`

DETERMINANTS OF FINANCIAL INCLUSION IN SUB-SAHARAN AFRICA

BY

BILIQEES AYOOLA ABDULMUMIN

14/27/PFI001

MAY, 2018

DETERMINANTS OF FINANCIAL INCLUSION IN SUB-SAHARAN AFRICA

BY

BILIQEES AYOOLA ABDULMUMIN

MATRIC. NO: 14/27/PFI001

BEING A DISSERTATION PRESENTED AND SUBMITTED TO THE DEPARTMENT OF ACCOUNTING AND FINANCE, COLLEGE OF HUMANITY, MANAGEMENT AND SOCIAL SCIENCES, KWARA STATE UNIVERSITY, MALETE, KWARA STATE, NIGERIA IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY (Ph. D) IN FINANCE

MAY, 2018

CERTIFICATION

This is to certify that this dissertation has been read and approved as meeting the requirements of the Department of Accounting and Finance, College of Humanities, Management and Social Sciences, Kwara State University, Malete, Kwara State.

Prof. Kenneth Sola Adeyemi
Supervisor

……
Signature and Date

Dr. Muftau Adeniyi Ijaiya
Co-Supervisor

……
Signature and Date

Prof. Moshood Nassar
Head of Department

……
Signature and Date

Prof. Esther Oluwafunmilayo Adegbite
External Examiner

……
Signature and Date

DECLARATION

I hereby declare that this dissertation titled "Determinants of Financial Inclusion in Sub-Saharan Africa" is my own work and has not been submitted or presented by me and to the best of my knowledge, by any other person for any course or qualification at this or any other academic or research institution. I also declare that the information provided herein are mine and those that are not mine are properly acknowledged.

…… ……...

Biliqees Ayoola Abdulmumin Date

DEDICATION

To my husband, Engineer Abdulmumin Naallah.

ACKNOWLEDGEMENTS

I am grateful to Allah (S.W.T.), the most Beneficent and the most Merciful. I give praise and adoration to Him for blessing me with guidance, knowledge and zeal to successfully complete this study.

I am grateful to my indefatigable supervisor, Professor Kenneth Sola Adeyemi and co-supervisor Dr. Muftau Adeniyi Ijaiya, for their invaluable guidance and contributions provided throughout the course of study.

My appreciation also goes to Professor Moshood Nassar, Dr. Sanni Mubaraq and Dr. Ebenezer Olubiyi for their useful suggestions and contributions. I deeply appreciate the unquantifiable contributions of the lecturers at the Department of Accounting and Department of Finance, University of Ilorin, most importantly, Dr. Fatima Etudaiye-Muhtar, Dr. I. B. Abdullahi, Dr. Rihanat Abdulkadir, Dr. T. O. Fagbemi, Mr. S. Abogun, Mr. R. O. Sakariyah and Mr. A. T. Jimoh.

I wish to also acknowledge the insightful guidance of Professor G. T. Ijaiya, Dr. A. A. Kilishi and Dr. M. A. Yaru of the Department of Economics, University of Ilorin, Ilorin.

Also to my uncle, Mr. Ola Abdul and the family of Alhaji Mohammed Solagberu, I appreciate your immense contributions.

Finally, my most special thanks go to my lovely and understanding husband for his constant support and to my children, parents and siblings, for their prayers and support.

ABSTRACT

Inclusive financial system is crucial for redistribution of economic resources between the deficit and surplus units in an economy. Despite the importance of financial inclusion, especially for economic growth of developing regions such as Sub-Saharan Africa, the prevailing level and factors that determine financial inclusion remain an open question. Against this background, the study investigated the determinants of financial inclusion in Sub-Saharan Africa from 2005 to 2015. The specific objectives were to: (i) determine the level of financial inclusion in Sub-Saharan Africa; (ii) investigate the influence of banking factors on financial inclusion in Sub-Saharan Africa; (iii) determine whether institutional factors affect financial inclusion in Sub-Saharan Africa; (iv) evaluate the effect of socio-economic factors on financial inclusion in Sub-Saharan Africa; and (v) examine infrastructural factors that influence financial inclusion in Sub-Saharan Africa. The study employed secondary data obtained from the International Monetary Fund, World Bank and Heritage Foundation database from 2005 to 2015. The data obtained was subjected to Principal Component Analysis (PCA) to determine the level of financial inclusion and System General Method of Moment (GMM) estimator to identify the determinants of financial inclusion in Sub-Saharan Africa. The findings were:

i. *Sub-Saharan Africa has a medium level of financial inclusion during the observed period.*
ii. *Financial freedom is an important determinant of financial inclusion in Sub-Saharan Africa and that there are no significant relationship between reserve ratio, liquidity ratio and financial inclusion in Sub-Saharan Africa.*
iii. *Government integrity has a significant impact on financial inclusion in the region. However, legal origin was reported not to have significant relationship with financial inclusion in Sub-Saharan Africa. Property rights has an adverse effect on financial inclusion in Sub-Saharan Africa. Information sharing has a positive impact on financial inclusion in the region.*
iv. *Population density has a positive effect on financial inclusion in the Sub-Saharan Africa.*
v. *Mobile phone has a positive impact on financial inclusion in the region. However, internet has a negative impact on financial inclusion in Sub-Saharan Africa.*

The study concludes that Sub-Saharan Africa has a medium level of financial inclusion, with a high propensity to achieve a high level of financial inclusion in the region if adequate credit information and communication facilities are put in place. The study recommends that property rights and government financial policies are strong motivations for financial inclusion in Sub-Saharan Africa.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Inclusive financial system has a particular significance for developing economies like those of Sub-Saharan Africa as it brings a large segment of the productive sectors of the economy under the formal financial system. Consequently, several Sub-Saharan African countries put in place different initiatives and policies in the formal financial system. Some of these policies and initiatives are the licensing of Microfinance banks, establishment of Non-Interest Financial Institutions, the introduction of electronic payments system, agent banking, mobile banking, licensing of non-conventional banks and liberalization of interest rates, among others. These policies were designed to encourage all everyone to use the formal financial system, even the poor and the usually excluded which would ultimately foster efficient allocation of resources, reduce inequalities and provide opportunities especially for the poor (Demirgüç-Kunt, Beck, & Honohan, 2008). Supporting this view, Khan (2011) noted that a means through which government achieves efficiency and leak-proof transfer of immense amounts of welfare benefits to targeted and disadvantaged groups of the population is through the inclusive financial system.

This justifies the efforts put in place by governments of Sub-Saharan African countries to achieve an inclusive financial system in order to improve the standard of living in the region. This has also captured the interest of the initially financially excluded as well as those already included.

Achieving an inclusive financial system is inseparable from the internal characteristics of financial institutions such as adequate capital base, sound reserve ratio and good liquidity ratio, which are features of a stringent regulatory environment. Similarly, the roles of financial institutions in promoting access to credit rest on the type of government policies governing their affairs in form of interest rate regime, capital reserves requirement and liquidity requirement (Olokoyo, 2011). In economies where repressive financial regulations continue to persist, funds available to financial institutions are limited and the cost of accessing the funds can be unaffordable (Akosah, 2013).

Financial inclusion reverberates not only from the market forces but through the institutional framework, property rights and other institutional factors which are necessary for financial contracts (Marcelin & Mathur, 2014). The level of financial development existing in an economy is a function of institutional quality such as protection of property rights, availability of credit information and the legal origin of a country, which may not totally fall within the control of the country (Beck & Levine, 2005). Such factors generally mimic the legal system of the country, such that the behaviour of individuals and financial institutions towards financial activities will be a reflection of the institutional quality prevailing in the economy.

The performance of an economy is reflected by socio-economic factors such as per capita income, economic growth, inflation and educational level. The financial intermediation functions exercised by the financial institutions between surplus and deficit units cannot be separated from the influence of these factors. The factors mimic the general socio-economic environment, such that the general ability and attitude of individuals towards saving and credit are reflected through the socio-economic status, which gives signals to the financial institutions (Somoye, 2011). Nevertheless, it is

expected that positive signal from the socio-economic environments will aid financial inclusion.

Infrastructural facilities such as the mobile phone and the internet have become important facilitators of inclusive financial system. The banking services have increasingly become inseparable from these factors. The use of mobile phone and internet facility have increased in recent time. According to Allen, Carletti, Cull, Qian, Senbet, and Valenzuela (2014), the use of mobile phone has influenced the use of savings and loan accounts in Sub-Saharan Africa.

In view of this, the need to establish the level of financial inclusion and its determinants in Sub-Saharan Africa becomes imperative so as to guide development bodies and governments towards the formation of policies to foster the growth of financial inclusion in the region.

1.2 Sub-Saharan Africa and Financial Inclusion

In Nigeria, for instance, policies put in place to reduce the level of financial exclusion range from various institutional involvements to specific policies and programmes (Kama & Adigun, 2013). One of these policies is the rural banking programme in the late 1970s. The scheme was introduced by the Central Bank of Nigeria in 1977 with the aim of achieving one bank branch in each of Nigeria's local government area, to promote savings culture and grow banking habit, other policies by the Central Bank of Nigeria (CBN) targeted at achieving financial inclusion in the country included the promotion of financial literacy campaign and streamlining of transaction charges, among others. Subsequently, the government founded the People's Bank and also facilitated the establishment of Community Banks in 1989. All these initiatives were put

in place to improve financial inclusion in the Nigerian financial system. Furthermore, the federal government of Nigeria in 2005 launched the National Microfinance Policy which provided the supervisory and regulatory framework. This facilitated the growth of privately-owned microfinance institutions while also permitting and facilitating the participation of mostly the third sector (informal) institutions, including market associations, cooperatives, non-governmental organizations, self-help groups. Financial System Strategy (FSS2020) was implemented in 2007, with the hope of fostering key transformation in the financial system by year 2020 (Financial System Strategy [FSS], 2013). FSS2020 aim to ensure 80 percent of adults in Nigeria are financially included by 2020 (Komolafe, 2017). These initiatives enhance greater financial inclusion. Also in June 2011, the CBN introduced a new framework for Non-Interest Financial Institutions (NIFIs) and granted two preliminary licenses in December 2011 to Jaiz Bank and Stanbic IBTC Non-Interest (Islamic) Banking Window. Furthermore, Nigeria launched a National Financial Inclusion Strategy (NFIS) in 2012 (Kama & Adigun, 2013).

While mobile money has not yet reached the limelight in Nigeria, the government established initiatives to promote digital consumer protection, payment services and agent banking in order to encourage the use of formal financial products and services by increasing consumer confidence and increase the use of digital financial services (Villasenor, West, & Lewis 2016).

Kenya has been able to attract more people into the formal financial system due to the Safaricom's M-Pesa mobile money service which was introduced in 2007. This service enables low-income earners to receive and send money using Safaricom airtime vendors. M-Pesa was easy to access and use due to the proximity of the Safaricom airtime vendors to the people. The network provider transformed its airtime vendors to registered agent branches where customers can register to send and receive money (Oji,

2015). In 2009, the Finance Act was established. These modifications to the Banking Act were to allow agent banking in Kenya. In 2011, the National Payment Systems Act was introduced. The Act made electronic money issuers to have open back-end systems with interoperable capacity. In 2013, the consumer protection guideline was also introduced (Muthiora, 2015; Villasenor *et al.,* 2016). Kenya further embarked on various initiatives such as licensing of Micro Finance banks in 2014, agent banking, credit referencing bureau and mobile banking. All these were geared towards enhancing financial inclusion. As at 2014, Kenya had licensed 9 microfinance institutions with 96 branches with 2.2 million deposit accounts valued at Ksh33.8 billion (USD388.5 million). The government further strengthened the Agency Act as than there were 30,449 agents in the country from 16 banks with 120.6 million transactions valued at Ksh653.7 billion (USD7.5 billion) (M'amanja, 2015).

Several policies and initiatives were put in place in South Africa in order to achieve an inclusive financial system. For example, in 2003, the Financial Services Charter (FSC) was established by the big four banks in collaboration with the government to assist in strengthening financial intermediation and financial inclusion in South Africa. The formal financial system at the time, though developed and comparable to those of developed countries, some significant proportion of the population was still financially excluded (World Bank, 2014). Furthermore, in 2004, the big four banks collaborated with Post bank (a state-owned financial institution) and other financial market players, to unveil a banking product called Mzansi for the financially excluded group in South Africa. In 2007, the National Credit Act was introduced to ensure more access to finance, reduce the cost of finance and improve customers' protection. Other important efforts introduced to improve the level of financial inclusion

are the Financial Advisory and Intermediaries Services Act (2002), the Financial Services Embeds Schemes Act (2004), the Consumer Protection Act (2008).

Rwanda has also demonstrated a strong commitment to promoting financial inclusion in terms of different initiatives, particularly digital payment system. Furthermore, the government of Rwanda is a member of the Better than Cash Alliance. In 2006, the Rwandan Financial Sector Development Program (RFSDP) was launched in order to achieve the Vision 2020 Economic Development and Poverty Reduction Strategy of Rwanda (Finscope, 2012). Access to Finance Rwanda (AFR), one of the initiatives of the Rwandan government to increase financial inclusion was established in 2010. In 2011, Rwanda committed itself to the Maya Declaration. The second phase of the RFSDP was approved by the Cabinet in order to achieve greater financial inclusion. By 2014, a National Financial Education Strategy was approved by the cabinet. The financial sector development working group was charged with the responsibility of implementing the strategy (Alliance for Financial Inclusion and Women's World Banking, 2016). In 2015, Mobile Telecommunication Network (MTN) Rwanda partnered with Safaricom in Kenya to enable their customers send and receive funds across borders. In 2016, the National interoperability switch was approved by the Ministry of Finance and Economic Planning and Ericsson Group during the World Economic Forum on Africa (Finscope Rwanda, 2016; Villasenor *et al.*, 2016).

Uganda also made numerous efforts to improve financial inclusion. In 2011, the Bank of Uganda became a signatory to the Maya Declaration. Due to the Maya declaration, Uganda, under the Sasana Accord raised the number of adult population that have a bank account with a formal financial institution. Uganda also created a joint working group on Mobile Money Financial Services between the Bank of Uganda and the Uganda Communications Commission. In the same year, the Bank of Uganda

released the Financial Consumer Protection Guidelines. In 2012, Financial Inclusion Project for Uganda was launched to facilitate access to finance and empower the users of financial services to make rational decisions about their personal finances so as to contribute to economic growth. In 2013, the Mobile Money Guidelines were issued. In 2016, the Parliament of Uganda passed amendments to the 2004 Financial Institutions Act (FIA), which enabled the introduction of Islamic banking (Villasenor *et al.*, 2016).

1.3 Statement of the Problem

The absence of adequate knowledge on the level of financial inclusion in the region has hindered authorities' relevant information on the progress and success of various financial innovations and initiatives put in place to boost financial inclusion. Ways to improve these efforts to meet set target of Universal Financial Access by 2020 is not clear (Faruk & Noman, 2013; Fungáčová & Weills, 2014; Gebrehiwot & Makina, 2015; Gupte, Venkataramanib, & Gupta, 2012; Peña, Hoyo, & Tuesta, 2014; Papadavid, 2016; Sarma & Pais, 2011).

Furthermore, on the determinants of financial inclusion, financial institutions have often been accused of not efficiently facilitating greater financial inclusion due to the government's repressive financial policies imposed on them, which cause inefficiency in their intermediation functions (Akosah, 2013). This is due to the fact that financial repression is high in developing region, Sub-Saharan Africa inclusive (Pourshahabi & Elyasi, 2013). Financial repression policies could be in form of interest rate regime, reserve ratio, liquidity ratio and capital requirements, which restrict funds at the disposal of financial institutions, thereby, leading to inefficiency and disincentive to extend credit (Sarma & Pais, 2011).

Despite the World Bank's emphasis on the importance of building effective institutions in order to achieve greater financial development, majority of Sub-Saharan African countries have weak institutions (Fan, Titman, & Twite, 2012). In most cases the credit information bureau in the region are just springing up, legal institutions are characterized by weak contractual framework. Rights of individuals are ill-defined and compounded by the weak enforcement because the judicial system is not totally independent, which leads to loss of credibility (Djankov, McLiesh, & Shleifer, 2005; Effiong, 2016). In the same vein, Sub-Saharan Africa is characterized by civil law countries which tend to support the government against the rights of individuals and hinders the growth of financial activities, thereby distorting financial development and therefore, financial inclusion. Corroborating this, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) argue that legal origin of civil law countries cause them financial backwardness.

In addition to these issues, the uncertainty of socio-economic factors such as inflation, the low level of other socio-economic factors such as the per capita income, economic growth and education, are salient vicious characteristics of Sub-Saharan Africa. On the one hand, inflation represses financial intermediation function by eroding the usefulness of financial assets and leads to the formulation of policies which could distort financial contracts (Kim, Lim, & Suen, 2010). On the other hand, the indicators of other socio-economic factors have led to the continuous depression of the ability and awareness of individuals to access and use the formal financial system, reduction in economic activities and increase in the unemployment rate (Effiong, 2016).

In addition, internet facility is expensive to access, therefore the utilization of formal financial services through the use of internet is difficult. Furthermore, despite the wide use of phone, a lot of people do not use their phones to access formal financial

services due to lack of technical know-how, unwillingness to try new things, or fear of loss of money (Gebrehiwot & Makina, 2015).

The occurrence of these problems has generated concern in the region because they hinder financial inclusion, which leads to a roadblock to poverty reduction and economic growth (Demirgüç-Kunt, Klapper, & Singer, 2017). Furthermore, this has impeded asset building and the ability to transform talents into productive uses due to inaccessibility of financial and social capital (Beck & De la Torre, 2007).

Available evidence on the level of financial inclusion in Sub-Saharan Africa is based on account ownership only (Demirgüç-Kunt, Klapper, Singer, & Van Oudheusden, 2015). Studies such as Akudugu (2013), Babajide, Adegboye, and Omankhanlen (2015), Marr, Leon and Ponce (2014), Onaolapo (2015) and Zins and Weill (2016) proxied financial inclusion with deposits from rural areas, commercial banks' deposits, total number of newly banked people and formal account with a commercial bank. These studies ignored the fact that having an account with a formal financial institution does not adequately mean financial inclusion, it only serves as an entry point into the formal financial system (Beck, Demirgüç-Kunt, & Martinez Peria, 2007; Demirgüç-Kunt & Klapper 2012). Therefore, financial inclusion in the region can hardly be inferred from the studies that fail to recognize the robustness of incorporating all the relevant indicators such as mobile money account, mobile money transactions etc. because financial inclusion is an important policy objective which is more comprehensive than each of the proxies (Allen, Demirgüç-Kunt, Klapper, & Martinez Peria, 2012; Sarma, 2008).

Earlier studies on the determinants of financial inclusion in the region such as Akudugu (2013), Allen *et al*. (2014), Boakye and Amankwah (2012), Chikalipah (2017),

Soumaré, Tchana, and Kengne (2016) and Zins and Weill (2016) consider factors such as age, level of education, population density, phone, income level and economic growth.

Arguably, no study to the best of the researcher's knowledge has measured and incorporated mobile money in the measurement of the level of financial inclusion in the Sub-Saharan African region. This has been regarded as a bright spot for financial service extension within Sub-Saharan Africa. Also, to the best of the researcher's knowledge no study on Sub-Saharan Africa investigating determinants of financial inclusion of individuals has used an index of financial inclusion. To circumvent this, a region-specific calculation of the level of financial inclusion with similar economic performance, financial development and institutional frameworks is necessary. This study addresses the gap existing in the literature by calculating the financial inclusion index, using the PCA, which generates the principal component of financial inclusion, that is, the actual extent of financial inclusion. This method allows all indicators within a dimension of financial inclusion to be incorporated to reflect the ideal situation, that is, the actual extent of financial inclusion.

Also, to the best of the researcher's knowledge, the conjoint effect of socio-economic, banking, infrastructure and institutional factors on financial inclusion remains unexplored in Sub-Saharan Africa. More so, there exists methodological inadequacy in previous studies on financial inclusion in the region; therefore, this study fills these gaps.

1.4 Research Questions

Arising from the above-established research problems, this study attempts to provide answers to the following research questions:

i. What is the level of financial inclusion in Sub-Saharan Africa?

ii. In what way do banking factors influence financial inclusion in Sub-Saharan Africa?

iii. To what extent do institutional factors influence financial inclusion in Sub-Saharan Africa?

iv. What are the socio-economic factors that determine financial inclusion in Sub-Saharan Africa?

v. To what extent do infrastructural factors determine financial inclusion in Sub-Saharan Africa?

1.5 Objectives of the Study

The main objective of this study is to examine the determinants of financial inclusion in Sub-Saharan Africa. The specific objectives are to:

i. determine the level of financial inclusion in Sub-Saharan Africa

ii. investigate the influence of banking factors on financial inclusion in Sub-Saharan Africa

iii. determine whether institutional factors affect financial inclusion in Sub-Saharan Africa

iv. evaluate the effect of socio-economic factors on financial inclusion in Sub-Saharan Africa

v. examine the influence of infrastructural factors on financial inclusion in Sub-Saharan Africa

1.6 Hypotheses of the Study

The following four hypotheses were tested in the course of the study:

The first main hypothesis is:

H_{01}: banking factors have no significant effect on financial inclusion in Sub-Saharan Africa

In order to determine the banking factors that significantly affect financial inclusion in Sub-Saharan Africa, the following seven sub-hypotheses were raised:

H_{01a}: reserve ratio has no significant effect on financial inclusion in Sub-Saharan Africa

H_{01b}: liquidity ratio has no significant effect on financial inclusion in Sub-Saharan Africa

H_{01c}: financial freedom has no significant effect on financial inclusion in Sub-Saharan Africa

H_{01d}: capital asset ratio has no significant effect on financial inclusion in Sub-Saharan Africa

H_{01e}: deposit interest rate has no significant effect on financial inclusion in Sub-Saharan Africa

H_{01f}: share of foreign banks asset in total banking sector asset has no significant effect on financial inclusion in Sub-Saharan Africa

H_{01g}: non-performing loan has no significant effect on financial inclusion in Sub-Saharan Africa

The second main hypothesis is:

H_{02}: institutional factors do not significantly affect financial inclusion in Sub-Saharan Africa

In an attempt to identify the institutional factors that significantly affect financial inclusion in Sub-Saharan Africa, the following four sub-hypotheses were raised:

H_{02a}: legal origin does not significantly affect financial inclusion in Sub-Saharan Africa

H_{02b}: government integrity does not significantly affect financial inclusion in Sub-Saharan Africa

H_{02c}: property rights do not significantly affect financial inclusion in Sub-Saharan Africa

H_{02d}: information sharing does not significantly affect financial inclusion in Sub-Saharan Africa

The third main hypothesis is:

H_{03}: socio-economic factors do not significantly affect financial inclusion in Sub-Saharan Africa

The study raised the following five sub-hypotheses in order to identify the socio-economic factors that significantly determine financial inclusion in Sub-Saharan Africa:

H_{03a}: per capita income does not significantly affect financial inclusion in Sub-Saharan Africa

H_{03b}: economic growth does not significantly affect financial inclusion in Sub-Saharan Africa

H_{03c}: inflation does not significantly affect financial inclusion in Sub-Saharan Africa

H_{03d}: population density does not significantly affect financial inclusion in Sub-Saharan Africa

H_{03e}: educational level does not significantly affect financial inclusion in Sub-Saharan Africa

The fourth main hypothesis is:

H_{04}: infrastructural factors do not significantly influence financial inclusion in Sub-Saharan Africa

The following two sub-hypotheses were raised in order to determine the infrastructural factors that significantly impact on financial inclusion in Sub-Saharan Africa:

H_{04a}: internet does not significantly influence financial inclusion in Sub-Saharan Africa

H_{04b}: phone does not significantly influence financial inclusion in Sub-Saharan Africa

1.7 Justification for the study

This study is important and expected to add to the frontier of existing knowledge on financial inclusion, particularly, in the Sub-Saharan African region. Firstly, the study measured the level of financial inclusion in Sub-Saharan Africa. Secondly, the study extended indicators of financial inclusion to cover mobile money, which has attracted people into the formal financial system in recent time especially in Sub-Saharan Africa. Thirdly, the study investigated determinants of financial inclusion of individuals in Sub-Saharan Africa using an index. Fourthly, the study expanded the financial inclusion literature by investigating whether reserve ratio, liquidity ratio, legal origin, government integrity, property rights and financial freedom affect financial inclusion. The first four are new contributions to financial inclusion literature to the best of the researcher's knowledge. The last two are relatively new and have been tested on informal firms' financial inclusion but are yet to be tested on financial inclusion of individuals, as it is the case in this study. Also, in identifying factors that explain financial inclusion in Sub-Saharan Africa, this study investigated beyond the socio-economic factors which most studies such as Chikalipah, (2017), Soumaré, Tchana, and Kengne, (2016) and Zins and Weill (2016) concentrated on. Therefore, one of the uniqueness of this study is that it

established whether the effect of the newly investigated factors listed earlier persist after the introduction of other banking, institutional, socio-economic and infrastructural factors. This study further established the conjoint effect of socio-economic, banking, infrastructure and institutional factors on financial inclusion in Sub-Saharan Africa.

In addition, studies that have investigated the determinants of financial inclusion in Sub-Saharan Africa used majorly logit and probit regressions which are plagued by the potential problems of heteroskedasticity, autocorrelation and endogeneity. Therefore, the study contributes methodologically by employing the system GMM estimator which caters for the problem of heteroskedasticity, autocorrelation and endogeneity (Wooldridge, 2002).

Governments and policymakers' need for reliable information about the level of inclusiveness that captures all relevant dimensions and its determinants in Sub-Saharan Africa will be met. This study captures all relevant dimensions that would provide the opportunity to further make policies that will enhance the achievement of financial inclusion target. Also, the findings would provide a template for policymakers to enable them review and determine effective and non-effective policies.

Financial intermediaries would be more aware of the extent of their penetration and the level with which banking related factors determine their ability to reach out to the potential customers in a bid to deepen financial inclusion.

This would also inform and guide agencies such as the World Bank, International Monetary Fund, among others, to make better plans that could achieve the objective of universal financial accessibility and inclusiveness.

Finally, a robust and comprehensive measure of financial inclusion is of importance to the research community, to investigate other interesting hypotheses relating to financial inclusion in the literature.

1.8 Scope of the study

This study measured the level of financial inclusion and its determinants in Sub-Saharan Africa. The study covered from 2005 to 2015. Sub-Sahara Africa was chosen because there is a dearth of research on the level and determinants of financial inclusion in the region. Furthermore, account ownership in Sub-Saharan Africa, which is a prerequisite to be financially included, is the lowest compared with other developing regions (Mehrotra & Yetman, 2015). In the same vain, out of the 48 underdeveloped countries, 34 are from Africa (Evans & Adeoye, 2016). The level and determinants of financial inclusion may, therefore, be more significant and easily evident in Sub-Saharan Africa than in other parts of the world. The study covered 22 Sub-Saharan African countries out of the population of 49 countries, the choice being informed by the availability of data. The choice of the time period was motivated by the fact that 2005 coincides with the United Nations' International Year of Micro Credit which provides the springboard for various innovations and policies geared towards promoting inclusive financial system by sustaining access to and increasing usage of financial services.

Policies and initiatives that could also be felt during these periods include electronic payment system, mobile banking, agent banking, cashless policy, microfinance policy, non-interest banking policies, among others (Kama & Adigun, 2013; M'Amanja, 2015). This period also included 2011 when the Maya Declaration was launched with Sub-Saharan Africa having the highest number of institutional commitments to the Maya Declaration. Also, during this period was the notable

declaration of the vision for Universal Financial Access by 2020 by the World Bank in the year 2013. The scope of the study ended in 2015 due to the availability of data.

1.9 Plan of the Study

The research work is organized into five chapters in order to address the research questions and achieve the stated objectives. Chapter one is the introductory chapter, which discusses the research background in relation to financial inclusion. The chapter gives a brief examination of the current state of financial inclusion in Sub-Saharan Africa. This chapter also presents the statement of the problem, research questions, research objectives, hypotheses, justification, scope and plan of the study.

Chapter two is the literature review, which discusses conceptual issues, related theories from which the research hypotheses were derived and empirical literature on financial inclusion. Chapter three describes the methodology of the study. The chapter details the conceptual framework, research models*, a priori* expectations, estimation techniques used in answering the research questions, potential determinants of financial inclusion, nature and sources of data, inferential statistics, research design, population and sample size and descriptive statistics.

Chapter four discusses the empirical results of the estimations in relation to existing literature on financial inclusion. The chapter includes a section that investigates the robustness of the main regressions. Chapter five concludes the research work and presents the summary, conclusion, recommendation and contribution to knowledge. It also contains the suggestions for further studies as well as limitations of the study.

CHAPTER TWO

REVIEW OF LITERATURE

2.0 Introduction

This chapter is subdivided into three sections. The first section is the conceptual review, it involves the review of the concept and dimensions of financial inclusion. The second section reviews theories underpinning the study. Following the theoretical review, the third section discusses and reviews empirical literature on financial inclusion from which research gaps in existing literature were identified.

2.1 Conceptual Review

This section reviews the concept of financial inclusion, Maya Declaration, mobile money and the various dimensions of financial inclusion.

2.1.1 Concept of Financial Inclusion

Financial inclusion has been the core target of many developing nations since the start of the new millennium, as many research findings have identified the importance of financial inclusion to an economy.

Financial inclusion is a situation which allows for ease of access to, availability of and usage of formal financial systems by everyone in an economy. It is a situation where no one in an economy has any difficulty in opening a bank account and everyone can afford credit and can conveniently, easily and consistently use the financial system's products and facilities. It is the process which ensures that a person's wealth is

maximized, expenses are controlled and one can exercise informed choices through access to basic financial services (Central Bank of Nigeria [CBN], 2012).

Micheal (2015) further notes that financial inclusion means ensuring that lower income earners, uneducated people living in rural areas and the financially disadvantaged in the society all have access to requisite financial services by bringing the services closer to them at an affordable price. This means that the usual banking practices, requirements and documentation for account opening, loan access, collateral requirements, interest on loans and advances and service charges which serve as barriers to the less-privileged will have to be relaxed. It also connotes the deepening of bank services both geographically and demographically through the establishment of branches in rural areas. Furthermore, financial exclusion is the inability of individual, household or group to access, particularly the formal financial products and services. Mohan (2006) explains that financial exclusion signifies the lack of access by certain segments of the society such as women and rural dwellers to appropriate low cost, fair and safe financial products and services from mainstream providers.

In the opinion of Kama and Adigun (2013), greater financial inclusion is achieved when everyone in a geographic region and segment of the society has access to financial service, financial information and financial assistance easily and at an affordable cost. This facilitates savings and investment and thus causes efficient resource allocation from surplus to deficit units of the economy. This also allows the government to be able to make use of bank accounts for social security services such as health and calamity insurance under various schemes for disadvantaged people in different geographic regions. From the bank's point of view, having such social security cover makes the financing of such individual less risky. Reduced risk implies more flow of funds at better rates (Porkodi & Aravazhi, 2013).

Chakravarty and Pal (2010) in their own opinion define financial inclusion in relation to the vulnerable groups. Financial inclusion described as the process of ensuring access to appropriate financial services needed by vulnerable groups such as the weaker segment of the society and low-income groups at an affordable cost in a fair and transparent manner by the financial intermediaries. It has also been defined as the state of the financial system where every member of society has access to appropriate financial services for effective and efficient management of their resources; get the needed resources to finance their businesses and financial leverages to take up opportunities that will lead to increase in their income (Chima, 2011). Aggressive financial inclusion strategies would gear the banking sector to perform its intermediation role by providing banking services and products through which savings will be mobilized for capital formation and growth of African countries (Sharma & Kukreja, 2013).

It is generally agreed that financial inclusion is multidimensional, encompassing access to, availability of and usage of different financial services by everyone in the society. This facilitates income redistribution, accumulation of capital and improvement in the wellbeing of the people. Furthermore, financial inclusion provides opportunities to the banking sector to reach out to societies and regions that are excluded in order to encourage the public to be included in the formal financial sector (Porkodi & Aravazhi, 2013). With the widespread of financial inclusion among Sub-Saharan Africa countries, effective direction can be given to the government initiatives (Sharma & Kukreja, 2013).

2.1.2 Concept of Maya Declaration

Maya Declaration is a commitment to common principle of achieving greater financial inclusion by enhancing the economic and social potential of the 2.5 billion poorest people. This also increase accountability on the part of the policy makers on the

Maya Declaration commitment. It was made by group of developing countries' regulatory institutions in 2011 during the Alliance for Financial Inclusion. More than 80 institutions from developing and emerging economies have made Maya Declaration, the three core values of the Maya Declaration include self-set target, Peer-to-peer knowledge exchange and international cooperation or partnership (African Financial Inclusion [AFI], 2012).

2.1.3 Concept of Mobile Money

Mobile money refers to a tool that allows financial products and services to be offered and accessed through mobile phones and other mobile devices. These services include account opening deposit, withdrawal and transfer of funds, receive of local and international remittances, payments of bills (Jerkins, 2008).

According to Ayo, Ukpere, Oni, Omote and Akinsiku (2012) mobile money is a tool that allows people to use financial services using mobile cell phones. The use of mobile money helps a great deal to facilitate remittances.

Mobile money allowed millions of people who do not initially use the formal financial system such as the poor, rural dwellers and women to have access to formal financial services relatively easily, cheaply and reliably. Users of mobile money make deposits, withdrawals and other transactions through the network of retail agents or conventional banks. This tool has recorded the greatest success in Sub-Saharan Africa than in other part of the World (Demirgüç-Kunt & Klapper).

2.1.4 Dimensions of Financial Inclusion

Literature has identified three major dimensions of financial inclusion to include penetration, availability and usage of financial services. Financial institution penetration means the ability of the formal financial institutions to penetrate deeply and widely amongst the users. The size of the banked population, that is, the proportion of people having a formal account and number of people with mobile money account are measures of the financial institutions' penetration in an economy (Gupte *et al.,* 2012). Furthermore, the number of deposit and loan account with commercial banks, microfinance institutions, regulated credit unions and cooperative societies and number of people with mobile money accounts per 1,000 adults serves as the indicators in the penetration dimension.

Deposit accounts were used in this study because a critical mass of data is missing for the number of the depositor, which may be more appropriate than deposit account as this may lead to double counting. Nevertheless, following Chakravarty and Pal (2010), Gupte *et al.* (2012) and Sethy (2016), deposit accounts were used. Similarly, this study considered loan account following Beck *et al*. (2007). This was considered appropriate because some individuals may for the first time have a loan account as against the deposit account. Although this might be small compared to the deposit account, the fact that such situation exists cannot be ruled out (Beck *et al*. 2007; Chakravaty & Pal 2010; Gupte *et al.* 2012; Bhuvana & Vasantha, 2016). Financial institutions, regulated credit unions and cooperative societies were included following Amidžić, Massara, and Mialou (2014). These institutions play a major role in financial inclusion, especially in Sub-Saharan Africa. According to Guièze, (2014), these financial institutions which are in thousands, offer different financial and non-financial services to over 71 million people

especially the poor and the rural dwellers with little or no access to conventional banking services. 44 million of 71 million people had access to a deposit account; 20 million had taken credit while others enjoy non-financial services in Sub-Saharan Africa. Therefore their contributions cannot be overlooked.

