitations of the thesis are listed below;

Because of the use of secondary data in essay two, certain experiences of respondents could only be studied using proxies. There is the need to use survey to assess the level at which political instability disrupts financial inclusion and economic growth in the MENA region in a longitudinal study. This will allow for a deeper understanding of the relations between political instability and financial inclusion, which for a very long time has been an issue for researchers.

There is also the need to investigate why over 50% of MENA women do not have required documents needed by banks for account ownership and therefore rely on informal finance for their financial needs.

In the second essay, the author investigated the use of informal and formal financial intermediaries in SSA, using proxies for a number of key variables of interests. There should be a survey to understand why households in SSA use both formal

and informal financial intermediaries, incorporating an examination of the local context of their decision into the investigation.

A key result in the study found that governments in SSA use cash instead of banks to distribute relief funds in their welfare programmes. This defeats the clarion call for inclusive financial systems and the benefits that come with it. There is the need therefore, to further investigate what driving factors exist for a government decision to pay welfare relief transfers in cash instead of using accounts in formal financial institutions and mobile money.

Furthermore, an investigation using survey data can be carried out to ascertain the reasons why households in SSA may prefer cash-based transactions to bank-based transactions.

Finally, the third essay investigated the relations between individual attitudes and intentions, and the availability of electricity and enabling regulation in the adoption of mobile money in Africa. Though the study laid out a good foundation and provides preliminary results using secondary data and small sample, future research projects could use primary data to test the model further and confirm the preliminary empirical results gathered in this research.

Lastly, what other context-based factors can further explain public attitudes and intentions towards the adoption and use of mobile money in SSA and other parts of the developing world?

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Appendices

The enabling regulation for financial inclusion in Africa – issues and practices

Extending access to financial inclusion for the poor and financially excluded is a top priority by the governments of Africa. This agenda will contribute to the sustainable long-term development of the economies of the African countries and lift the standards of living of low-income households. However, this agenda cannot be achieved without adequate regulation in the system. According to Bester, de Koker, and Hawthorne (2003) regulation covers the market space, shapes its development, and seeks to control the behaviour of market players. Financial regulators are charged primarily with maintaining system stability. They determine who can enter and operate in the market and determine the cost implications, through compliance requirements, for providers. In addition, regulation determines the types of products or services as per the framework of the financial services industry. It sets out registration requirements for clients/consumers who are seeking direct access to the products and services (Falkena, Bamber, Llewellyn, & Store, 2001).

Regulatory arrangements have a powerful impact on competitive conditions overall and between subsectors of the system. Some regulatory structures are more likely to contribute to the ultimate objectives than others. Accordingly, regulation has the capacity to do great harm, including being inefficient by imposing unwarranted costs on regulated institutions (Falkena et al., 2001). Similarly, the absence of regulation can create market uncertainty, and thus drive the evolution of the market in a particular direction, where the outcome can lead to financial exclusion

(Porteous, 2006). Falkena et al. (2001) noted that effective regulation could be formulated when six "ideal conditions" are satisfied:

- the financial system is based on subsets of specialist financial institutions, each conducting a narrow range of business, so that there is a reasonably precise parallel between function and institution;
- the structure of the financial system and the business operations of financial institutions are reasonably stable;
- the moral suasion of the regulatory agencies is universally accepted;
- the business of financial firms is predominantly domestic in nature;
- competitive pressures in the financial system are weak; and
- simple and limited objectives of regulation are set.

The more actual conditions move away from these "ideal conditions", the more complex and challenging the regulatory process becomes. For regulation to be effective (in that it contributes to its objectives) as well as cost efficient, it has to adapt and respond to changes in institutional and market circumstances (Falkena et al., 2001). The financial system of many countries is undergoing periods of structural changes. The system is subjected to the combined impact of internal competition, global competitive pressures, changes in regulation, new technology, and the fast-evolving strategic objectives of financial institutions.

The financial sector adjustment programme (FINSAP), as part of the 1980s and 1990s structural adjustment programme (SAP) of the World Bank and IMF, saw many changes to the African financial landscape. Apparently, these changes in regulation opened up the banking sector by reforming distressed banks, abandoning the interest rates caps, deregulating the credit control policies by allowing market-

oriented lending, and promulgating new legislation that would allow for effective prudential supervision (Easterly, 2005; Falkena et al., 2001; Heidhues & Obare, 2011; Hugon, 1990; Riddell, 1992). The purpose of FINSAP was to make the African financial sector competitive with their counterparts in developed economies, but this has not been achieved over the years.

