Access to financial services: Towards an understanding of the role and impact of financial exclusion in Sub-Saharan Africa

By

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Thesis Presented for the Degree of

Doctor of Philosophy

in the Faculty of Commerce,

Department of Finance and Tax

University of Cape Town

August 2017

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Declaration

I, Godfrey Ndlovu, do hereby declare that the work presented in this thesis, is my own, except where acknowledged and that this thesis or any part of it, has not been previously submitted for the award of a degree at any university.

Signed ……..…… Date ……..

Godfrey Ndlovu

Abstract

This thesis investigates the nature and extent of financial inclusion in Sub-Saharan Africa (SSA). It sequentially investigates this in three related studies. The first study examines the impact of access to finance on poverty, while the second investigates the extent to which cross-country structural and macroeconomic variations contribute to the observed variations in the levels of financial inclusion. Finally, because both financial inclusion and financial stability have been embraced as key policy initiatives over the past decade, the third study examines the nature of relationship between these two policy goals.

The first paper uses household-level data from FinScope Surveys conducted in eight SSA countries between 2014 and 2015 to examine the impact of access to finance on household wealth. The few studies which have looked at this relationship in the past apply a linear estimation and thus inadvertently assume a uniform distribution across all levels of poverty. This study examines the heterogeneous impact of access to finance along the entire wealth distribution line using a Re-centered Influence Function (RIF) regression model. Further, to eliminate potential endogeneity, an instrumental variable quantile approach is implemented. Results from both estimations indicate that the unconditional effect of access to finance on poverty is non-monotonic. For most of the countries, the effect is highest at the median level, and very low at the bottom of the wealth index. This suggests that the extension of formal financial services disproportionately benefits the middle-class more than the very-poor and rich categories.

The second paper uses macroeconomic data obtained from various World Bank databases over the period 2004-2014 to examine the extent to which the observed cross-country variations in financial inclusion are mirrored by country-specific structural and macroeconomic characteristics. To conceptualize, the study uses a benchmark model to establish the optimal level of financial inclusion given the country's fundamentals, and thus provide a meaningful cross-country comparison. The key structural and policy factors that determine the extent of the gap between the actual and predicted levels of access to finance are analysed via a fixed-effects model based on selected SSA countries. The results suggest the existence of a gap in access to finance within the region, compared to their potential. The gap is wider in banking systems with high concentration, low proportion of foreign banks and poor economic conditions.

The final paper empirically examines the theoretical ambiguity between financial inclusion and stability. Theory provides conflicting views on whether the two are complementary, or mutually exclusive. This paper examines this dynamic relationship via a system-GMM panel estimation model using a panel of 40 countries from the SSA region over the period 2004-2014, while controlling for both bank-specific and macroeconomic-wide factors. The results indicate that financial inclusion has a positive impact on bank stability, however, high market power within the banking systems and poor institutional framework tends to undermine the impact of financial inclusion on stability.

Overall, the results provide evidence that the existing portfolio of formal financial services does not provide sustainable solutions to poverty eradication in terms of meeting the unique needs of the poorer members of the societies. This ultimately widens the gap between the poorest and the middle-class which further complicates the poverty structure. Therefore, there is a need for more investment on improving both the range of existing product offering and the financial capabilities of the poor, in order to improve their participation in financial markets. Demand-side policies should focus on increasing the bankable population by improving both awareness and usage of financial services and products. Supply-side policies should seek to eliminate market frictions by reducing concentration levels, improve competiveness through relaxation of entry restrictions, and opening the market to foreign institutes and non-banking players, and thus improve innovation in both new products offering and service delivery. This work further argues that financial inclusion is not only a developmental or welfare issue, but has positive ramifications on the banking system. Therefore, to be effective financial inclusion policies should adopt a market systems approach to development, which recognizes the importance of support structures and seek to benefit the poor by incentivizing service providers to improve product quality, variety and returns, and thus create value throughout the value chain. An effective approach should also embrace the role of macro-prudential regulatory and supervisory framework, as an indispensable tool, not only in governing the behaviour of financial services providers, but because of its efficacy in building consumer confidence- a key element for increased access and usage of financial services.