Availability of financial services is the second dimension. In an inclusive financial system, banking services should be easily available to the users. Indicators of availability of financial services are the number of branches of commercial banks, MFIs, regulated credit unions and cooperative societies per 100,000 adults and number of Automated Teller Machine (ATM) per 100,000 adults. In the present day banking system in many countries, ATMs play an important role. Therefore, the importance of ATMs in providing improved access to financial services cannot be ruled out. However, the spread of ATM network varies from financial institution to financial institution and from country to country while the role of a bank branch still remains (Sarma, 2012). Furthermore, keeping in view the move towards mobile money especially in Sub-Saharan Africa, data on mobile banking outlets per 100,000 adults is incorporated in this dimension. In the data on the number of bank branches, the number of ATM and mobile money outlets per 100,000 adults served as indicators for availability dimension. These indicators are used following Sarma (2008), Sethy (2016), and Gupte *et al.* (2012).

Usage represents the third dimension. It has been noted that in some countries where high number of formal accounts has been recorded, very few make use of the services due to various reasons such as availability of banking outlets, stringent conditions attached to financial services among others (Cámara & Tuesta, 2014). Therefore, having a bank account is not adequate for an inclusive financial system (Sarma, 2012). Hence, in incorporating the usage dimension in the present index, two basic indicators have been noted in literature, namely; deposit and credit from

commercial banks, MFIs, credit union and cooperative societies but the study went further to include mobile money transactions which often include payment, remittance, transfer among others as earlier noted by Sarma (2008) but not considered in Sarma (2008) due to non-availability of data. As against the deposit and credit as a percentage of Gross Domestic Product (GDP) used by Okpara (2013) and Sarma (2008), the study used outstanding loan and credit because in finance-growth literature, credit to GDP is a measure of financial depth and Demirgüç-Kunt, *et al.* (2017) argued that financial depth and financial inclusion are only similar but not the same. Similarly, Beck *et al.* (2007) posit that deposit and credit as a percentage to GDP do not adequately represent the value of services received by individuals. Data on all the indicators were obtained from the IMF Financial Access Survey database.

Table 2.1 shows the three dimensions and the eight indicators used in this study for the construction of financial inclusion for Sub-Saharan African countries, which are adapted from Sarma (2008) with modifications.

Table 2.1: The Dimensions and Indicators used to Construct Financial Inclusion Index for African Countries

Dimension	Indicators
Financial Institution penetration	Number of Deposit Account with Commercial Banks, MFIs, Credit Union and Cooperative Societies per 1,000 Adults
	Number of Loan Account with Commercial Banks, MFIs, Credit Union and Cooperative Societies per 1,000 Adults
	Number of Mobile Money Account per 1,000 Adults
Availability of Financial Institution services	Number of Branches of Commercial Banks, MFIs, Credit Union and Cooperative Societies per 100,000 Adults
	Number of ATM per 100,000 Adults
	Mobile Money Agent Outlets per 100,000 Adults
Usage	Depositor with Commercial Banks, MFIs, Credit Union and Cooperative Societies per 1,000 Adults
	Creditor at Commercial Banks, MFIs, Credit Union and Cooperative Societies per 1,000 Adults
	Mobile Money Transaction per 1,000 Adults

Source: Author (2018)

2.2 Theoretical Review

This section presents the theories reviewed in the study. This includes the financial repression theory, demand-following hypothesis, supply-leading hypothesis, information theory of credit and law and finance theory.

2.2.1 Theory of Financial Repression

The term financial repression was introduced by Mckinnon (1973) and Shaw (1973), and refers to a situation where financial regulations and laws such as interest rate control, liquidity ratio requirements, high reserve requirement, high transaction cost, capital controls, restrictions on entry into the financial sector, restrictions on directions or allocation of credit, government ownership or domination of banks and other legal restrictions could distort willingness to save and the availability of loanable funds in an economy. This makes individuals seek funds from the informal service providers to fill the vacuum created by the restricted ability of the formal financial institutions and thereby, aggravating the neglect of the formal financial system. Repressive government financial restrictions confiscate funds from financial institutions meant for intermediation purposes by imposing high requirement; this allows the governments to finance budget deficit at close to no cost (Khalfaoui & Ben Saada, 2015). This is more peculiar to economies where the banking sector dominates the financial system such as in the Sub Saharan Africa.

McKinnon (1973) and Shaw (1973) argued that conditions of money supply have a first-order impact on the decisions to save and invest. They also argued that economies with government interventions and regulations have less competitive financial sector, low saving and investment. In the same vein, Andersen and Trap (2003) argued

that financial repression leads to disequilibrium in the market and reduces the ability of the market to extend credit. McKinnon (1973) and Shaw (1973) further opined that these financial regulations, rules and policy determine whether a person will be financially included as it affects willingness to save and the ability of financial intermediaries to lend. They also advocated for the removal of any financial regulation, rules and policy serving as restriction on financial intermediaries and the people which can hinder financial development. Ito (2006), Leaven (2003), McKinnon (1973) and Shaw (1973) suggests seeking financial liberalization policies as a way of promoting the country and that all government financial policies should be channeled towards financial development in which financial inclusion is inclusive.

Studies such as Andrianaivo and Yartey (2010) and Sufian and Habibullahi (2009) provided evidence to uphold the theory of financial repression.

2.2.2 Demand-Following Hypothesis

Experts take different positions as to the relationship between financial sector development and growth. Prominent among these is the "supply leading" and the "demand-following" hypotheses (Obademi, 2013 as cited in Sakariyahu, Ibrahim, & Abdulmumin, 2016). The supply-leading hypothesis was propounded by Schumpeter (1911). The supply-leading hypothesis states that financial development causes economic growth. Proponents of the demand-following perspective of finance-growth nexus, such as Robinson (1952) and Kuznets (1955), state that financial development is caused by economic growth. In other words, financial sector responds positively to change in the productive sector. In line with this, Arestis and Demetriades (1997) argue that increased economic activities lead to the creation of more demand for financial products and services, thereby leading to financial development in an economy.

Therefore, according to this hypothesis, financial development does not spur economic growth rather, economic growth spurs financial development. This also implies that economic growth spurs financial inclusion. Studies such as Aduda and Kalunda (2012), Salman, Ayo-Oyebiyi, and Emenike (2015), Sakariyahu *et al.* (2016), Adeyeye, Fapetu, Aluko and Migiro (2015) and Terzi (2015) built their work on these hypotheses.

2.2.3 Information Theory of Credit

The information theory of credit was formalized by Jaffee and Russell (1976) and Stiglitz, and Weiss (1981). This theory indicates that what matters for the extension of credit is the availability of information about the borrower, his credit history and information of his dealing with his other lenders (Djankov, McLiesh, & Shleifer, 2007).

According to McDonald and Schumacher (2007), the theory suggests that more credit will be extended to borrowers if financial institutions have access to the credit information of borrowers which would enable lenders to predict the probability of repayment of borrowers. Consequently, the availability of information about the credit worthiness of borrowers will lead to extension of credit.

Research works such as McDonald and Schumacher (2007); Djankov *et al.* (2007); Boyd and Hakenes (2013) offer support for this theory.

2.2.4 Law and Finance Theory

The law and finance theory was developed by La Porta *et al*. (1997, 1998). Beck and Levine (2005) discussed the theory in two directions. The first is that countries which protect the property rights of individuals and enforces contractual agreement, give room for financial development (Bhattacharyya, 2013; Graff, 2006). Secondly, past

colonial regimes explain to a greater extent the financial system that prevails in an economy. La Porta *et al*., (1998), Beck, Demirgüç-Kunt and Levine (2003) argued that countries that are of British common law are more financially developed than those with French civil law. The theory further argued that the legacy of the British system flourishes regulatory quality and financial activities. This is because appointment of judges is not done by the governments. The legacy of the French legal system is characterized by the legal procedures codified by the state, absence or little decentralization, absence of federations, appointment of judges by the central government among others. These attributes hinder the quality of regulation and thus, financial development. This is because government with too much power will interfere in the activities of the financial market and make the market unfavourable for financial development (Asongu, 2012). Thus, this system may make economies in French former colonies less financially included than the British. This theory has been used in studies such as Beck *et al.* (2003), Djankov *et al.* (2007) and Filippidis and Katrakilidis (2014).

2.3 Empirical Review

This section discusses prior empirical evidence related to the study. This includes studies that provide evidence on the level of financial inclusion and also studies on determinants of financial inclusion. The section is divided into cross-country studies and country-specific studies.

2.3.1 Cross Country Studies on the level of Financial Inclusion

Recent researches have examined the level of financial inclusion across countries, prominent and one of the earliest among them is Beck *et al.* (2007) who measured access to financial services and presented new indicators of banking sector penetration for 99

countries. The study showed that the indicators predict household and firm use of banking services. The study took a bold step to first identify outreach indicator. However, the study was for a point in time and did not allow for study of trend. Also, important financial service such as mobile money was not also considered, the study considered both geographic and demographic outlets; in which if incorporated together in an index may overstate the level of financial inclusion.

The most widely cited in this area of research is that of Sarma (2008, 2010, & 2012). Sarma (2008) used a methodology similar to the United Nation Development Project methodology to calculate a multi-dimensional index of financial inclusion. The study used indicators such as the number of bank accounts, number of ATMs, bank branches, credit and deposit. The study found that level of financial inclusion varies across countries. Unfortunately, equal weight was allocated to each of the dimensions and in reality, they might have different contributions. The bias weight allocation might affect the reliability of the findings. This is supported by the argument of Lockwood (2004) that index is sensitive to subjective weight assignment. Furthermore, trending indicators such as mobile money, which has allowed for increase in the use of formal financial services were not included, thus the financial inclusion index is one-sided. Nevertheless, Sarma (2008) is one of the earliest studies that filled the gap of constructing a financial inclusion index.

Honohan (2008) combined primary and secondary data on the number of bank accounts to determine the proportion of households/adults having access to financial services for 160 countries. The study used simple percentage. The result reported that Latin America and the Caribbean have the highest financial access while Sub-Saharan Africa, Eastern Europe and Central Asia have the lowest financial access. Kempson, Atkinson, and Pilley (2004) argued that having an account alone does not translate to

financial inclusion because people might open a bank account without making use of it, however, Honohan (2008) considered only account ownership and ignored other indicators of financial inclusion. Furthermore, the data used suffers from inconsistency, which could hinder comparison over time. Nevertheless, the study provided useful information.

The distance-based methodology which is a modification to the UNDP methodology was used in Sarma (2010), who measured the level of financial inclusion of 49 countries. Dimensions and indicators similar to Sarma (2008) were used. The study found that majority of countries with high IFI are high-income countries, except for few that are middle-income countries that also have high IFI. The study also reported that low-income countries were also found in the low IFI category. However, the study suffers the same limitation as Sarma (2008). In the same vein, Sarma (2012) measured the level of financial inclusion of 94 countries. He used the same dimensions and indicators as used in his formal study Sarma (2008). The study showed general improvement just as reported in his previous study, Sarma (2008). The study concludes that the IFI can be used to monitor the progress of economies with respect to financial inclusion over time. This study also has the same limitation as his earliest study that is bias weight allocation and exclusion of important indicators of financial inclusion such as mobile money account, mobile money transaction among others.

Furthermore, Arora (2010) calculated the index of financial inclusion for 98 countries using the same dimension as Sarma (2008). The study showed that among all the countries, Belgium has the highest level of financial inclusion, followed by Spain and Germany. However, this study used a subjective methodology as noted in the case of Sarma (2008). The study included indicators such as cost associated with an account which has been identified to be a determinant as indicated by financial repression theory.

Furthermore, outreach indicator such as ATMs was considered using land area and population. This may overstate the outreach dimension. Nevertheless, the study took a step above that of Sarma (2008) by reporting financial inclusion by dimensions and the overall index.

Demirgüç-Kunt and Klapper (2012) measured financial inclusion around the world. The study used survey data and reported results using percentages and charts. Indicators include formal account, savings behaviour and sources of borrowing. The study reports that account ownership in Africa is the lowest in the World, while Sub-Saharan Africa reports 24 percent of the adult population having an account with a formal financial institution. The study for the first time provides wide coverage of household data on the use of financial services around the world. However, the findings provided were for a single period, which does not allow for comparisons over the year. Similarly, the study did not construct an index but accounted for some of the indicators separately.

Fungáčová and Weill (2014) investigated the extent of financial inclusion in Brazil, Russia, India, China and South Africa (BRICS) using data from the Global Findex. Using simple percentages, the study found that formal account and savings are more in use in China than in other countries in the study. The limitation of this study is similar to Demirgüç-Kunt and Klapper (2012) which do not allow for study of trend over time and also ignore the use of an index.

In the same vein, Amidžić *et al.* (2014) assessed the financial inclusion standing of 35 countries by using Factor Analysis. The dimension consists of outreach (geographic and demographic penetration), usage (deposit and lending) and quality (disclosure requirement, dispute resolution and cost of usage). It reveals that from both

dimensional and composite index, country rankings relative to one another remain stable over the observed periods. However, the methodology adopted is not free of shortcomings as Factor Analysis was used to determine the indicator to include. This methodology is not preferred over the PCA because it makes assumptions on raw data such as the selection of underlying number of common factor. More so, indicator included such as the cost of usage, which could be the interest rate has been identified by the financial repression theory as a determinant. Unfortunately, this was included as part of the indicators of financial inclusion. The financial inclusion index derived might be different if determinants were not included in the indicators. Nevertheless, this study made remarkable effort to include indicators relating to microfinance institutions and cooperative society into financial inclusion index.

Other methodologies used in measuring financial inclusion include PCA. This was used in a study conducted by Cámara and Tuesta (2014) for 82 countries. The study revealed that access is the most important dimension for measuring the level of financial inclusion. The methodology constructed has three dimensions, namely, access, usage and barriers; and is free of researcher's bias. Its use also overcomes the shortcomings of Amidžić *et al.* (2014), Arora (2010), Sarma (2008), Sarma (2010) and Sarma (2012) which is subjective weight allocation. However, the indicators include factors such as cost, which has been empirically and theoretically proven to form part of the determinants (Mckinnon, 1973; Shaw, 1973; Sarma & Pais, 2011; Allen *et al.,* 2012). Another drawback of this study is that it was for a single period and does not allow for comparison over time.

Park and Mercado (2015) used the UNDP methodology to measure financial inclusion and included five dimensions, namely, ATM per 100,000 adults; commercial bank branches per 100,000 adults; borrowers from commercial banks per 1,000 adults;

depositors with commercial banks per 1,000 adults; and domestic credit to GDP ratio. The financial inclusion index showed a similar ranking pattern as those of Honohan (2008) and Sarma (2008), where some developing countries were reported to have high financial inclusion. One limitation of Park and Mercado's study is that the indicators did not include deposit, which is an important indicator of the usage dimension (Beck *et al.* 2007; Sarma, 2012). Other important indicators such as mobile money account, mobile money outlet and mobile money transactions, which are noted to lead to the high use of financial services in recent times were excluded. Furthermore, the UNDP methodology uses a subjective means of allocating weight to each indicator. The resultant financial inclusion index will, therefore, be biased (Lockwood, 2004).

Korynski and Pytkowska (2016) calculated the financial inclusion score for the European Union (EU) using the Data Envelopment Analysis (DEA). Dimensions included are input and output while the study showed that, generally, level of financial inclusion in the EU was high. However, DEA is an extreme point technique; noise (even symmetrical noise with zero mean) such as measurement error can cause significant problems.

2.3.2 Country-Specific Studies on the Level of Financial Inclusion

Gupte *et al.* (2012) designed financial inclusion index for India using the distance-based methodology. The study covered 2008 and 2009, adopted the indicators of Sarma (2008) and further included ease and cost of financial services. The study showed that the index improved in 2009 and then argued that the improvement can be attributed to several initiatives taken by financial regulators, the government and banking sector. However, the study suffers similar limitation as Sarma (2010) in terms of methodology. The study even stated that the interpretation of the methodology should be

made with care because the max-min values across countries would impact the index of one country and may not reflect the extent of the impact made by financial inclusion initiatives of another country. In the same vein, the study went ahead to include indicators which have been identified theoretically and empirically as factors that impede financial inclusion.

Faruk and Noman (2013) measured financial inclusion in Bangladesh. Following Sarma (2008), the study measured the level of financial inclusion using the UNDP methodology. Indicators such as the number of branches per 100,000 people; per capita deposits and per capita credit of banking sector were used. The study revealed that the extent of financial inclusion in nine districts worsened from June 2007 to December 2010 and that the ranking of some of the districts has not changed in the study period. However, the study allocated equal weight to each indicator, which introduces biasness into the study. Other important and frequently used indicators such as ATM and number of account at the financial institutions, which are the prerequisite to being financially included were ignored. Considering the effort of government and other stakeholders in improving financial inclusion, the result which indicated that financial inclusion in some districts had worsened was not expected. This might perhaps be due to the subjective nature of the UNDP methodology and the exclusion of important indicators such as ATMs and number of accounts.

Pi˜neyro (2013) measured financial inclusion for Mexico using the PCA methodology. The dimensions include access, usage, financial education, consumer protection and social development. The findings showed that 36% of Mexico's municipalities possess a high level of financial inclusion. However, the inclusion of financial education, customer protection by legal right and social development in form of access to phone, internet, etc. has been classified as determinants in studies such as

Akudugu (2013), Boakye and Amankwah (2012), Connolly and Hajaj (2001), Djankov *et al.* (2007), Gebrehiwot and Makina (2015), Laha, Kuri, and Kumar (2011), Sarma and Pais (2011), Zins and Weill (2016), this makes the study a stand-alone and therefore the extent of financial inclusion is not reliable. Meanwhile, principal component was used to analyze the data which is free of researcher's bias.

Yorulmaz (2013) examined the level of financial inclusion in Turkey using the distance-based methodology. The study closely used the dimensions of Sarma (2008). The study found that level of financial inclusion moves with income level. This is similar to the findings of Sarma (2012). However, the study suffers shortcoming as Sarma (2012) in terms of weight allocation and exclusion of important indicators that have been driving financial inclusion lately. Nevertheless, the study provided the level of financial inclusion over time, which allows for easy comparisons and monitoring, thereby, overcoming the shortcoming of Demirgüç-Kunt and Klapper (2012) and Fungáčová and Weill (2014).

Gupta, Chotia, and Rao (2014) investigated the level of financial inclusion for 28 states in India. Dimensions incorporated include penetration, availability and usage of financial services. Following Sarma (2012), the study used the distance-based methodology; it was found that Goa, Punjab, and Kerala are financially included. However, the study suffers the same methodological problem as in Sarma (2012) and suffers another drawback due to the inclusion of the demographic and geographic indicators for ATMs and bank branches which would lead to the overstatement of these indicators.

Ambarkhane, Singh, and Venkataramani (2014) developed a comprehensive index of financial inclusion index for India. Dimensions used include supply, demand and infrastructure. The findings revealed that drag factor has a negative effect on the

financial inclusion index. One of the drawbacks of the study is the inclusion of infrastructural dimension which includes ratio of irrigated area, road length, railway, life expectancy, etc., which was not in any way indicators of financial inclusion.

Again, in a study conducted in rural regions of Vellore District, Tamil Nadu, India by Sriram and Sundaram (2015), the index of financial inclusion based on Sarma (2010) dimensions and methodology, showed that the extent of financial inclusion is on average in the study area. Although, the study used the same dimensions as Sarma (2010). The study combined data on availability dimension, which was secondary in nature and usage data were collected directly from respondents. The combination may be misleading as argued by Sarma (2012) for the case of Honohan (2008). Also, weight allocation to each of the dimensions was not free of researcher's bias because the equal weight was allocated without any basis. Nevertheless, the study made good effort to adopt the questionnaire of Global Findex to collect primary data for the study.

Sethy (2016) developed financial inclusion index for supply and demand sides for India using the distance based methodology. The demand side indicators were the same with that of Sarma (2012) except for the exclusion of outstanding credit with commercial banks as a percentage of GDP. The demand side indicators included the proportion of households having access to savings and insurance and the number of loans given to small enterprises. The study revealed that India has high financial inclusion using the demand dimension while low financial inclusion level was observed from the supply side. One important drawback of this study was the exclusion of credit which is an important indicator of financial inclusion (Sarma, 2008). Also, the indicators of both demand and supply sides are similar and do not distinctively portray the two dimensions as argued by Cámara and Tuesta (2014). In the same vein, the study suffers the same methodological shortcomings as Sarma (2010).

Using the same methodology as Ambarkhane *et al.* (2014), Bhuvana and Vasantha (2016) measure the level of financial inclusion in the rural areas of Tamil Nadu, India with the three dimensions such as branch penetration, deposit penetration and credit penetration. The study used the distanced-based methodology and reported that among the districts studied, Perambalur has a higher level of financial inclusion.

On the determinants of financial inclusion, literature is grouped into cross-country studies, starting with region-specific and country-specific studies.

2.3.3 Cross-Country Studies on the Determinants of Financial Inclusion

Sarma and Pais (2011) identified factors that are significantly associated with financial inclusion in a cross-country study, using the index of financial inclusion developed by Sarma (2008). The study used pooled OLS method for data analysis. Among socio-economic factors, income, inequality, literacy and urbanization were reported as important factors. Infrastructural factors such as phone, internet and television were also reported to be significant. Banking factors such as the non-performing asset and capital asset ratio were reported to be negatively associated with financial inclusion. Interest rate and government ownership in banks were reported to have no significant relationship with financial inclusion. The study concluded that banking factors do not have unambiguous effect on financial inclusion, while ownership pattern in the banking sector is of great importance. Apart from being a groundbreaking research on determinants of financial inclusion, however, it ignored banking factors such as reserve ratio, liquidity ratio which are important financial repression factors and institutional factors. Also, the use of OLS cannot take care of the problem of serial correlation, endogeneity and heterogeneity which have been attributed to related dataset.

Also, the method may not take into consideration the individual country fixed effect (Flannery & Hankins, 2013).

Furthermore, income level was also reported to affect access to credit and deposit by Kumar (2011). The study concludes that improvement of credit and deposit penetrations have been continuous during the studied period.

Chithra & Selvam (2013) investigated similar factors as Sarma and Pais (2011). The study used OLS and showed that income, population, literacy, deposit and credit penetration are significantly associated with financial inclusion. The study suffers similar limitations as Sarma and Pais (2011).

Using probit estimation, Farazi (2014) reported that firm size, the level of education of the owner, financial freedom, property rights and whether the owner has a job in the formal sector are significantly associated with financial inclusion of informal firms. This finding might not be reliable because financial inclusion is proxied with bank account and loan individually, while literature has established that financial inclusion is comprehensive than having an account, for instance, Amidžić *et al.* (2014), Cámara and Tuesta (2014), Faruk and Noman (2013), Gupte *et al.* (2012), Honohan (2008), Park and Mercado (2015) and Sarma (2008) have shown that other indicators such as deposit, ATMs, Bank branch etc. are important.

Allen *et al.* (2014), investigated the determinants of financial development and financial inclusion. The study revealed that population density is considerably more important for financial development and inclusion in Africa than elsewhere. The study further argued that mobile banking expands the use of financial services and that there is a linkage between financial development and economic development in Africa. However, the study used a single measure of financial inclusion which has been argued

to be insufficient by Beck *et al*. (2007) and Sarma (2012). The study covers a single time period which did not account for improvement or otherwise, nevertheless, provides information about the determinants of financial development and inclusion.

Using system GMM, Gebrehiwot and Makina (2015) revealed that financial inclusion in Asia is significantly affected by income level and mobile infrastructure, while population was reported not to have an impact on financial inclusion. Following the methodology of Sarma (2010), the study measured financial inclusion which is used as the dependent variable. However, the methodology suffers shortcomings as earlier mentioned. Nevertheless, the study used system GMM estimator which takes care of the problem of serial correlation, endogeneity and heteroskedasticity which might be plagued by previous studies.

Naceur, Barajas, and Massara (2015) investigated the impact of Islamic banking on financial inclusion using pooled OLS and Fixed Effect Estimator. The result shows that physical access to financial services has increased more in member countries of Organization of Islamic Countries (OIC), but are still less financially inclusive than the rest of the world in recent time. However, the study used a single measure of financial inclusion and did not provide a justification for using the two methodologies together. Further, the proxy for Islamic banking might not be appropriate. Similarly, the study used the OIC which some of the members do not practice Islamic banking and some non-members practicing Islamic banking were excluded. The study also used countries in the World Bank data for Islamic banking; unfortunately, the World Bank stated that the data are not accurate because it is still in the collection stage. A good share of the data is not available and did not account for some countries that are operating Islamic banking. The study identified that Islamic banking asset is less than 2 percent of the total banking

asset, therefore, this might indicate that research on the impact of Islamic banking may not be ripe.

Zins and Weill (2016) identified gender, income, age and education as determinants of financial inclusion proxy with formal, savings and loan accounts. Using probit estimation, the study concludes that African countries have low financial inclusion in comparison with the rest of the world and recommends that policies favouring financial inclusion should target young people and women. This study suffers similar drawback as Farazi (2014).

Another study on the determinants of financial inclusion in Africa is Evans and Adeoye (2016), who used system and difference GMM to identify per capita income, broad money supply, education, internet access and Islamic banking as important determinants of financial inclusion. This study proxy financial inclusion with deposit account with commercial banks ignoring the fact that not only commercial banks offer formal financial services. There are other licensed institutions charged with this responsibility. The study also ignored other indicators as in the case of Zins and Weill (2016), therefore suffered similar shortcomings. The study covered only 15 countries which makes it difficult to generalize findings to other parts of the region. Nevertheless, the study used a dynamic estimator, robust to autocorrelation and heteroskedasticity (Wooldridge, 2002).

Soumaré, Tchana, and Kengne (2016) confirmed that gender, education, age, income, employment status and marital status influence access to formal finance in North and Central Africa. The drawback of this study is the same as Allen *et al.* (2014) who used a single factor to proxy for financial inclusion. Furthermore, the study did not cover

banking, infrastructural and institutional factors. The study covers only 2014; this did not provide information over time.

Chikalipah (2017) investigated the factors that matter for financial inclusion in Sub-Saharan Africa using probit estimation. The study revealed that financial inclusion in the region is hindered by educational level in the region. The study is one of the early attempts to investigate the determinants of financial inclusion in the region. This study is characterized by the same limitation as Soumaré, Tachana, and Kengne (2016).

With respect to the institutional factors, it has been observed that research works have studied these variables namely creditors' right, information sharing and legal origin on factors such as private credit, financial development and external financing. Prominent among these scanty studies is La Porta *et al.* (1997), who buttressed that countries with weak investors' protection, measured by creditors' right and legal origin, have less developed capital market. However, pooled OLS was used in these studies which did not take into consideration the individual country fixed effect (Flannery & Hankins, 2013). Similarly, using pooled OLS, La Porta *et al.* (1998) argued that common law countries are more financially developed than their French counterparts. Djankov *et al*. (2005) also argued that creditors' protection and information sharing are associated with private credit; the study suffers the same drawback as La Porta *et al.* (1997). Chinn and Ito (2005) also reported that high level of legal development and financial openness spurs equity market development. The study concludes that the level of finance-specific legal institutional development is not as important as the general level of legal development. Although this study provided some empirical regularity, the study suffers methodological issues.

The findings of Djankov *et al.* (2005) is similar to the findings of Djankov *et al.* (2007) who posits that access to credit will increase after an improvement in creditors' right and information sharing. Also that legal origin is a determinant of creditors' right and information sharing. The two studies suffer the same limitations.

In the same vein, McDonald and Schumacher (2007) also confirmed that countries that share information and have strong legal institution have more financial depth. The study argued further that financial liberalization and legal institutions help in financial deepening. The study suffers the same methodological limitations as Djankov *et al.* (2005) and La Porta *et al*. (1998) due to the use of pooled OLS which assume that all observations are homogeneous which may not be the case.

Furthermore, Anayiotos and Toroyan (2009) who used Data Envelopment Analysis (DEA) reported that institutional factor such as depth of credit information and political stability affect financial depth in sub-Sahara countries. However, the study suffers similar methodological limitation as Korynski and Pytkowska (2016). Using pooled OLS, Padilla and Requejo (2000) found that effective judicial system and other socio-economic indicators such as inflation and economic growth are important for the development of the credit market.

Allen *et al*. (2012) who used probit estimation argued that the likelihood of use of formal, savings and loan accounts is associated with legal rights, cost and political stability. However, the study used the indicators of financial inclusion individually which limited the ability of the study to give the actual insight into the determinants of financial inclusion. Nevertheless, the study provided a fair view into the determinants of financial inclusion which includes the institutional factors. Alter and Yontcheva (2015) used both fixed and random effect methods and identified a positive relationship between the

availability of credit information with financial development, while a negative relationship was observed with banks' operational costs, cost-income ratio and poverty headcount. The study also identified that countries with government effectiveness and property rights have more inclusive financial systems. However, the study did not identify which of the results it relied on between the two using Hausman test because the two estimators have different assumptions.

In contrast, Effiong (2016) used a dynamic panel data estimation technique and provided evidence that institutions have not impacted on the finance-growth relationship in Sub-Saharan Africa region. The study further stressed that financial development in Africa is low and the financial sector is dominated by the banking system. The contradiction might be due to the fact that Effiong (2016) is region specific.

It is important to mention that these institutional factors have only been investigated in relation to factors that might relate to financial inclusion but cannot be taken to financial inclusion (Demirgüç-Kunt, *et al.*, 2017).

2.3.4 Country-Specific Studies on the Determinants of Financial Inclusion

In a survey study conducted by Adeyemi, Pramanik, and Meera (2012), Structural Equation Modelling (SEM) was used to identify voluntary and involuntary financial exclusion factors which account for financial exclusion among Muslim micro-entrepreneurs. The study suggests that the target clients of microfinance banks should ideally include the poor households and microenterprises with affordable services. The study, therefore, recommends that aggressive campaign should be embarked upon by the government and microfinance banks to arouse the interest and understanding of the poor on financial services. However, SEM does not screen data for outliers or inappropriate

code, missing values are erroneously assumed as missing completely at random, distributions may not be normally skewed, platy or leptokurtic, thus, this might lead to divergence from the necessary conditions of multivariate normality (Kline, 1998). Nevertheless, this study is the first of its kind in the study area giving insight into the determinants of financial exclusion.

Financial literacy was reported to determine financial inclusion in South Africa by Mishi, Vacu, and Chipote (2012). The study further stressed that with increased financial inclusion, South Africa will be able to avoid volatile capital inflows sourced to supplement low domestic savings, therefore able to have stability within the economy.

Akudugu (2013) used logit model to identify age, literacy levels, income, distance to financial institutions, lack of documentation and lack of trust for formal financial institutions, money poverty and social networks as reflected in family relations as significant determinants of financial inclusion in Ghana. The study concludes that only two in five adults are included in the formal financial sector of Ghana. However, the study proxy financial inclusion with account ownership which has been established as inadequate in studies such as Faruk and Noman (2013), Gebrehiwot and Makina (2015) Peña *et al.* (2014) and Sarma and Pais (2011). In the same vein, the study ignored other important determinants of financial inclusion identified in the literature such as Sarma and Pais (2011). Nevertheless, this might be due to the different sources of data as the one used by Akudugu (2013) which is a survey data gathered by the World Bank. Still in Ghana, Boakye and Amankwah (2012) using logit model, found financial literacy, educational level, income or expense stability, urban residence, access to electricity, access to communication channels and local perception about inherent benefits of products, as factors that determine the use of formal financial products. The research concludes that financial education, financial products that cater for volatile cash flows,

communication of inherent benefits derived from financial products and the use of mobile phones and internet to deliver services would improve the use of financial products in Ghana. However, measure of formal financial product was in form of binary variable that represents usage as 'one' and non-usage as 'zero', thus this is not explicit enough to capture the different types of financial products and services.

Peña *et al.* (2014) used the generalized linear model to study the determinants of financial inclusion in Mexico. The study emphasized the importance of the level of education and income to financial inclusion in the study area and argued that financial inclusion is an essential ingredient of economic development and poverty reduction and it can also be a way of preventing social exclusion. One important limitation of this study is that financial inclusion was proxy by three types of indicator which include the ownership of credit and savings products jointly (Aggregate Index) and separately (Savings Index and Borrowing Index) which no basis was given and also ignored other important indicators identified earlier.

Using bivariate analysis, Marr *et al.* (2014) reported that financial inclusion in Peru is determined by the value and maturity of MFIs asset and recommended the introduction of mechanisms to help strengthen MFIs' assets and their ability to engage in working relations with other actors in the microfinance system. However, the study measured financial inclusion with the number of people newly included in the formal financial system. This proxy will more likely give the wrong view of financial inclusion because the study neglected those initially included which were considered in the case of Evans and Adeoye (2016) and Zins and Weill (2016) which were earlier criticized in this study.

In a survey study by Aina and Oluyombo (2014), documentation requirement was reported to restrict people from accessing financial services. The study further argued that the use of mobile money and insurance is still in the infancy in Nigeria. The study concludes that relaxed account opening documentation requirement is important.

Clamara, Peña, and Tuesta (2014) investigated factors that matter in financial inclusion in Peru using probit model. The study argued that financial exclusion is more peculiar to females, young people and rural dwellers. The study suggested that improvement in technologies and increase in the use of mobile phones will make mobile banking a more efficient alternative to traditional branch banking and help reduce financial exclusion. However, financial inclusion was measured by account ownership, which makes the study suffer the same limitation as Allen *et al*. (2014).

In the same vein, age, education and income were reported to determine access to financial services such as accounts, credit and debit cards, formal credit and electronic payments in Argentina by Tuesta, Sorensen, Haring, and Cámara (2015). The study argued that increase in awareness of the obstacles faced by individuals will improve the standard of living. In contrast to Mishi *et al.* (2012), Desai and Surti (2015) argued that literacy level does not strongly affect usage of banking services in India.

Other relevant studies reviewed to justify the inclusion of other variables especially the banking factors include Demirgüç-Kunt and Detragiache (1998), who used multivariate logit model and reported that low GDP, interest rate and inflation affect banks stability. The drawback of this study is that it could not account for the period when the effects of a banking crisis came to an end.

Grigorian and Manole (2006) who used DEA, reported that GDP per capita, capital asset ratio and foreign ownership are important for banks performance. One

drawback of this study is the use of DEA, which suffers the same limitation as Korynski and Pytkowska (2016). Similarly, Sufian and Habibullah (2009), who used a multivariate model, found GDP per capita and capital asset ratio as the major determinants of bank profitability.

Pourshahabi and Elyasi (2013) examined the impact of financial repression on financial depth. Interest rate and reserve ratio were used to proxy financial repression. Using the Dynamic Panel Data technique (DPD), it was revealed that reserve ratio and interest rate have a negative impact on financial depth. However, the study did not consider other aspects of financial repression such as liquidity ratio, government interference in ownership etc. Nevertheless, the study used an estimator that has been argued by Wooldridge (2002) to take care of possible endogeneity, autocorrelation and heteroskedasticity.

Using pooled OLS estimation technique, Khalfaoui and Ben Saada (2015) found that non-performing loan, liquidity ratio, total assets and disclosure of information relating to credit are the determinants of banking performance in Tunisia. However, Flannery and Hankins (2013) argued that estimating firm-level data with pooled OLS yields biased estimates because firm fixed effects are not observable. Nevertheless, the study filled a geographical gap as argued by the study. Ameer (2015) identified non-performing loan and inflation as indirect determinants of bank performance, while size of bank, capital, deposit and loan have significant positive relation with bank's performance, although GDP and liquidity have insignificant positive relation with performance of bank.

Other relevant studies on financial inclusion include Caporale, Rault, Sova, and Sova (2009) argued that causality runs from financial development to economic growth,

but not from economic development to financial development. Bhattacharaya and Wolde (2010) reported that inadequate access to credit has been undermining growth in MENA countries compared to the rest of the world.