Effective regulation cannot secure its objectives in the absence of efficient supervision and enforcement. This in effect is where African financial regulators are missing. The process of regulation consists of two basic activities: the provision of guidance and the imposition of constraints. The guidance mechanism consists of timely information, the sharing of rules and regulations regarding the banking sector, and effective monitoring and supervision of the constant evolution of activities in the market. The constraints process, on the other hand, has to do with enforcement of the law in matters that border on consumer protection and with the activities of the market players that seem to be reckless and unwarranted.

Challenges of regulators

Financial services are undoubtedly the most regulated sector in the economies of Africa. However, the sector also faces more challenges as it constantly evolves due to innovation and changes in societal responsibilities. According to Porteous (2006), innovation in financial services is a double-edged sword for regulators, where regulators have to keep a balance between ensuring the stability of the system and promoting new ways of doing things. Although innovation represents the possibility for greater efficiency, it has a tendency of disrupting older processes too.

As a result of the 2007 global financial crisis and the Asian financial crisis in 1998, as well as the aftermath of the 2011 terrorist bombing of the World Trade Centre in

the US, the global banking industry and governments have instituted international codes and standards as a way of stabilising and standardising the banking system. The challenge for local regulators is how to apply these international standards without dislocating the priorities set for the local system. The costs of compliance could be high, which can have adverse consequences for local access. Regulatory costs exhibit economies of scale and thus smaller banks face higher average costs than larger banks in complying with regulations (Christen et al., 2003; Demirguc-Kunt, Laeven, & Levine, 2003; Elliehausen & Kurtz, 1988; Hartarska & Nadolnyak, 2007). This is the case for Africa, where most financial institutions, such as non-bank financial institutions (NBFIs) and MFIs, are smaller. The costs associated with compliance such as start-up costs and the expertise for conducting prudential returns can disrupt their operations (Demirguc-Kunt et al., 2003). Additionally, formal financial services providers are required to increase eligibility requirements such as customer due diligence (CDD) and know-your-customer (KYC), the anti-money laundering and combating the financing of terrorism (AML-CFT). These requirements subsequently leave more individuals unbanked especially in the developing world (Porteous, 2006).

A typical issue in regulation concerns with the accommodation of new institutional types. This comes as a result of the broadening of access to finance characterised by the introduction of microcredit, which results in the formation of MFIs across the developing world including Africa. The challenge faced by regulators has been how to regulate these new institutions (Cull, Demirgüç-Kunt, & Morduch, 2011; Porteous, 2006). Many countries in Africa, especially in SSA, have developed regulatory frameworks for MFIs by creating the tier system (charter). For example, Ghana, South Africa, Nigeria, Kenya and a host of others have initiated the tier

system, where mainstream banks are in the tier 1 category. Other financial institutions such as savings and loans services, NBFIs and MFIs are placed in tiers 2, 3 or 4 respectively or in whatever category a particular institution is classified. The major challenge has been the prudential reporting standards for the tiers. There seems to be a one-size-fits-all system of reporting that has created a number of issues, especially for MFIs whose forms of operations inherently involve making small loans to large numbers of borrowers, and other social capital costs (Cull et al., 2011).

Another example of challenges faced by financial sector regulation is the introduction of mobile based financial services innovation that has come to play a strong force in the access frontier (Dolan, 2009). The pioneering introduction of M-PESA by the Kenyan telecommunication giant, Safaricon in the past decade has marked a milestone in using technology to broaden access to financial services to low income individuals. Although it is a great initiative, it has forced the regulators of the financial industry to consider how to balance the regulatory challenge (Mas & Morawczynski, 2009) posed by mobile money vendors. The risks associated with the new system (Dolan, 2009), where most countries have yet to consider tailored regulations for the innovation, is a concern for the stability of the financial sector. Reports of fraudsters (Mas & Morawczynski, 2009; Maurer, 2012) capitalising on the lack of proper regulations to guide the activities of both providers and users have seen more unsuspecting individuals, especially those with minimal levels of education, become victims and losing large sums of money in the process.