Dedication

To my mom and my late dad, your investments and sacrifice have taken me this far.

Acknowledgements

I would like express my sincere appreciation to Dr Chipo Mlambo, who assisted me to nurse the idea of this write-up from its embryonic stage. Her comments and suggestion have been invaluable.

I am grateful to my supervisor, A/Professor Francois Toerien for his untiring efforts, the inspiration and guidance he brought throughout this journey. Without him this work would not have been a success.

I would also like to thank the organizers and participants at the *Economic Research Southern Africa (ERSA) -Politics, Finance and Growth Conference held from 30-31 March 2016, South African Reserve Bank, Pretoria*, the organizers and participants at the *Global Development Finance from 23-24 November 2016 in Durban*, the organizers and participants at the *ERSA Day-Ahead Event Banking in Emerging Markets, held from 8-9 December 2016, at the GSB, UCT, Cape Town* for their invaluable comments on the first draft of Chapter two and four of this work The current version of both chapters benefited immensely from their views and comments.

I would like to acknowledge the support from FinMark Trust employees and management, who assisted me with the survey data used in Chapter 2 of this study.

The loving support I got from my lovely wife, my family, colleagues my friend Sabre and his wife. I am really grateful of your emotional and physical support in ways I had never thought possible.

Above all I would like to thank the National University of Science and Technology (NUST) staff, the Department of Finance members for allowing me to take time off and over burden them with extra work, and best for all, the financial support through the scholarship awarded by the NUST. I am really grateful.

Table of Contents

List of Figures

List of Tables

Chapter 1 : Introduction and Background

1.1 Introduction

Over the past decade there has been a world-wide policy shift towards promoting greater access to finance, resulting in a number of key development institutions such as The World Bank, the International Monetary Fund (IMF), the African Development Bank (AfDB), Asian Development Bank (ADB), and the Organization for Economic Co-operation and Development (OECD), amongst others[1], devoting a significant proportion of their funding and research activity towards promoting and understanding access to finance or financial inclusion. As such access to finance or financial inclusion has emerged as one of the top agenda items at both international and country-level discussion forums. Despite this effort, there still remains a lot of ambiguity on the relationship between access to finance and key development indicators.

Research evidence suggests that about 2 billion people around the world lack access to formal financial products and services; 88% of these are in Africa, Asia, Latin America and the Middle East (Chaia et al., 2013; Demirgüç-Kunt, et al., 2015; World Bank, 2014b). In a cross-country analysis, Kendall, Mylenko, and Ponce (2010) established that in developed countries there is an average of 3.2 bank accounts per adult, and 81% of adults are considered to be banked. Recent evidence suggests that in high income OECD countries, only 6% of the adult population lack access to financial services, with universal access existing in some countries[2] (Demirgüç-Kunt, et al., 2015). By contrast, in developing countries, there are 0.9 accounts per adult representing about 54% of the adult population (Demirgüç-Kunt et al., 2015).

However, in Sub-Saharan Africa (SSA) about 80% of the adult population is financially excluded, and only 22%[3] of the adult population has an account with a financial institution (Chaia et al., 2013; Demirguc-kunt & Klapper, 2013a; Demirgüç-Kunt et al., 2015). Although the SSA region has, on average, higher bank account penetration than the Middle East and North African (MENA) region (were 14% of the adult population has a bank account), there exist wide heterogeneity in account ownership across countries within the region. Whereas in

[1] See, for example Beck, Demirgüç-kunt, & Martinez Peria (2007); Beck, Torre, & de la Torre (2007); World Bank (2010); Klapper & Singer (2013); World Bank (2014); Triki & Faye (2013), amongst others

[2] In Australia, Canada, Germany, Netherlands and the United Kingdom 99% of the adults have a bank account, whereas in Denmark, Finland, New Zealand and Norway, 100% adults have a bank account (Demirgüç-Kunt et al., 2015)

[3] The figure increases to 34% if we consider mobile bank account ownership

countries like Mauritius, Kenya and South Africa respectively about 82%, 75% and 70% of the adult population has a formal bank account in Burundi, Guinea and Niger only 7% have a bank account (Demirgüç-Kunt et al., 2015)[4].