Andrianaivo and Kpodar (2011) attributed mobile phone development through Information Communication Technology (ICT) to economic growth in Africa and identified mobile phone usage as a potential tool to improve financial inclusion in Africa. Sackey and Nkrumah (2012) buttressed further that there is a significant relationship between financial sector development and economic growth in Ghana. Mbutor and Uba (2013) reported a long but inverse relationship between the rate of inflation and the size of commercial banks' loans and advances as a ratio of the GDP. The study also stated that financial inclusion improves the effectiveness of monetary policy in Nigeria.

Jishajoseph and Varghese (2014) also found that financial inclusion influences economic growth while the use of credit cards has increased banks focus on rural and semi-rural urban areas. Similarly, Micheal (2015) found that loans and advances to the financially disadvantaged, positively impact on the Nigerian economy. Onaolapo (2015) also argued that there is a positive relationship between financial inclusion, poverty reduction, economic growth and financial intermediation in Nigeria. The study stated further that reduction in cost will attract the financially excluded, especially among the low-income earners. However, the study proxy financial inclusion with formal accounts which is not adequate as mentioned earlier.

In contrast, Nkwede (2015) argued that there is a negative relationship between financial inclusion and economic growth in Africa using Nigeria as a case study. This result might not be generalizable to Africa because the only country covered is Nigeria leaving out more than 50 other countries. Financial inclusion was argued by Babajide *et*

al. (2015) to significantly impact total factor of production, as well as capital per worker, which invariably determines the economic growth. One of the limitations of the study is the use of commercial bank deposit to proxy financial inclusion.

Using PCA and narrative technique, Oladimeji and Adegbite (2017) investigated factors that determine the financial inclusion of micro, small and medium enterprises (MSMEs) and the impact of their financial inclusion on economic growth. The study identified unfavourable business environments, financial literacy etc. as important determinants of financial inclusion of MSMEs. The study further suggests that through mobilization of deposit and access to micro-credits, businesses of MSMEs expanse which further leads to economic growth.

The highlight of the reviewed empirical studies is shown in Table 2.2 below.

Table 2.2 Highlight of Empirical Review

AUTHOR(S)/YEAR	TITTLE	METHODOLOGY	FINDINGS
Cross-Country Studies on the level of Financial Inclusion			
Beck, Demirgüç-Kunt, & Martinez Peria (2007)	Reaching out: Access to and use of banking services across countries	Simple average	The study showed that the banking sector penetration predicts household and firm use of banking services
Sarma (2008)	Index of financial inclusion	UNDP methodology	The study found that level of financial inclusion varies across countries.
Honohan (2008)	Cross-country variation in household access to financial services	Simple percentage	The study reported that Latin America and the Caribbean have the highest financial access while Africa, Eastern Europe and Central Asia have the lowest financial access
Sarma (2010)	Index of financial inclusion	Distance-based methodology	The study found that majority of countries that have high IFI are high-income countries except for few that are middle-income countries. The study also reported that high-income countries were found in the low IFI category.
Arora (2010)	Measuring financial access	UNDP methodology	The study showed that among all the countries studied, Belgium has the highest level of financial inclusion, followed by Spain and Germany.
Demirgüç-Kunt & Klapper (2012)	Measuring financial inclusion	Percentages and charts	The study reported that account ownership in Africa is the lowest in the World, while Sub-Saharan Africa has 24 percent of the adult population having an account with a formal financial institution.
Fungáčová & Weill (2014)	Understanding financial inclusion in China	Simple percentages	The study found that formal account and savings are more in use in China than in other BRICS.
Amidžić, Massara & Mialou (2014)	Financial inclusion standing of countries	Factor analysis	The result confirmed that from the dimension and the composite index, country ranking relative to one another remains stable over the observed periods.
Cámara & Tuesta (2014)	A multi-dimensional financial inclusion index for eighty-two countries	Principal component analysis	The study revealed that access is the most important dimension for measuring the level of financial inclusion.

Park & Mercado (2015)	Financial inclusion, poverty and income inequality in Asia	UNDP methodology	The financial inclusion index showed that the level of financial inclusion varies across countries.
Korynski & Pytkowska (2016)	Measuring financial inclusion in the EU: Financial inclusion score Approach	Data Envelopment Analysis	The result showed that generally, the level of financial inclusion in the EU is high.
	Country-Specific Studies on the level of Financial Inclusion		
Gupte, Venkataramanib, & Gupta (2012)	Computation of financial inclusion index for India	UNDP methodology	The study showed that financial inclusion has increased during the study period.
Faruk & Noman (2013)	The extent of financial inclusion: A district wise study on Bangladesh	UNDP methodology	The analysis found that five districts were worsened from June 2007 to December 2010 while others improved.
Pi neyro (2013)	Financial inclusion index: Proposed multi-dimensional measure for Mexico	Principal component analysis	The study revealed that more Mexico's municipalities possess a high level of financial inclusion
Yorulmaz (2013)	Construction of a Regional Financial Inclusion Index in Turkey	Distance-base methodology	The study found that the level of financial inclusion moves with the income level.
Gupta, Chotia & Rao (2014)	Financial inclusion and human development: A State-wise Analysis from India	Distance-base methodology	It was confirmed that in India, Goa, Punjab and Kerala are more financially included.
Ambarkhane, Singh & Venkataramani (2014)	Developing a Comprehensive Financial Inclusion Index	Distance-base methodology	The findings revealed that the drag factor has a negative effect on the financial inclusion index.
Sriram & Sundaram (2015)	Financial inclusion index: A customized regional model with reference to economically most backward districts of Tamil Nadu, India	Distance-base methodology	The study showed that the extent of financial inclusion is on average in the study area
Sethy (2016)	Developing a financial inclusion	Distance-base	The study revealed that India has high financial inclusion using the demand

	index and inclusive growth in India	methodology	dimension while low financial inclusion level is observed from the supply side.
Bhuvana & Vasantha (2016)	Dimensions for Measuring Financial Inclusion in the Rural Areas of Tamil Nadu	Distance-base methodology	The study used the distance-based methodology and reported that among the districts studied, Perambalur has a higher level of financial inclusion. The Districts are Sivaganga and Nagapattinam.
	Cross-Country Studies on determinants of Financial Inclusion		
Sarma & Pais (2011)	Financial inclusion and development: A cross-country analysis	Pooled OLS	The result showed that income, literacy, population density, phone, internet and television were identified as determinants of financial inclusion.
Farazi (2014)	Informal firms and financial inclusion: status and determinants	Probit estimation	Reported that firm size, the level of education of the owner, financial freedom, property right and whether the owner has a job in the formal sector are significantly associated with financial inclusion of informal firms.
Clamara, Peña & Tuesta (2014)	Factors that Matter for Financial Inclusion: Evidence from Peru	OLS	The study showed that income, population, literacy, deposit and credit penetration are significantly associated with financial inclusion.
Allen, Carletti, Cull, Qian, Senbet & Valenzuela (2014)	The African financial development and financial inclusion gaps	OLS	The study revealed that population density is considerably more important for financial development and inclusion in Africa than elsewhere.
Gebrehiwot & Makina (2015)	Financial inclusion in selected Asian countries: Evidence using dynamic panel data	System GMM	Revealed that financial inclusion in Asia is significantly affected by income level and mobile infrastructure while population was reported not to have an impact on financial inclusion.
Naceur, Barajas & Massara (2015)	Can Islamic Banking Increase Financial Inclusion?	OLS and Fixed Effect Estimator	The study confirmed that physical access to financial services has increased more in OIC countries, but are still less financially inclusive than the rest of the world in the recent time.
Zins & Weill (2016)	The determinants of financial inclusion in Africa	Probit estimation	It was revealed that gender, income, age and education affect a financial inclusion.
Evans & Adeoye	Determinants of financial inclusion	GMM	The study identified per capita income, broad money supply, education, internet

(2016)	in Africa: A dynamic panel approach		access and Islamic banking as important determinants of financial inclusion.
Soumaré, Tachana & Kengne (2016)	Analysis of the determinants of financial inclusion in Central and West Africa	Probit estimation	Confirmed that gender, education, age, income, employment status and marital status influence access to formal finance in North and Central Africa.
Chikalipah (2017)	What determines financial inclusion in Sub-Saharan Africa	Probit estimation	Revealed that financial inclusion in the region is hindered by educational level in the region.
La Porta, Lopez-De-Silanes, Shleifer & Vishny (1997)	Legal determinant of external financing	Pooled OLS	The study showed that countries with weak investors' protection measured by creditor right and legal origin have less developed market.
La Porta, Lopez-De-Silanes, Shleifer & Vishny (1998)	Law and Finance	Pooled OLS	The study revealed that common-law countries are more financially developed than the French civil-law countries.
Djankov, McLiesh & Shleifer (2005)	Determinants of private credit in 129 countries	Pooled OLS	The result showed that creditors' right and information sharing are factors that determine private credit.
Djankov, McLiesh & Shleifer (2007)	Determinants of private credit in 129 countries	Pooled OLS	The study found that access to credit will increase after an improvement in creditors' right and information sharing.
McDonald & Schumacher (2007)	Financial deepening in sub-Saharan Africa: Empirical evidence on the role of creditor rights protection and information sharing	Pooled OLS	Financial liberalization and legal institutions help financial deepening.
Anayiotos & Toroyan (2009)	Institutional factors and financial sector development: Evidence from Sub-Saharan Africa	Data Envelopment Analysis	The study revealed that access quality and profitability does not cause financial depth and access to finance as much as institutional factors.
Padilla & Requejo (2000)	The Costs and Benefits of the Strict Protection of Creditor Rights: Theory and Evidence	Pooled OLS	The study found that effective judicial system and other socio-economic indicators such as inflation and economic growth are important for the development of the credit market.
Allen, Demirgüç-Kunt, Klapper & Martinez Peria (2012)	Foundation of financial inclusion in 129 countries	Probit estimation	The use of bank account is related to legal rights, cost, bank penetration and political stability.
Alter & Yontcheva	Financial inclusion	Fixed effect and	The study identified a positive

(2015)	and development in CEMAC	Random effect method	relationship between availability of credit information, property right and government effectiveness with financial development.
Effiong (2016)	Financial development, institutions and economic growth: evidence from Sub-Saharan Africa	OLS and GMM	The result showed that institutions have not impacted on the finance-growth relationship in the region.
Country-Specific Studies on determinants of Financial Inclusion			
Adeyemi, Pramaanik & Meera (2012)	A measurement model of the determinant of financial exclusion among Muslims micro-entrepreneurs in Ilorin	Structural Equation Modeling approach	The study confirmed that eligibility, affordability, religion and financial complacency are the main determinants of financial exclusion in the study area.
Mishi, Vacu & Chipote (2012)	Impact of financial literacy in optimizing financial inclusion in rural South Africa	Quantile and OLS	The result showed that financial inclusion is enhanced by improvement in literacy level.
Boakye & Amankwah (2012)	Determinants of the demand for financial products in Ghana	Logit estimation	The study found financial literacy, educational level, income, urban residence, access to electricity, access to communication and local perception about inherent benefits of products as factors that determine whether a person will use a financial product.
Akudugu (2013)	Determinants of financial inclusion in Africa: Insight from Ghana	Logit estimation	Age, literacy level, distance, documentation requirement and trust in the financial institutions were identified as factors affecting financial inclusion.
Peña, Hoyo & Tuesta (2014)	Determinant of financial inclusion in Mexico	General linear model	The result showed that income and educational level affect financial inclusion.
Marr, Leon & Ponce (2014)	Financial inclusion of the poor in Peru: Exploratory factors and determinant	Bivariate analysis	Microfinance institutions' characteristics and social performance affect financial inclusion in Peru.
Kumar (2011)	Determinants of financial inclusion in India	OLS	There is increase in branch network and has a positive impact on deposit and credit penetration.
Aina & Oluyombo (2014)	The economy of financial inclusion in Nigeria	Simple percentages	The use of mobile money and insurance is small in the study area and documentation was the highest reported

			barrier.
Clamara, Peña & Tuesta (2014)	Factors that matter in financial inclusion in Peru	Probit estimation	Younger people, women and rural people are the most financially excluded.
Tuesta, Sorensen, Haring & Cámara (2015)	The determinants of financial inclusion in Argentina	Probit estimation	The study revealed that educational level, income and age affect access to financial services.
Demirgüç-Kunt & Detragiache (1998)	The Determinants of banking crises in developing and developed countries	Logit model	The study reported that low GDP, interest rate and inflation affect banks stability.
Grigorian & Manole (2006)	Determinants of commercial bank performance in transition: An application of Data Envelopment Analysis	DEA	The study reported that GDP per capita, capital asset ratio and foreign ownership are important for banks performance.
Sufian & Habibullah (2009)	Bank specific and socio-economic determinants of bank profitability: Empirical evidence from the China banking sector	Multivariate analysis	The study revealed that GDP per capita and capital asset ratio are the determinants of bank profitability.
Khalfaoui & Ben Saada (2015)	The Determinants of Banking Performance: Empirical evidence from Tunisian Listed Banks	Pooled OLS	The result showed that non-performing loan, liquidity ratio, total assets and disclosure of information relating to credit are the determinants of banking performance in Tunisia.
Ameer (2015)	Determinants of Banking Sector Performance in Pakistan	Bivariate correlation and multiple regression analysis	The study reported that non-performing loan and inflation have indirect determinants of bank performance.
Andrianaivo and Kpodar (2011)	ICT, financial inclusion and growth in Africa	GMM estimator	The study showed that the use of mobile phone contribute to economic growth in Africa.
Sackey & Nkrumah (2012)	The causal link between the financial sector development and economic growth	OLS and Vector Autoregressive estimator	The result showed that there is a positive and significant relationship between financial sector development and economic growth.

	in Ghana		
Mubtor & Uba (2013)	Impact of financial inclusion on monetary policy	OLS	There is a long but inverse relationship between the rate of inflation and the size of commercial banks' loan and advances.
Jishajoseph & Vargese (2014)	The role of financial inclusion in the development of India economy	Simple percentages	The study showed that the use of credit cards has improved throughout the studied period.
Micheal (2015)	Financial system, financial inclusion and economic development	OLS	The study showed that financial inclusion has an impact on economic development.
Murthy and Al-Muharrami (2014)	Financial sector development and the determinants of bank profitability: A GCC panel study	Fixed effect estimator	The study reported that capital ratio, non-performing loan and inflation affect banks' performance.
Onaolapo (2015)	Effect of financial inclusion on economic growth	OLS	There is a positive relationship between financial inclusion, poverty reduction, financial intermediation and economic growth in Nigeria.
Nkwede (2015)	The influence of financial inclusion on the growth of African economy: Nigeria as a case study	OLS	The study showed that financial inclusion as a significant negative impact on growth.
Babajide, Adegboye & Omankhanlen (2015)	Financial inclusion and economic growth	OLS	The study showed that financial inclusion is a significant determinant of economic growth.
Oladimeji & Adegbite (2017)	Financial inclusion of MSMEs in Nigeria		The study reported that business environment, financial literacy, among others, are determinants of financial inclusion of MSMEs in Nigeria.

Source: Author's Compilation (2018)

2.4 Summary and Gap Identified in the Literature

The body of literature reviewed on the level of financial inclusion shows that the level of financial inclusion in Sub-Saharan Africa has not been studied. Furthermore, account ownership, ATM, commercial bank branches, deposit and credit are the most used indicators of financial inclusion (Faruk & Noman, 2013; Gupte *et al.*, 2012; Park & Mercado, 2015, Sarma, 2008) to mention a few.

The study adopts the indicators of Sarma and Pais (2011) and broadens the indicators to include mobile money account, mobile money outlets and mobile money transactions which have not been included in the index of financial inclusion in the region. The goal is to explore all reliable and important indicators of financial inclusion in order to have a more indicative extent of financial inclusion. More so, these indicators have been identified as important especially in relation to financial inclusion in Sub-Saharan Africa (Demirgüç-Kunt & Klapper, 2012; Demirgüç-Kunt e*t al.*, 2017; Demirgüç-Kunt *et al.*, 2015).

Furthermore, it has been noticed that literature on the extent of financial inclusion in a region of countries with similar economic and institutional qualities is limited to only Asia, which was carried out by Gebrehiwot and Makina (2015). There is none in existence in the Sub-Saharan Africa region to the best of the researcher's knowledge. Country-specific studies revealed that the level of financial inclusion in China, Bangladesh, Mexico and India have been documented by Gupte *et al.* (2012); Fungáčová and Weill (2014); Faruk and Noman (2013); Peña, *et al.* (2014) but none in the case of African countries.

The review of past specific studies on determinants of financial inclusion in Sub-Saharan Africa majorly studied the socio-economic factors, which partially revealed the determinants of financial inclusion and the reality of the effect of these variables.

Presently, there is no empirical evidence on the effect of socio-economic, infrastructural, banking and institutional factors on financial inclusion in the Sub-Saharan African region.

Similarly, there exist methodological gap in previous studies on determinants of financial inclusion in Sub-Saharan Africa especially those that covered the region such as Akudugu (2013); Alter and Yontcheva (2015); Chikalipah (2017); Soumaré, Tchana, and Kengne (2016); Zins and Weill (2016) and cross-country studies that are not region specific such as Sarma and Pais (2011) which suffered from simultaneity bias, potential endogeneity, unobserved country specific effects which could form part of the error term and eventually lead to biased coefficient estimates (Levine, Loayza & Beck, 2000).

This study, therefore, used the System General Method of Moment technique (GMM) to cater for these issues. This method is more robust and less bias when compared to the OLS method, generalized linear model, logit model, probit estimation, bivariate and multivariate analysis (Flannery and Hankins, 2013). Hence, the need for System GMM becomes relevant in identifying the determinants of financial inclusion in the region.

In summary, this chapter provides a review of conceptual, theoretical and empirical issues relating to the research area. The review shows that literature abounds on financial inclusion; however, there remain unanswered questions. Thus, this study attempts to provide further evidence to fill the identified gaps.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the methodology of the research. It contains the conceptual framework, model specification, estimation techniques *a priori* expectations, potential determinants of financial inclusion, nature and sources of data, measurement of variables, inferential statistics, research design, population and sample size and descriptive statistics.

3.1 Conceptual Framework

This section describes the conceptual framework underpinning the study.

In view of the foregoing multidimensional nature of financial inclusion, an obvious question that arises is what determines financial inclusion. Based on the earlier discussion, a basic significance of financial inclusion is the redistribution of economic resources. For this to occur, there must be access, availability and usage of financial services. Accordingly, there ought to be factors that determine financial inclusion through the process of access, availability and usage of financial services. Combining this philosophy with the definition of financial inclusion which is a situation whereby there is ease of access, availability of and usage of financial services, there arises a need for a conceptual framework. To the best of the researcher's knowledge, there is little guidance from the academic literature on the framework for financial inclusion. The existing literature did not use any explicit criteria to analyze financial inclusion given the multidimensional nature of financial inclusion which could be impacted on through banking, institutional, socio-economic and infrastructural factors, instead the existing literature identified basically socio-economic and infrastructural factors that matter for financial inclusion. For instance, Allen *et al.* (2014) indicated that population density in Africa significantly determines financial inclusion.

This framework relies on quantitative methods of data analysis and historical narrative. Due to the fact that the study examines the relationship among variables by testing hypotheses in this study, a quantitative method was used adhering to the suggestions of Creswell (1994) that the use of the quantitative method is appropriate when the phenomena are examined by collecting quantitative data and analyzing the data using mathematical based methods. In practice, this method seems more appropriate

especially in collecting some variables such as socio-economic factors than other methods.

This study focuses on banking, institutional, socio-economic and infrastructural factors. Especially, the reserve ratio, liquidity ratio and financial freedom (banking factors) of the financial repression theory that argued that government restrictions on the activities of financial institutions in form of reserve requirement, liquidity, interest rate regime etc. affects their ability to make available financial services. Furthermore, the government interference in the activities of financial institutions in terms of credit allocation, ownership etc. impend on the efficiency of financial institutions. In the same vein, literature appears silent on the argument of the law and finance theory (institutional factors) in relation to financial inclusion. This theory argues on the one hand that the extent of legal protection available to creditors and the quality of enforcement influences the availability or supply of financial services, on the other hand, the theory argues that the legal origin of a country which influences the components of legal institutions affects financial activities. Unfavourable banking and institutional factors may reduce the availability of financial services. Also, unfavourable socio-economic and infrastructural factors may discourage access and usage of financial services. It is based on this that Figure 3.1 is designed as the conceptual framework for this study.

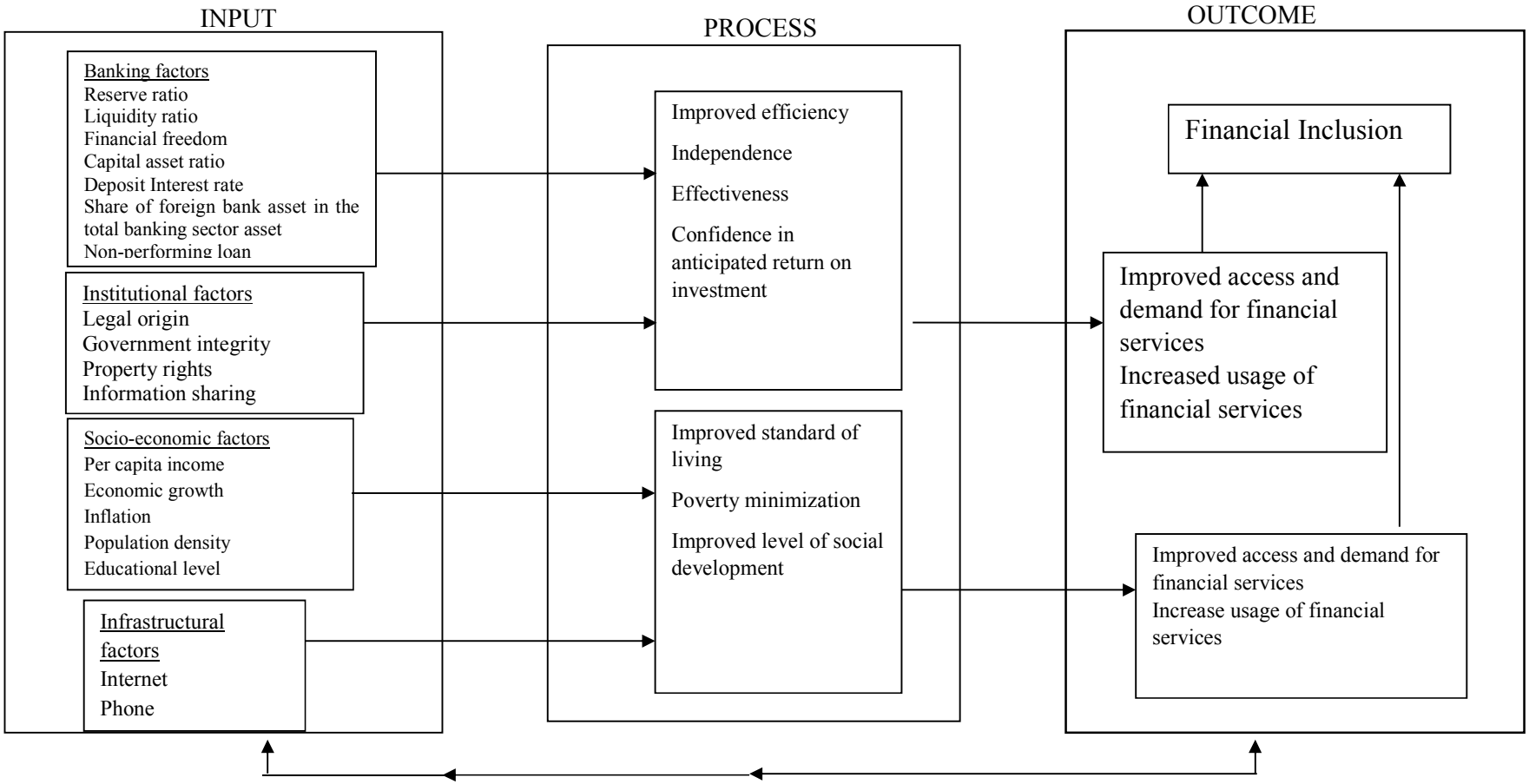

Figure 3.1 A Schematic Link Between The Institutional Factors, Banking Factors, Socio-economic Factors, Infrastructural Factors And Financial Inclusion
Source: Author (2018)

It is important to note that the validity of this framework depends on the following assumptions:

i. that the financial institutions operate in a regulated financial environment;

ii. that the countries are of British or French legal origin;

iii. that there is protection for the property rights of creditors;

iv. that credit information is available to the financial institutions;

The framework shows a schematic link between the independent variables (banking, institutional, socio-economic and infrastructural factors) and the dependent variable (financial inclusion). The framework shows how an increase in capacity, efficiency and confidence of anticipated return on investment (banking and institutional) is likely to determine financial inclusion through an increase in supply or availability of financial services and ability to attract people into the formal financial system. Similarly, it shows how better standard of living, good economic conditions and level of socialization (socio-economic and infrastructural factors) are expected to influence financial inclusion through increase in access, demand and usage of financial services.

The framework also indicates a feedback loop from the role of the banking, institutional, socio-economic and infrastructural factors to financial inclusion which is then ploughed back from financial inclusion to these factors. This feedback loop is necessary in order to sustain the influence of these factors on financial inclusion and also to maintain the flow. It is assumed that as efficiency and confidence of financial institutions increases, these institutions will supply more financial services which will boost financial inclusion. This process applies to the customers as well. With good

economic condition, customers will demand more financial services which will influence financial inclusion, when this process eventually impact on financial inclusion, this will in return increase access, availability and usage of financial services which will also influence the contribution of the banking, institutional, socio-economic and infrastructural factors. With this, a schematic flow is derived and maintained, thus making a continuous flow of the influence of banking, institutional, socio-economic and infrastructural factors on financial inclusion.

3.2 Model Specification

The model specifications of Sarma and Pais (2011) on the determinants of financial inclusion were calibrated to come up with the models to achieve objective two to five. The theoretical underpinning of the models is majorly the financial repression theory propounded by Mckinnon (1973) and Shaw (1973), which stipulates that excessive financial regulations and laws in form of interest rate control, liquidity ratio requirements, high reserve requirement, high transaction cost and other legal restrictions affect effective financial development in an economy. This study further modified the model to include other variables such as property rights and legal origin on the basis of law and finance theory, financial freedom, reserve ratio and liquidity ratio based on financial repression theory, while information sharing on the bases of information theory of credit. The model was also crafted on the demand-following hypothesis of the finance and economic growth theory. Following in-depth review of literature, variables such as government integrity and inflation were also included.

Variables such as newspaper, radio, computer and cable television in the model of Sarma and Pais (2011) were excluded in this study. This is due to the fact that these facilities could be accessed through an internet enabled phone, which is already included

in the model. The share of government in the total banking sector asset is excluded as this is already incorporated in the financial freedom variable which is included in this study. Dynamism was introduced into the models by the inclusion of the one year lag of the dependent variable as a regressor. This is due to the fact that banking sector development and thus, financial inclusion rely on previous performance (Aluko & Ajayi, 2017). Furthermore, the lag of the dependent variable permits partial adjustment of the dependent variable to its long-run equilibrium. (Baltagi, Demetriades, & Law, 2009). Consequently, the modified model implies that:

IFI = *f*(Lagged IFI, RR, LR, LO, GI, PP, FF, CA, IR, SF, NL, IS, IN, EG, IF, PD, EL, IT, PH)

……..(3.1)

Where:

IFI = Index of Financial Inclusion

Banking factors

RR = Reserve Ratio

LR = Liquidity Ratio

FF = Financial Freedom

CA = Capital Asset Ratio

IR = Deposit Interest Rate

SF = Share of Foreign bank asset in the total banking sector asset

NL = Non-performing Loan

Institutional factors

LO = Legal Origin

GI = Government Integrity

PP = Property Right

IS = Information Sharing

Socio-economic factors

IN = Per capita income

EG = Economic Growth

IF = Inflation

PD = Population Density

EL = Educational level

Infrastructural factors

IT = Internet

PH = Phone

β_0 - β_{18} are coefficient estimates

μ_i = Time-invariant unobservable country-specific effects

η_t = time-specific effects

$\varepsilon_{i,t}$ = time-varying error term

i = subscript i (individual country in the sample)

t = Time t

Due to the fact that the study follows a stepwise approach, in order to establish the impact of first four variables in equation (3.1), which are new contributions to financial inclusion literature and the next two which have not been tested on financial inclusion of individuals even after the introduction of other variables, equation (3.1), which is the main equation was used to answer objectives two to five which investigates the effect of banking, institutional, socio-economic and infrastructural factors respectively on financial inclusion in Sub-Saharan Africa and is further synthesized into the following:

IFI = f(Lagged IFI, RR, LR, LO, GI, PP, FF)…….(3.2)

IFI = *f*(Lagged IFI, RR, LR, LO, GI, PP, FF, CA, IR, SF, NL)……………………..(3.3)

IFI = *f*(Lagged IFI, RR, LR, LO, GI, PP, FF, CA, IR, SF, NL, IS)………………….(3.4)

IFI = *f*(Lagged IFI, RR, LR, LO, GI, PP, FF, CA, IR, SF, NL, IS, IN, EG, IF, PD, EL)..(3.5)

IFI = *f*(Lagged IFI, RR, LR, LO, GI, PP, FF, CA, IR, SF, NL, IS, IN, EG, IF, PD, EL, IT, PH)……………………………………………………………………………….(3.6)

Thus, the econometric models for this study are implied as in the following five models:

Model One:

$$IFI_{i,t} = \beta_0 + \beta_1 IFI_{i,t-1} + \beta_2 RR_{i,t} + \beta_3 LR_{i,t} + \beta_4 LO_{i,t} + \beta_5 GI_{i,t} + \beta_6 PP_{i,t} + \beta_7 FF_{i,t} + \mu_i + \eta t + \varepsilon_{i,t} \quad (3.7)$$

Model Two:

$$IFI_{i,t} = \beta_0 + \beta_1 IFI_{i,t-1} + \beta_2 RR_{i,t} + \beta_3 LR_{i,t} + \beta_4 LO_{i,t} + \beta_5 GI_{i,t} + \beta_6 PP_{i,t} + \beta_7 FF_{i,t} + \beta_8 CA_{i,t} + \beta_9 IR_{i,t} + \beta_{10} SF_{i,t} + \beta_{11} NL_{i,t} + \mu_i + \eta t + \varepsilon_{i,t} \quad (3.8)$$

Model Three:

$$IFI_{i,t} = \beta_0 + \beta_1 IFI_{i,t-1} + \beta_2 RR_{i,t} + \beta_3 LR_{i,t} + \beta_4 LO_{i,t} + \beta_5 GI_{i,t} + \beta_6 PP_{i,t} + \beta_7 FF_{i,t} + \beta_8 CA_{i,t} + \beta_9 IR_{i,t} + \beta_{10} SF_{i,t} + \beta_{11} NL_{i,t} + \beta_{12} IS_{i,t} + \mu_i + \eta t + \varepsilon_{i,t} \quad (3.9)$$

Model Four:

$$IFI_{i,t} = \beta_0 + \beta_1 IFI_{i,t-1} + \beta_2 RR_{i,t} + \beta_3 LR_{i,t} + \beta_4 LO_{i,t} + \beta_5 GI_{i,t} + \beta_6 PP_{i,t} + \beta_7 FF_{i,t} + \beta_8 CA_{i,t} + \beta_9 IR_{i,t} + \beta_{10} SF_{i,t} + \beta_{11} NL_{i,t} + \beta_{12} IS_{i,t} + \beta_{13} IN_{i,t} + \beta_{14} EG_{i,t} + \beta_{15} IF_{i,t} + \beta_{16} PD_{i,t} + \beta_{17} EL_{i,t} + \mu_i + \eta t + \varepsilon_{i,t} \quad (3.10)$$

Model Five:

$$IFI_{i,t} = \beta_0 + \beta_1 IFI_{i,\ t-1} + \beta_2 RR_{i,t} + \beta_3 LR_{i,t} + \beta_4 LO_{i,t} + \beta_5 GI_{i,t} + \beta_6 PP_{i,t} + \beta_7 FFi,t + \beta_8 CA_{i,t} + \beta_9 IR_{i,t} + \beta_{10} SF_{i,t} + \beta_{11} NL_{i,t} + \beta_{12} IS_{i,t} + \beta_{13} IN_{i,t} + \beta_{14} EG_{i,t} + \beta_{15} IF_{i,t} + \beta_{16} PD_{i,t} + \beta_{17} EL_{i,t} + \beta_{18} IT_{i,t} + \beta_{19} PH_{i,t} + \mu_i + \eta t + \varepsilon i,t \quad (3.11)$$

3.3 Estimation Techniques

This section details the estimation methods used in determining the level of financial inclusion, which is the dependent variable and the technique used to estimate the models specified under the model specification section.

3.3.1 Estimation Technique for the Dependent Variable: The Principal Component Analysis (PCA)

The principal component analysis was propounded in 1901 by Karl Pearson (Pearson, 1901) and was later formalized in the work of Harold Hotelling **(**Hotelling, 1933**).** PCA is a statistical method that makes use of an orthogonal transformation to convert a set of data under observation into a set of value of linearly uncorrelated variables. This study used PCA to calculate the financial inclusion index for Sub-Saharan African countries. This is due to the fact that this method account for the principal components of the indicators of financial inclusion.

Unlike other methods that can be used to construct an index, such as the UNDP methodology and the distance-based method, where the weight allocated to the dimensions is subjective and the value of the resultant index is restricted between 0-1, PCA uses optimal weight devoid of researcher's bias. Furthermore, the resultant index

does not fall within a predetermined range. The resultant principal components that account for the widest variances will be regarded as the most important while principal components that account for less variance are called noise (Shlen, 2003).

Studies that used principal component analysis to measure the level of financial inclusion are Pi˜neyro (2013), who proposed a multidimensional measure for Mexico and Cámara and Tuesta (2014), who built a multidimensional financial inclusion index for eighty-two developed and less-developed countries.

3.3.2 Estimation Technique for the Models Specification: System GMM

It has been established that the problems of serial correlation, endogeneity and heterogeneity, which have been attributed to related dataset, cannot be resolved with the use of OLS because individual country's fixed effect is not observed. Furthermore, inconsistent coefficient estimates will be generated by the correlation between the country's fixed effects and the lagged dependent variable (Flannery & Hankins, 2013). Two-Stage Least Square (2SLS), which is an improvement on OLS, distinguishes between regressors and instruments. The estimation problem in 2SLS is to choose coefficients on the regressors so that the moments of the errors with the instruments are 0. However, an ambiguity occurs when satisfying such moment conditions. This leads to inconsistent and biased outcome because, in finite samples, the instruments are correlated with the endogenous components of the instrumented regressors (Roodman, 2009). The General Least Square method (GLS) either fixed effect or random effect, introduces endogeneity into the regression when trying to control for the unobserved country's fixed effect and the error term will then be correlated with the lagged dependent variable, eventually, the estimation becomes bias. The situation is worse in

panel studies that cover a short number of years (Dang, Kin, & Shin, 2015; Flannery & Hankins, 2013; Johnson, 2003).

The Instrumental Variable (IV) technique by Anderson and Hsiao (1982) may lead to a biased result as the technique does not take into consideration all moment conditions and may not perform well when the time covered is small (Arellano & Bond, 1991; Dang *et al.*, 2015). The generalized method of moment (GMM) proposed by Hansen (1982) overcomes the shortcoming of the technique of Anderson and Hsiao (1982) by taking into consideration all moment conditions, but this technique applied the difference of each variables to the independent and dependent variables, then included the instrumental variable from the lagged level of the regressor with this process in the presence of serial correlation. The lagged levels of the regressors may be inappropriate instruments thereby leading to a spurious result (Arellano & Bover, 1995; Baum, 2006; Blundell & Bond, 1998).