The protection of customers' vis-à-vis broadening access has also become a challenge to regulators. As the number of consumers increases, so too does the potential number of victims of unscrupulous dealings rise as a result of companies

or individuals seeking the largest share of profits. The promise of MFIs to broaden access for inclusive and shared growth have resulted in a change of priority to protecting the very individuals these MFIs promised to help. Porteous (2006) argues that the minimalist prescription of product information alone is not enough if clients lack the ability to process such information, especially first-time borrowers and those with little financial literacy. Regulators, in an effort to protect borrowers from high costs of credits, may introduce interest rates caps. Available evidence shows that this form of protection does have negative outcomes, where credit rationing results in limited access, which also defeats the purpose of protection, and broadening access (Cull et al., 2011). Defining, prohibiting, and monitoring excessive and reckless lending and borrowing is again an issue that constantly confronts regulators and policy makers in most African countries.

To effectively regulate and affect broader financial inclusion, the issues raised in this piece are important for policy discourse. Efforts should be made to understand how to deal with these issues through policy and regulatory changes for the development and stability of the financial systems of Africa.

Financial inclusion in Africa and the world: The numbers

Table 0-1 Appendix XA: Levels of financial inclusion through account ownership (bank account and mobile money) at the country level

Country	Adults with an account	Country	Adults with an account
Afghanistan	15%	Ethiopia	35%
Albania	40%	Finland	100%
Algeria	43%	France	94%
Argentina	49%	Gabon	59%
Armenia	48%	Georgia	61%
Australia	100%	Germany	99%
Austria	98%	Ghana	58%
Azerbaijan	29%	Greece	85%
Bahrain	83%	Guatemala	44%
Bangladesh	50%	Guinea	23%
Belarus	81%	Haiti	33%
Belgium	99%	Honduras	45%
Benin	38%	Hong Kong SAR, China	95%
Bolivia	54%	Hungary	75%
Bosnia and Herzegovina	59%	India	80%
Botswana	51%	Indonesia	49%
Brazil	70%	Iran, Islamic Rep.	94%
Bulgaria	72%	Iraq	23%
Burkina Faso	43%	Ireland	95%
Cambodia	22%	Israel	93%
Cameroon	35%	Italy	94%
Canada	100%	Japan	98%
Central African Republic	14%	Jordan	42%
Chad	22%	Kazakhstan	59%
Chile	74%	Kenya	82%
China	80%	Korea, Rep.	95%
Colombia	46%	Kosovo	52%
Congo, Dem. Rep.	26%	Kuwait	80%
Congo, Rep.	26%	Kyrgyz Republic	40%
Costa Rica	68%	Lao PDR	29%
Côte d'Ivoire	41%	Latvia	93%
Croatia	86%	Lebanon	45%
Cyprus	89%	Lesotho	46%
Czech Republic	81%	Liberia	36%
Denmark	100%	Libya	66%
Dominican Republic	56%	Lithuania	83%
Ecuador	51%	Luxembourg	99%
Egypt, Arab Rep.	33%	Macedonia, FYR	77%
El Salvador	30%	Madagascar	18%
Estonia	98%	Malawi	34%

Malaysia	85%	Tajikistan	47%
Mali	35%	Tanzania	47%
Malta	97%	Thailand	82%
Mauritania	21%	Togo	45%
Mauritius	90%	Trinidad and Tobago	81%
Mexico	37%	Tunisia	37%
Moldova	44%	Turkey	69%
Mongolia	93%	Turkmenistan	41%
Montenegro	68%	Uganda	59%
Morocco	29%	Ukraine	63%
Mozambique	42%	United Arab Emirates	88%
Myanmar	26%	United Kingdom	96%
Namibia	81%	United States	93%
Nepal	45%	Uruguay	64%
Netherlands	100%	Uzbekistan	37%
New Zealand	99%	Venezuela, RB	73%
Nicaragua	31%	Vietnam	31%
Niger	16%	West Bank and Gaza	25%
Nigeria	40%	Zambia	46%
Norway	100%	Zimbabwe	55%
Pakistan	21%		
Panama	46%		
Paraguay	49%		
Peru	43%		
Philippines	34%		
Poland	87%		
Portugal	92%		
Romania	58%		
Russian Federation	76%		
Rwanda	50%		
Saudi Arabia	72%		
Senegal	42%		
Serbia	71%		
Sierra Leone	20%		
Singapore	98%		
Slovak Republic	84%		
Slovenia	98%		
South Africa	69%		
South Sudan	9%		
Spain	94%		
Sri Lanka	74%		
Sweden	100%		
Switzerland	98%		
Taiwan, China	94%		

Table 0-2 Appendix XB: Three-year interval accounts growth (banks and mobile money) among individual characteristics in the regions of the world