Until recently, the SSA region has for over a decade recorded an unprecedented high economic growth rate- ranked one of the highest in the world- despite the gloomy state of the global economy (IMF, 2013a, 2013b). As a result, the region has drawn a lot of interest from investors, researchers and other stakeholders as they seek to either take advantage of this growth trajectory or better understand the growth dynamics within the region. Empirical evidence indicates that financially inclusive economies tend to record economic growth and a significant reduction in poverty (Beck, Demirgüç-Kunt, & Levine, 2007). However, the SSA region has the greatest proportion of population living in extreme poverty. It is the only region which has been recording an increase in poverty over the past two decades, with the poor getting worse-off compared to other world regions (SESRTCIC, 2007; Simmons, 2015). Therefore, although improved access to financial services is a global challenge, the situation in the SSA region poses a unique economic challenge, not only because the region ranks among the lowest in terms of financial access compared to other regions, but also because of the heterogeneity that exists within the region and the seeming anomaly between the level of access to finance and economic growth.

Financial exclusion (or lack of access to finance) refers[5] to developments that prevent poor and disadvantaged social groups from gaining access to the mainstream financial system. It refers to a lack of, or an inability to, access basic financial products and services, and has been traditionally measured as access to a basic bank account (Beck & de la Torre, 2007; Beck, Demirgüç-Kunt, & Martinez Peria, 2007; Osei-Assibey, 2009). Financial exclusion has been observed to be worse in the presence of limited geographical outreach, exorbitant prices,

[4] These figures are based on The World Bank's Global Financial Inclusion Index (Global Findex) whose approach to deciphering whether an individual is financially included or not is different to FinScope. The numbers for Global Findex tend to be higher due to the manner in which the questions are asked.

[5] A widely accepted taxonomy of financial exclusion is by Collard, Kempson, and Whyley (2001); Kempson and Whyley (1999) and Kempson et al., (2000) who suggest that exclusion is usually an outcome of the following:

- *Access exclusion*: restricted access as a result of risk assessment measures by service providers.
- *Condition exclusion:* attaching certain conditions to services which make them unsuitable for other societal members.
- *Price exclusion*: pricing of services/products at unaffordable prices to some people.
- *Marketing exclusion*: use of target marketing which effectively excludes some people.
- *Self-exclusion:* voluntarily non-use of financial services, e.g. due to past experience, religion, perception, etc.

market segmentation, and poor household socio-economic factors (Kempson & Whyley, 1999; Kempson, Whyley, Collard, & Caskey, 2000).

The economic importance of improved access to financial services[6] hinges on three key perspectives. Firstly, from an *investment theory perspective*, improved access to finance facilitates new project investment (Beck & Demirgüç-Kunt, 2006; Claessens & Tzioumis, 2006). Therefore, a reduction in financial exclusion increases overall investment levels within an economy, which ultimately results in improved economic growth and development (Beck & Demirgüç-Kunt, 2008; Demirgüç-Kunt, Beck, & Honohan, 2008). Secondly, from the perspective *human-capital theory*, which hinges on the idea that development in human capital is fundamental for sustainable growth (see, for example, Bergheim, 2005; Evans, Green, and Murinde, 2002 and Schultz, 1961) access to finance improves household investment in human capital through improvements in schooling, attainment of university education, etc., leading to better paying jobs, with further ramifications on poverty (Grier, 2002, 2005). A study by Arora (2012), using data from 21 developing countries in the Asia over the period 2000-2010, found the existence of a positive and statistically significant association between human capital development and access to banks. Therefore, with poor or limited access to finance, development in human capital can only be an elusive dream (Pani & Jafar, 2010; Arora, 2012). Finally, from a *firm-behaviour perspective,* financial inclusion (the opposite of financial exclusion) has positive externalities on the economy, including a reduction in the total cost of capital (as it reduces the use of costly middlemen), ultimately leading to increased production and employment opportunities**.** Further, theory and evidence have shown that small-to-medium scale business enterprises (SMEs), by their structure, lack access to finance (*e.g.* Banerjee and Newman, 1993; Galor and Zeira, 1993; Aghion and Bolton, 1997; Beck, et al., 2005). Therefore, considering that SMEs are primarily individually or family owned, improvements on access to finance at household level is key for overall economic performance.