Arellano and Bond (1991) proposed a two-step estimator otherwise called Difference GMM estimator which uses the lagged values of the explanatory variables in levels as instruments in order to address correlation and potential endogeneity problem. In the first step of this estimation, the error terms are assumed to be both independent and homoscedastic across countries and over time. In the second step, the residuals obtained in the first step are used to construct a consistent estimate of the variance-covariance matrix, thus relaxing the assumptions of independence and homoscedasticity. The difference GMM estimator has its shortcomings; differencing reduces the signal-to-noise ratio and leads to a loss of the pure cross-country dimension of data. Furthermore, if the lagged dependent and the explanatory variables are persistent over time, lagged levels of these variables are weak instruments for the regressions in differences (Blundell & Bond, 1998).

In order to solve this problem, lagged first differences should be used in addition to the first differencing of the regressors as instruments (Arellano & Bover, 1995; Blundell & Bond, 1998). That is, there is a need for two simultaneous equations, the lagged difference of the dependent variable as instruments for equation in levels and another one in lagged levels of the dependent variables as instruments for equation in first difference. The effects of time-invariant variables are eliminated in first difference but are estimated in levels. The technique described in the preceding paragraph is known as the system GMM propounded by Arellano and Bover (1995). This technique solves the aforementioned problems and is suitable for studies with small study period as well as the independent variables that are not strictly exogenous, removes the potential biases in finite samples and asymptotic imprecision associated with the difference estimator, controls the variability of the time dimension thereby giving additional degrees of freedom and does not require the total knowledge of the data (Arellano & Bover, 1995; Blundell & Bond, 1998; ; Flannery & Hankins, 2013; Roodman, 2009).

More so, Flannery and Hankins (2013) posit that most finance data are characterized by endogeneity problem, serially correlated and the datasets in some cases consist of unbalanced panel. In order to take care of the aforementioned issues, system GMM is used to analyse the panel data. Gebrehiwot and Makina (2015) used system GMM in a financial inclusion study of the Asian countries. In order to ensure the result obtained from the GMM are valid and robust, the following validity tests were carried out, namely; Hansen test for the joint validity of instrument and over-identification of the model, Arellano and Bond tests (AR(1) and AR(2)) of autocorrelation and the Wald Test.

3.4 *A priori* Expectation

These are expected relationships between the dependent and independent variables in a study. These are usually derived from theories or findings of previous studies. Table 3.1 shows how the independent variables are expected to affect the dependent variable.

Table 3.1 A prior Expectation

Variables	Expected Signs	Empirical Studies
Dependent Variable		
Index of Financial Inclusion		
Independent Variables		
Reserve ratio	-	Ang (2008); Demirgüç-Kunt & Detragiache (1998); Pourshahabi & Elyasi (2013).
Liquidity ratio	+	Ameer (2015); Khalfaoui & Ben Saada (2015)
Financial freedom	-	Beju & Ciupac-Ulici (2012); Daumont, Le Gall, & Leroux (2004); Farazi (2014).
Capital asset ratio	+	Ameer (2015); Beju & Ciupac-Ulici (2012); Khalfaoui & Ben Saada (2015); Sarma & Pais (2011).
Deposit Interest rate	+	Chittira & Selvam (2013); Demirgüç-Kunt & Detragiache (1998); Evans and Adeoye (2016); Pourshahabi & Elyasi (2013); Sarma & Pias (2011).
Share of foreign banks in the total banking sector asset	+	Allen *et al.* (2012); Barth, Caprio & Levine (2004); Clarke, Cull, & Shirley (2005) Grigorian & Manole (2006); Sarma & Pais (2011).
Non-performing loan	_	Ameer (2015); Anayiotus & Toroyan (2009); Beju & Ciupac-Ulici (2012); Khalfaoui & Ben Saada (2015); Murthy & AlMuharrami (2014); Padilla & Requejo (2000); Sarma & Pais (2011).
Legal origin	+/-	Beck *et al.* (2003); Djankov *et al.* (2005); Djankov *et al.* (2007); Graff (2006); Levine, *et al.* (2000); McDonald & Schumacher (2007).
Government integrity	+	Alter & Yontcheva (2015); Edison, Levine, Ricci and Slok (2002).
Property right	+/-	Beck, Demirgüç-Kunt & Levine (2001); Farazi (2014); Filippidis & Katrakilidis (2014); Levine, *et al.* (2000).
Information sharing	+	Anayiotus & Toroyan (2009); Beck & Levine (2005); Beck *et al*. (2007); Djankov *et al.* (2005); Djankov *et al.* (2007); Khalfaoui & Ben Saada (2015); Naceur *et al*. (2015); McDonald & Schumacher (2007).
Per Capita Income	+/-	Allen *et al.* (2012); Allen *et al*. (2014); Chittira & Selvam (2013); Evans & Adeoye (2016); Naceur *et al.* (2015); Sarma & Pais (2011).
Economic growth	+	Allen *et al*. (2014); Demirgüç-Kunt & Detragiache

		(1998); Murthy & AlMuharrami (2014).
Inflation	-	Allen *et al*. (2014), Ameer (2015); Demirgüç-Kunt & Detragiache (1998); Djankov *et al.* (2005); Djankov *et al.* (2007); Effiong (2016), Evans & Adeoye (2016); Khalfaoui & Ben Saada (2015).
Population density	+	Allen *et al*. (2014); Alter & Yontcheva (2015); Beck *et al.* (2007); Evans & Adeoye (2016); Kumar (2011); Naceur *et al.* (2015).
Educational level	+	Allen *et al.* (2012); Honohan (2008); Park & Marcado (2015); Tuesta *et al.* (2015).
Internet	+/-	Chittira & Selvam (2013); Evans & Adeoye (2016); Gebrehiwot & Makina (2015); Sarma & Pias (2011); Salifu (2008).
Phone	+	Beck *et al.* (2007); Chittira & Selvam (2013); Evans & Adeoye (2016); Gebrehiwot & Makina (2015); Sarma & Pias (2011).

Source: Author (2018)

3.5 Potential Determinants of Financial Inclusion

Recent years have witnessed burgeoning research into the potential determinants of financial inclusion. This sub-section describes the main possible determinants of financial inclusion grouped into institutional factors, banking factors, socio-economic factors and infrastructural factors. These variables are as follows:

3.5.1 Banking Factors

(i) Reserve ratio

This is the part of the bank's asset that is required to be kept as reserve. This reserve requirement is imposed by regulatory authorities. This limits the funds at the disposal of the financial institutions thereby limiting their ability to extend credit. A negative

relationship is expected between reserve ratios which are measured as the bank liquid reserve to bank asset ratio following Demirgüç-Kunt and Detragiache (1998) and Pourshahabi and Elyasi (2013).

(ii) Liquidity Ratio:

This indicates the availability of cash or near cash assets that can be easily converted into cash which will determine the bank's ability to give loan to customers and invest in other economic activities. Insufficient liquidity is one of the important reasons for the failures of financial institutions (Ameer, 2015). Sarma and Pais (2011) argued that financial institution's ratio of liquidity is indicative of an expanded platform for financial inclusion. Liquidity ratio is calculated as liquid assets to deposits and short-term funds.

(iii) Financial Freedom

Financial freedom is a proxy for banking efficiency and independence of financial institutions from government control and interference in the financial sector. This is because government interference in ownership of financial institutions reduces competition and lowers access to credit. The score of financial freedom ranges from 0 to 100, the higher the score, the higher the level of financial freedom in the country. Financial freedom influences financial inclusion (Fazari, 2013).

(iv) Capital asset ratio

A positive relationship is expected between capital asset ratio and financial inclusion because financial institutions with high capital have greater latitudes to extend more credit and perform other intermediation functions because they are not under serious capital constraint (Hancock and Wilcox, 1998). Hence, high capital asset ratio signifies soundness of financial institutions and will not be limited by it to perform their intermediation functions. Also, low capital asset ratio shows that financial institutions are

not sound and may limit their ability to perform intermediation function. Capital asset ratio is measured as the ratio of bank capital and reserve to total asset, following Ameer (2015) and Sarma and Pais (2011).

(v) **Deposit Interest rate**

This is the amount earned by customers of financial institutions on savings before allowing for inflation. It is argued that it is the cost of capital prevailing in the banking system and determines the attractiveness of the banking system (Sarma & Pais, 2011). In addition, since the reward for saving is interest rate, encouraging reward for saving will bring a bigger share of the population into financial institutions (Evans & Adeoye, 2016). Thus, a positive relationship is expected between interest rate on deposit and financial inclusion.

(vi) Share of foreign banks in the total asset of banks

This has to do with that part of bank's asset that is owned by other banks domiciled outside the country. Previous studies that used share of foreign banks in the total asset of banks are Allen *et al.* (2012) and Sarma and Pais (2011).

(vii) **Non-performing loan**

Non-performing loan is part of the loan facilities provided by banks to their customers of which part of the principal or interest remain unpaid for a period of 90 days or more (Campbell, 2007). Ameer (2015) argued that low non-performing asset might encourage financial institutions to extend more loan to customers and encourage more people to use the formal financial institution in order to benefit from the facility. On the other hand, high non-performing asset can discourage financial institutions to extend credits to customers. This is measured by non-performing loan to total gross loan following Ameer (2015) and Murthy and Almuharrami (2014).

3.5.2 Institutional Factors

(i) Legal Origin

Legal origin indicates whether a country's legal system is based on British or German common law, French or Scandinavian civil law (La Porta *et al.*, 1997, 1998). In this study, sampled countries are grouped into countries with English legal origin and countries with French legal origin. The former is represented with a dummy variable that has the value of one while the latter has the value of zero following La Porta *et al.* (1998). There is equal number of countries with British and French legal origin in the sample.

(ii) Government Integrity

This measures the ability of the government to avoid corrupt practices such as bribery, nepotism, patronage and embezzlement, which distort economic freedom by introducing insecurity and uncertainty into the economy. Concerning the expected effect of government integrity on financial inclusion, the expectation is that it will strengthen the confidence of stakeholders in actively participating in a financial contract. The effect will be contrary when government integrity is low.

(iii) Property Rights

This indicates the quality of the legal environment in protecting the property right of parties in a financial agreement and the extent to which they are respected. In the case of default, the protected right of financial institutions allows them to easily enforce contracts by forcing repayment or seizing collateral (McDonald & Schumacher 2007). Following Beck *et al.* (2003) and Levine *et al.* (2000), property rights are derived from the average of physical property rights, intellectual property rights, the strength of investors protection, risk of expropriation and quality of land administration.

(iv) Information Sharing

Under the information theory of credit, availability of public and private credit bureau that provide credit information about debtors is expected to have a positive relationship with financial inclusion because the information provided by credit registries help financial institutions to make informed credit decision thus, reducing credit risk (McDonald & Schumacher 2007). This implies that financial institutions are able to lessen cost and risk associated with the allocation of credit. In addition, Brown and Zehnder (2007) added that information sharing increases repayment rates of debtors; this is because debtors anticipate that a good credit history improves their access to funds. Information sharing is measured by an index that ranges from 0-6, where high index indicate the availability of credit information about debtors.

3.5.3 Socio-economic Factors

(i) Per Capita Income

The effect of real growth on financial inclusion is in two folds. On one hand, countries with high level of per capita income may be associated with greater financial development and financial inclusion (Allen *et al.,* 2012; Sarma, 2012). On the other hand, countries with high per capita income tend to have slower financial growth (Naceur *et al.,* 2015). Thus, a-priori the relationship of financial inclusion with level of per capita income can be either negative or positive. It is measured as the logarithm of GDP per capita constant US$2005 following Sarma and Pais (2011) and Chithra and Selvam (2013).

(ii) Economic Growth

This is the annual percentage growth rate of GDP. Allen *et al.* (2014) argued that countries with high growth rate experience high financial development and financial inclusion. Access to funds increases during economic boom. During this period, financial institutions relax criteria, thereby, leading to increase in lending. During economic recession, however, funds are not readily available, non-performing loan increases and financial institutions ration out available funds (Dell' Ariccia & Marquez, 2006). In the same vein, the state of the economy affects available funds at the disposal of individuals. This in turn influences individuals' ability to save and manage funds. Accordingly, the study expects a positive influence of GDP growth rate on financial inclusion. It is measured by the WDI as the annual percentage growth rate of GDP.

(iii) Inflation

Inflation is the annual percentage change in the general price level of goods and services in an economy, proxied by consumer price index as measured by the World Bank Development Indicator database (WDI). Inflation is used to measure socio-economic stability. High inflation rate may bring about uncertainty and risk which may have long-run negative impact on financial development (Effiong, 2016). Thus, it is expected that it will have a negative effect on financial inclusion i.e. when inflation is low and stable, financial inclusion will be high and vice versa. A negative relationship is expected because inflation slows down financial development (Allen *et al.,* 2014).

(iv) **Population density**

In terms of population density, it is argued that it influences the establishment of proportionately more financial institutions in a location and ability to attract financial development (Alter & Yontcheva, 2015). When an economy is highly populated, its population density should be positively associated with financial inclusion (Evans & Adeoye, 2016). In addition, population density is a signal to financial institutions that

more customers will be gotten from the population, hence the study expects a positive coefficient for population density. In this thesis, population density is measured as the logarithm of population density following Allen *et al*. (2014).

(v) Educational level

As argued by Goodstein and Rhine (2013), Laha, Kuri, and Kumar (2011) and Mitton, (2008), the percentage of people who can read and write is important for financial inclusion because education exposes individuals to the benefit of financial inclusion. Thus, it is expected that education will have a positive impact on financial inclusion. Education is measured by primary school enrollment following Cámara and Tuesta (2014). Literacy rate and secondary school enrollment were not used considering a large number of missing observations for the countries in the study. In the same vain, tertiary education was not used because only 3 percent of adults in the region has tertiary education (Demirgüç-Kunt & Klapper, 2012).

3.5.4 Infrastructural Factors

(i) Internet

On the one hand, positive relationship is expected between internet and financial inclusion because internet services have helped to ease the opening, access and usage of financial services. This has enhanced electronic banking (Evans & Adeoye, 2016). Hence, economies with more internet facility is expected to have greater financial inclusion (Sarma & Pais, 2011; Chithra & Selvam, 2013). On the other hand, negative relationship is expected between internet and financial inclusion because internet services although financial development, it also gives room for fraudulent activities which could discourage people from using the formal financial system (Salifu, 2008).

Internet is measured by internet server per 1 million population following the same measurement as used by Gebrehiwot and Makina (2015).

(ii) Phone

As argued by Chithra and Selvam (2013), Sarma and Pais (2011) and Beck *et al.* (2007), use of phone is positively related to financial inclusion because the availability of this facility will enhance connectivity to bank accounts which will facilitate the use of formal financial services. For this reason, it is expected that countries with high number of phone subscriptions are expected to be more financially included. Phone is measured by the logarithm of the number of mobile subscription per 100 people following Gebrehiwot and Makina (2015). In this study, phone is classified as physical infrastructure as reported by Sarma and Pais (2011). It is expected to affect financial inclusion positively.

3.6 Nature and Sources of Data

The data for this study were mainly secondary. The data for the level of financial inclusion were obtained from the IMF database (Financial Access Survey, 2017). Data for economic growth, per capita income, population density, educational level, inflation, phone, internet, reserve ratio, capital asset ratio, non-performing loan and deposit interest rate were sourced from World Bank database (World Development Indicator, 2017), while share of foreign banks in the total banking sector asset and liquidity ratio were sourced from World Bank (Global Financial Development Indicator, 2017). Information sharing was sourced from World Bank

Doing Business database (Doing Business, 2017) while financial freedom, property rights and government integrity were sourced from the Heritage Foundation database (Heritage Foundation, 2017). Legal origin was sourced from La Porta *et al.* (1999). The measurement and data sources of the variables are further shown in Table 3.2 below:

Table 3.2 Measurements of Variables and Data Sources

Variables	Acronyms/proxies for model estimation	Measurement/indices	Data source
Index of financial inclusion	IFI	Computed using principal component analysis (PCA) of different dimensions of financial inclusion	International Monetary Fund FAS data
Reserve ratio	RR	Bank liquid reserve to bank asset ratio (%)	World Development Indicator
Liquidity ratio	LR	Liquid assets to deposits and short-term funds (%)	Global Financial Development Indicator
Financial freedom	FF	The Index scores an economy's financial freedom from five perspectives namely; the degree of government intervention in banks and other financial firms through direct and indirect ownership, the extent of government financial regulations, government influence on the allocation of credit, the extent of financial market development and openness to foreign competition. The score ranges from 0 to 100.	Heritage Foundation Database
Capital asset ratio	CAR	Ratio of bank capital and reserves to total assets	Global Financial Development Indicator
Deposit Interest rate	IR	Deposit interest rate (%)	World Development Indicator
Share of foreign banks in total banking sector asset	SF	The percentage of the total banking assets that are held by foreign banks	Global Financial Development Indicator
Non-performing loan	NL	Total of non-performing loans to the gross loan of the bank	World Development Indicator
Legal origin	LO	Dummy variables will be used with values of 1 and 0. 1= Sub-Saharan African countries with British legal origin 0= Sub-Saharan African countries with French legal origin	La Porta, Lopez-de-Silanes, Shleifer, & Vishny (1999)

Government integrity	GI	The score is derived by averaging scores for public trust in politicians, irregular payments and bribes, transparency of government policymaking, the absence of corruption, perceptions of corruption and governmental and civil service transparency. The score ranges from 0 to 100	Heritage Foundation Database
Property rights	PP	The score for property rights is achieved by averaging scores for Physical property rights, intellectual property rights, the strength of investor protection, risk of expropriation and quality of land administration. The score ranges from 0 to 100	Heritage Foundation Database
Information sharing	IS	This index measure rules affecting the accessibility, scope and quality of credit information available through public or private credit bureaus. The index ranges from 0 to 6. Higher values indicating the availability of more credit information, from either a public registry or a private bureau.	Doing Business
Per Capita Income	IN	Logarithm of GDP per capita (Constant 2010 US$)	World Development Indicator
Economic growth	EG	Annual percentage growth rate of GDP	World Development Indicator
Inflation	IF	Annual rate of change of consumer price index	World Development Indicator
Population density	PD	Logarithm of Population density (People per square km of land area)	World Development Indicator
Educational level	ED	School enrollment, primary (% of gross enrollment)	World Development Indicator
Internet	IT	Secured internet server per 1 million people	World Development Indicator
Phone	PH	Telephone subscriptions per 100 people	World Development Indicator

Source: Author (2018)

3.7 Inferential Statistics

Inferential statistics using panel data regression technique was employed to test the hypotheses of this study. Panel data study consists of time series and cross-sectional

data about objects (Gujarati & Porter, 2009). Panel data was used because the number of observations per country is not long enough, it covers for a period of 11 years (2005-2015) for each country. The use of panel data allows the use of technique which takes care of the problems of heterogeneity, collinearity, omitted variables, model misspecification, unobserved country-specific effects, other unobservable variable effects among others (Baltagi, 2008; Delcoure, 2007; Flannery & Hankins, 2013; Levine *et al*., 2000).

3.8 Research Design

The research work adopted *ex-post facto* design, relying on secondary data obtained after the occurrence of the event with the researcher having no control over variables studied. Ex-post facto design, according to Kerlinger and Rint (1986), seeks to reveal possible relationship by observing an existing condition or state of affairs and searching back in time for plausible contributing factor. It has been used in the past by Evans and Adeoye (2016); Babajide *et al.* (2015) and Onaolapo (2015) among others. The ex-post facto design is suitable for research in business and social science disciplines (Simon & Goes, 2013).

3.9 Population and Sample Size

The population of the study consist of all the Sub-Saharan African countries. There are 49 Sub-Saharan African countries. The sample size consists of 22 Sub-Saharan African countries drawn from the population of 49 Sub-Saharan countries based on the availability of data. These countries are listed in Appendix 1.

3.10 Descriptive Statistical Method

The simple descriptive statistical method was used in this study to summarise the complex data sets. They include tabulations, percentages, charts and pair-wise analysis. This also includes a snapshot of data in the form of means, standard deviation, minimum and maximum values of the variables, which were used to depict the composition of the dependent variable and the independent variables. The dependent variable was also described by income level and legal origin. Pair-wise correlation analysis was carried out to establish the bivariate relationship, the presence of multicollinearity and the direction of strength between the dependent and independent variables.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter presents the descriptive statistics, stylized facts and preliminary analysis. The chapter also provides the results on the level of financial inclusion using tables and charts. The empirical result on the determinants of financial inclusion in Sub-Saharan Africa is also reported including the post-estimation tests conducted to confirm the validity of the results. The results are discussed and summary of hypotheses are presented. The last part reports the results of the robustness test of the main regressions.

4.1 Descriptive Statistics

This section provides a snapshot of countries in the sample and their level of financial inclusion by income level and legal origin, aligning with previous studies such as Etudaiye-Muhtar (2016) and Sarma and Pais (2011) using charts, percentages and summary statistics. This section further shows the descriptive statistics for all variables in the models. The list of countries based on their income level and legal origin is in Appendix 1.

4.1.1 Descriptive Statistics Based on Income Level

Figure 4.1 presents the classification of countries in the total sample size of the study by income level, based on the World Bank classification.

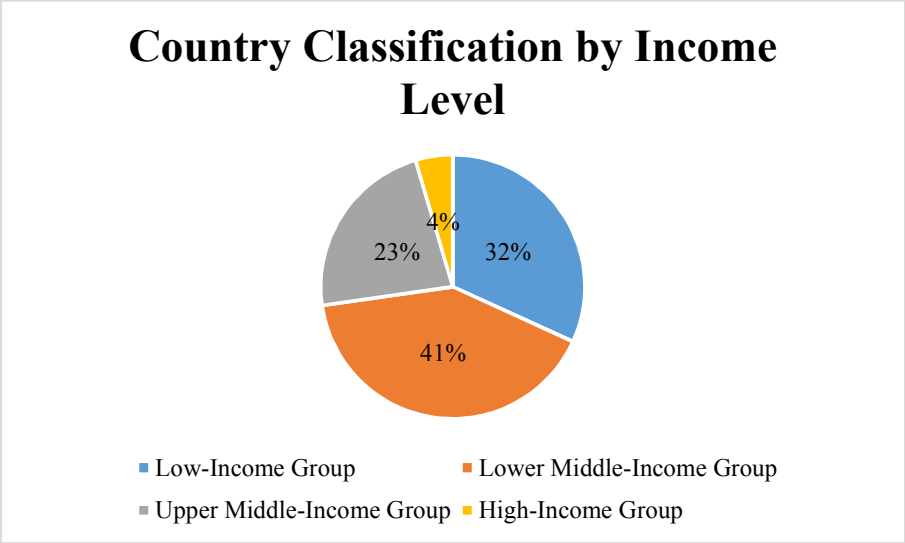

Figure 4.1 Country Classification by Income Level
Source: Author (2018)

Figure 4.1 shows that lower-middle-income countries dominate the sample. This represents 41% of the total sample size while low, upper-middle and high-income countries represent 32%, 23% and 4% respectively. Inferring from the distribution pattern, the level of financial inclusion may be driven by income level as stated by Sarma (2012). In order to verify whether this is applicable in case of Sub-Saharan Africa, the descriptive statistics is divided into various income levels.

4.1.2 Descriptive Statistics of IFI of Countries Based on Income Level

Table 4.1 presents the descriptive statistics of IFI of countries observed in the study by income level, based on the World Bank classification.

Table 4.1 Descriptive Statistics of IFI of Countries Based on Income Level

Variable	Mean	Std. Dev.	Minimum	Maximum
Low-Income Countries				
IFI	0.103	0.939	-1.266	1.977
Lower-Middle-Income Countries				
IFI	0.089	0.949	-1.399	2.739
Upper-Middle-Income Countries				
IFI	0.078	1.061	-1.104	4.491
High-Income Country				
IFI	0.168	0.852	-0.649	1.365

Source: Author's computation (2018)

From Table 4.1 above, it is seen that high-income country has the highest mean of 0.168 followed by the low-income group with mean of 0.103. The third and fourth are lower-middle and upper-middle-income countries with 0.089 and 0.078 respectively. However, this is in contrast with the argument of Sarma (2012) that income level and financial inclusion move in similar direction. Nevertheless, this is supported by the argument of Allen *et al.* (2012) that the relationship between income level and financial inclusion is weak. In order to authenticate this claim empirically, the only country with high-income level country (Seychelles) in the sample was removed from the sample in the robustness check section to determine whether the result will be altered.

4.1.3 Descriptive Statistics Based on Legal Origin

Figure 4.2 presents the classification of countries in the sample by legal origin, based on the classification of La Porta *et al.* (1998).

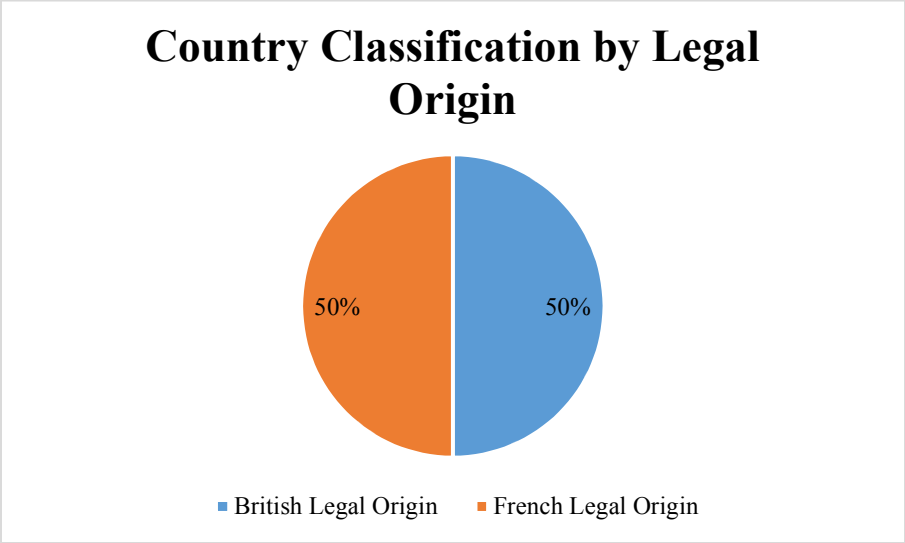

Figure 4.2 Country Classification by Legal Origin
Source: Author (2018)

Coincidentally, the countries are equally distributed across the two classifications. In order to verify the assertion of La Porta *et al.* (1998) that countries that are of British legal origin are more financially developed than their French counterpart. The descriptive statistics of the two classifications are presented separately.

4.1.4 Descriptive Statistics of IFI of Countries Based on Legal Origin

Table 4.2 presents the descriptive statistics of IFI of countries observed in the study by legal origin.

Table 4.2 Descriptive Statistics of IFI of Countries Based on Legal Origin

Variable	Mean	Std. Dev.	Minimum	Maximum
British Legal Origin Countries				
IFI	0.093	0.944	-1.399	2.626
French Legal Origin Countries				
IFI	0.097	0.985	-1.333	4.491

Source: Author's computation (2018)

A comparison of the two groups of countries in Table 4.2 above indicates that IFI in countries with French legal origin are higher (0.097) than that of countries with British legal origin (0.093). This implies that countries with French legal origin are more financially included than their British counterpart in Sub-Saharan Africa. Although this evidence supports the finding of Rajan and Zingales (2003), it nonetheless contradicts the finding of Asongu (2012). In order to verify this claim, a dummy variable is introduced into the regression to ascertain empirically the applicability of the argument of La Porta *et al.* (1998) for this study.

4.1.5 Descriptive Statistics of All Variables

Table 4.3 presents the descriptive statistics for all the variables in all the different specifications. The table shows the mean, standard deviation, minimum and maximum values for all variables. The sample covered 22 Sub-Saharan Africa countries from 2005 to 2015. This yields a dataset consisting of 242 observations. Variables in Table 4.2 are as defined in Table 3.2.

Table 4.3 Descriptive Statistics for the Whole Sample

Variable	Mean	Std. Dev.	Minimum	Maximum
IFI	0.095	0.963	-1.399	4.491
RR	32.838	33.381	2.267	221.244
LR	41.551	22.093	9.740	224.560
FF	45.124	11.091	30	70
CA	10.676	4.369	1.107	33.386
IR	6.388	3.545	2.080	19.586
SF	64.492	27.653	1	144
NL	8.221	6.631	0.034	37.253
LO	0.5	0.501	0	1
GI	29.600	10.609	10	55
PP	33.802	12.908	10	70
IS	1.045	1.920	0	6
IN	7.539	1.183	5.389	9.920
EG	2.437	4.578	-36.829	18.300
IF	7.295	5.820	-8.975	37.142
PD	3.943	1.436	0.904	6.433
EL	105.939	16.605	64.755	189.489
IT	43.175	167.563	0. 025	1326.609
PH	59.418	40.089	1.969	171.375

Source: Author's computation (2018)

The mean value for IFI is 0.095 while the standard deviation is 0.963. The maximum value of IFI shows that there exists as high as 4.491 financial inclusion level in Sub-Saharan Africa while the minimum value indicates the least financial inclusion level in the region for the countries in the sample.

The table further shows that the mean value of economic growth is 2.437 over the period. This is comparable to 3.4 reported by Allen *et al.* (2014) for Africa. The mean value for population density is 3.943. The measure of inflation ranges from negative minimum value of -8.975 to a maximum value of 37.142. This indicates a wide disparity

in inflation rate among the countries in the sample. Effiong (2016) also reported a wide difference in inflation rate of Sub-Saharan African countries.

The mean value of capital asset ratio also implies that on average, financial institutions set aside 10.676 capitals on total asset while the mean of 32.838 for reserve ratio was also reported. The mean value of deposit interest rate among Sub-Saharan Africa is 6.388 over the period of study.

The minimum value of liquidity ratio is 9.740 while the maximum value is 224.560. This indicates a wide disparity in liquidity ratio among the countries observed. The mean value of financial freedom is 45.124. The mean value of information sharing is 1.045 while the minimum and maximum values are 0 and 6 respectively. This indicates that availability of credit information in some Sub-Saharan African countries is as high as 6 while credit information is totally absent in some of the countries studied. This collaborates with the argument of Effiong (2016) that institutions are generally just springing up in the region. The value of minimum and maximum value for credit information perfectly match that of Beck *et al.* (2007) who also reported 0 and 6.

The mean value of legal origin is 0.5. This is because equal number of countries belongs to the two legal origins considered. Dummy of 1 is allocated to countries with British legal origin while 0 is allocated to their French counterpart. The mean value of property rights is 33.802 for the period observed while government integrity is 29.600.

The minimum value for phone subscription is 1.969 while the maximum value is as high as 171.375. Similarly, the minimum value for internet is 0.025 while the maximum value is 1326.609. A close look at the dataset indicates that Seychelles accounted for the highest infrastructure while Tanzania recorded the lowest. The mean of non-performing loan is 8.221 with a standard deviation of 6.631. This shows that non-

performing loan is relatively fair and the rate of variation is low compared with reserve or liquidity ratios which are some of the banking factors considered in the study. The mean value of share of total banking sector asset owned by foreign banks is 64.492, the minimum value of 1 and the maximum value of 144. The mean value is high when compared to what is reported in Beck *et al.* (2007). The maximum value reveals that foreign banks have up to 144 share in the total banking assets while the minimum value of 1 shows that in some countries, banking assets are almost totally owned by local investors. The descriptive statistics also shows the mean of 105.939 for educational level and the level of per capita income as measured by the log of GDP per capita which has a mean value of 7.539.

4.2 Stylized Facts

In this section, the study presents some stylized facts on the IFI values of the countries from 2005-2015 and the level of financial inclusion of Sub-Saharan Africa from 2005-2015

4.2.1 Analysis of IFI Value for Sub-Sahara African Countries from 2005-2015

Table 4.4a-d shows the trend of IFI for each country in the sample from 2005 to 2015. This shows the fluctuation of the level of financial inclusion of these countries from year to year and their ability to achieve a better level of financial inclusion or otherwise.