Year	Region	Account	Acc. male	Acc. female	Acc. young adults	Acc. older adults	Acc. primary or less	Acc. secondary or more	Acc. income poorest 40%	Acc. income richest 60%	Acc. Rural
2011	Arab world	22%	30%	14%	15%	26%	14%	31%	16%	26%	11%
2014	Arab world	30%	38%	22%	21%	34%	21%	39%	23%	35%	19%
2017	Arab world	37%	48%	26%	21%	43%	26%	49%	28%	43%	28%
2011	East Asia & Pacific	60%	62%	58%	54%	61%	51%	73%	46%	69%	53%
2014	East Asia & Pacific	72%	74%	70%	63%	74%	64%	81%	65%	76%	69%
2017	East Asia & Pacific	74%	76%	71%	69%	75%	64%	85%	63%	81%	71%
2011	Europe & Central Asia	69%	73%	66%	51%	73%	49%	75%	68%	70%	60%
2014	Europe & Central Asia	78%	79%	76%	60%	81%	57%	82%	74%	80%	76%
2017	Europe & Central Asia	81%	84%	79%	64%	85%	68%	85%	76%	85%	79%
2011	Latin America & Caribbean	39%	44%	35%	27%	44%	30%	46%	24%	50%	34%
2014	Latin America & Caribbean	52%	55%	49%	38%	57%	43%	58%	41%	59%	49%
2017	Latin America & Caribbean	55%	59%	52%	40%	60%	44%	61%	43%	63%	53%
2011	Low income	13%	16%	11%	9%	16%	8%	23%	7%	17%	12%
2014	Low income	23%	26%	20%	17%	26%	18%	35%	14%	29%	20%
2017	Low income	35%	40%	30%	31%	37%	29%	50%	26%	41%	32%
2011	Lower middle income	29%	34%	23%	22%	32%	23%	40%	20%	35%	26%
2014	Lower middle income	42%	48%	36%	34%	45%	31%	53%	32%	48%	41%
2017	Lower middle income	58%	63%	53%	49%	61%	50%	66%	51%	63%	58%
2011	Developing	42%	47%	37%	31%	45%	35%	53%	30%	50%	38%
2014	Developing	55%	60%	51%	42%	59%	47%	65%	47%	61%	53%

2017	Developing	63%	67%	59%	53%	66%	54%	72%	54%	69%	62%
2011	Middle East & North Africa	38%	47%	28%	28%	42%	26%	47%	31%	42%	28%
2017	Middle East & North Africa	48%	57%	38%	34%	52%	31%	61%	40%	53%	39%
2011	Middle income	43%	48%	39%	33%	46%	37%	54%	31%	52%	40%
2014	Middle income	58%	62%	53%	45%	61%	50%	66%	49%	63%	56%
2017	Middle income	65%	70%	61%	56%	68%	57%	73%	56%	71%	65%
2011	North America	89%	92%	85%	78%	91%	63%	91%	80%	95%	88%
2014	North America	94%	93%	95%	88%	95%	72%	95%	89%	98%	94%
2017	North America	94%	94%	93%	88%	95%	67%	95%	87%	99%	93%
2011	High income: OECD	90%	92%	88%	78%	93%	74%	93%	87%	93%	88%
2014	High income: OECD	94%	94%	94%	84%	96%	80%	96%	91%	96%	94%
2017	High income: OECD	95%	95%	94%	84%	96%	85%	96%	91%	97%	94%
2011	South Asia	32%	40%	24%	24%	35%	27%	51%	24%	38%	31%
2014	South Asia	47%	55%	38%	37%	50%	36%	60%	38%	52%	46%
2017	South Asia	70%	75%	64%	60%	73%	63%	78%	66%	72%	69%
2011	Sub-Saharan Africa	23%	26%	21%	17%	27%	12%	38%	13%	29%	19%
2014	Sub-Saharan Africa	34%	39%	30%	26%	38%	23%	51%	24%	42%	30%
2017	Sub-Saharan Africa	43%	48%	37%	37%	46%	31%	60%	32%	50%	39%
2011	Upper middle income	57%	62%	52%	49%	59%	51%	65%	42%	67%	54%
2014	Upper middle income	72%	74%	69%	60%	74%	67%	77%	64%	76%	71%
2017	Upper middle income	73%	77%	69%	66%	75%	66%	80%	62%	80%	73%
2011	World	51%	55%	47%	37%	54%	37%	66%	41%	57%	44%
2014	World	62%	66%	58%	47%	66%	48%	73%	55%	67%	58%
2017	World	69%	72%	65%	56%	72%	56%	79%	61%	74%	66%