A lack of access to finance leads to reduced participation in economic activity and hence in reduced wealth accumulation, and thus denies 'financial citizenship' to the affected societal members (Dymski, 2005b). This mainly affects the poorer and more disadvantaged members of society, and is a significant barrier to economic growth and development (Beck, Demirgüç-Kunt, & Peria, 2008). Theory and anecdotal evidence suggests that access to financial

[6] Although financial inclusion is broader than access to finance, the two are often 'loosely' used interchangeably

services is an integral element of poverty alleviation, social inclusion and economic growth (Beck & Cull, 2014; Beck, Demirgüç-Kunt, et al., 2008; Demirgüç-Kunt, Beck, & Honohan, 2008; Triki & Faye, 2013). Therefore, elimination of financial exclusion is a key development policy initiative[7].

Although the situation in Sub-Saharan Africa (SSA) has improved, poverty remains a major challenge in most countries, and as a result poverty alleviation has always been a top priority for both governments and many non-government organisations. Evidence suggests that improvements in the financial sector potentially impact positively on poverty reduction, asset accumulation, efficient risk management and entrepreneurial development opportunities (Tejerina, Boullion, & Demaestri, 2006). As such, the removal of financial market friction has been viewed as key to poverty elimination and economic growth. Despite the existence of extensive empirical literature linking financial development, in general, with other developmental outcomes there is, however, limited empirical evidence on the possible link between financial inclusion and poverty. It is, for example, not clear how improvements in financial inclusion affect wealth at household or individual level.

Unfortunately, the existing literature on the relationship between financial inclusion and poverty is biased towards access to credit. Although access to credit is important for increasing both current consumption and investment, it is access to savings and payment systems that help households and individual to grow both current and future consumption levels and thus break the poverty cycle. The few studies that seek to go beyond the impact of access to credit, and thus examine the relationship between broad access to finance and poverty often apply a linear estimation (Honohan & King, 2013), and thus inadvertently assume a uniform effect across all poverty levels. However, economic theory suggests that the relationship may be non-linear. With the wide variations in the level of financial inclusion across countries within the SSA region, an understanding of the extent to which poverty depends on initial levels of financial inclusion is paramount. Therefore, it is important to clearly identify whether financial

[7] Following the G20 Pittsburgh Summit in 2009, where the G20 leaders first expressed commitment to improved access to finance for the poor and SMEs and the subsequent institution of the Financial Inclusion Experts Group (FEIG), financial inclusion has increasingly been recognized as key to global development. In 2010, the G20 developed and endorsed *The G20 Principles for Innovative Financial Inclusion*. In 2011, the Alliance for Financial Inclusion (AFI) endorsed the *Maya declaration,* where a number of countries throughout the world committed to development and implementation of country specific targets, policies and regulations to foster financial inclusion. In 2015, the World Bank Spring Meeting pushed for universal access to financial services by 2020. For more details see http://www.afi-global.org/about-us; http://www.worldbank.org/en/events/2015/04/06/universal-financial-access-2020 and Kimenyi & Songwe (2012)

inclusion equally benefits the entire population (*i.e.* has a linear effect), or whether it has a disproportionate impact on the economic well-being of the lower quantiles or the upper quantiles. If access to finance does not have a uniform effect, efforts aimed at improving access to finance may either alleviate poverty, or negate the benefit of financial inclusion for the poorest members of the society. Examining how the impact varies across the different levels of the poverty continuum potentially provides meaningful insights on the interventions aimed at improving access to finance, and thus provides a better guide for both policy formulation and strategy implementation.