Table 4.4a IFI Value for Sub-Sahara African Countries from 2005-2007

Country	2005	IFI Category	Country	2006	IFI Category	Country	2007	IFI Category
Gabon	-0.408	High	Seychelles	-0.393	High	Gabon	-0.408	High
Cameroon	-0.482	High	Gabon	-0.408	High	Cameroon	-0.4815	High
South Africa	-0.495	High	Cameroon	-0.482	High	Namibia	-0.4824	High
Mauritius	-0.548	High	South Africa	-0.495	High	South Africa	-0.495	High
Ghana	-0.580	High	Mauritius	-0.548	High	Rwanda	-0.519	High
Seychelles	-0.604	High	Ghana	-0.580	High	Mauritius	-0.548	High
*Swaziland	-0.622	High	*Swaziland	-0.622	High	Lesotho	-0.569	High
Nigeria	-0.872	High	Equatorial G	-0.652	High	Equatorial G	-0.575	High
Chad	-0.874	Medium	Namibia	-0.760	Medium	Ghana	-0.580	Medium
Uganda	-0.908	Medium	Gambia	-0.762	Medium	*Swaziland	-0.622	Medium
Kenya	-0.939	Medium	Chad	-0.831	Medium	Seychelles	-0.649	Medium
Tanzania	-1.037	Medium	Lesotho	-0.871	Medium	Congo Rep	-0.827	Medium
Equatorial G	-1.051	Medium	Nigeria	-0.872	Medium	Zambia	-0.849	Medium
Central Africa	-1.073	Medium	Uganda	-0.908	Medium	Nigeria	-0.872	Medium
Congo Rep	-1.083	Medium	Congo Rep	-0.938	Medium	Tanzania	-0.874	Medium
Namibia	-1.104	Low	Kenya	-0.939	Low	Chad	-0.888	Low
Burundi	-1.138	Low	Burundi	-0.966	Low	Central Africa	-0.889	Low
Gambia	-1.176	Low	Central Africa	-0.999	Low	Kenya	-0.9021	Low
Rwanda	-1.266	Low	Tanzania	-1.037	Low	Angola	-0.9023	Low
Angola	-1.333	Low	Angola	-1.143	Low	Uganda	-0.908	Low
Zambia	-1.336	Low	Zambia	-1.264	Low	Burundi	-0.918	Low
Lesotho	-1.399	Low	Rwanda	-1.266	Low	Gambia	-1.145	Low

Source: Author's Computation (2018)

Table 4.4b IFI Value for Sub-Sahara African Countries from 2008-2010

Country	2008	IFI Category	Country	2009	IFI Category	Country	2010	IFI Category
Gambia	1.665	High	Nigeria	0.651	High	Nigeria	1.235	High
Rwanda	-0.204	High	Angola	0.327	High	Rwanda	0.501	High
Lesotho	-0.289	High	Gambia	0.309	High	Angola	0.369	High
Zambia	-0.316	High	Rwanda	0.278	High	Uganda	0.248	High
Namibia	-0.370	High	Zambia	-0.053	High	Central Africa	0.202	High
Gabon	-0.408	High	Lesotho	-0.139	High	Zambia	0.142	High
Angola	-0.412	High	Namibia	-0.271	High	Lesotho	0.123	High
Cameroon	-0.482	High	Seychelles	-0.337	High	Tanzania	0.034	High
South Africa	-0.494	Medium	Tanzania	-0.350	Medium	Burundi	-0.035	Medium
Equatorial G	-0.513	Medium	Gabon	-0.408	Medium	Kenya	-0.093	Medium
Mauritius	-0.548	Medium	Kenya	-0.429	Medium	Congo Rep	-0.099	Medium
Seychelles	-0.567	Medium	Chad	-0.441	Medium	Equatorial G	-0.193	Medium
Ghana	-0.580	Medium	Burundi	-0.457	Medium	Chad	-0.224	Medium
Chad	-0.589	Medium	Equatorial G	-0.465	Medium	Namibia	-0.239	Medium
Congo Rep	-0.612	Medium	Cameroon	-0.481	Medium	Seychelles	-0.362	Medium
*Swaziland	-0.622	Low	South Africa	-0.494	Low	Gabon	-0.408	Low
Burundi	-0.664	Low	Congo Rep	-0.541	Low	Gambia	-0.410	Low

Tanzania	-0.699	Low	Mauritius	-0.548	Low	Cameroon	-0.428	Low
Central Africa	-0.726	Low	Ghana	-0.580	Low	South Africa	-0.494	Low
Kenya	-0.800	Low	Central Africa	-0.581	Low	Mauritius	-0.548	Low
Nigeria	-0.872	Low	*Swaziland	-0.622	Low	Ghana	-0.580	Low
Uganda	-0.908	Low	Uganda	-0.906	Low	*Swaziland	-0.622	Low

Source: Author's Computation (2018)

Table 4.4c IFI Value for Sub-Sahara African Countries from 2011-2013

Country	2011	IFI Category	Country	2012	IFI Category	Country	2013	IFI Category
Angola	1.039	High	Central Africa	1.801	High	Gabon	4.491	High
Uganda	0.738	High	Seychelles	1.333	High	Mauritius	1.319	High
Central Africa	0.698	High	Nigeria	1.263	High	Congo Rep	1.284	High
Gambia	0.667	High	Angola	1.096	High	Cameroon	1.261	High
Burundi	0.594	High	Congo Rep	1.045	High	Kenya	1.260	High
Congo Rep	0.581	High	Burundi	0.942	High	Namibia	1.236	High
Zambia	0.361	High	Uganda	0.919	High	Burundi	1.124	High
Tanzania	0.341	High	Chad	0.861	High	Lesotho	1.054	High
Lesotho	0.293	Medium	*Swaziland	0.836	Medium	Zambia	1.033	Medium
Namibia	0.139	Medium	Namibia	0.824	Medium	Seychelles	0.952	Medium
Kenya	0.110	Medium	Equatorial G	0.689	Medium	Tanzania	0.906	Medium
Chad	0.053	Medium	Zambia	0.686	Medium	Central Africa	0.876	Medium
Rwanda	0.005	Medium	Kenya	0.608	Medium	*Swaziland	0.840	Medium
Seychelles	-0.112	Medium	Tanzania	0.606	Medium	Uganda	0.781	Medium
Equatorial G	-0.172	Medium	Lesotho	0.459	Medium	Rwanda	0.683	Medium
Cameroon	-0.306	Low	Ghana	0.394	Low	Equatorial G	0.653	Low
Nigeria	-0.330	Low	Gambia	0.109	Low	Chad	0.631	Low
Gabon	-0.408	Low	Cameroon	0.104	Low	Angola	0.591	Low
South Africa	-0.494	Low	Rwanda	-0.006	Low	South Africa	0.566	Low
Mauritius	-0.548	Low	Gabon	-0.408	Low	Ghana	0.523	Low
Ghana	-0.580	Low	South Africa	-0.494	Low	Gambia	0.187	Low
*Swaziland	-0.622	Low	Mauritius	-0.548	Low	Nigeria	-0.797	Low

Source: Author's Computation (2018)

Table 4.4d IFI Value for Sub-Sahara African Countries from 2014-2015

Country	2014	IFI Category	Country	2015	IFI Category
Cameroon	2.739	High	Ghana	2.549	High
South Africa	2.626	High	*Swaziland	2.374	High
Mauritius	1.697	High	Equatorial G	2.076	High
Chad	1.548	High	Rwanda	1.977	High
Nigeria	1.459	High	Mauritius	1.918	High
Congo Rep	1.404	High	Chad	1.851	High
Burundi	1.399	High	Tanzania	1.843	High
Equatorial G	1.3974	High	Uganda	1.689	High
Zambia	1.3971	Medium	Lesotho	1.679	Medium
Kenya	1.386	Medium	Kenya	1.678	Medium
Seychelles	1.365	Medium	Namibia	1.584	Medium
Tanzania	1.304	Medium	Zambia	1.351	Medium
Ghana	1.174	Medium	South Africa	1.258	Medium
Lesotho	1.162	Medium	Burundi	1.246	Medium
Namibia	1.102	Medium	Seychelles	1.226	Medium
Gambia	1.090	Low	Angola	1.085	Low
Rwanda	1.084	Low	Congo Rep	1.014	Low
Uganda	1.070	Low	Gambia	0.929	Low
*Swaziland	0.929	Low	Nigeria	0.881	Low
Central Africa	0.876	Low	Central Africa	0.876	Low
Angola	0.788	Low	Gabon	-0.408	Low
Gabon	-0.408	Low	Cameroon	-0.481	Low

Source: Author's computation (2018)

Table 4.4 a-d present the IFI of countries from 2005-2015. The level of financial inclusion year to year among the Sub-Saharan African countries measured by the IFI varies. In order to facilitate understanding and align with previous research such as Sarma (2012), the IFI is classified into high (1st to 8th country), medium (9th to 15th country) and low (16th to 22nd country). The ranking of countries based on level of their IFI shows that countries that often have high IFI value during 2005-2015 are Angola, Cameroon, Mauritius, Nigeria, Burundi, Rwanda and Lesotho. It is important to note that Angola, Burundi, Rwanda and Lesotho moved from low to high IFI category. Most of the countries in these categories are lower-middle and upper-middle-income countries. However, Rwanda and Lesotho that are low-income countries often have high IFI during the study period. This is similar to the argument of Allen *et al.* (2012) that per capita income does not matter for financial inclusion. This provides support for the ability of low-income countries to be able to make it to the high category.

Furthermore, in the high IFI category, countries with French legal origin outnumbered the British, where Nigeria and Lesotho were the only countries with British legal origin. This implies that countries with British legal origins are not more financially included than the French counterpart. This is however not in line with the postulation of La Porta *et al*. (1998). Nevertheless, this is supported by the argument of Fowowe (2014), who states that legal origin does not matter for financial development in Africa.

Countries that are consistently in the middle category are Seychelles, Chad, Kenya, Tanzania, Equatorial Guinea, Congo, Namibia and Zambia. It is important to note that Seychelles dropped from the high category, where it was in the earlier years, while Namibia and Zambia rose from the low category. Among countries consistent in the middle category, only Seychelles is a high-income country, Namibia and Equatorial Guinea are upper-middle-income countries; Zambia, Congo and Kenya are lower-middle-income countries while Tanzania and Chad are low-income countries. Seychelles, Chad, Equatorial Guinea and Congo are of French legal origin while Kenya, Tanzania, Namibia and Zambia are of British legal origin.

Gabon, South Africa, Ghana, Swaziland, Uganda, Central Africa and Gambia are more consistent in the low IFI category. Gabon and South Africa are upper-middle-income countries, Ghana and Swaziland are from the lower-middle-income group while other countries in this category are of low-income countries. Most of these countries are of British legal origin except Gabon and Central Africa.

Due to the vigorous effort by different stakeholders to improve financial inclusion in individual countries and across the region, the expectation is increase in the level of financial inclusion and not reduction (Sarma, 2012). Countries such as Rwanda made it from the low category in 2005 to the high category later during the study period.

Also, Lesotho made it from the low category to the middle then to the high category. This improvement may be associated with their commitment to the Maya declaration and the willingness to achieve the vision 2020. However, despite the remarkable improvement by some countries, Gabon, South Africa, Ghana and Swaziland showed more decline in their IFI during the study period.

South Africa witnessed reduction in IFI, a close look at the data indicates that the decline may be linked to reduction in mobile banking outlets. This may be associated with the evolution of technology, which in an effort to increase financial inclusion, linked the conventional bank accounts with that of the mobile money accounts. This enables users to access their mobile money accounts from the conventional banks. Therefore, this may reduce the need for physical outlet of the non-conventional banks.

Gabon experienced reduction in IFI within the study period which may be linked to reduction in patronage of the non-conventional banks. It may be that the conventional banks engaged in the provision of competitive products similar to those of the non-conventional banks. It has earlier been noted by Alter and Yontcheva (2005) that financial sector development in Gabon has been declining over time.

Furthermore, Ghana and Swaziland experienced reduction in conventional banking physical outlets which might perhaps be linked to decrease in its IFI. This may be attributed to increased use of other non-conventional means of accessing account, which is fast spreading across the region.

4.2.2 Trend of the Level of Financial Inclusion in Sub Saharan Africa (2005-2015)

Apart from the trend of IFI value of each country from 2005 to 2015, the study also shows the trend of the level of financial inclusion in Sub-Saharan Africa for countries in the sample as a whole from 2005 to 2015 in order to have an overall view.

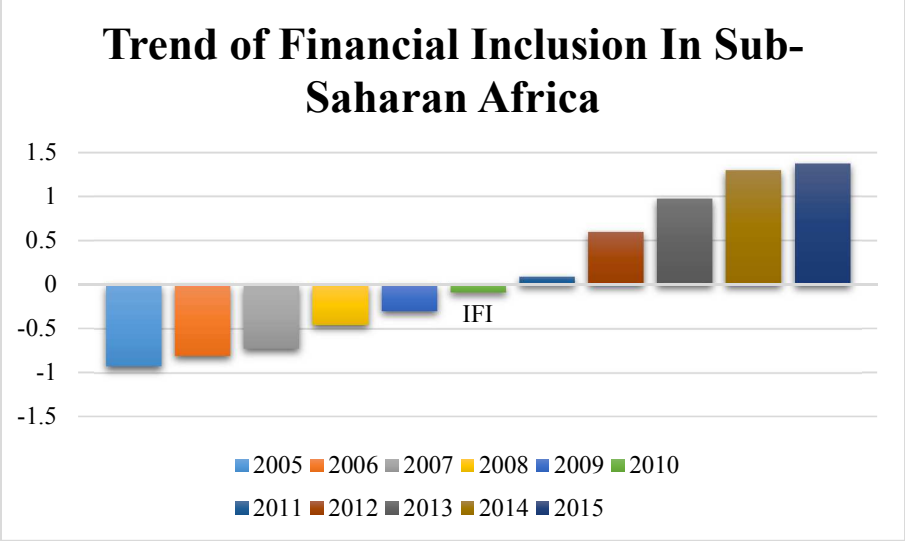

Figure 4.3 Trend of Financial Inclusion in Sub-Saharan Africa (2005-2015)
Source: Author (2018)

Figure 4.3 above shows the trend of financial inclusion in Sub-Saharan Africa from 2005-2015 for the 22 countries covered in the study. The study found that financial inclusion grew steadily throughout the past decade, with high growth after the Maya Declaration in 2011 in which most of the countries that have made this commitment are Sub-Saharan African countries. The Maya Declaration was followed by the issuance of

Financial Inclusion Strategy across the region, which helps in the achievement of greater IFI. However, growth slowed down in the latter years between 2014 and 2015. Nevertheless, this finding is in line with Andrianaivo and Yartey (2010), who argued that financial depth has increased over time in Africa, contrary to that of Yorulmaz (2013) who reported decreasing level of financial inclusion over time in Turkey.

4.3 Preliminary Analysis

This section presents diagnostic test conducted prior to the estimation of the models specified. The diagnostics test presented include the pairwise correlation analysis.

4.3.1 Pairwise Correlation Analysis

Pairwise correlation analysis was carried out before estimating the regression to investigate the bivariate relationship between variables in the models. A pairwise correlation analysis shows the direction and strength of variables and also identifies the presence of high correlation among variables. Variables in Table 4.5 which present the pairwise correlation matrix are as defined in Table 3.2.

Table 4.5 Pairwise Correlation Matrix

	IFI	RR	LR	LO	PP	FF	GI	CA	IR	SF	NL	IS
IFI	1.00											
RR	-0.11	1.00										
LR	-0.13**	0.54*	1.00									
LO	-0.00	-0.39*	-0.19*	1.00								
PP	-0.16**	-0.43*	-0.13**	0.24*	1.00							
FF	-0.15**	-0.22*	-0.14**	0.42*	0.46*	1.00						
GI	0.11***	-0.45*	-0.27*	0.20*	0.69*	0.29*	1.00					
CA	0.23*	-0.06	0.01	-0.01	-0.14**	-0.22*	-0.10	1.00				
IR	-0.08	-0.15**	-0.05	0.50*	0.20*	0.47*	0.11***	0.09	1.00			
SF	0.15**	0.24*	0.19*	-0.20*	-0.26*	-0.12***	-0.25*	0.16**	-0.32*	1.00		
NL	-0.08	-0.05	0.11***	-0.02	-0.13**	-0.05	-0.30*	0.06	0.10	0.11***	1.00	
IS	0.20*	-0.29*	-0.37*	0.24*	0.39*	0.31*	0.61*	-0.12***	0.01	-0.13**	-0.30*	1.00
IN	0.05	0.25*	0.11	-0.15**	0.38*	0.02	0.40*	-0.19*	-0.24*	0.01	-0.40*	0.38*
EG	-0.18*	-0.02	-0.05	0.07	0.18*	0.19*	0.08	-0.27*	0.11***	-0.19*	-0.12***	-0.01
IF	-0.11***	-0.14**	-0.08	0.17*	0.03	0.00	-0.08	0.03	0.29*	-0.10	0.22*	-0.12***
PD	0.04	-0.26*	0.13**	0.07	0.39*	0.20*	0.20*	-0.01	0.37*	-0.34*	-0.00	-0.06
EL	0.10	-0.14**	-0.16**	-0.10	-0.01	-0.11	0.03	0.20*	-0.11***	-0.07	-0.19*	0.04
IT	0.03	-0.10	0.08	-0.20*	0.33*	-0.20*	0.42*	-0.11***	-0.15**	-0.05	-0.09	-0.02
PH	0.49*	-0.10	-0.12***	0.04	0.36*	0.06	0.59*	0.04	-0.02	-0.02	-0.35*	0.44*

Table 4.5 (Continued)

	IN	EG	IF	PD	EL	IT	PH
IN	1.00						
EG	0.05	1.00					
IF	-0.18*	0.09	1.00				
PD	-0.20*	0.10	0.13**	1.00			
EL	-0.10	0.12***	0.10	0.20*	1.00		
IT	0.37*	0.09	0.02	0.22*	0.02	1.00	
PH	0.59*	-0.07	-0.19*	0.04	-0.01	0.41*	1.00

Note: *,** and *** denote rejection of null hypothesis at 1, 5 and 10% significant level respectively. Variables are as defined in Table 3.2.

Source: Author's computation (2018)

The pairwise correlation analysis is presented in Table 4.5 for all variables used in the study and for the years 2005 – 2015. The correlation coefficients reported for the variables are mostly statistically significant and below 0.7 indicating the absence of multicollinearity which might render the estimation spurious. According to Bryman and Cramer (1997), only correlation coefficients above 0.7 constitute a problem of multicollinearity, therefore, these variables can safely be combined in the same model.

4.4 Analysis on the Level and Determinants of Financial Inclusion in Sub-Saharan Africa

This section presents the result of the level of financial inclusion in Sub-Saharan Africa. The section further presents the test of hypotheses focusing on the analysis of the impact of banking, institutional, socio-economic and infrastructural factors on financial inclusion in Sub-Saharan Africa. This is achieved by testing the significance of the regression coefficients in the system GMM models appropriate in each case of the hypothesis being tested.

4.4.1 Level of Financial Inclusion in Sub-Saharan Africa

The first objective sought to measure the level of financial inclusion in Sub-Saharan Africa. In order to achieve this objective, different indicators under the three dimensions of financial inclusion were used to compute the level of financial inclusion using PCA. Table 4.6 presents the result of PCA on the level of financial inclusion in Sub-Saharan Africa.

Table 4.6 Level of Financial Inclusion in Sub-Saharan Africa

Name of Country	IFI	IFI Category	Ranking based on IFI
Seychelles	0.168	High	1
Namibia	0.152	High	2
Lesotho	0.137	High	3
Angola	0.136	High	4
Gambia	0.133	High	5
Rwanda	0.115	High	6
Congo Rep	0.112	High	7
Equatorial G	0.109	High	8
Zambia	0.105	Medium	9
Burundi	0.102	Medium	10
Chad	0.099	Medium	11
Central Africa	0.096	Medium	12
Tanzania	0.094	Medium	13
Kenya	0.085	Medium	14
Uganda	0.083	Medium	15
Nigeria	0.079	Low	16
*Swaziland	0.057	Low	17
Ghana	0.053	Low	18
Mauritius	0.049	Low	19
South Africa	0.045	Low	20
Cameroon	0.044	Low	21
Gabon	0.037	Low	22
Sub-Saharan Africa	0.095	Medium	

Source: Author's computation (2018)

Table 4.6 above presents the average IFI of each country in the sample from 2005-2015. This ranking shows sharp disparities in the level of financial inclusion among Sub-Saharan African countries ranging from high to low category as earlier mentioned.

Seychelles, Namibia, Lesotho, Angola, Gambia, Rwanda, Congo Republic and Equatorial Guinea are the countries in the high IFI category with 0.168, 0.152, 0.137, 0.136, 0.133, 0.115, 0.112 and 0.109 IFI values respectively. These countries belong to the high, upper-middle and low-income level. Countries in this category with French legal origin are Seychelles, Angola, Rwanda, Congo Republic and Equatorial Guinea while Namibia, Lesotho and Gambia are of British legal origin.

Countries in the second category are Zambia, Burundi, Chad, Central Africa, Tanzania, Kenya and Uganda with 0.105, 0.102, 0.099, 0.096, 0.094 and 0.085, 0.083 IFI values respectively. These countries are low-income countries except, Zambia and Kenya that are lower-middle-income countries. Burundi, Chad and Central Africa are countries with French legal origin while Zambia, Tanzania, Kenya and Uganda are countries with British legal origin in this category.

Nigeria, Swaziland, Ghana, Mauritius, South Africa, Cameroon, and Gabon belong to the low IFI category with 0.079, 0.057, 0.053, 0.049, 0.045, 0.044 and 0.037 IFI values respectively. Nigeria is the only country from the lower-middle-income group while Mauritius, South Africa and Gabon are upper-middle countries. Other countries in this category are low-income countries. Similarly, Mauritius, Cameroon and Gabon are countries with French legal origin while Nigeria, Swaziland, Ghana and South Africa are of the British legal origin in this category.

The study shows that the IFI value for Sub-Saharan Africa as a whole is 0.095, when compared with other IFI values it indicates that financial inclusion in Sub-Saharan Africa is in the medium category.

4.4.2 Determinants of Financial Inclusion in Sub-Saharan Africa

The second, third, fourth and fifth objectives sought to examine the influence of banking, institutional, socio-economic and infrastructural factors respectively on financial inclusion in Sub-Saharan Africa. In an attempt to answer the research questions related to these objectives, a stepwise process was used. The study started with a baseline model which is model one. It identifies the effect of legal origin, government integrity, reserve ratio, liquidity ratio, property rights and financial freedom on financial inclusion in Sub-Saharan Africa. The first four factors are new contributions to financial inclusion literature to the best of the researcher's knowledge. The last two factors are relatively new, and are yet to be tested on financial inclusion of individuals in the region. Other banking factors were incorporated into model two. In model three, the model was expanded to include other institutional factors. Socio-economic factors were included in model four. In model five, the study extends the model to include infrastructural factors. Model five is the main model that sought to achieve all the above-listed objectives. The stepwise process gives room to gauge the effects of the variables in model one even after the introduction of other variables.

Therefore, equations (3.2) to (3.6), which are for model one to five as stated in Chapter 3, were estimated in order to test the hypotheses related to these objectives using System GMM. Table 4.7 presents the results of the estimations.

Table 4.7 System Generalized Method of Moments Regression Estimates for the Determinants of Financial Inclusion in Sub-Saharan Africa

Variables	Model One	Model Two	Model Three	Model Four	Model Five
IFIi,t-1	0.38**	0.39**	0.35**	0.33**	0.25***
	(0.16)	(0.15)	(0.15)	(0.15)	(0.14)
RR	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LR	0.00	-0.00	0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LO	0.09	0.08	0.02	0.15	0.07
	(0.08)	(0.07)	(0.09)	(0.10)	(0.09)
GI	0.02**	0.02**	0.01	0.01	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
PP	-0.01***	-0.01***	-0.01***	-0.02**	-0.02**
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
FF	-0.01**	-0.01	-0.01**	-0.01***	-0.01**
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
CA		0.01	0.01	0.02	0.01
		(0.02)	(0.02)	(0.02)	(0.02)
IR		0.01	0.02	0.01	-0.01
		(0.02)	(0.02)	(0.02)	(0.02)
SF		0.00	0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)
NL		0.00	0.00	0.01	0.01
		(0.01)	(0.01)	(0.01)	(0.01)
IS			0.09**	0.10**	0.07**
			(0.04)	(0.04)	(0.03)
IN				0.11	-0.08
				(0.07)	(0.06)
EG				0.00	0.01
				(0.01)	(0.01)
IF				-0.01	-0.00
				(0.01)	(0.00)
PD				0.14*	0.11**
				(0.04)	(0.05)
ED				0.00	0.00
				(0.00)	(0.00)
IT					-0.00**
					(0.00)
PH					0.01*
					(0.00)
Constant	0.61***	0.13	0.35	-0.88	0.21
	(0.32)	(0.43)	(0.42)	(0.77)	(0.67)
Model Diagnostics					
AR(1) test	-2.15	-2.14	-2.16	-2.23	-2.05
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
AR(2) test	1.13	1.11	1.06	0.91	0.58
	(0.26)	(0.27)	(0.29)	(0.36)	(0.56)
Hansen test	0.18	0.21	0.18	0.17	0.53
	(0.67)	(0.65)	(0.68)	(0.68)	(0.47)
Wald chi 2	103.0	75.78	242.23	1218.64	3827.45
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
No. of groups	22	22	22	22	22
No. of instrument	9	13	14	19	21
No. of observations	220	220	220	220	220

Note: *,** and *** denote rejection of null hypothesis at 1, 5 and 10% significant level respectively. P-values are reported in ( ). Variables are as defined in Table 3.2.

Source: Author's computation (2018)

Firstly, Table 4.7 shows that the one-period lagged dependent variable is statistically significant in all the models; this justifies the use of a dynamic panel estimator. It is observed that two of the independent variables under banking factors of interest namely; reserve ratio and liquidity ratio are not significant in all of the models, nonetheless both have the right or expected signs. This implies that reserve ratio and liquidity ratio do not spur financial inclusion in Sub-Saharan Africa. However, financial freedom, which is also a variable of interest, is significant at 5, 5, 10 and 5% levels with negative coefficients -0.01, -0.01 and -0.01 for models one, three, four and five. This shows that government intervention in the activities of financial institutions has impacted negatively on financial inclusion in the region. Other banking factors such as capital asset ratio, deposit interest rate, share of foreign banks in total banking sector asset and non-performing loan are not significant.

Regarding institutional factors, namely; legal origin, government integrity and property rights are the variables of interest. Legal origin is not statistically significant, this non-significance implies that the legal origin of a country does not affect its level of inclusiveness. Nevertheless, government integrity has a positive impact on financial inclusion at 5% level with a coefficient of 0.02 for both model one and two. This shows that government deviation from corrupt practices and adoption of attitudes that uphold the value of the state have a positive influence on financial inclusion in Sub-Saharan Africa. Similarly, property rights is significant at 10, 10, 10, 5 and 5% levels with negative coefficients -0.01, -0.01, -0.01, -0.02 and -0.02 for models one to five respectively. This indicates that protection of property rights in Sub-Saharan Africa has an adverse effect on being financially included. Other institutional factors, such as credit information introduced in the third model is significant throughout model three, four and

five at 5% level for each of the models with coefficients 0.09, 0.10 and 0.07 respectively. This shows that the availability of credit information of debtors has influence on financial inclusion.

Finally, among the entire socio-economic variables introduced in the model, only population density is significant at 1 and 5% levels with coefficients 0.14 and 0.11 for model four and five respectively. This implies that population density is important for financial inclusion in Sub-Saharan Africa.

Infrastructural factors such as internet and phone, introduced in model five are significant at 5 and 1% levels with coefficients -0.00 and 0.01 respectively, indicating the importance of technology.

4.5 Discussions of Findings

This section presents the discussions of major findings in relation to the research objectives of the study. The discussions are presented in the sequence of the research questions for the study.

4.5.1 Level of Financial Inclusion in Sub-Saharan Africa

The first research question is used to investigate the first objective, which examines the level of financial inclusion in Sub-Saharan Africa. The result shows sharp disparities in the level of financial inclusion among Sub-Saharan African countries ranging from high to low category.

Countries in the high category are Seychelles, Namibia, Lesotho, Angola, Gambia, Rwanda, Congo Republic and Equatorial Guinea. These countries belong to the high, upper-middle and low-income level. This group which is characterized by different

income group buttresses the argument of Demirgüç-Kunt and Klapper (2012) that even among countries with similar income level and in the same region, their financial inclusion level may differ. The presence of middle-income countries in this category is supported by the evidence put forth by Yorulmaz (2013) that middle-income countries also have high level of financial inclusion. It is interesting to note that Gambia and Rwanda that are low-income countries were able to make it to the high category, where high-income country like Seychelles was found. This is similar to the argument put forth by Naceur *et al.* (2015) who stated that low and lower-middle income countries also show a high growth rate of financial inclusion. Logically, low-income countries are aware of their problem, such as financial exclusion and low financial development, among others. Therefore, they strive really hard to overcome these problems by making Maya Declaration, issuing financial inclusion strategy, licensing MFIs, etc., which therefore transform into a better level of financial inclusion. This contrasts with the findings of Amidžić *et al.* (2014), who argued that low-income countries tend to have low financial inclusion.

Furthermore, the number of countries with French legal origin that have high IFI outnumbered their British counterparts. This is in line with the findings and the assertions of Fowowe (2014) that legal origin does not matter for financial development in Africa. However, it is in stark contrast to the findings of Beck *et al.* (2003). The outstanding performance of these countries may perhaps be due to the effort by the Anglophones on various initiatives such as mobile banking, agent banking, cashless policy, microfinance policy, non-interest banking policies among others (Kankasa-Mabula, 2012; M'Amanja, 2015). This may also be attributed to the countries' commitment to Maya Declaration and determination to achieve universal financial access by 2020 as declared by World Bank.

Countries in the second category are Zambia, Burundi, Chad, Central Africa, Tanzania, Kenya and Uganda. Except for Zambia and Kenya that are lower-middle-income countries, other countries in this category are low-income countries.

Zambia, Tanzania, Kenya and Uganda are countries with British legal origin in this category while Burundi, Chad and Central Africa are countries with French legal origin in the medium category.

Nigeria, Swaziland, Ghana, Mauritius, South Africa, Cameroon and Gabon belong to the low IFI category. Nigeria is the only country from the lower-middle-income group while Mauritius, South Africa and Gabon are upper-middle countries. Other countries in this category are low-income countries. The presence of Nigeria in the low IFI category speak to the fact that mobile money which is highly responsible for attracting people into the formal financial system especially in Sub-Saharan Africa is just coming up in Nigeria. This might have contributed to her inability to compete favourably with other Sub-Saharan African countries in the study. South Africa's inability to have a better level of IFI may be attributed to gross inequality which still affect financial inclusion in the country. Level of IFI of Mauritius and Gabon is probably a reflection of the degree of inequality, segregation, rather than income. Nigeria, Swaziland, Ghana and South Africa are countries with British legal origin in this category while Mauritius, Cameroon and Gabon are countries with French legal origin in this category. It is important to note that the low IFI category is not wholly dominated by low-income countries.

The study found that the level of financial inclusion in Sub-Saharan Africa is at the medium category, implying that the level of financial inclusion has only improved in

the region but there is room for improvement to further achieve a better level in the nearest future.

4.5.2 Effect of Banking Factors on Financial Inclusion in Sub-Saharan Africa

The second research question, which is used to investigate the second objective, sought to determine the extent to which financial inclusion in Sub-Saharan Africa is influenced by banking factors, namely; reserve ratio, liquidity ratio, financial freedom, capital asset ratio, deposit interest rate, share of foreign bank in the total banking sector asset and non-performing loan. Theory portrays that government guidelines and restrictions on the activities of financial institutions in form of the reserve requirement, liquidity ratio, capital requirements, deposit interest rate regime and interference in government ownership are detrimental to financial intermediation. These restrictions, according to Mckinnon (1973) and Shaw (1973), will restrict the ability of financial institutions to perform their intermediation function, and therefore, reduction in financial inclusion. However, the result presented in Table 4.7 suggests that the effect of reserve ratio is not as postulated by the theory of financial repression. This implies that reserve ratio does not influence financial inclusion in Sub-Saharan Africa. The insignificant effect of reserve ratio does not match the findings of Ang (2008) and Pourshahabi and Elyasi (2013), who found reserve ratio as an important factor that influences financial depth. This is also contrary to the findings of Dancourt (2012), who reported that reserve ratio has a negative impact on loan disbursement. However, this evidence is supported by the argument of Adedayo and Ayodeji (2015), who argued that reserve requirement does not influence loan disbursement. They further argued that reduction in reserve ratio will not lead to a proportionate increase in access to credit. This might perhaps be due to the fact that financial institutions have internally laid down rules and criteria which

include the maximum amount that could be disbursed due to their ability to manage the process, this might limit the effect of increase or decrease in reserve requirement on financial inclusion. This view is supported by the argument of Ajayi and Atanda (2012), that monetary policy instruments are not efficient enough to influence the functions of financial institutions.

It is adduced from the study that liquidity ratio of financial institutions in Sub-Saharan Africa does not affect financial inclusion. This finding is in line with the evidence put forth by Sufian and Habibullahi (2009) and Demirgüç-Kunt and Detragiache (1998). This contrasts the findings of Ameer (2015), Khalfaoui and Ben Saada (2015) and the financial repression theory. This might be ascribed to the interest of financial institutions in investing in other credit-worthy securities such as government bills, aside the usual lending and acceptance of deposit. This implies that even if the liquid asset at the disposal of the financial institutions is low, their usual intermediation function is not affected, what perhaps may occur is the shortening of asset maturity, lengthening of liability maturity, issuance of more equity, among others (Elliot, 2014).

However, the coefficient of financial freedom is significantly negative in all the models except model two. This indicates that the higher the interference of government in financial institutions' independence proxy by financial freedom, the lower the level of financial inclusion in Sub-Saharan Africa. This is consistent with the view of financial repression theory. This suggests that financial inclusion in Sub-Saharan Africa is less likely to be high when government influence on financial institution is high. This implies that government's financial regulations' influence on allocation of credit and intervention through ownership, adversely affects the level of financial inclusion in the Sub-Saharan Africa. This is because government interference in ownership of financial institutions reduces competition and generally lowers access to credit. The finding is in accordance

with prior studies such as Farazi (2014) who also reported negative and significant relationship between financial inclusion and financial freedom. This is, however, contrary to the result of Beju and Ciupac-Ulici (2012) who reported no impact of financial freedom on the banking system. The evidence provided by the study is supported by the fact that financial institutions in Sub-Saharan Africa such as Nigeria, Ghana, Kenya, Cameroon etc. are at one time or the other owned solely or partly by government and from time to time receive policies on credit allocation among others, therefore, affecting their ability to attract people into the formal financial system (Daumont, Le Gall, & Leroux, 2004).

Against the findings of Sarma and Pais (2011) and Sufian and Habibullahi (2009), this study found evidence that financial inclusion is not influenced by the capital asset ratio of financial institutions. This finding also contradicts the financial repression theory that capital requirement impacts on the ability of the financial institutions to effectively carry out their intermediation function. Nevertheless, previous studies such as the Beju and Ciupac-Ulici (2012) and Khalfaoui and Ben Saada (2015) found evidence that capital of financial institutions is not crucial to financial institutions.

The results showed that deposit interest rate does not have a significant impact on financial inclusion in Sub-Saharan Africa. This is in line with Evans and Adeoye (2016) who found that deposit interest rate is not an important determinant of financial inclusion in Africa. This is also in consonance with finding of Sarma and Pais (2011). This can be ascribed to the low deposit interest rate which is given to customers in the region. This has a reward that does not seem to commensurate with the returns from trade engaged in by the financial institutions with the funds of their customers. This makes deposit interest rate less likely to motivate existing customers or attract new ones.

The study found that foreign ownership does not have a significant influence on financial inclusion. This is in line with the finding of Allen *et al.* (2012). This finding also matches the result of Barth *et al.* (2004) who argued that foreign-bank ownership and their efficiency is weak. The reason, perhaps, is that despite the rise in recent efforts to strengthen cross-border cooperation in the region, there is still considerable scope to further enhance consolidated and cross-border supervisory practices which could boost the impact of foreign ownership. This has led to the conclusion that the contribution of foreign-owned banks to financial inclusion is low as argued by Mlachila (2016). However, this findings is contrary to the evidence put forth by Sarma and Pais (2011), that financial inclusion is influenced by the share of foreign banks in the total banking sector assets. They argued that foreign banks will strive to achieve efficiency as they achieve in their own countries in order to gain a better share of the market. Through this process, financial inclusion may be influenced.

Financial inclusion in Sub-Saharan Africa is not an outcome of the level of non-performing loan in the region, this finding is similar to the finding of Beju and Ciupac-Ulici (2012). This might be as a result of low non-performing loan in recent time for some Sub-Saharan African countries as reported by Anayiotus and Toroyan (2009). Similarly, stringent conditions on opening an account and accessing credit such as the request for collateral might have contributed to the reduction in the rate of non-performing loans thereby, reducing its effect on financial inclusion. Some financial institutions may be willing to still extend credit to customers despite apparent difficulty to repay, if the customer's access to funds promises to be more effective. However, this finding is contrary to that of Ameer (2015) and Sarma and Pais (2011). These studies find evidence to imply that non-performing loan influences banking sector performance and financial inclusion respectively.

4.5.3 Effect of Institutional Factors on Financial Inclusion in Sub-Saharan Africa

The third research question is used to investigate the third objective. This objective examines the impact of institutional factors such as legal origin, government integrity, property rights and information sharing on financial inclusion in Sub-Saharan Africa. The theory of law and finance portrays on the one hand, that those countries that are of British legal origin are usually more financially developed than countries with any other legal origin. This is also expected to be applicable to financial inclusion since it is a core part of financial development. However, legal origin did not have a significant impact on financial inclusion in Sub-Saharan Africa. This is supported by the explanation on the level of financial inclusion for Table 4.2, where it was noted that countries with British legal origin are not more financially included than their French counterparts. This is in line with the finding of Fowowe (2014), who states that the law and finance view does not hold for African countries. This might perhaps be due to the introduction of different policies in an attempt to develop the financial sector across the region which might have eroded the initial legacy formed over many years ago by the colonial masters. These policies such as the control of credit allocation, interest rate deregulation among others, have been driven by organizations such as World Bank and the IMF and not necessarily individual countries. The finding is contrary to Beck, *et al.* (2003), who found that legal origin of a country is important for financial development because countries due to their legal traditions differ in ability to adapt efficiently to evolving economic conditions.

In model one and two, government integrity is positive and statistically significant. This indicates that attitude of government towards upholding good attitude and integrity impacts positively on financial inclusion in the region. This matches the

finding of Edison, Levine, Ricci and Slok (2002). This is also consistent with Demirgüç-Kunt and Levine (2008), who argued that government play an important role in promoting effective and inclusive financial system. Government integrity in enforcing law encourages creditors to provide funds for customers. The reason is not farfetched, as the government has woken up to their responsibilities and there is increase in the fight against corruption and poor government effectiveness in the region. This also matches with the result of Alter and Yontcheva (2005), who reported a significant and positive relationship with financial system development.