Source: @ Global Findex database 2017

Table 0-3 Appendix XC: Three-year interval financial institutions accounts growth among individual characteristics in the regions of the world

Year	Region	Fin. Inst. account	Fin. Inst. account male	Fin. Inst. account female	Fin. Inst. account young adults	Fin. Inst. account older adults	Fin. Inst. account primary or less	Fin. Inst. account secondary or more	Fin. Inst. account income poorest 40%	Fin. Inst. account income richest 60%	Fin. Inst. account rural
2011	Arab world	22%	30%	14%	15%	26%	14%	31%	16%	26%	11%
2014	Arab world	29%	36%	21%	20%	33%	20%	38%	22%	34%	17%
2017	Arab world	37%	48%	25%	20%	42%	26%	48%	27%	43%	28%
2011	East Asia & Pacific	60%	62%	58%	54%	61%	51%	73%	46%	69%	53%
2014	East Asia & Pacific	72%	74%	70%	63%	74%	64%	81%	65%	76%	69%
2017	East Asia & Pacific	73%	76%	71%	68%	74%	64%	84%	63%	80%	70%
2011	Europe & Central Asia	69%	73%	66%	51%	73%	49%	75%	68%	70%	60%
2014	Europe & Central Asia	78%	79%	76%	60%	81%	56%	82%	74%	80%	76%
2017	Europe & Central Asia	81%	84%	79%	63%	85%	68%	85%	76%	85%	79%
2011	Latin America & Caribbean	39%	44%	35%	27%	44%	30%	46%	24%	50%	34%
2014	Latin America & Caribbean	52%	55%	49%	38%	56%	43%	57%	41%	59%	48%
2017	Latin America & Caribbean	54%	57%	51%	38%	60%	44%	60%	42%	62%	52%
2011	Low income	13%	16%	11%	9%	16%	8%	23%	7%	17%	12%
2014	Low income	17%	19%	15%	11%	20%	13%	27%	10%	22%	15%
2017	Low income	24%	29%	21%	20%	27%	20%	35%	16%	30%	22%
2011	Lower middle income	29%	34%	23%	22%	32%	23%	40%	20%	35%	26%
2014	Lower middle income	41%	47%	34%	32%	44%	29%	52%	31%	47%	40%

2017	Lower middle income	56%	61%	52%	47%	60%	48%	65%	49%	61%	56%
2011	Developing	42%	47%	37%	31%	45%	35%	53%	30%	50%	38%
2014	Developing	54%	58%	50%	41%	58%	46%	64%	46%	60%	52%
2017	Developing	61%	65%	57%	50%	65%	53%	70%	53%	67%	60%
2011	Middle East & North Africa	38%	47%	28%	28%	42%	26%	47%	31%	42%	28%
2017	Middle East & North Africa	47%	56%	38%	33%	52%	31%	61%	39%	52%	39%
2011	Middle income	43%	48%	39%	33%	46%	37%	54%	31%	52%	40%
2014	Middle income	57%	61%	53%	44%	61%	49%	65%	48%	62%	55%
2017	Middle income	64%	68%	60%	54%	67%	56%	72%	56%	70%	64%
2011	North America	89%	92%	85%	78%	91%	63%	91%	80%	95%	88%
2014	North America	94%	93%	95%	88%	95%	72%	95%	89%	98%	94%
2017	North America	94%	94%	93%	88%	95%	67%	95%	87%	99%	93%
2011	High income: OECD	90%	92%	88%	78%	93%	74%	93%	87%	93%	88%
2014	High income: OECD	94%	94%	94%	84%	96%	80%	96%	91%	96%	94%
2017	High income: OECD	95%	95%	94%	83%	96%	85%	96%	91%	97%	94%
2011	South Asia	32%	40%	24%	24%	35%	27%	51%	24%	38%	31%
2014	South Asia	46%	54%	37%	36%	50%	35%	59%	37%	51%	46%
2017	South Asia	68%	73%	64%	59%	72%	62%	76%	65%	71%	68%
2011	Sub-Saharan Africa	23%	26%	21%	17%	27%	12%	38%	13%	29%	19%
2014	Sub-Saharan Africa	29%	33%	25%	20%	33%	17%	46%	19%	36%	25%
2017	Sub-Saharan Africa	33%	38%	27%	26%	36%	21%	50%	23%	39%	30%
2011	Upper middle income	57%	62%	52%	49%	59%	51%	65%	42%	67%	54%
2014	Upper middle income	72%	74%	69%	60%	74%	67%	77%	64%	76%	71%
2017	Upper middle income	73%	77%	69%	65%	74%	65%	80%	62%	80%	73%
2011	World	51%	55%	47%	37%	54%	37%	66%	41%	57%	44%
2014	World	61%	65%	58%	46%	66%	47%	73%	54%	66%	57%