On the other hand, the theory of law and finance postulates that the protection of property rights is important for financial development. The coefficients of property rights are negatively significant in all the models. This implies that the higher the protection of rights of creditors, the less likely the increase in financial activities and contracts. This finding supports the position of Antoniou, Guney, and Paudyal (2008) and Cho, El Ghoul, Guedhami, and Suh (2014) that debtors are reluctant to access credit especially when the rights of creditors are well protected for the fear of being cheated or losing collateral. This perhaps maybe due to the fact that financial institutions are seen by debtors as powerful entities, that can finance and influence judgment. This, however, contradicts the findings of Fowowe (2014) who argues that law and finance theory is not applicable to Africa.

Similarly, in accordance with expected predictions, the coefficient of credit information is positively significant in all the models it appears. This indicates that the higher the credit information made available by the private and public bureau, the higher the level of financial inclusion. This provides evidence in support of the information theory of credit, which postulated that more credit is extended efficiently when financial institutions have access to the credit history of their debtors and debtors ensure that debt

are repaid since credit history are kept. This lends support to the argument of Effiong (2016) that Sub-Saharan African countries are making significant improvement in their institutional framework which transforms into financial development. Also, Central Banks of some Sub-Saharan African countries such as Nigeria, have taken it upon themselves to list all debtors of financial institutions through their Bank Verification Numbers who have refuse to pay (Emefiele, 2017). This exercise is an evidence of improvement in credit information which will in turn, impact on financial inclusion. This finding concurs with the evidence put forth by Alter and Yontcheva (2005), Beck *et al*. (2007), Djankov *et al.* (2007) and McDonald and Schumacher (2007), who indicate that there is a link between financial development, depth and information sharing.

4.5.4 Effect of Socio-economic Factors on Financial Inclusion in Sub-Saharan Africa

Research question four was used to investigate objective four which investigates the impact of socio-economic factors such as per capita income, growth, inflation, population density and educational level on financial inclusion in Sub-Saharan Africa. Interestingly, per capita income does not affect financial inclusion in Sub-Saharan Africa in line with evidence reported under the level of financial inclusion and descriptive statistics. This is against the undermining effect put forth by literature, for instance, Evans and Adeoye (2016) and Zins and Weill (2016) who confirmed that income significantly influences financial inclusion in Africa. Also, the study of Sarma and Pais (2011) argued that financial inclusion is affected by income level. Nevertheless, Allen *et al.* (2014) argued that GDP per capita does not affect one of the proxies of financial inclusion (loan) in Sub-Saharan Africa. In a similar argument, Alter and Yontcheva

(2005) posit that income level does not determine financial inclusion gap. Furthermore, this finding is validated by the evidence put forth by Allen *et al.* (2012) who asserts that the relationship between GDP per capita and financial inclusion is much weaker in economies with a GDP per capita below $2,436. This evidence is collaborated by the assertion of Effiong (2016) that GDP per capita of Sub-Sahara African countries is low. Allen *et al.* (2012) suggest that variance in financial inclusion in low-income countries is not strongly determined by GDP per capita. The negative coefficient is in consonance with that of Effiong (2016) who argued that there is evidence of conditional convergence among the Sub-Sahara African countries.

Theoretical literature portrays that economic development spurs financial development (Agbetsiafa, 2004; Akinlo & Egbetunde, 2010; Ghirmay, 2004). This process according to Allen *et al.* (2014) may be associated with high financial inclusion. However, the findings reported in Table 4.7 suggest that the effect of economic growth is not as postulated by demand-following hypothesis in this study. In essence, economic growth does not promote financial inclusion in Sub-Saharan Africa. This outcome is noted to be dependent on the fact that countries in Sub-Saharan Africa depend largely on natural resources such as oil which reduces the desire to generate more economic activities that can lead to financial development (Effiong, 2016). These countries are further characterized by large informal sector, low income and poor infrastructure, among others, which could inhibit economic growth and also restrict the impact of economic growth on financial inclusion. Nevertheless, Demetriades and James (2011) assert that the finance-growth relationship in Sub-Saharan Africa is weak. The finding is, however, in contrast to that of Allen *et al.* (2014) who found that economic growth in Sub-Saharan Africa led to a corresponding increase in financial inclusion. The difference in the result may perhaps be due to the different proxy of financial inclusion.

The negative coefficient of inflation is in line with the argument that socio-economic instability is detrimental to financial development in Sub-Saharan Africa (Efiong 2016). However, inflation does not have a significant impact in reducing financial inclusion in the region. This is in contrast with the finding of Alter and Yontcheva (2005). Nevertheless, this is in consonance with the finding of Allen *et al.* (2014), who reported that financial inclusion is not affected by inflation in the region. In the same vein, Evans and Adeoye (2016) also assert that financial inclusion is not affected by inflation in Africa.

Population density is also significant in all the models it appeared. This implies that high population matters for financial inclusion in Sub-Saharan Africa. This finding indicates strong support for the assertion of Allen *et al.* (2014), who argued that population density matters for financial inclusion in Africa. This finding also corroborates the findings of Chithra and Selvam (2013), who showed that population has a significant impact on financial inclusion in India and also the findings of Sarma and Pais (2011). This finding is appreciated since most Sub-Saharan Africa countries are highly populated, for instance, Nigeria, which is the most populous black nation in the World, is from Sub-Saharan Africa. However, the findings of this study is in contrast with the findings of Evans and Adeoye (2016) which reported an insignificant impact of population on financial inclusion in Africa and Gebrehiwot and Makina (2015), which reported no impact of population on financial inclusion in Asia.

Furthermore, the results suggest that education is not crucial for financial inclusion in Sub-Saharan Africa. This shows that change in financial inclusion in the region is not due to the level of education. This is not surprising as the majority of upcoming rich men and women are farmers or businessmen who may not necessarily be educated, although engage in high volume of economic activities and make use of the

formal financial institution knowing fully well the importance of these institutions to the success of their businesses. This further speaks to the fact that the level of education is low in Sub-Saharan Africa and limits its contribution to financial inclusion in the region (Demirgüç-Kunt & Klapper, 2012). These factors in addition to low-income levels, education, infrastructural weakness to mention a few, inhibit the effectiveness of the fund in order to achieve quality education. In addition, the result raises concerns on the success of educational reforms implemented so far in the region such as the Universal Basic Education, which may be conditional on the existing educational quality. The use of primary education as against the tertiary education due to non-availability of data and the low level of tertiary education recorded in the region which is just 3% may also be a contributing factor to this result. This is because, Demirgüç-Kunt and Klapper (2012) argues that individuals with a tertiary or higher education are more than four times likely to have an account than individuals with a primary education or less. This evidence is consistent with the finding of Peña *et al.* (2014) who studied the determinants of financial inclusion in Mexico and the study of Sarma and Pais (2011). However, this is in contrast with Evans and Adeoye (2016) and Zins and Weill (2016), who confirms that literacy rate significantly influences financial inclusion in Africa.

4.5.5 Effect of Infrastructural Factors on Financial inclusion in Sub-Saharan Africa

Finally, the fifth research question is used to investigate the fifth objective which seeks to examine the effect of infrastructural factors on financial inclusion in Sub-Saharan Africa. The study provides evidence that phone is an important determinant of financial inclusion in Sub-Sahara Africa. This is in line with Evans and Adeoye (2016),

who found phone to be an important determinant of financial inclusion in Africa. In a similar result, Boake and Amankwah (2012) found phone as an important determinant of the demand for financial products in Ghana. This is also in consonance with findings of Chittra and Selvam (2013) and Sarma and Pais (2011). Similarly, the result is supported by the findings of Beck, Cull, Fuchs, Getenga, Gatere, Randa, and Trandafir, (2010), who found ownership of cell phones as an important determinant of the use of financial services in Kenya.

This study reported a negative significant effect of internet on financial inclusion in the region. The negative significant effect of internet on financial inclusion in Sub-Saharan Africa is in line with the findings of Salifu (2008), who argued that although internet is an important tool for development, it creates opportunities to commit financial crime, which is detrimental to the effective operation of financial institutions and also to the funds of customers. The study argued that the internet presents new challenges to financial sector operation and thus, financial inclusion. This perhaps speaks to the fact that developing countries such as Sub-Saharan African countries are characterized by substandard technology and low law enforcement to curb the use of the facilities for fraudulent practices. However, this is in contrast to the argument of Evans and Adeoye (2016), that widespread of internet service to access different financial services irrespective of distance to a physical financial outlet boosts financial inclusion.

In sum, out of the six variables of interest; reserve ratio, liquidity ratio and legal origin are not significant in all of the model specifications. Interestingly, government integrity, property rights and financial freedom are robust to the addition of other variables because the significance and signs of these variables remain unaltered. However, government integrity loses significance once the study accounts for information sharing. In the same vein, financial freedom loses significance in the second

model where other banking factors are accounted for. The insignificance of these variables in the expanded models implies they can no longer explain financial inclusion in Sub-Saharan Africa when other factors are considered. Nevertheless, the insignificance of financial freedom matches the evidence put forth by Beju and Ciupac-Ulici (2012).

The model diagnostics confirm the validity and robustness of regression specifications in model one to five. The null hypothesis of no first-order autocorrelation AR(1) is rejected at 5% significant level, while no second-order autocorrelation AR(2) is not rejected. The Hansen test did not reject the null hypothesis of overidentifying restrictions. This implies that the instruments satisfy the orthogonality condition, which means they are uncorrelated with the error term. This indicates that the instruments are valid and thus, the model is correctly specified. Wald x^2 indicates that the models are statistically significant at 1% significant level, which implies that the variables in each model are jointly significant. The number of instrument does not exceed the number of the group as advised by Roodman (2009). The study, therefore, infers that estimates are consistent and satisfactory.

4.6 Summary of Hypotheses Testing

Table 4.8 presents the summary of the results of the hypotheses tested, which shows support for or against each of the hypotheses as it relates to financial inclusion in Sub-Saharan Africa.

Table 4.8 Summary of Hypotheses Testing on Determinants of Financial Inclusion in Sub-Saharan Africa

	Hypothesis	Sign Obtained	Support for Hypothesis
$H0_1$: banking factors have no significant effect on financial inclusion in Sub-Saharan Africa			
$H_{01a:}$	Reserve ratio has no significant effect on financial inclusion in Sub-Saharan Africa	Significant (-ve)	Supported
$H_{01b:}$	Liquidity ratio has no significant effect on financial inclusion in Sub-Saharan Africa	Significant (+ve)	Supported
$H_{01c:}$	Financial freedom has no significant effect on financial inclusion in Sub-Saharan Africa	Significant (-ve)	Not Supported
$H_{01d:}$	Capital asset ratio has no significant effect on financial inclusion in Sub-Saharan Africa	Significant (+ve)	Supported
$H_{01e:}$	Deposit interest rate has no significant effect on financial inclusion in Sub-Saharan Africa	Significant (-ve)	Supported
$H_{01f:}$	Share of foreign banks asset in total banking sector asset has no significant effect on financial inclusion in Sub-Saharan Africa	Significant (+ve)	Supported
$H_{01g:}$	Non-performing loan has no significant effect on financial inclusion in Sub-Saharan Africa	Significant (+ve)	Supported
$H0_2$: institutional factors does not significantly affect financial inclusion in Sub-Saharan Africa			
$H0_{2a:}$	Legal origin does not significantly affect financial inclusion in Sub-Saharan Africa	Significant (+ve)	Supported
$H_{02b:}$	Government integrity does not significantly affect financial inclusion in Sub-Saharan Africa	Significant (+ve)	Partially supported
$H_{02c:}$	Property rights does not significantly affect financial inclusion in	Significant (-ve)	Not Supported

	Sub-Saharan Africa		
$H_{02d:}$	Information sharing does not significantly affect financial inclusion in Sub-Saharan Africa	Significant (+ve)	Not Supported
H_{03}: no socio-economic factor significantly affect financial inclusion in Sub-Saharan Africa			
$H_{03a:}$	Per capita income does not significantly affect financial inclusion in Sub-Saharan Africa	Significant (-ve)	Supported
$H_{03b:}$	Economic growth does not significantly affect financial inclusion in Sub-Saharan Africa	Significant (+ve)	Supported
$H_{03c:}$	Inflation does not significantly affect financial inclusion in Sub-Saharan Africa	Significant (-ve)	Supported
$H_{03d:}$	Population density does not significantly affect financial inclusion in Sub-Saharan Africa	Significant (+ve)	Not Supported
$H_{03e:}$	Educational level does not significantly affect financial inclusion in Sub-Saharan Africa	Significant (+ve)	Supported
H_{04}: infrastructural factors do not significantly influence financial inclusion in Sub-Saharan Africa			
$H_{04a:}$	Internet does not significantly influence financial inclusion in Sub-Saharan Africa	Significant (-ve)	Not Supported
$H_{04b:}$	Phone does not significantly influence financial inclusion in Sub-Saharan Africa	Significant (+ve)	Not Supported

Source: Author's compilation (2018)

Table 4.8 shows that the results of the study did not offer support for six of the sub-hypotheses while partial support was provided to one of the sub-hypotheses because it was statistically significant in the first two models before it became insignificant in the other models. Furthermore, the findings are consistent with earlier studies on financial inclusion.

4.7 Robustness Test on the Determinants of Financial Inclusion in Sub-Saharan Africa

In order to ascertain the robustness of the estimation above, the sample is modified by excluding Seychelles that has the highest level of IFI, the only country in the sample with high income level and better infrastructural facilities. This was done to ascertain the influence of Seychelles in the regression results.

Table 4.9 System Generalized Method of Moments Regression Estimates for the Determinants of Financial Inclusion in Sub Saharan Africa (without Seychelles)

Variables	Model One	Model Two	Model Three	Model Four	Model Five
IFIi,t-1	0.37**	0.39**	0.34**	0.33**	0.24***
	(0.16)	(0.16)	(0.15)	(0.15)	(0.14)
RR	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LR	0.00	0.00	0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LO	0.07	0.05	0.02	0.15	0.10
	(0.08)	(0.07)	(0.09)	(0.10)	(0.09)
GI	0.02*	0.02**	0.01	0.01	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
PP	-0.01***	-0.01	-0.01***	-0.02**	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
FF	-0.01**	-0.01***	-0.01***	-0.01***	-0.01**
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
CA		0.01	0.01	0.02	0.01
		(0.02)	(0.02)	(0.02)	(0.02)
IR		0.01	0.02	0.01	-0.01
		(0.02)	(0.02)	(0.02)	(0.02)
SF		0.00	0.00	0.00	0.00***
		(0.00)	(0.00)	(0.00)	(0.00)
NL		-0.00	0.00	0.01	0.01
		(0.01)	(0.01)	(0.01)	(0.01)
IS			0.10**	0.09**	0.07***
			(0.04)	(0.05)	(0.04)
IN				0.11	-0.08
				(0.08)	(0.06)
EG				0.01	0.01
				(0.01)	(0.01)
IF				-0.01	-0.00
				(0.01)	(0.01)
PD				0.15*	0.11**
				(0.05)	(0.05)
ED				0.00	0.00
				(0.00)	(0.00)
IT					0.00
					(0.00)
PH					0.01*
					(0.00)
Constant	0.62**	0.13	0.35	-0.86	0.28
	(0.31)	(0.43)	(0.42)	(0.77)	(0.70)
Model Diagnostics					
AR(1) test	-2.10	-2.09	-2.12	-2.19	-2.06
	(0.04)	(0.04)	(0.03)	(0.03)	(0.04)
AR(2) test	1.09	1.07	0.99	0.87	0.53
	(0.28)	(0.29)	(0.32)	(0.38)	(0.60)
Hansen test	0.15	0.20	0.16	0.15	0.47
	(0.70)	(0.65)	(0.69)	(0.70)	(0.49)
Wald chi 2	107.7	78.85	250.59	1482.68	43558.16
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
No. of groups	21	21	21	21	21
No. of instrument	9	13	14	19	21
No. of observations	210	210	210	210	210

Note: *,** and *** denote rejection of null hypothesis at 1, 5 and 10% significant level respectively. P-values are reported in ( ). Variables are as defined in Table 3.2.
Source: Author's computation (2018)

A comparison of the results of the main regression shows that results are qualitatively similar with little variation. This is due to the fact that the main result on property rights, financial freedom, government integrity, credit information, population and phone remain unaltered as they are still significant with their various signs of coefficient as noted in the main results. Thus, affirming the robustness of the initial results irrespective of whether Seychelles is included or excluded.

In contrary, the significance of internet fizzles out while share of foreign banks in total banking sector asset became significant in the result in Table 4.11. However, both have different implications. On the one hand, this implies that internet facility cannot explain financial inclusion in Sub-Saharan Africa when Seychelles is excluded from the sample. This might perhaps be due to the fact that internet facility of Seychelles as indicated in the data set, is far higher than in other countries in the sample. However, it is important in explaining financial inclusion for the whole sample. On the other hand, in the case of foreign ownership of banks, this indicates that foreign ownership of banks in Seychelles is really low which might have influenced the insignificance of the variable in the main models. The results are both useful for governments and other stakeholders in explaining the impact of internet and share of foreign banks in total banking asset on financial inclusion in the region.

The model diagnostics of AR(1), AR(2), Wald test and Hansen test confirm the robustness test's validity.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter concludes this study on the determinants of financial inclusion in Sub-Saharan Africa. This chapter presents the summary, conclusions and recommendations based on findings of the study. This chapter further presents the policy implications of the study, contribution to knowledge, suggestions for future studies and limitation of the study.

5.1 Summary

Financial inclusion which is the ease of access to, availability of and usage of formal financial services by everyone in an economy is seen globally as very important in stabilizing the financial system of an economy. Governments of Sub-Saharan African countries have introduced different policies in order to boost financial inclusion. Despite the importance of financial inclusion, the prevailing level and determinants of financial inclusion in the region remains an open question. In view of the aforementioned background, this study examines the level of financial inclusion in Sub-Saharan Africa covering 22 countries. This study further investigates the determinants (banking, institutional, socio-economic and infrastructural factors) of the level of financial inclusion in Sub-Saharan Africa.

The latter was carried out with the PCA while the former was carried out with the system GMM estimator due to problems of serial correlation, endogeneity, among others, that are inherent in this type of data set. The models were subjected to diagnostic

tests such as the AR(1), AR(2), Wald test and Hansen test, which confirm the validity of the models. Thereafter, robustness test was carried out on the models.

The major findings from the investigations in the study are discussed in line with the objectives stated in chapter one.

The first objective examined the level of financial inclusion in Sub-Saharan Africa. The result shows that Seychelles has the highest with 0.168 while Gabon has the lowest level of financial inclusion among the Sub-Saharan African countries observed with 0.037. The aggregate results show that Sub-Saharan Africa has a medium level of financial inclusion with 0.095 average IFI. The trend of financial inclusion in the region shows steady improvement over the period of study while higher growth was recorded in 2011.

The second objective examined the impact of banking factors on financial inclusion in Sub-Saharan Africa. The study found that financial freedom with coefficients -0.01, -0.01, -0.01 and -0.01 is an important determinant of financial inclusion in Sub-Saharan Africa. The study further reported no significant relationship between reserve ratio, non-performing loan, deposit interest rate, liquidity ratio and capital asset ratio and financial inclusion in Sub-Saharan Africa within the observed period.

The third objective which is the last assessed whether financial inclusion in Sub-Saharan Africa is caused by the institutional factors. The findings submits that property rights with coefficients of -0.01, -0.01, -0.02 and -0.02 have adverse effect on financial inclusion in Sub-Saharan Africa. Information sharing with coefficients 0.09, 0.10 and 0.07 was reported to have positive impact on financial inclusion in the region. The study

provided evidence that there is significant relationship between government integrity with coefficients 0.02 and 0.02 and financial inclusion in the region. However, legal origin was reported not to have a significant relationship with financial inclusion in Sub-Saharan Africa.

The fourth objective of the study examined the impact of socio-economic factors on financial inclusion in Sub-Saharan Africa. The result shows that population density has positive effect on financial inclusion in Sub-Saharan Africa with coefficients 0.14 and 0.11. However, per capita income, economic growth, inflation and education do not significantly affect financial inclusion in Sub-Saharan Africa during the observed period.

The fifth objective of the study investigated the influence of infrastructural factors on financial inclusion in Sub-Saharan Africa. The results show that mobile phone which has a coefficient of 0.01 has a positive impact on financial inclusion in the region. However, internet which has a coefficient of -0.00 has a negative impact on financial inclusion in Sub-Saharan Africa.

5.2 Conclusion

The discussions in the first section of this chapter indicate that the study has provided an informative insight into the level and determinant of financial inclusion in Sub-Saharan Africa. The study reported that the level of financial inclusion is in the medium category. The study further identified banking, institutional, socio-economic and infrastructural factors as determinants of financial inclusion in Sub-Saharan Africa.

Consequently, the following major conclusions were drawn from the study in line with the objectives stated in chapter one:

i. The study reveals that the level of financial inclusion has been growing over the observed period. Based on the average index for all the countries in the study, the study concludes that the level of financial inclusion is at the medium category in Sub-Saharan Africa.

ii. The study discovers a negative impact of property rights on financial inclusion. Based on this, the study concludes that property rights are adverse determinants of financial inclusion in Sub-Saharan Africa. This indicates that protection of rights of creditors leads to fear of loss to the other party in the contract and that law and finance theory is on one hand relevant in explaining financial inclusion.

iii. In the same vein, the study reveals a negative impact of financial freedom on financial inclusion in Sub-Saharan Africa. Considering this result, government interference in the operations of financial institutions has a detrimental effect on achieving a well inclusive financial system in the region. The study, therefore, concludes that the theory of financial repression is relevant in explaining financial inclusion in Sub-Saharan Africa.

iv. Furthermore, the study shows that government integrity has a positive effect on financial inclusion. The study concludes that financial inclusion in Sub-Saharan Africa is a reflection of the integrity imbibed in the operations of Sub-Saharan African governments which segregates them from corrupt practices.

v. Findings indicate that credit information sharing positively impacts on financial inclusion in the region. Thus, financial institutions make effective use of the information to make informed decision about credit allocation and also encourage the debtor to pay as agreed in order to maintain good credit records. Based on this, the study concludes that information theory of credit is important in explaining financial inclusion in Sub-Saharan Africa.

vi. The study further shows that population density positively influences financial inclusion in Sub-Saharan Africa. This leads to a conclusion that dense population matters for financial inclusion in Sub-Saharan Africa.

vii. The study also shows that internet has a negative impact on financial inclusion in the region. The study concludes that internet has a detrimental impact on financial inclusion in Sub-Saharan Africa, as it has provided an avenue for fraudulent activities which had led to the abandonment of some financial services that rely on internet.

viii. Finally, the study submits that mobile phone is positively related to financial inclusion in Sub-Saharan Africa. Based on this, this study concludes that infrastructural facility such as the mobile phone ease access to and use of financial services thereby boosting financial inclusion in the region.

5.3 Recommendations

Based on the preceding discussions and conclusion, this study provides the following recommendations:

i. This study recommends that other Sub-Saharan African countries should implement policies of countries in the high IFI category in order to be able to achieve a high level of financial inclusion as against the medium category the region is in presently. These policies include the establishment of more financial institution outlets such as ATMs and branches of financial institution as in the case of Seychelles. Also, a policy to have all savings and credit cooperatives regulated and digitized as in the case of Rwanda is also recommended.

ii. Findings suggest that financial inclusion in the region is adversely affected by the protection of rights of creditors in the financial contract. Therefore, the study recommends that property rights and its enforcement should be upheld with integrity. Bodies entrusted with law enforcement should implement the law with caution and respect for the rights of all parties in a financial contract and not to the detriment of any party.

iii. Based on the negative effect of financial freedom, the study recommends that government regulation which influences ownership and imposes restrictions on operations or the activities of the financial institutions should be removed. This will give room for competition and innovation of new products and services that will further increase inclusive financial system in Sub-Saharan Africa.

iv. The government of Sub-Saharan Africa countries with distinctive integrity should be honoured by international bodies such as United Nations, in order to serve as a source of encouragement to others.

v. Credit information bureau should be strengthened further due to the positive impact they have on financial inclusion in Sub-Saharan Africa. The study suggests further that this credit information should be made available at reduced cost by the credit bureaus to facilitate easy access. The governments of Sub-Saharan countries should enforce laws on financial institutions to make available the credit history of their customers to other financial institutions in order to reduce adverse selection where debtors approach different financial institutions sequentially. Importantly, Central Banks should also be charged with the responsibility of harmonizing this information in a database which will be available to financial institutions in need of the information.

vi. The study further suggests that campaign on family planning aimed at reducing population should be relaxed. However, caution should be taken considering the socio-economic standard of the countries such as GDP per capita, economic growth and standard of living.

vii. There should be stringent reforms to reverse the negative influence of internet on financial inclusion in Sub-Saharan Africa. These reforms must target sanctioning the use of internet for fraudulent activities and reward for uncovering such activities. This reform must also cover improving the security of the internet to perform financial transactions.

viii. Finally, the study recommends that government of Sub-Saharan African countries should invest in technology; this could lead to production of electronic gadgets, such as phone at a reduced cost in the region. This could further lead to increase in acquisition of mobile phone, which will further increase access to and usage of financial services in the region.

5.4 Contribution to Knowledge

This section presents areas in which the present study contributes to financial inclusion literature.

i. The study measured the level of financial inclusion in Sub-Saharan Africa. Studies on the level of financial inclusion are mostly from the Asian continent. Furthermore, the study included for the first time, indicators of mobile money which have become the driving force of financial inclusion in Sub-Saharan Africa in recent time.

ii. Unlike prior studies that proxied financial inclusion with a single variable such as account ownership, the study used a measured level of financial inclusion to investigate its determinants in Sub-Saharan Africa.

iii. This study extends the contribution of previous studies on the determinants of financial inclusion on variables such as reserve ratio, liquidity ratio, legal origin, government integrity, property rights and financial freedom. The impact of the first four factors had remained an open question while the last two factors have not been investigated on the individual level of financial inclusion in the region to the best of the researcher's knowledge. The study proposed an unexplored explanation of government integrity and found that increasing government integrity has significantly impacted on the level of financial inclusion in Sub-Saharan Africa. The study also found that law and finance theory on legal origin cannot explain the level of financial inclusion in the region. Nevertheless, the theory is important in explaining the impact of property rights on financial inclusion in the region. The study also found that financial repression theory (reserve ratio and liquidity ratio) cannot explain financial inclusion, but that the theory is relevant in explaining the effect of financial freedom on financial inclusion in Sub-Saharan Africa.

iv. Most studies that investigated the determinants of financial inclusion in the region have used pooled OLS, logit and probit estimation. This may, however, lead to a spurious result due to unobserved endogeneity, heteroskedasticity and unobserved fixed effect. Therefore, the study used system GMM, which can deal with such bias based on the argument of Woodridge (2002).

5.5 Policy Implications of the Study

In addition to the theoretical implications presented in chapter four, the results of the study also have policy implications to various stakeholders such as the researchers, policymakers and industry players. The researchers are the academics and members of research departments of private entities such as the financial institutions and government entities such as the Central Banks and World Bank which may be interested in financial inclusion. Policy makers are the monetary authorities from the Central Banks and government agencies saddled with the responsibility of formulating policies which will facilitate financial inclusion. The industry players are the financial institutions.

This study provides empirical literature for researchers examining the level and determinants of financial inclusion in Sub-Saharan Africa to rely on due to the scanty empirical literature in this research area in Sub-Saharan Africa. This study can be relied on because it allows for generalization of findings to other countries with similar characteristics. This study revealed the actual level of financial inclusion in Sub-Saharan Africa. This study also showed the banking, institutional, socio-economic and infrastructural factors that matter for financial inclusion in Sub-Saharan Africa. This will serve as a guide to researchers on factors to focus on when carrying out a similar study. Furthermore, the evidence provided by this study indicates that introduction of dynamism into the investigation is key in order to incorporate the effect of past performance. Importantly, findings reveal that institutional factors contribute significantly to financial inclusion in Sub-Saharan Africa, as a result, the inclusion of these factors in the model to be used to investigate the determinants of financial inclusion is necessary in order to avoid model misspecification.

Policymakers should take cognisance of the fact that while protection of property rights of creditors' appears to be effective in the region, it is detrimental to financial inclusion as it discourages the debtors from going into financial contracts. In view of this, policymakers and concerned regulatory authorities should review these rights. Consequent upon the review, policies that will further protect the right of the debtors should also be put in place. For instance, the protection offered on property rights of creditors should not oppress that of the debtors, so as not to allow debtors view creditors as being too big to institute litigations against in the court of law during contractual disagreement due to the level of protection enjoyed by the creditors. If the property rights protection offered to the creditors do not oppress those of the debtors, there is the likelihood of positive contribution of property rights to financial inclusion in Sub-Saharan Africa.

In terms of the financial institutions who are the industry players, the findings reveal that deposit interest rate is not significant enough to impact on financial inclusion, implying that interest paid on deposit is too cheap. Thus, in order to maximize return on funds, customers might deposit their funds outside the formal financial system. Therefore, in order to boost financial inclusion, there is the need for financial institutions to pay interest on deposit which commensurate with the return derived from the investment carried out with the customers' funds. Relating this to the level of financial inclusion, it may also serve as a stimulus for policymakers to increase the enforcement of deposit interest rate bottom in addition to the existing deposit interest rate ceiling. By doing so, financial institutions will be paying a more encouraging deposit interest rate, thereby stimulating more people to use the formal financial system.

5.6 Suggestions for Further Studies

i. Future studies may also measure the achieved level of financial inclusion of the 25 focused countries by World Bank to achieve Universal Financial Access by 2020.

ii. Future studies may also be carried out to compare the level of financial inclusion in Sub-Saharan Africa and other developing regions such as Latin America.

iii. A related study may be carried out on firm and household data on financial inclusion to establish whether the explanation for financial inclusion differs.

iv. Future studies may also be extended to cover Africa to ascertain whether the same factors explain financial inclusion for Sub-Saharan Africa and Africa as a whole.

v. Future investigations may look into the effect of Islamic banking on financial inclusion when reliable data is available.

vi. The effect of the insignificant variables may be reinvestigated using a different measure of financial inclusion or covering a more number of observations and time.

5.7 Limitation of the Study

The study excluded some other Sub-Saharan countries due to data constraints, therefore the findings of this study may not be applicable to those countries. Similarly, the study could not use banking factors as they relate to different financial institutions, due to data availability. The study, however, takes comfort in the fact that the banking factors used are for the financial institutions as a whole. Nevertheless, the results of the

study are professionally adequate, comprehensive, reliable and fit for policy formulation and implementations.

REFERENCES

Adedayo, O. E., & Ayodeji, E. A. (2015). Cash reserve requirement and lending behaviour of banks to small and medium scale enterprises in Nigeria. *International Journal of Banking, Finance, Management and Development Studies. 3*(1), 23-34.

Adeyemi, A. A., Pramanik, A. H., & Meera, K. A. (2012). A measurement model of the determinants of financial exclusion among Muslim micro-entrepreneurs in Ilorin, Nigeria. *Journal of Islamic Finance*, *1*(1), 30-43.

Adeyeye, P. O., Fapetu, O., Aluko, O. A., & Migiro, S.O. (2015). *Procedia Economics and Finance 30,* 30 – 37.

Aduda, J., & Kalunda, E. (2012). Financial inclusion and financial sector stability with reference to Kenya. *Journal of Applied Finance and Banking*, *2*(6), 96-120.

African Financial Inclusion (2012). *A Quick Guide to the Maya Declaration on Financial Inclusion* (The AFI 2012 Global Policy Forum). Cape Town: South Africa. Retrieved from https://www.afi-global.org/gpf.

Agbetsiafa, D. (2004). The finance growth nexus: Evidence from Sub-Saharan Africa. *Savings and Development, 28*(3), 271–288.

Aina, S., & Oluyombo, O. (2014).*The economy of financial inclusion in Nigeria: Theory, Practice and policy* (CIBN Occasional Papers Series. No. 1). Lagos: Chartered Institution of Bankers' of Nigeria.

Ajayi, K., & Atanda, A. (2012). Effect of monetary policy instruments on banks' lending disposition. *Journal of Business and Management Research, 7*(3), 125-139.

Akinlo, A. E., & Egbetunde, T. (2010). Financial development and economic growth: The experience of 10 Sub-Saharan African countries revisited. *The Review of Finance and Banking, 2*(1), 17-28.

Akosah, N. K. (2013) Dynamics of inflation and financial development: Empirical evidence from Ghana. *Journal of Economics and Sustainable Development, 4*(15), 20-38.

Akudugu, M. A. (2013). The determinants of financial inclusion in Western Africa: Insights from Ghana. *Research Journal of Finance and Accounting, 4*(8), 1-10.

Allen, F., Carletti, E., Cull. R., Qian, J., Senbet, L., & Valenzuela, P. (2014). The African financial development and financial inclusion gaps. *Journal of African Economies, 23*(5), 614-642.

Allen, F., Demirgüç-Kunt, A., Klapper, L., & Martinez Peria, M. (2012). *The foundations of financial inclusion: Understanding ownership and use of formal accounts* (Policy Research Working Paper No. 6290). Washington, DC: World Bank.

Alliance for Financial Inclusion and Women's World Banking, (2016). *Policy Frameworks to Support Women's Financial Inclusion.* Retrieved from http://www.afi-global.org/sites/default/files/publications/2016-02-womenfi.1_0.pdf

Alter, A., & Yontcheva, B. (2015). *Financial inclusion and development in the CEMAC* (IMF Working Paper No. 235). Washington, DC: International Monetary Fund.

Aluko, O. A, & Ajayi, M. A. (2017). Determinants of banking sector development: Evidence from Sub-Saharan African countries. *Borsa Istanbul Review,* xx, 1-18.

Ambarkhane, D., Singh, A. S., & Venkataramani, B. (2014). Measuring financial inclusion of Indian States. *International Journal of Rural Management, 12*(1), 72-100.

Ameer, B. M. (2015). Determinants of banking sector performance in Pakistan. *Global Journal of Management and Business Research: C Finance. 15*(6), 21-48

Amidžić, G., Massara, A., & Mialou, A. (2014). *Assessing Countries' Financial Inclusion Standing—A New Composite Index* (IMF Working Paper No. 26). Washington, DC: International Monetary Fund.

Anayiotos, G. C., & Toroyan, H. (2009). *Institutional factors and financial sector development: Evidence from Sub-Saharan Africa* (IMF Working Paper No. 258). Washington, DC: International Monetary Fund.

Andersen, T. B., & Trap, F. (2003). Financial liberalization, financial development and economic growth in LDCs. *Journal of International Development, 15*(2), 189-209.

Anderson, T. W., & Hsiao, C. (1982). Formulation and estimation of dynamic models using panel data. *Journal of Econometrics, 18*(1), 47-82.

Andrianaivo, M., & Kpodar, K. (2011). *ICT, financial inclusion and growth evidence from African countries* (IMF Working Paper No. 46). Washington, DC: International Monetary Fund.

Andrianaivo, M., & Yartey, C. A. (2010). Understanding the growth of African financial markets. *African Development Review, 22*(3), 394-418.

Ang, J. B. (2008). What are the mechanisms linking financial development and economic growth in Malaysia? *Economic Modelling, 25*(1), 38-53.

Antoniou, A., Guney, Y., & Paudyal, K. (2006). The determinants of debt maturity structure: Evidence from France, Germany and the UK. *European Financial Management*, *12*(2), 161-194.

Antoniou, A., Guney, Y., & Paudyal, K. (2008). The determinants of capital structure: Capital market-oriented versus bank-oriented institutions. *Journal of Financial and Quantitative Analysis, 43*(1), 59-92.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277-297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics, 68*(1), 29-51.

Arestis, P., & Demetriades, P. (1997). Financial development and economic growth: Assessing the evidence. *The Economic Journal, 107*(442), 783-799.