2017	World	67%	71%	64%	54%	71%	54%	77%	59%	72%	64%

Source: @ Global Findex database 2017

Table 0-4 Appendix XD: Mobile money accounts among individual characteristics in the World

Country	Mobile money account	Mobile money account male	Mobile money account female	Mobile money account in labour force	Mobile money account out of labour force	Mobile money account young adults	Mobile money account older adults	Mobile money account, primary education or less	Mobile money account secondary education or less	Mobile money account Income poorest 40%	Mobile money account, income richest 60%	Mobile money account rural
Afghanistan	1%	1%	1%	2%	0%	0%	1%	0%	2%	0%	1%	1%
Albania	2%	2%	2%	3%	2%	6%	1%	1%	4%	0%	4%	2%
Argentina	2%	3%	2%	3%	1%	3%	2%	1%	3%	1%	3%	1%
Armenia	10%	14%	6%	15%	4%	18%	8%	21%	8%	8%	11%	11%
Burundi	1%	1%	1%	1%	0%	1%	1%	0%	4%	0%	1%	1%
Benin	18%	25%	12%	21%	9%	19%	18%	11%	34%	14%	21%	16%
Burkina Faso	33%	42%	24%	38%	23%	33%	34%	28%	52%	21%	41%	31%
Bangladesh	21%	32%	10%	31%	13%	27%	19%	14%	26%	15%	26%	22%
Bolivia	7%	9%	5%	7%	8%	11%	6%	2%	10%	7%	7%	7%
Brazil	5%	5%	4%	7%	0%	5%	5%	1%	7%	2%	7%	4%
Botswana	24%	29%	21%	34%	13%	28%	23%	9%	36%	12%	32%	22%
Chad	15%	20%	11%	16%	14%	15%	15%	14%	28%	10%	19%	15%
Cambodia	6%	6%	5%	6%	5%	6%	5%	5%	10%	5%	6%	5%
Chile	19%	21%	16%	25%	8%	23%	18%	4%	24%	11%	24%	16%
Cote d'Ivoire	34%	38%	30%	40%	23%	31%	36%	28%	53%	27%	39%	31%
Cameroon	15%	17%	13%	18%	9%	16%	14%	9%	25%	7%	20%	11%
Congo, Dem. Rep.	16%	19%	14%	19%	10%	15%	17%	8%	20%	12%	19%	14%
Congo, Rep.	6%	9%	3%	9%	3%	7%	6%	6%	7%	6%	6%	8%

Colombia	5%	6%	4%	6%	2%	3%	5%	2%	6%	4%	5%	4%
Developing	5%	7%	4%	7%	3%	7%	5%	3%	8%	3%	7%	5%
Dominican Republic	4%	6%	2%	5%	1%	4%	4%	4%	4%	3%	4%	5%
Ecuador	3%	3%	2%	3%	2%	3%	3%	1%	4%	0%	5%	2%
Egypt, Arab Rep.	2%	3%	1%	2%	2%	3%	1%	1%	2%	0%	3%	1%
El Salvador	4%	5%	2%	4%	2%	5%	3%	2%	5%	2%	4%	4%
Ethiopia	0%	1%	0%	0%	0%	0%	0%	0%	2%	0%	1%	0%
Gabon	44%	46%	41%	49%	32%	49%	42%	31%	56%	37%	48%	36%
Georgia	2%	4%	1%	4%	1%	3%	2%	0%	2%	1%	3%	2%
Ghana	39%	44%	34%	42%	33%	37%	40%	33%	46%	32%	44%	35%
Guinea	14%	18%	10%	16%	8%	17%	12%	10%	29%	12%	15%	10%
Guatemala	2%	2%	2%	2%	1%	3%	2%	1%	3%	1%	3%	2%
Honduras	6%	10%	3%	9%	1%	6%	7%	5%	7%	6%	7%	6%
Haiti	14%	16%	11%	20%	6%	12%	14%	6%	18%	7%	18%	11%
Indonesia	3%	4%	3%	3%	3%	5%	3%	0%	6%	2%	4%	3%
India	2%	3%	1%	2%	2%	1%	2%	1%	4%	1%	3%	1%
Iran, Islamic Rep.	26%	31%	22%	33%	20%	34%	24%	8%	31%	20%	30%	23%
Iraq	4%	7%	1%	6%	1%	4%	5%	4%	4%	3%	5%	3%
Jamaica	1%	0%	1%	1%	1%	1%	1%	0%	1%	1%	1%	1%
Jordan	1%	2%	0%	1%	1%	1%	1%	0%	1%	0%	2%	1%
Kenya	73%	77%	69%	78%	52%	70%	74%	57%	84%	59%	82%	73%
Kyrgyz Republic	3%	4%	3%	4%	2%	3%	3%	3%	3%	0%	5%	3%
Lebanon	1%	1%	0%	1%	0%	1%	1%	0%	1%	0%	1%	0%
Liberia	21%	23%	18%	21%	19%	23%	19%	15%	33%	17%	24%	20%
Low income	18%	21%	15%	20%	11%	18%	18%	13%	29%	13%	21%	16%

Lower middle income	5%	7%	4%	7%	3%	6%	5%	3%	8%	3%	7%	5%
Lesotho	28%	24%	31%	41%	20%	25%	29%	18%	47%	16%	36%	27%
Madagascar	12%	12%	12%	13%	7%	13%	12%	9%	28%	9%	14%	10%
Mali	24%	29%	20%	28%	16%	25%	24%	19%	42%	21%	27%	21%
Malaysia	11%	13%	9%	13%	4%	16%	9%	8%	11%	10%	12%	8%
Malawi	20%	23%	18%	23%	10%	21%	20%	14%	38%	10%	27%	19%
Mauritania	4%	4%	4%	5%	3%	4%	4%	4%	4%	3%	5%	2%
Mauritius	6%	7%	5%	8%	2%	8%	5%	3%	8%	4%	7%	6%
Mexico	6%	7%	4%	8%	1%	12%	3%	1%	8%	2%	8%	4%
Middle income	4%	5%	3%	5%	3%	6%	4%	2%	7%	3%	5%	4%
Morocco	1%	1%	0%	1%	0%	1%	0%	0%	2%	0%	1%	0%
Mongolia	22%	23%	21%	28%	12%	13%	25%	7%	27%	13%	28%	22%
Mozambique	22%	27%	17%	26%	14%	26%	19%	16%	48%	12%	29%	18%
Myanmar	1%	1%	1%	1%	1%	1%	0%	0%	2%	1%	1%	0%
Namibia	43%	45%	42%	47%	35%	46%	42%	33%	49%	29%	53%	39%
Niger	9%	12%	5%	13%	2%	7%	10%	8%	18%	7%	10%	7%
Nigeria	6%	7%	4%	6%	4%	5%	6%	1%	9%	3%	7%	3%
Nicaragua	4%	5%	3%	4%	3%	6%	3%	3%	4%	4%	4%	4%
Nepal	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
Pakistan	7%	13%	1%	12%	3%	7%	7%	4%	13%	3%	9%	6%
Panama	4%	5%	2%	5%	1%	3%	4%	1%	4%	2%	5%	2%
Paraguay	29%	31%	27%	33%	18%	23%	31%	21%	33%	22%	33%	27%
Peru	3%	3%	2%	3%	1%	4%	2%	1%	3%	2%	3%	2%
Philippines	5%	5%	4%	5%	3%	4%	5%	2%	6%	1%	7%	2%
Romania	3%	2%	4%	4%	2%	3%	3%	0%	4%	2%	4%	2%