Arora, R. (2010). *Measuring Financial Access* (Discussion Paper Economics No. 7). Gold Coast: Griffith University.

Asongu, S. (2012). Law and finance in Africa. *Brussels Economic Review, 55*(4), 385-408.

Ayo, C. K., Ukpere, W. I., Oni, A., Omote, U., & Akinsiku D. (2012). *African Journal of Business Management*, *6*(6), 2195-2201.

Babajide, A. A., Adegboye, F. B., & Omankhanlen, A. (2015). Financial inclusion and economic growth in Nigeria. *International Journal of Economics and Financial Issues*, *5*(3), 629–637.

Baltagi, B. (2008). *Econometric analysis of panel data* (4th ed.). Chichester: Wiley.

Baltagi, B. H., Demetriades, P. O., & Law, S. H. (2009). Financial development and openness: Evidence from panel data. *Journal of Development Economics*, *89*(2), 285-296.

Barth, J., Caprio, G., & Levine, R., (2004). Bank regulation and supervision: What works best. *Journal of Financial Intermediation 13*(2), 205-248.

Baum, C. F. (2006). *An introduction to modern econometrics using Stata*: Stata press.

Beck, T., & De la Torre, A. (2007). The basic analytics of access to financial services. *Financial Markets, Institutions and Instruments, 16*(2), 79-117.

Beck, T., & Levine, R. (2005). Legal institutions and financial development. In Menard, C., & M. M. Shirley (Eds.). *Handbook of New Institutional Economics* (pp. 251-278). Boston: Springer.

Beck, T., Cull, R., Fuchs, M., Getenga, J., Gatere, P., Randa, J., & Trandafir, M. (2010). *Banking sector stability, efficiency and outreach in Kenya* (Policy Research Working Paper N. 5442). Washington DC: World Bank.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2001). *Law, politics and finance* (Policy Working Paper No. 2586) Washington, DC: World Bank.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2003). Law and finance: Why does legal origin matters? *Journal of Comparative Economics, 31*(4), 653-675.

Beck, T., Demirgüç-Kunt, A., & Martinez Peria, M. (2007). Reaching out: Access to and use of banking services across countries. *Journal of Financial Economics, 85*(1), 234-266.

Beju, D. G., & Ciupac-Ulici, M. (2012). The impact of financial liberalization on banking system. *Procedia Economics and Finance 3,* 792 – 799.

Bhattacharya, R., & Wolde, H. (2010), *Constraints on trade in the MENA region* (IMF Working Paper No. 30). Washington DC: International Monetary Fund.

Bhattacharyya, S. (2013). Political origins of financial structure. *Journal of Comparative Economics*, *41*(4), 979-994.

Bhuvana, M., & Vasantha, S. (2016). Dimensions for measuring financial inclusion in the rural areas of Tamil Nadu. *Indian Journal of Science and Technology*, *9*(32), 1-8.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115-143.

Boakye, C., & Amankwah, N. F. (2012). Determinants of the demand for financial products in Ghana. Retrieved from https://www.microfinancegateway.org/sites/default/files/mfg-en-paper-determinants-of-the-demand-for-financial-products-in-ghana-2012.pdf

Boyd J. H., & Hakenes, H. (2013). A theory of creditor rights, information sharing and bank risk taking. Retrieved from https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=cicf2013&paper_id=983

Brown, M., & Zehnder, C. (2006). *Credit Reporting, Relationship Banking and Loan Repayment* (Swiss National Bank Working Paper No. 2006-03). Zurich: Swiss National Bank.

Bryman, A., & Cramer, D. (1997). *Quantitative data analysis with SPSS for windows: A guide for social scientists*, London: Routledge.

Cámara, N., & Tuesta, D. (2014). Measuring financial inclusion : *A Multidimensional index* (BBVA Research Working Paper No. 26). Spain: Banco Bilbao Vizcaya Argentaria.

Campbell, A. (2007). Bank insolvency and the problem of nonperforming loans. *Journal of Banking Regulation. 9*(2), 25-45.

Caporale, G. M., Rault, C., Sova, R., & Sova, A. (2009). *Financial development and economic growth: Evidence from ten new EU members* (DIW Discussion Paper No. 940). Mohrenstr: German Institute for Economic Research.

Central Bank of Nigeria (2012). *Summary Report on Financial Inclusion in Nigeria.* Retrieved from http://www.cenbank.org/Out/2012/publications/reports/dfd/CBNSummary%20Report%20ofFinancial%20Inclusion%20in%20Nigeria-final.pdf.

CGAP (2012, May). *Financial inclusion and stability: what does research show?* (Issue Brief). Washington, DC: Cull, R., Demirgüç-Kunt, A., & Lyman, T.

Chakravarty, S. R., & Pal, R. (2010). *Measuring financial inclusion : An axiomatic approach* (IGIDR Working Paper No, 03). Mumbai: Indira Gandhi Institute of Development Research.

Chikalipah, S. (2017). What determines financial inclusion in Sub-Saharan Africa? *African Journal of Economic and Management Studies, 8*(1), 8-18,

Chima, O. (2011). Financial services still shallow in Africa. *ThisDay News*. Retrieved from http://www.thisdaylive.com.

Chinn, M. D., & Ito, H. (2006). What matters for financial development? Capital controls, institutions and interactions. *Journal of Development Economics*, *81*(1), 163–192.

Chithra, N., & Selvam, M. (2013). Determinants of financial inclusion: An empirical study on the inter-State variations in India. Retrieved from http://dx.doi.org/10.2139/ssrn.2296096.

Cho, S. S., El Ghoul, S., Guedhami, O., & Suh, J. (2014). Creditor rights and capital structure: Evidence from international data. *Journal of Corporate Finance, 25*, 40-60.

Clamara, N., Peña, X., & Tuesta, D. (2014). *Factors that matter for financial inclusion: Evidence form Peru* (BBVA Working Paper No. 09). Spain: Banco Bilbao Vizcaya Argentaria.

Clarke G., Cull, R., & Shirley, M. (2005). Bank privatisation in developing countries: A summary of lessons and findings. *Journal of Banking & Finance, 29*(8-9), 1905-1930.

Connolly, C., & Hajaj, K. (2001). Financial services and social exclusion, financial services, consumer policy centre, University of New South Wales. Chifley Research Centre. Retrieved from www.chifley.org.au.

Creswell, J. W. (1994). *Research design: Qualitative and quantitative approaches*. Thousand Oaks, CA: SAGE Publications.

Dancourt, O. (2012) Banking credit, policy interest rate and reserve requirements in Peru. IDEAS: Research Division of Federal Reserve Bank of St Louis.

Dang, V. A., Kim, M., & Shin, Y. (2015). In search of robust methods for dynamic panel data models in empirical corporate finance. *Journal of Banking & Finance, 53*, 84-98.

Daumont, R., Le Gall, F., & Leroux, F. (2004). *Banking in Sub-Saharan Africa: What went wrong?* (IMF Working Policy No. 55). Washington, DC: International Monetary Fund.

Delcoure, N. (2007). The determinants of capital structure in transitional economies. *International Review of Economics & Finance, 16*(3), 400-415.

Dell' Ariccia, G., & Marquez, R. (2006). Lending booms and lending standards. *The Journal of the American Finance Association, 61*(5), 2511–2546.

Demetriades, P. O., & James, G. A. (2011). Finance and growth in Africa: the broken link. *Economic Letters, 113*(3), 263-265.

Demirguc-Kunt, A., Beck, T., & Honohan, P. (2008). *Finance for all: Policies and pitfalls in expanding* (Policy research report). Washington, DC: World Bank.

Demirgüç-Kunt, A. & Detragiache, E. (1998). The determinants of bank crises in developing and developed countries. *IMF Staff papers, 45*, 81-109.

Demirgüç-Kunt, A., & Klapper, L. (2012). *Measuring financial inclusion*: *The global findex database* (Policy Research Working Paper No. 6025). Washington, DC: World Bank.

Demirgüç-Kunt, A., Klapper, L., & Singer, D. (2017). *Financial inclusion and inclusive growth: A review of recent empirical evidence in Africa* (Policy Research Working No. Paper 8040). Washington, DC: World Bank.

Demirgüç-Kunt, A., Klapper, L., Singer, D., & Van Oudheusden, P. (2015). *The global findex database 2014: Measuring financial inclusion around the World* (Policy Research Working Paper No. 7255).Washington, DC: World Bank.

Demirgüç-Kunt, A., & Levine, A. (2008). *Finance, financial sector policies and long-run growth* (Commission on Growth and Development Working Paper No 11). Washington, DC: World Bank.

Desai, R. P., & Surti, M. M. (2015). Financial inclusion and literacy rate in India. *International Journal in Management and Social Science*, *3*(4), 531-537.

Djankov, S., McLiesh, C., & Shleifer, A. (2005). *Private credit in 129 countries*. (NBER Working Paper No. 11078). Cambridge: National Bureau for Economic Research.

Djankov, S., McLiesh, C., & Shleifer, A. (2007). Private credit in 129 countries. *Journal of Financial Economics*, *84*(2), 299–329.

Doing Business. (2017). Historical data sets and trends data. Retrieved from http://www.doingbusiness.org/Custom-Query

Edison, H. J., Levine, R., Ricci, L., & Slok, T. (2002). International financial integration and economic growth. *Journal of International Money and Finance, 2*, 749-776.

Effiong, E. (2016). Financial development, institutions and economic growth: Evidence from Sub-Saharan Africa. Retrieved from https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=CSAE2016&paper_id=190.

Elliot, D. J. (2014). Bank liquidity requirements: An introduction and overview. Retrieved from https://www.brookings.edu/wp-content/uploads/2016/06/23_bank_liquidity_requirements_intro_overview_elliott.pdf

Emefiele, G. (2017, December 11). CBN set to blacklist loan defaulters. *Vanguard News.* Retrieved from https://www.vanguardngr.com/2017/12/cbn-set-blacklist-loan-defaulters/

Enhancing Financial Inclusion and Access Report (2014). *Access to financial services in Nigeria. 2012 Survey*. Retrieved from: http://www.efina.org.ng/assets/ResearchDocuments/2013Documents/EFInA-Access-to-FinancialServices-in-Nigeria-2012-surveyKeyFindings2.pdf.

Etudaiye-Muhtar, O. F. (2016). *The effect of financial market development on capital and debt maturity structure of firms in selected African countries* (Unpublished doctoral dissertation). University of Malaya, Kuala Lumpar.

Evans, O., & Adeoye, B. (2016). Determinants of financial inclusion in Africa: A dynamic panel data approach. *University of Mauritius Research Journal, 22*(1), 1-23.

Fan, J., Titman, S., & Twite, G. (2012). An international comparison of capital structure and debt maturity choices. *Journal of Financial and Quantitative Analysis, 47*(1), 23-56.

Farazi, S. (2014). Informal firms and financial inclusion: Status and determinants. *Journal of International Commerce, Economics and Policy, 5*(3), 1-28.

Faruk, M. O., & Noman, S. (2013). The financial inclusion: A district wise study on Bangladesh. *International Journal of Economics, Finance and Management*, *2*(4), 291-296.

Filippidis, I., & Katrakilidis, C. (2014). Institutions, policy and banking sector development: A reassessment. *Czech Journal of Economics, 82*(2), 193-208.

Financial Access Survey (2017). Access to macroeconomic and financial data. Retrieved from http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C&sId=1460043522778

Financial System Strategy (2013). *An overview of the Financial System Strategy for effective transformation – A focus on the Payments System programme.* Retrieved http://www.cbn.gov.ng/icps2013/papers/FSS2020%20Presentation%20Payments%20System%20Conference_130913.pdf.

FinScope (2012). Financial inclusion in Rwanda 2008-2012. Retrieved 12th December 2016 from http://www.statistics.gov.rw/publications/finscope-survey-report-2012

FinScope Rwanda, (2016). Access to Finance Rwanda. Retrieved from http://statistics.gov.rw/publication/finscope-rwanda-2016.

Flannery, M. J., & Hankins, K. W. (2013). Estimating dynamic panel models in corporate finance. *Journal of Corporate Finance, 19*(1), 1-19.

Fowowe, B. (2014). Law and finance revisited: Evidence from African countries. *South African Journal of Economics, 82*(2), 193-208.

Fungáčová, Z., & Weill, L. (2014). *Understanding financial inclusion in China* (BOFIT Discussion Paper No. 10). Finland: Bank of Finland.

Gebrehiwot, K., G. & Makina, D., (2015). Financial inclusion in selected Asian countries: Evidence using dynamic panel data analysis. Retrieved from https://ssrn.com/abstract=2636564

Ghirmay, T. (2004). Financial development and economic growth in Sub-Saharan African countries: evidence from time series analysis. *African Development Review, 16*(3), 415–432.

Global Financial Development Indicator. (2017). Global financial development. Retrieved from http://databank.worldbank.org/data/reports.aspx?source=global-financial-development

Goodstein, I., & Rhine, J. (2013). What determines household use of financial transaction services? Retrieved from http://www.fdic.gov/news/conferences/2013ResearchConf/Papers/Goodstein.pdf.

Graff, M. (2006). Myths and truths: The "law and finance theory" revisited. *Jahrbuch für Wirtschaftswissenschaften, 57*(1), 51-76.

Grigorian D. A., & Manole, V. (2006). Determinants of commercial bank performance in transition: An application of data envelopment analysis. *Comparative Economic Studies, 48*(3), 497-552.

Grigorian, D., & Manole, V. (2006). Determinants of commercial bank performance in transition: An application of data envelopment analysis. Comparative Economic Studies, *48*(3), 497-522.

Guièze, J. (2014). Financial inclusion in Sub-Saharan Africa. Retrieved from http://economic-research.bnpparibas.com/Views/DisplayPublication.aspx?type=document&IdPdf=24791

Gujarati, D., & Porter, C. (2009). *Basic Econometrics (Fifth ed.)*. New York, USA: The McGraw-Hill.

Gupta, A., Chotia, V., & Roa, M. (2014). Financial inclusion and human development: A State-wise analysis from India. *International Journal of Economics, Commerce and Management*, *2*(5), 1-23.

Gupte, R., Venkataramani, B., & Gupta, D. (2012). Computation of financial inclusion index for India. *Procedia -Social and Behavioral Sciences*, *37*, 133–149.

Hancock, D., & Wilcox, J. A. (1998). The credit crunch and availability of credit to small business. *Journal of Banking & Finance, 22*(6-8), 983-1014.

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica, 50*(4), 1029-1054.

Heritage Foundation. (2017). *Index of economic freedom.* Retrieved from https://www.heritage.org/index/download

Honohan, P. (2008). Cross-country variation in household access to financial services. *Journal of Banking and Finance, 32*(11), 2493-2500.

Hotelling, H. (1933). Analysis of a complex of statistical variables into principal components. *Journal of Educational Psychology, 24*(2), 417–441.

Ito, H. (2006). Financial development and financial liberalization in Asia: Threshold, institutions and the sequence of liberalization. *The North American Journal of Economics and Finance, 17*(3), 303-327.

Jaffee, D. M., & Russell, T. (1976). Imperfect information, uncertainty and credit rationing. *The Quarterly Journal of Economic, 90*(4), 651-666.

Jerkins B (2008). *Developing mobile money ecosystems.* Washington, DC: IFC and the Harvard Kennedy School. Retrieved from http://www.hks.harvard.edu/m-rcbg/papers/ jenkins_mobile_money_summer_008.pdf

JishaJoseph, M., & Varghese, T., (2014). Role of financial inclusion in the development of Indian economy. *Journal of Economics and Sustainable Development, 5*(11), 6-12.

Johnson, S. A. (2003). Debt maturity and the effects of growth opportunities and liquidity risk on leverage. *Review of Financial Studies, 16*(1), 209-236.

Kama, U., & Adigun, M. (2013). *Financial inclusion in Nigeria : Issues and challenges* (CBN Occasional Paper No. 45). Abuja: Central Bank of Nigeria.

Kankasa-Mabula, T. (2012). *How can governments promote financial inclusion for women: The Zambian case*. Paper presented at the second African women's economic summit of Bank of Zambia, Lagos.

Kempson E., Atkinson, A., & Pilley, O. (2004). Policy level response to financial exclusion in developed economies: lessons for developing countries. *Report of Personal Finance Research Centre, University of Bristol.* Retrieved from http://www.bristol.ac.uk/media-library/sites/geography/migrated/documents/pfrc0409.pdf

Kerlinger, F. N., & Rint, N. (1986). *Foundation of Behaviour Research*. London: Wintson Inc.

Khalfaoui, H., & Ben Saada, M. (2015). The determinants of banking performance: Empirical evidence from Tunisian listed banks. *International Journal of Finance and Banking Studies, 4*(2), 21-28.

Khan, H. R. (2012). Issues and challenges in financial inclusion: Policies, partnerships, processes and products. *RBI Monthly Bulletin, August*, 1447–1457.

Kim, D., Lin, S., & Suen Y. (2010). Dynamic relationship between inflation and financial development. *Journal of Economic Literature*, 2-21.

King, R., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics, 108*(3), 717-737.

Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: The Guilford Press.

Komolafe, B. (2017, December 8). FSS 2020: CBN others to develop roadmap for 80% financial inclusion. *Vanguard News.* Retrieved from https://www.vanguardngr.com/2017/12/fss-2020-cbn-others-develop-roadmap-80-financial-inclusion/

Korynski, P., & Pytkowska, J. (2016). Measuring financial inclusion in the EU: Financial inclusion score approach. Retrieved from https://www.microfinancegateway.org/library/measuring-financial-inclusion-eu-financial-inclusion-score-approach

Kumar, N. (2011*). Financial inclusion and its determinants: Evidence from state level empirical analysis in India*. Paper presented at the Mumbai 2011 conference on money and finance by Indira Gandhi Institute of Development Research, Mumbai.

Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review, 45*(1), 1-30.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1998). Law and finance. *Journal of Political Economy, 106*(6), 1113-1155.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal determinants of external finance. *Journal of Finance, 52*(3), 1131-1150.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1999). The quality of government. *Journal of Law, Economics, & Organization*, 15(1), 222-279.

Laha, D., Kuri, D., & Kumar, P. (2011). Determinants of financial inclusion: A study of some selected districs of West Bengal, India. *Indian Journal of Finance, 5*(8), 29-36.

Leaven, L. (2003). Does financial liberalization reduces financial contriants? *Financial Management, 32*(1), 5-34.

Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics*, *46*(1), 31-77.

Lockwood, B, (2004). How robust is the foreign policy-Kearney globalization index? *The World Economy*, *27*(4), 507-523

M'Amanja, D. A. (2015, May). *Financial inclusion, regulation and stability: Kenyan experience and perspective*. Paper presented at the UNCTAD's Multi-Year Expert Meeting on Trade, Services and Development, Geneva, Switzerland.

Marcelin, I., & Mathur, I. (2014). Financial development, institutions and banks. *International Review of Financial Analysis, 31*(C), 25–33.

Marr A., Leon J., & Ponce, F. (2014). Financial inclusion of the poor in Peru: Exploratory factors and determinants. *Applied Econometrics and International Development*, *14*(1), 101-300.

Mbutor, O. M., & Uba, I. A. (2013). The impact of financial inclusion on monetary policy in Nigeria. *Journal of Economics and International Finance*, *5*(8), 318-326.

McDonald, C., & Schumacher, L. (2007). *Financial deepening in Sub-Saharan Africa: evidence on the role of creditor rights protection and information sharing* (IMF Working Paper No. 203). Washington, DC: International Monetary Fund.

Mckinnon, R. I. (1973). *Money and capital in economic development.* Washington, DC: Brookings Institution.

Mehrotra, A., & Yetman, J. (2015). Financial inclusion – issues for central banks. *BIS Quarterly Review*, *March,* 83-96.

Micheal, O. B. (2015). Financial system, financial inclusion and economic development in Nigeria. Retrieved from http://www.afra.org.ng/download/28.pdf

Mishi, S., Vacu, N. P., & Chipote, P. (2012). Impact of financial literacy in optimizing financial inclusion in rural South Africa: Case study of the Eastern Cape. Retrieved from http://www.econrsa .org/system/files/…/2012/mishi-financial-literacy.pdf

Mitton, L. (2008). Financial inclusion in the UK: Review of policy and practice. Retrieved from https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/2234.pdf.

Mlachila, (2016). Financial development in Sub-Saharan Africa – Promoting inclusive and sustainable growth. Retrived from https://www.imf.org/external/pubs/ft/dp/2016/afr1605.pdf

Mohan, R. (2006, November). *Economic growth, financial deepening and financial Inclusion.* Paper presented at the Annual Bankers' 2006 Conference. Retrieved from http://rbidocs.rbi.org.in/rdocs/Speeches/PDFs/73697.pdf

Murthy, S. R., & Al-Muharrami, S. M. (2014). Financial sector development and the determinants of bank profitability: A GCC panel study. *International Research Journal of Finance and Economics, 121*, 1-12.

Muthiora, B. (2015). Enabling mobile money policies in Kenya: Fostering a digital financial revolution. Retrieved from http://www.gsma.com/mobilefordevelopment/wp

Naceur, S. B., Barajas, A., & Massara, A. (2015). *Can Islamic banking increase financial inclusion?* (IMF Working Paper No. 31). Washington DC: International Monetary Fund.

Nkwede, F. (2015). Financial inclusion and economic growth in Africa: Insight from Nigeria. *European Journal of Business and Management, 7*(35), 71-80.

Oji, C. K. (2015). *Promoting financial inclusion for inclusive growth in Africa* (SAIIA Occasional paper 210). South Africa: South African Institute of International Affairs.

Okpara, G. C. (2013). *Developing an index of financial inclusion: An average ratio approach* (MPRA Paper No. 49505). Germany: Munich University Library.

Oladimeji, A., & Adegbite, E. (2017). *Financial inclusion of micro, small and medium enterprises in Nigeria.* Latvia: Lambert Academic Publishing.

Olokoyo, F. O. (2011). Determinants of commercial banks' lending behavior in Nigeria. *International Journal of Financial Research, 2*(2), 61-72.

Onaolapo, A. R. (2015). Effect of financial inclusion on economic growth of Nigeria (1982-2012). *International Journal of Business and Management Review*, *3*(8), 11-28.

Padilla A., & Requejo A. (2000). *The costs and benefits of the strict protection of creditor rights: Theory and evidence* (IDA Working Paper No. 114). Washington, DC: Inter-American Development Bank.

Papadavid, P. (2016). Broadening financial inclusion in sub-Saharan Africa: Policies should prioritise financial stability. Retrieved from https://www.odi.org/sites/odi.org.uk/files/resource-documents/10958.pdf

Park, C. Y., & Mercado, R. V. (2015). *Financial inclusion, poverty and income inequality in developIng Asia*. (Asia Development Bank Economics Working Paper Series 426). Philippines: Asia Development Bank.

Pearson, K. (1901). On lines and planes of closest fit to systems of points in space. *Philosophical Magazine*. *2*(11), 559–572.

Peña, X. E., Hoyo, C., & Tuesta, D. (2014). *Determinants of financial inclusion in Mexico* (IMF Working Paper No. 235). Washington, DC: International Monetary Fund.

Pi˜neyro, Z. (2013). The financial inclusion index: Proposal of a multidimensional measure for Mexico. *Revista Mexicana de Econom´ıa y Finanzas*, *8*(2), 157-180.

Porkodi, S., & Aravazhi, D. (2013). Role of micro finance and self-help groups in financial inclusion. *International Journal of Marketing, Financial Services and Management Research, 2*(3), 137-149.

Pourshahabi, F., & Elyasi, Y. (2013). Financial depth – financial repression linkage. *Iran Economic Review, 17*(2), 66-81.

Rajan, R. G., & Zingales, L. (2003). The great reversals: The politics of financial development in the twentieth century. *Journal of Financial Economics, 69*(1), 5-50.

Robinson, J. (1952). *The generalization of the general theory, in the rate of interest and other essays.* London: Macmillan.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal, 9*(1), 86-136.

Sackey, F. G., & Nkrumah, E. M. (2012). Financial sector deepening and economic growth in Ghana. *Journal of Economics and Sustainable Development, 3*(8), 122-139.

Sakariyahu, O. R., Ibrahim, H. K., & Abdulmumin, B. A. (2016). Impact of microfinance banks' credit facilities on agricultural production improvement among small-scale farmers in Kwara State. *Journal of Management and Social Sciences, 5*(1), 75-85.

Salifu, A. (2008). The impact of internet crime on development. *Journal of Financial Crime, 15*(4), 432-443

Salman, A. Y., Ayo-Oyebiyi, G. T., & Emenike, O. A. (2015). Influence of financial inclusion on small and medium scale enterprises growth and development in Nigeria. *International Journal in Management and Social Science, 3*(4), 390-401.

Sarma, M. (2010). *Index of financial inclusion* (Discussion Paper No. 10-05). India: Centre on Money, Trade finance and Development.

Sarma, M. (2008). *Index of financial inclusion* (Working Paper No.215). India: Indian Council for Research on International Economic Relations.

Sarma, M. (2012). *Index of financial inclusion: A measure of financial sector inclusiveness* (Working Paper No. 07/2012). India: Centre on Money, Trade finance and Development.

Sarma, M. & Pais, J. (2011). Financial inclusion and development. *Journal of International Development, 2*(3), 613-628.

Sethy, S. K. (2016). Developing a financial inclusion index and inclusive growth in India. *Theoretical and Applied Economics*. *23*(2), 187-206.

Sharma, A., & Kukreja, S. (2013). An analytical study: Relevance of financial inclusion for developing nations. *International Journal of Engineering and Science. 2*(6), 15-20.

Shaw. E. (1973). *Financial deepening in economic development*. New York: Oxford University Press.

Shlens, J. (2003). A tutorial on principal component analysis: Derivation, discussion and singular value decomposition. Retrieved from https://www.cs.princeton.edu/picasso/mats/PCA-Tutorial-Intuition_ip.pdf

Simon, M. K., & Goes, J. (2013). *Ex Post Facto Research*. Retrieved from http://www.dissertationrecipes.com/wp-content/uploads/2011/04/Ex-Post-Facto-research.pdf

Somoye, R. O. C. (2011). *The role of financial intermediation in entrepreneurship financings in Nigeria* (Unpublished doctoral dissertation). University of the west of Scotland, Scotland.

Soumaré, I., Tchana, F. T. & Kengne T. M. (2016). Analysis of the determinants of financial inclusion in Central and West Africa. *Transnational Corporations Review*, *8*(4) 231-249.

Sriram M., & Sundaram, N. (2015). Financial inclusion index: A customized regional model with reference to economically most backward districts of Tamil Nadu, India. *Mediterranean Journal of Social Sciences, 6*(6), 209-216.

Stiglitz, J., & Weiss, A. (1981). Credit rationing in market with imperfect information. *The American Economic Review, 71*(3), 393-410.

Sufian, F., & Habibullahi, M. S. (2009) Bank specific and macroeconomic determinants of bank profitability: Empirical evidence from the China banking sector. *Frontiers of Economics in China, 4*(2), 274-291.

Terzi, N. (2015). Financial inclusion and Turkey. *Academic Journal of Interdisciplinary Studies, 4*(1), 269-276.

Tuesta, D., Sorensen, G., Haring, A., & Cámara, N. (2015). *Financial inclusion and its determinants: the case of Argentina* (BBVA Working Paper no. 03). Spain: Banco Bilbao Vizcaya Argentaria.

Villasenor, J., West, D., & Lewis, R. (2016). The 2016 brooking financial and digital inclusion Project Report. Retrieved from https://www.brookings.edu/wp-content/uploads/2016/07/fdip_20160803_project_report.pdf

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data.* Cambridge: MIT Press.

World Bank. (2014). Global financial development report 2014: Financial inclusion. Washington, DC: World Bank.

World Development Indicator. (2017). World Bank development indicators. Retrieved from http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

Yorulmaz, R. (2013). Construction of a regional financial inclusion index in Turkey. *Journal of BRSA Banking and Financial Markets, 7*(1), 79–101.

Zins, A., & Weill, L. (2016). The determinant of financial inclusion in Africa. *Review of Economics*, *6*(1), 46-57.

APPENDICES

Appendix I

Table A. List of Countries

Country	Legal Origin	Income Level
Angola	French	Lower-middle
Burundi	French	Low-income
Cameroon	French	Lower-middle
Central Africa	French	Low-income
Chad	French	Low-income
Congo Republic	French	Lower-middle
Gabon	French	Upper-middle
Gambia	British	Low-income
Ghana	British	Lower-middle
Kenya	British	Lower-middle
Lesotho	British	Lower-middle
Mauritius	French	Upper-middle
Namibia	British	Upper-middle
Nigeria	British	Lower-middle
Rwanda	French	Low-income
Seychelles	French	High-income
South Africa	British	Upper-middle
Swaziland	British	Lower-middle
Tanzania	British	Low-income
Uganda	British	Low-income
Zambia	British	Lower-middle
Equatorial Guinea	French	Upper-middle

Appendix II

Table B. Summary Statistics of the First Principal Components

Country	Variance	Eigenvalue
Angola	0.93	2.789
Burundi	0.93	2.779
Cameroon	0.62	1.873
Central Africa	0.95	2.839
Chad	0.88	2.639
Congo Republic	0.90	2.711
Gabon	0.77	2.322
Gambia	0.77	2.319
Ghana	0.97	2.912
Kenya	0.66	1.978
Lesotho	0.92	2.749
Mauritius	0.84	2.532
Namibia	0.87	2.620
Nigeria	0.69	2.057
Rwanda	0.92	2.752
Seychelles	0.72	2.148
South Africa	0.84	2.520
*Swaziland	0.91	2.737
Tanzania	0.96	2.868
Uganda	0.89	2.673
Zambia	0.90	2.689
Equatorial Guinea	0.81	2.424

Appendix V

Data Used for the Regressions

Country	IFI	RR	LR	LO	GI	PP	FF	CA	IR	SF	NL	IS	IN	EG	IF	PD	EL	IT	PH
Angola	-1.333	81.205	53.100	0	20	30	50	6.989	13.398	48	8.963	0	7.768	14.107	22.964	2.753	91.804	0.256	9.738
Angola	-1.143	67.655	40.310	0	20	30	50	7.247	4.500	49	7.805	0	7.921	16.505	13.303	2.788	98.507	0.296	17.840
Angola	-0.902	69.320	28.820	0	20	20	40	7.504	6.756	50	6.647	0	8.089	18.300	12.249	2.824	105.210	0.857	28.011
Angola	-0.412	56.048	53.480	0	22	20	40	7.762	6.538	52	5.489	0	8.183	9.833	12.474	2.860	111.914	1.149	36.984
Angola	0.327	48.651	31.960	0	22	20	40	8.020	7.589	54	4.331	0	8.171	-1.176	13.731	2.895	111.158	1.685	42.847
Angola	0.369	61.304	36.840	0	19	20	40	8.277	12.756	53	3.173	0	8.169	-0.219	14.471	2.931	113.508	2.225	48.101
Angola	1.039	53.845	34.980	0	19	20	40	8.535	6.309	54	2.015	0	8.172	0.274	13.467	2.967	128.704	2.560	59.826
Angola	1.096	40.624	32.840	0	19	20	40	8.678	3.604	54	4.350	0	8.186	1.478	10.293	3.002	143.900	2.869	61.406
Angola	0.591	38.401	31.310	0	20	15	40	9.327	3.145	54	7.977	0	8.217	3.107	8.776	3.038	159.097	3.193	61.873
Angola	0.788	41.775	37.010	0	18	15	40	7.957	3.527	54	10.191	0	8.229	1.215	7.280	3.072	174.293	4.086	63.479
Angola	1.085	40.454	37.110	0	23	15	40	8.422	3.315	54	10.611	0	8.224	-0.464	10.279	3.107	189.489	4.918	60.844
Burundi	-1.138	23.983	45.050	0	30	30	30	4.264	4.917	36	18.926	0	5.390	-2.374	13.524	5.667	79.062	0.135	1.969
Burundi	-0.966	21.896	52.930	0	30	30	30	5.753	4.333	33	17.004	0	5.409	1.924	2.809	5.700	100.045	0.130	2.487
Burundi	-0.918	17.695	47.160	0	23	30	30	7.241	4.250	58	15.082	0	5.422	1.298	8.342	5.734	111.300	0.252	3.242
Burundi	-0.664	20.122	42.110	0	24	30	30	8.729	3.750	64	13.159	0	5.437	1.560	24.107	5.768	118.098	0.122	5.572
Burundi	-0.457	25.985	47.700	0	25	30	30	10.217	3.250	66	11.237	0	5.438	0.095	10.981	5.801	126.070	0.236	10.315
Burundi	-0.035	17.940	38.770	0	19	25	30	11.706	3.250	69	9.315	0	5.443	0.496	6.401	5.833	131.457	0.228	18.175
Burundi	0.594	8.650	38.780	0	18	20	30	13.194	3.250	71	7.393	0	5.453	1.005	9.735	5.864	135.119	0.111	20.068
Burundi	0.942	12.010	37.260	0	18	20	30	14.272	3.250	71	8.168	0	5.463	0.937	18.013	5.894	133.305	0.322	22.814
Burundi	1.124	15.590	43.060	0	19	20	30	14.522	3.208	73	9.887	0	5.478	1.538	7.951	5.924	130.459	0.312	24.963
Burundi	1.399	19.873	43.420	0	16	20	30	13.448	2.600	75	10.823	0	5.493	1.576	4.380	5.954	127.636	0.607	30.462
Burundi	1.246	15.960	33.190	0	21	20	30	13.453	2.450	71	17.917	0	5.423	-6.802	5.554	5.984	123.782	0.588	46.221
Cameroon	-0.482	35.552	37.600	0	18	30	30	11.886	4.917	71	3.375	0	7.069	-0.414	2.014	3.607	100.340	0.115	12.419
Cameroon	-0.482	50.281	44.550	0	21	30	50	10.973	4.333	74	4.720	0	7.073	0.463	5.118	3.634	99.314	0.335	16.849
Cameroon	-0.482	60.675	48.190	0	22	30	60	10.060	4.250	71	6.065	0	7.078	0.473	0.921	3.661	101.308	0.381	23.752

Cameroon	-0.482	47.911	51.450	0	23	30	50	9.147	3.750	82	7.411	0	7.079	0.100	5.338	3.689	101.645	0.370	31.441
Cameroon	-0.481	50.285	51.860	0	24	30	50	8.234	3.250	80	8.756	0	7.071	-0.825	3.044	3.716	103.872	0.515	39.814
Cameroon	-0.428	50.108	41.740	0	23	30	50	7.322	3.250	75	10.101	0	7.076	0.487	1.275	3.744	106.193	0.551	41.876
Cameroon	-0.306	38.828	39.940	0	22	30	50	6.409	3.250	77	11.447	0	7.089	1.350	2.940	3.771	105.906	1.023	49.567
Cameroon	0.104	41.544	35.350	0	22	30	50	6.910	3.250	76	11.553	0	7.107	1.801	2.943	3.798	110.811	1.233	60.407
Cameroon	1.261	33.104	32.000	0	25	30	50	8.348	3.208	75	10.295	1	7.134	2.767	1.945	3.825	112.181	1.524	70.390
Cameroon	2.739	33.156	24.620	0	22	30	50	8.369	2.600	74	9.702	1	7.165	3.145	1.948	3.851	113.550	1.709	75.685
Cameroon	-0.481	27.287	25.570	0	25	25	50	8.307	2.450	73	9.315	1	7.195	3.019	2.686	3.878	117.134	2.540	71.845
Central African Republic	-1.073	13.634	18.300	0	30	30	50	1.107	4.917	46	15.847	0	6.017	-0.873	2.884	1.891	65.034	0.238	2.525
Central African Republic	-0.999	5.043	18.800	0	30	30	50	1.238	4.333	61	15.205	0	6.046	2.930	6.695	1.909	64.755	0.238	2.728
Central African Republic	-0.890	16.293	48.320	0	30	20	40	1.396	4.250	67	14.563	0	6.074	2.796	0.928	1.926	75.011	0.238	8.279
Central African Republic	-0.726	15.800	29.540	0	24	20	40	6.630	3.750	74	13.922	0	6.078	0.420	9.273	1.942	86.831	0.238	13.620
Central African Republic	-0.581	40.927	38.050	0	20	20	30	11.863	3.250	81	13.280	0	6.081	0.350	3.520	1.956	88.865	0.227	20.244
Central African Republic	0.202	26.614	29.070	0	20	20	30	17.097	3.250	88	12.638	0	6.101	2.021	1.493	1.966	91.809	0.227	22.511
Central African Republic	0.698	11.338	28.190	0	20	20	30	22.330	3.250	95	11.996	0	6.128	2.663	1.301	1.972	92.584	0.227	22.371
Central African Republic	1.801	9.313	30.060	0	21	20	30	22.193	3.250	102	9.583	0	6.165	3.782	5.772	1.975	93.456	0.223	25.261
Central African Republic	0.876	13.864	32.670	0	22	20	30	23.677	3.208	109	28.502	0	5.705	-36.830	1.502	1.977	94.328	0.222	29.467