Rwanda	31%	37%	26%	32%	26%	32%	31%	27%	58%	15%	42%	30%
South Asia	4%	7%	2%	5%	3%	4%	4%	2%	7%	2%	6%	4%
Senegal	32%	35%	29%	39%	22%	27%	35%	27%	43%	27%	35%	28%
Singapore	10%	11%	8%	13%	2%	4%	11%	1%	12%	4%	13%	0%
Sierra Leone	11%	14%	9%	10%	13%	11%	11%	7%	25%	7%	14%	8%
Somalia	37%	42%	32%	46%	26%	41%	36%	32%	65%	27%	44%	30%
Sri Lanka	2%	4%	1%	4%	1%	8%	1%	1%	4%	2%	3%	2%
Tanzania	39%	44%	33%	45%	23%	37%	39%	33%	57%	30%	44%	38%
Thailand	8%	11%	6%	9%	5%	16%	7%	1%	16%	3%	12%	5%
Togo	21%	27%	16%	24%	16%	25%	20%	17%	30%	16%	25%	23%
Tunisia	2%	2%	2%	3%	1%	2%	2%	1%	3%	2%	2%	1%
Turkey	16%	19%	14%	26%	5%	20%	15%	8%	21%	12%	19%	13%
Uganda	51%	59%	43%	55%	35%	51%	50%	39%	66%	40%	58%	50%
United Arab Emirates	21%	23%	18%	23%	9%	10%	22%	9%	22%	16%	25%	14%
Uruguay	1%	2%	0%	1%	1%	2%	1%	1%	1%	1%	1%	2%
Venezuela, RB	11%	14%	8%	14%	1%	7%	12%	6%	12%	6%	14%	9%
Vietnam	3%	3%	4%	4%	2%	8%	2%	1%	5%	1%	5%	2%
World	4%	6%	3%	5%	3%	6%	4%	3%	6%	3%	5%	4%
South Africa	19%	19%	19%	25%	9%	17%	20%	12%	22%	12%	24%	19%
Zambia	28%	30%	26%	32%	19%	29%	27%	15%	41%	19%	34%	26%
Zimbabwe	49%	51%	46%	52%	40%	43%	51%	32%	58%	40%	54%	43%

Source: @ Global Findex database 2017

Table 0-5 Appendix XE: Account ownership among countries in the Middle East and North Africa

Country	Account	Account male	Account female	Account young adults	Account older adults	Account primary or less	Account secondary or more	Account income poorest 40%	Account income richest 60%	Account rural
Afghanistan	15%	23%	7%	10%	18%	9%	31%	14%	16%	15%
Algeria	43%	56%	29%	29%	49%	39%	49%	35%	48%	44%
Bahrain	83%	86%	75%	67%	85%	71%	84%	76%	87%	85%
Chad	22%	29%	15%	18%	24%	18%	46%	14%	27%	21%
Comoros	22%	26%	18%	7%	29%	13%	32%	11%	28%	20%
Djibouti	12%	17%	9%	4%	16%	6%	22%			8%
Egypt, Arab Rep.	33%	39%	27%	14%	40%	32%	33%	20%	41%	29%
Iran, Islamic Rep.	94%	96%	92%	92%	95%	90%	95%	93%	94%	95%
Iraq	23%	26%	20%	15%	26%	19%	28%	19%	25%	20%
Jordan	42%	56%	27%	25%	51%	37%	45%	33%	49%	46%
Kuwait	80%	83%	73%	70%	81%	28%	82%	71%	86%	61%
Libya	66%	71%	60%	53%	70%	41%	69%	58%	71%	72%
Lebanon	45%	57%	33%	25%	50%	31%	51%	30%	55%	44%
Morocco	29%	41%	17%	16%	33%	23%	44%	19%	35%	20%
Oman	74%	84%	64%	68%	77%	37%	76%	66%	79%	74%
Pakistan	21%	35%	7%	15%	25%	16%	34%	14%	26%	19%
Qatar	66%	69%	62%	64%	66%	32%	70%	54%	75%	53%
Saudi Arabia	72%	81%	58%	54%	76%	65%	73%	65%	76%	79%
Sudan	15%	20%	10%	10%	17%	7%	28%	8%	20%	13%
Somalia	39%	44%	34%	43%	37%	33%	69%	27%	46%	32%

Syrian Arab Republic	23%	27%	20%	22%	24%	23%	24%	24%	23%	22%
Tunisia	37%	46%	28%	23%	40%	24%	48%	21%	47%	28%
Turkey	69%	83%	54%	56%	72%	57%	74%	56%	77%	65%
United Arab Emirates	88%	93%	76%	60%	91%	71%	89%	83%	92%	80%
West Bank and Gaza	25%	34%	16%	12%	33%	18%	28%	12%	34%	31%
Yemen, Rep.	6%	11%	2%	2%	9%	4%	13%	4%	8%	6%
Middle East & North Africa	48%	57%	38%	34%	52%	31%	61%	40%	53%	39%
Arab world	37%	48%	26%	21%	43%	26%	49%	28%	43%	28%

Source: @ Global Findex database