Central African Republic	0.876	19.399	35.280	0	21	10	30	21.940	2.600	116	27.662	0	5.712	0.688	25.283	1.981	95.200	0.221	24.540
Central African Republic	0.876	22.128	37.890	0	25	15	30	21.052	2.450	123	30.865	0	5.752	4.092	37.142	1.988	96.071	0.221	25.869
Chad	-0.874	23.462	25.300	0	10	30	50	1.369	4.917	46	21.277	0	6.728	13.172	7.890	2.079	71.903	0.147	2.097
Chad	-0.831	55.657	35.090	0	17	30	50	1.442	4.333	61	19.006	0	6.700	-2.776	8.036	2.113	71.282	0.147	4.500
Chad	-0.888	56.950	42.510	0	17	20	50	2.484	4.250	67	16.734	0	6.698	-0.122	-8.975	2.147	70.161	0.147	8.587
Chad	-0.590	39.681	21.660	0	20	20	40	5.411	3.750	74	14.462	0	6.696	-0.262	10.297	2.180	78.182	0.147	14.505
Chad	-0.441	33.975	16.810	0	18	20	40	8.337	3.250	81	12.191	0	6.704	0.875	9.952	2.212	82.539	0.147	20.062
Chad	-0.224	35.695	44.200	0	16	20	40	11.264	3.250	88	9.919	0	6.799	9.878	-2.078	2.245	82.608	0.147	24.532
Chad	0.053	41.972	35.500	0	16	20	40	14.190	3.250	95	7.648	0	6.766	-3.187	-3.704	2.278	89.576	0.147	30.345
Chad	0.861	38.958	23.240	0	17	20	40	15.035	3.250	102	7.374	0	6.818	5.313	14.018	2.312	93.998	0.147	35.365
Chad	0.631	32.419	24.330	0	20	20	40	14.695	3.208	109	9.777	0	6.840	2.252	0.145	2.345	101.404	0.147	35.564
Chad	1.548	31.948	51.940	0	16	20	40	10.676	2.600	116	11.738	0	6.874	3.466	1.681	2.377	108.810	0.147	39.751
Chad	1.851	31.038	79.550	0	19	20	40	11.546	2.450	123	17.011	0	6.860	-1.397	3.670	2.409	116.216	0.214	40.173
Congo, Republic of	-1.083	126.953	47.550	0	22	30	30	13.779	4.917	46	0.396	0	7.825	4.487	3.094	2.388	111.853	0.538	15.755
Congo, Republic of	-0.938	126.254	49.500	0	23	10	30	12.667	4.333	61	0.510	0	7.853	2.804	6.538	2.420	112.169	0.260	25.160
Congo, Republic of	-0.827	175.807	51.450	0	23	10	30	11.556	4.250	67	0.623	0	7.803	-4.896	2.656	2.455	109.613	0.503	34.256
Congo, Republic of	-0.612	169.561	53.400	0	22	10	30	10.444	3.750	74	0.737	0	7.823	2.002	7.334	2.489	107.243	0.243	46.615
Congo, Republic of	-0.541	112.321	60.390	0	21	10	30	9.333	3.250	81	0.851	0	7.862	3.975	7.454	2.522	111.063	0.470	73.797
Congo, Republic of	-0.099	87.647	60.080	0	19	10	30	8.222	3.250	88	0.964	0	7.915	5.455	0.426	2.553	113.067	1.140	90.443
Congo, Republic of	0.581	106.860	59.980	0	19	10	30	7.110	3.250	95	1.078	0	7.920	0.532	0.760	2.581	113.317	1.108	91.939
Congo, Republic of	1.045	99.540	52.100	0	21	10	30	7.669	3.250	102	1.519	2	7.931	1.097	6.095	2.608	110.888	1.295	98.757

Congo, Republic of	1.284	56.238	44.220	0	22	10	30	9.526	3.208	109	1.225	2	7.940	0.871	6.009	2.633	108.460	1.052	104.770
Congo, Republic of	1.404	92.207	36.340	0	21	10	30	9.518	2.600	116	2.506	2	7.980	4.156	0.077	2.658	106.032	1.437	108.150
Congo, Republic of	1.014	40.602	28.460	0	22	10	30	13.468	2.450	123	3.573	2	7.981	0.087	4.514	2.683	103.604	1.601	111.664
Gabon	-0.408	38.058	45.510	0	30	50	30	33.386	4.917	46	5.062	0	9.179	1.019	3.708	1.695	111.853	5.702	53.404
Gabon	-0.408	37.257	49.550	0	33	50	30	29.571	4.333	61	4.681	0	9.113	-6.417	-1.409	1.724	112.169	4.845	63.556
Gabon	-0.408	40.003	26.520	0	29	40	40	25.757	4.250	67	4.301	0	9.138	2.512	5.030	1.754	109.613	3.358	80.766
Gabon	-0.408	64.227	28.360	0	30	40	40	21.943	3.750	74	3.920	0	9.073	-6.280	5.264	1.786	107.243	3.905	87.669
Gabon	-0.408	60.236	59.380	0	33	40	40	18.129	3.250	81	3.540	0	9.042	-3.047	1.886	1.818	111.063	6.302	95.448
Gabon	-0.408	71.174	44.120	0	31	40	40	14.315	3.250	88	3.159	0	9.077	3.600	1.462	1.851	113.067	7.316	103.456
Gabon	-0.408	68.613	46.520	0	29	40	40	10.501	3.250	95	2.778	2	9.112	3.502	1.269	1.885	113.317	7.660	148.694
Gabon	-0.408	58.708	42.510	0	28	40	40	9.737	3.250	102	2.550	2	9.128	1.673	2.662	1.920	110.888	10.246	156.669
Gabon	4.491	31.421	29.690	0	30	40	40	10.036	3.208	109	2.742	2	9.149	2.124	0.480	1.953	108.460	8.804	164.217
Gabon	-0.408	32.760	34.550	0	29	40	40	9.809	2.600	116	4.067	2	9.160	1.065	4.656	1.985	106.032	9.596	171.375
Gabon	-0.408	42.245	33.460	0	34	40	40	9.347	2.450	123	5.259	2	9.169	0.948	0.605	2.014	103.604	8.807	161.121
Gambia, The	-1.176	47.702	69.750	1	25	30	50	12.548	17.333	44	12.569	0	6.263	-4.072	4.839	4.961	90.703	0.671	17.227
Gambia, The	-0.762	40.642	77.310	1	28	30	50	12.430	12.667	58	13.187	0	6.242	-2.051	2.057	4.993	88.545	0.671	27.278
Gambia, The	-1.145	41.866	76.110	1	27	30	60	10.885	12.892	74	10.436	0	6.246	0.393	5.369	5.024	89.778	1.299	52.332
Gambia, The	1.665	31.889	73.380	1	25	30	50	11.725	12.867	66	13.675	0	6.270	2.443	4.444	5.056	87.353	1.888	73.900
Gambia, The	0.310	27.576	59.320	1	23	30	50	10.502	15.500	70	12.309	0	6.301	3.139	4.562	5.088	85.428	3.050	80.627
Gambia, The	-0.410	28.822	68.740	1	19	25	50	16.041	14.625	69	14.516	0	6.333	3.214	5.049	5.119	84.351	2.955	87.963
Gambia, The	0.667	30.324	75.870	1	29	30	50	14.296	11.750	63	12.146	0	6.257	-7.299	4.796	5.151	81.472	2.863	80.760
Gambia, The	0.109	26.004	66.380	1	32	30	50	14.654	11.500	63	12.039	0	6.283	2.587	4.255	5.182	84.013	3.884	85.204

Gambia, The	0.187	37.184	41.050	1	35	30	50	13.520	13.436	55	19.070	0	6.298	1.557	5.700	5.213	85.168	4.303	99.977
Gambia, The	1.090	48.222	57.020	1	32	30	50	15.049	16.511	47	7.223	0	6.276	-2.201	5.947	5.244	88.511	5.736	119.630
Gambia, The	0.929	59.260	56.520	1	28	25	50	14.828	19.586	39	6.486	0	6.291	1.553	6.809	5.275	91.556	5.562	137.846
Ghana	-0.580	18.170	39.320	1	33	50	30	3.951	10.163	57	2.889	0	6.993	3.169	15.118	4.550	90.354	0.139	13.443
Ghana	-0.580	19.485	34.720	1	36	50	50	6.103	8.885	58	4.367	0	7.029	3.651	10.915	4.577	95.351	0.317	23.726
Ghana	-0.580	18.374	27.360	1	40	50	50	8.255	8.896	61	5.845	0	7.046	1.650	10.733	4.603	100.975	0.441	33.757
Ghana	-0.580	17.278	30.820	1	33	50	50	10.407	11.285	64	7.678	0	7.107	6.346	16.522	4.629	106.733	0.687	50.066
Ghana	-0.580	20.248	40.240	1	37	50	60	12.559	17.064	68	16.200	0	7.129	2.191	19.251	4.654	105.546	0.711	63.773
Ghana	-0.580	24.675	42.740	1	39	50	60	13.297	12.878	69	18.082	0	7.180	5.222	10.708	4.680	106.107	1.713	71.867
Ghana	-0.580	28.745	38.590	1	39	50	60	13.747	8.908	67	14.146	0	7.287	11.278	8.727	4.704	106.669	2.189	85.275
Ghana	0.394	30.788	28.080	1	41	50	60	14.773	10.050	69	13.197	0	7.351	6.696	9.161	4.728	109.711	2.915	100.993
Ghana	0.523	30.794	26.160	1	39	50	60	14.717	12.350	71	11.999	5	7.398	4.815	11.608	4.752	108.476	2.581	108.191
Ghana	1.174	27.812	27.510	1	40	50	60	14.325	12.904	73	11.269	5	7.414	1.609	15.493	4.775	106.464	3.672	114.819
Ghana	2.550	29.203	28.310	1	46	50	60	14.529	13.339	75	14.674	5	7.430	1.579	17.145	4.798	109.925	4.967	129.736
Kenya	-0.939	11.166	32.710	1	19	50	50	9.784	5.083	46	28.472	0	6.767	3.047	10.313	4.148	107.678	0.250	12.888
Kenya	-0.939	11.419	38.330	1	21	50	50	10.264	5.139	46	19.351	0	6.803	3.588	14.454	4.176	105.573	0.459	19.970
Kenya	-0.902	13.856	36.930	1	21	40	50	10.743	5.162	39	10.230	0	6.841	3.950	9.759	4.203	112.630	0.814	30.063
Kenya	-0.800	11.480	31.180	1	22	35	50	11.048	5.302	38	9.007	0	6.816	-2.488	26.240	4.231	112.302	1.047	42.048
Kenya	-0.430	10.817	24.320	1	21	30	50	12.036	5.967	38	7.999	0	6.821	0.512	9.234	4.258	113.268	1.292	48.624
Kenya	-0.093	11.362	18.510	1	21	30	50	13.553	4.557	35	6.291	0	6.875	5.485	3.961	4.286	114.910	2.539	61.035
Kenya	0.110	10.380	19.900	1	22	30	50	13.262	5.629	33	4.429	0	6.907	3.273	14.022	4.313	116.552	3.107	66.815
Kenya	0.608	13.322	17.570	1	21	30	50	13.552	11.572	33	4.594	0	6.924	1.785	9.378	4.340	116.131	4.124	71.174
Kenya	1.260	10.087	16.990	1	22	30	50	14.294	8.642	36	5.046	0	6.955	3.092	5.718	4.366	113.764	4.729	71.764
Kenya	1.386	11.293	18.040	1	21	30	50	14.247	8.373	39	5.455	0	6.981	2.611	6.877	4.393	111.396	7.605	73.843
Kenya	1.678	9.974	17.910	1	27	30	50	14.414	9.189	42	5.989	0	7.010	3.001	6.582	4.419	108.974	8.913	80.678
Lesotho	-1.400	25.782	83.860	1	30	50	50	8.200	3.954	44	3.043	0	6.876	2.627	3.438	4.162	117.138	0.504	12.970
Lesotho	-0.871	15.238	94.050	1	30	50	50	8.353	4.543	58	3.042	0	6.909	3.375	6.073	4.170	117.412	0.504	18.445

Lesotho	-0.569	12.042	89.020	1	34	40	50	8.506	6.458	74	3.040	0	6.947	3.930	8.012	4.179	110.910	0.504	24.668
Lesotho	-0.289	8.527	68.080	1	32	40	50	8.658	7.642	66	3.038	0	7.003	5.718	10.716	4.188	110.188	0.500	30.079
Lesotho	-0.139	12.297	72.620	1	33	40	40	8.811	4.850	70	3.036	0	7.015	1.176	7.379	4.197	109.374	0.495	33.218
Lesotho	0.123	11.305	69.290	1	32	40	40	8.964	3.683	69	3.034	0	7.068	5.422	3.598	4.208	110.491	0.490	49.153
Lesotho	0.293	9.472	69.640	1	33	40	40	10.113	2.695	63	2.095	0	7.120	5.410	5.025	4.219	110.971	0.490	60.722
Lesotho	0.459	10.355	53.260	1	35	40	40	11.573	2.850	63	2.466	0	7.165	4.596	6.104	4.232	110.963	0.490	75.300
Lesotho	1.054	10.962	60.090	1	35	40	40	11.535	2.850	55	3.663	0	7.173	0.829	4.928	4.245	107.975	0.472	86.302
Lesotho	1.162	14.400	55.740	1	37	40	40	11.107	2.725	47	4.108	0	7.183	0.923	5.340	4.258	107.094	1.398	101.968
Lesotho	1.680	11.886	59.290	1	49	35	40	10.532	2.336	39	3.901	0	7.224	4.212	3.175	4.271	105.520	4.139	100.945
Mauritius	-0.548	8.348	26.290	0	44	70	70	8.966	7.250	44	5.402	0	8.740	0.644	4.942	6.405	103.226	18.726	54.160
Mauritius	-0.548	6.649	37.910	0	41	70	50	8.641	9.550	58	4.875	0	8.817	8.033	8.933	6.410	103.965	18.639	63.492
Mauritius	-0.548	8.172	46.750	0	42	60	60	8.315	11.771	74	4.347	2	8.868	5.246	8.803	6.415	103.657	42.755	76.118
Mauritius	-0.548	6.366	35.720	0	51	60	60	7.990	10.108	66	3.820	2	8.917	5.007	9.733	6.418	103.883	61.087	84.466
Mauritius	-0.548	6.931	35.780	0	47	60	70	7.664	8.446	70	3.292	3	8.947	3.041	2.550	6.421	102.865	63.330	88.581
Mauritius	-0.548	9.753	35.290	0	55	60	70	7.339	8.350	69	2.765	3	8.987	4.129	2.893	6.423	102.786	88.772	96.769
Mauritius	-0.548	9.884	33.320	0	54	60	70	7.250	7.108	63	2.808	3	9.026	3.911	6.531	6.425	103.041	119.770	104.793
Mauritius	-0.548	8.719	37.910	0	54	65	70	8.466	6.233	63	3.637	3	9.057	3.209	3.852	6.428	103.176	138.548	119.865
Mauritius	1.319	11.308	41.690	0	51	70	70	8.774	6.813	55	4.150	5	9.088	3.133	3.543	6.430	102.222	131.093	123.240
Mauritius	1.697	13.656	42.740	0	53	65	70	9.331	6.784	47	4.920	6	9.123	3.557	3.218	6.432	102.698	154.647	132.250
Mauritius	1.918	16.056	44.540	0	52	65	70	10.520	6.086	39	7.195	6	9.156	3.332	1.287	6.433	103.036	175.827	140.581
Namibia	-1.104	2.500	9.740	1	47	30	50	11.181	6.240	73	4.357	4	8.402	1.370	2.282	0.904	109.053	6.889	22.144
Namibia	-0.760	2.267	10.210	1	41	30	50	10.625	6.298	59	3.878	4	8.459	5.847	4.961	0.915	108.126	7.783	29.657
Namibia	-0.482	2.672	11.380	1	43	30	60	10.068	7.547	58	3.400	4	8.511	5.378	6.548	0.927	109.658	9.616	38.462
Namibia	-0.370	4.285	12.760	1	41	30	50	9.512	8.384	53	2.921	4	8.524	1.360	9.095	0.939	108.762	8.545	49.839
Namibia	-0.271	6.972	18.610	1	45	30	50	8.955	6.242	54	2.443	4	8.513	-1.143	9.452	0.954	108.228	8.891	76.117
Namibia	-0.239	9.100	12.190	1	45	30	40	8.399	4.997	54	1.965	4	8.555	4.276	4.875	0.971	107.665	14.725	89.495
Namibia	0.140	6.814	12.420	1	45	30	40	7.842	4.283	49	1.486	4	8.585	3.078	5.006	0.990	108.589	20.762	98.957
Namibia	0.824	5.231	17.810	1	44	30	40	8.044	4.209	52	1.337	4	8.613	2.820	6.722	1.012	109.513	19.877	95.018
Namibia	1.236	5.723	15.510		44	30	40	8.567	3.978	52	1.286	4	8.645	3.256	5.601	1.035	111.428	18.131	118.434

Namibia	1.102	7.045	15.250	1	44	30	40	10.282	4.248	52	1.453	4	8.684	4.013	5.350	1.058	113.343	22.775	113.756
Namibia	1.584	5.588	13.810	1	48	30	40	10.937	4.713	52	1.552	4	8.713	2.926	3.406	1.081	115.258	28.859	106.581
Nigeria	-0.872	24.625	73.070	1	14	30	30	11.081	10.533	8	14.121	0	7.536	0.805	17.863	5.028	100.933	0.173	13.316
Nigeria	-0.872	17.344	68.650	1	16	30	30	13.372	9.743	7	11.812	0	7.589	5.423	8.240	5.054	101.673	0.252	22.553
Nigeria	-0.872	24.629	68.590	1	19	30	50	15.663	10.288	6	9.503	0	7.629	4.054	5.382	5.080	92.902	0.492	27.445
Nigeria	-0.872	14.233	66.700	1	22	30	40	17.955	11.971	4	7.194	0	7.663	3.492	11.578	5.106	83.760	0.798	41.657
Nigeria	0.651	6.220	31.250	1	22	30	40	4.080	13.297	5	37.253	0	7.704	4.126	11.538	5.133	84.993	0.810	47.958
Nigeria	1.235	8.303	32.100	1	27	30	40	1.490	6.521	14	20.143	0	7.752	5.000	13.720	5.160	84.719	1.204	54.661
Nigeria	-0.330	20.290	32.220	1	25	30	40	10.618	5.699	17	5.772	0	7.773	2.119	10.841	5.186	90.248	1.688	57.961
Nigeria	1.263	19.707	27.500	1	24	30	40	10.821	8.408	20	3.705	0	7.789	1.524	12.217	5.213	91.659	1.757	66.798
Nigeria	-0.797	36.816	22.740	1	24	30	40	10.392	7.945	19	3.393	0	7.814	2.615	8.476	5.240	93.675	1.694	73.292
Nigeria	1.459	39.334	21.500	1	23	30	40	10.423	9.339	18	2.960	0	7.849	3.520	8.057	5.267	95.691	2.335	77.842
Nigeria	0.881	35.706	19.320	1	25	30	40	12.376	9.148	17	4.861	0	7.849	-0.022	9.018	5.293	97.708	2.616	82.186
Rwanda	-1.266	21.748	49.500	0	10	30	30	14.221	8.010	53	15.335	0	6.065	7.280	9.014	5.898	136.598	0.309	2.365
Rwanda	-1.266	29.093	47.090	0	10	30	50	14.401	8.290	54	13.647	0	6.130	6.683	8.883	5.922	142.715	0.309	3.252
Rwanda	-0.519	31.433	40.400	0	21	30	40	14.581	6.770	39	11.959	0	6.178	4.947	9.081	5.948	145.851	0.309	6.397
Rwanda	-0.204	11.598	36.490	0	25	30	40	14.761	6.720	43	10.271	0	6.257	8.173	15.445	5.975	143.384	0.309	12.938
Rwanda	0.278	29.573	39.260	0	28	30	40	14.941	8.540	24	8.583	0	6.290	3.419	10.394	6.002	143.793	0.601	23.071
Rwanda	0.501	25.968	41.610	0	30	30	40	13.768	7.100	16	7.332	0	6.334	4.470	2.309	6.029	142.341	0.683	32.748
Rwanda	0.005	25.275	39.550	0	33	35	40	15.585	7.960	13	5.593	0	6.383	5.028	5.671	6.055	141.691	0.951	39.897
Rwanda	-0.006	17.061	33.310	0	40	35	40	15.384	10.040	10	5.106	0	6.442	6.088	6.271	6.081	141.301	2.132	49.667
Rwanda	0.683	13.542	35.910	0	50	30	40	13.626	8.580	7	5.933	6	6.463	2.086	4.235	6.106	137.743	2.711	56.801
Rwanda	1.084	17.370	29.880	0	47	30	40	13.668	7.757	4	5.224	6	6.511	4.962	1.784	6.131	133.582	3.878	64.025
Rwanda	1.977	15.192	25.860	0	53	30	40	14.693	7.589	1	5.906	6	6.572	6.212	2.518	6.156	132.550	4.127	70.483
Seychelles	-0.604	16.477	27.710	0	45	50	30	6.384	3.720	52	6.399	0	9.154	8.502	0.907	5.194	109.065	482.754	67.520
Seychelles	-0.393	38.534	27.690	0	45	50	30	6.668	2.456	57	4.364	0	9.223	7.153	-0.353	5.214	107.244	520.095	79.742
Seychelles	-0.649	25.774	42.790	0	45	50	30	6.952	3.069	60	2.330	0	9.317	9.859	5.321	5.220	107.717	540.966	86.699
Seychelles	-0.567	19.887	61.010	0	45	50	30	8.602	3.966	65	2.029	0	9.273	-4.311	36.965	5.242	107.738	724.504	103.975
Seychelles	-0.337	20.234	46.670	0	45	50	30	9.890	9.767	61	3.776	0	9.258	-1.493	31.754	5.246	107.921	790.396	122.181

Seychelles	-0.362	26.957	53.430	0	48	50	30	9.232	2.860	63	5.466	0	9.288	3.037	-2.405	5.274	110.671	######	128.922
Seychelles	-0.112	19.762	71.180	0	48	50	30	9.026	2.083	67	8.123	0	9.390	10.761	2.559	5.247	110.399	######	137.903
Seychelles	1.333	20.873	61.620	0	48	50	30	9.941	3.298	65	9.009	0	9.444	5.570	7.110	5.257	108.844	######	147.803
Seychelles	0.952	22.269	59.780	0	48	50	30	9.228	3.429	63	9.221	0	9.484	4.109	4.339	5.276	105.981	611.458	147.343
Seychelles	1.365	18.427	44.780	0	49	50	30	8.255	2.333	61	7.990	0	9.501	1.722	1.386	5.291	104.148	470.671	162.193
Seychelles	1.226	18.228	36.900	0	54	50	30	11.107	3.161	59	7.588	0	9.514	1.216	4.042	5.314	102.291	481.701	158.120
South Africa	-0.495	3.663	19.250	1	44	50	50	2.755	6.043	22	1.522	5	8.820	3.939	3.399	3.670	99.591	20.207	70.405
South Africa	-0.495	3.413	19.360	1	46	50	50	3.730	7.138	21	1.708	5	8.861	4.231	4.642	3.683	98.187	22.889	81.076
South Africa	-0.495	3.910	18.170	1	45	50	60	4.705	9.153	23	1.907	5	8.900	3.959	7.098	3.696	98.649	30.214	85.277
South Africa	-0.494	4.098	18.190	1	46	50	60	5.680	11.613	21	3.922	6	8.918	1.788	11.536	3.710	97.718	36.160	89.521
South Africa	-0.494	4.047	16.640	1	51	50	60	6.655	8.537	22	5.936	6	8.889	-2.906	7.130	3.724	96.876	39.677	91.249
South Africa	-0.494	4.503	17.280	1	49	50	60	7.046	6.465	22	5.792	6	8.904	1.577	4.257	3.738	96.254	61.378	97.900
South Africa	-0.494	4.639	21.780	1	47	50	60	7.227	5.673	25	4.681	6	8.922	1.787	5.000	3.753	96.316	72.241	123.198
South Africa	-0.494	4.067	18.070	1	45	50	60	7.789	5.437	24	4.043	6	8.929	0.700	5.654	3.768	97.630	81.647	130.558
South Africa	0.566	4.123	18.650	1	41	50	60	7.920	5.153	23	3.641	6	8.938	0.941	5.752	3.783	98.502	85.816	145.644
South Africa	2.626	4.036	21.190	1	42	50	60	7.577	5.801	22	3.245	6	8.940	0.132	6.067	3.799	99.723	115.242	149.194
South Africa	1.258	3.804	22.910	1	42	50	60	7.038	6.153	21	3.122	6	8.937	-0.294	4.588	3.814	100.945	129.844	164.512
*Swaziland	-0.622	5.720	15.410	1	30	50	50	4.059	4.013	80	0.034	4	8.135	4.962	4.774	4.163	103.145	1.809	18.105
*Swaziland	-0.622	7.921	30.520	1	30	50	50	5.717	4.930	81	0.054	4	8.180	4.607	5.305	4.177	108.172	4.462	22.356
*Swaziland	-0.622	9.276	24.860	1	27	50	50	7.375	7.054	83	1.992	4	8.208	2.791	8.076	4.193	110.463	4.392	33.481
*Swaziland	-0.622	10.323	32.870	1	25	50	40	9.033	8.167	81	3.931	4	8.198	-0.959	12.657	4.210	110.637	5.177	46.072
*Swaziland	-0.622	13.424	45.390	1	33	50	40	10.691	5.403	88	5.869	4	8.195	-0.308	7.448	4.229	110.812	4.235	56.611
*Swaziland	-0.622	15.733	45.090	1	36	45	40	12.349	3.853	84	7.807	4	8.213	1.881	4.509	4.248	115.773	9.976	60.831

*Swaziland	-0.622	12.098	34.470	1	36	40	40	12.233	2.850	76	3.527	4	8.217	0.377	6.105	4.266	114.995	13.058	63.238
*Swaziland	0.836	12.062	30.590	1	32	40	40	12.547	2.465	78	10.671	4	8.245	2.814	8.940	4.285	114.340	6.409	65.395
*Swaziland	0.840	10.653	25.740	1	31	40	40	11.947	2.080	100	6.793	4	8.293	4.899	5.620	4.303	113.267	8.651	71.468
*Swaziland	0.928	11.804	20.210	1	32	40	40	12.613	2.140	122	6.871	4	8.316	2.343	5.685	4.321	112.766	10.038	72.320
*Swaziland	2.374	13.935	24.900	1	39	40	40	12.911	2.270	144	6.630	4	8.312	-0.376	4.954	4.340	112.265	15.163	73.200
Tanzania	-1.037	27.022	70.910	1	25	30	70	11.726	4.733	92	20.081	0	6.415	4.993	5.035	3.795	103.596	0.025	7.634
Tanzania	-1.037	23.260	66.610	1	28	30	70	11.442	6.727	93	17.633	0	6.430	1.512	7.251	3.826	106.635	0.025	14.043
Tanzania	-0.874	28.673	61.380	1	29	30	50	11.157	8.680	87	15.186	0	6.480	5.136	7.026	3.857	108.271	0.072	20.068
Tanzania	-0.699	21.509	38.040	1	29	30	50	10.873	8.253	56	12.739	0	6.503	2.287	10.278	3.889	108.750	0.185	30.710
Tanzania	-0.350	29.779	39.590	1	32	30	50	10.589	7.972	54	10.291	0	6.523	2.098	12.142	3.920	102.800	0.224	40.031
Tanzania	0.034	28.867	27.770	1	30	30	50	10.304	6.566	45	7.844	0	6.553	3.055	6.200	3.952	98.955	0.390	46.658
Tanzania	0.341	28.827	35.600	1	26	30	50	10.020	6.777	40	5.396	0	6.598	4.570	12.691	3.983	93.470	0.483	55.370
Tanzania	0.606	25.472	34.810	1	27	30	50	10.062	9.512	39	6.402	0	6.617	1.907	16.001	4.015	90.105	0.733	56.964
Tanzania	0.906	24.333	20.980	1	30	30	50	10.614	9.818	47	5.115	0	6.656	3.978	7.871	4.046	86.768	1.047	55.718
Tanzania	1.304	24.577	20.410	1	29	30	50	10.346	9.855	55	6.584	0	6.692	3.698	6.132	4.077	83.718	1.493	62.774
Tanzania	1.843	26.092	24.140	1	33	30	50	11.109	9.897	63	8.583	0	6.729	3.699	5.588	4.108	81.706	2.023	75.856
Uganda	-0.908	32.865	48.720	1	22	30	70	9.433	8.793	89	2.139	0	6.174	2.699	8.449	4.962	122.712	0.035	4.579
Uganda	-0.908	25.699	46.410	1	26	30	70	9.957	9.085	95	2.752	0	6.242	7.011	7.311	4.996	121.157	0.068	6.761
Uganda	-0.908	21.586	36.220	1	25	30	70	9.376	9.262	95	3.932	0	6.288	4.727	6.139	5.031	119.947	0.065	13.653
Uganda	-0.908	20.141	29.180	1	27	30	70	11.779	10.671	86	2.090	0	6.337	5.024	12.051	5.066	122.433	0.221	26.920
Uganda	-0.908	21.566	23.780	1	28	30	60	11.946	9.753	89	3.974	0	6.368	3.128	13.017	5.100	123.236	0.305	28.553
Uganda	0.248	20.220	22.090	1	26	30	60	11.338	7.687	89	1.862	0	6.389	2.103	3.977	5.131	120.252	0.855	37.744
Uganda	0.738	17.083	27.810	1	25	30	60	12.835	13.018	80	2.032	0	6.445	5.764	18.693	5.165	112.378	1.482	47.505
Uganda	0.920	21.886	27.960	1	25	30	60	12.733	16.228	81	4.056	0	6.448	0.383	14.016	5.199	111.757	1.460	45.002
Uganda	0.781	25.301	32.440	1	24	30	50	12.368	11.841	85	5.757	0	6.450	0.135	5.464	5.233	109.886	1.172	48.082
Uganda	1.070	27.449	33.990	1	24	30	40	13.018	10.810	89	4.011	0	6.467	1.779	4.288	5.266	108.016	1.571	52.429
Uganda	1.689	22.636	33.600	1	26	25	40	13.039	12.768	93	5.127	0	6.483	1.563	5.225	5.299	106.145	1.868	50.373
Zambia	-1.336	50.925	57.335	1	25	50	50	9.342	11.189	69	37.061	0	7.010	4.385	18.324	2.786	110.587	0.166	8.279
Zambia	-1.264	51.108	53.711	1	26	50	50	9.271	10.325	70	32.613	0	7.059	5.017	9.020	2.813	112.242	0.081	14.118

Zambia	-0.850	35.527	46.788	1	26	40	50	9.200	9.216	88	28.166	0	7.112	5.436	10.657	2.840	113.686	0.079	21.793
Zambia	-0.316	34.106	39.993	1	26	40	50	9.129	6.551	99	23.718	0	7.159	4.837	12.446	2.868	115.030	0.306	28.411
Zambia	-0.053	36.708	42.577	1	26	30	50	9.058	7.090	100	19.271	0	7.219	6.186	13.395	2.896	108.844	0.669	34.360
Zambia	0.142	50.694	42.237	1	28	30	50	8.987	7.400	99	14.824	0	7.288	7.164	8.502	2.925	107.598	1.155	41.212
Zambia	0.361	22.599	37.829	1	30	30	50	8.916	7.023	99	10.376	0	7.313	2.496	6.429	2.954	109.018	1.472	59.885
Zambia	0.686	30.400	33.827	1	30	30	50	10.976	7.000	99	8.105	0	7.356	4.412	6.576	2.984	109.211	2.245	74.775
Zambia	1.033	34.566	33.741	1	32	30	50	13.484	6.491	99	6.958	5	7.375	1.917	6.978	3.015	103.653	2.640	71.505
Zambia	1.397	38.526	33.273	1	31	30	50	15.991	7.877	99	5.811	5	7.391	1.561	7.812	3.045	98.095	3.457	67.338
Zambia	1.351	40.044	40.864	1	38	30	50	18.499	8.992	99	4.664	5	7.389	-0.146	10.101	3.075	92.538	4.348	74.472
Equatorial Guinea	-1.051	221.244	82.600	0	10	30	50	1.513	4.917	46	6.233	0	9.677	11.738	5.632	3.296	96.204	1.152	16.052
Equatorial Guinea	-0.652	172.020	85.940	0	10	30	50	1.709	4.333	61	5.930	0	9.706	2.960	4.416	3.341	91.186	1.152	19.308
Equatorial Guinea	-0.575	149.302	88.180	0	19	30	60	4.032	4.250	67	5.628	0	9.802	10.124	2.804	3.387	86.167	1.152	23.451
Equatorial Guinea	-0.513	60.414	86.270	0	21	30	50	6.355	3.750	74	5.325	0	9.920	12.496	6.552	3.433	81.148	1.152	27.355
Equatorial Guinea	-0.465	83.115	90.990	0	19	30	40	8.678	3.250	81	5.023	0	9.888	-3.193	4.691	3.478	80.705	1.100	29.549
Equatorial Guinea	-0.193	98.978	90.930	0	17	20	40	11.001	3.250	88	4.720	0	9.749	-12.945	7.789	3.524	81.562	2.103	57.355
Equatorial Guinea	-0.172	66.968	76.290	0	18	20	40	13.324	3.250	95	4.418	0	9.768	1.897	4.805	3.568	81.546	2.011	66.880
Equatorial Guinea	0.690	190.236	224.560	0	19	20	40	10.569	3.250	102	5.768	0	9.804	3.693	3.657	3.612	84.457	0.963	68.054
Equatorial Guinea	0.653	117.684	85.700	0	19	15	30	11.054	3.208	109	20.130	0	9.719	-8.127	2.949	3.654	82.678	0.923	67.473
Equatorial Guinea	1.397	112.100	85.700	0	17	10	30	11.755	2.600	116	19.735	0	9.671	-4.711	4.310	3.695	80.899	2.656	66.388
Equatorial Guinea	2.076	66.008	85.700	0	19	10	30	13.348	2.450	123	16.799	0	9.535	-12.682	1.668	3.735	79.120	2.552	66.719

*Note that Swaziland represents eSwatini which is new name of the country announced on 19 April 2018.