Although improved access to finance may be beneficial, there is a need to balance the trade-off between too much and too little access to finance. Existing theory on access to finance suggest the existence of structural limits in terms of both demand and supply of financial services, *i.e.* the so-called *access possibilities frontier* (see Beck and de la Torre, 2007; De la Torre, Feyen, and Ize, 2013 for more details). The theory proposes that, in the absence of effective macro-prudential regulatory oversight, the supply of financial services can 'overshoot' the equilibrium, resulting in too much supply for the given population, *i.e.* where the bankable population[8] is less than the banked population. This is often the case if a country lags behind in key institutional factors or has a highly under developed financial system; thus further increasing systemic risk. Demand deficiency has been viewed as an outcome of non-economic factors. For example, due to religious factors or lack of financial sector confidence, the demand curve may shift to a point where the observed equilibrium is below its expected level. This disequilibrium problem becomes more complicated where there is a deficiency in both the supply and demand of financial services, which results in both movements in the demand and/or the supply curve, thus resulting in a market equilibrium point which is different from the expected equilibrium. The interactive relationship between supply and demand of financial services, becomes even more significant in the SSA region, where most countries face the triad challenge of under developed financial systems, low access to financial services and a poor macroeconomic environment.

Therefore, based on the above, in the provision of financial services, there seems to be a limit to the amount, the extent and the range of financial services given the country's level of development. This limit is determined by a number of factors which include the extent of financial services usage (demand), the provision of financial services (financial system

[8] Bankable population refers to the proportion of the population that can be reached by a financial system's savings and payment services.

supply), the efficacy of policy interventions and the overall macroeconomic environment. Indeed both theoretical and empirical evidence suggests that improvements in the financial system can potentially become too big in relation to the economy it seeks to support (Arcand, Berkes, & Panizza, 2015; Beck & Feyen, 2013; Law & Singh, 2014; Pagano, 2012). As such, given the level of both financial market development and economic development in most developing countries, it is almost expected that the problem of supply is an interaction of both demand and supply-related factors. Therefore, in order to address the problem of access to finance, there is a need to understand the optimal level (or equilibrium) of access, and thus benchmark countries based on their characteristics, in order to identify the extent to which a country is under- or over-performing in terms of access to finance. Besides identifying or classifying whether countries are above or below the frontier, benchmarking is also an effective way for both identification and crafting of key policy interventions necessary to remedy the situation.

However, existing research tends to examine financial system development and access to financial services independently. Research on financial system development has focused mainly on its determinants and its causal relation to other key indicators, such as economic growth and stock market development[9]. On the other hand, research on access to financial services focuses on the relationship between financial inclusion and micro-level development outcomes such as savings, consumption, entrepreneurship and reduction in financial constraints[10]. As a result there is limited empirical evidence on the relationship between financial inclusion and macro-level development, specifically on the extent to which financial system development impacts on access to finance. However, although anecdotal evidence suggests that the high level of financial inclusion observed in advanced economies is partly due to highly developed financial system, the extent to which this has contributed to financial inclusion (or exclusion) has not yet been statistically explored.

Researchers and policy makers have always been cognizant of the double-edged impact of finance (see, for example, Arcand et al., 2015; Law & Singh, 2014; Samargandi, Fidrmuc, & Ghosh, 2015). Although improved access to finance is good, and too little of access to finance may stifle growth and development, too much of access to finance may result in financial

[9] See, for example, Beck, Levine, and Loayza (2000); Haiss, Juvan, and Mahlberg (2016); King and Levine (1995); Levine, Loayza, and Beck (2000) and Levine and Zervos, (1998)

[10] These include Aterido, Beck, and Iacovone (2013); Banerjee, Duflo, Glennester, and Kinnan, (2015); Honohan and King (2013); Mckenzie and Woodruff (2008); Rhine and Greene (2006); and Swamy (2014).

fragility, and therefore effective policy on financial inclusion should strive to balance the trade-off between access to finance and fragility. The global financial crisis of 2007-2008, besides highlighting the need for greater financial stability, provides a good example of the catastrophic impact of excessive systemic risk undermining financial stability in the expansion of financial services to unbanked and under-banked. Following the crisis, both financial stability and expansion of financial services have become key policy concerns, and a number of central banks are including both elements as part of their mandates. However, theoretical postulations seem to be divided on whether the two are complementary, and thus reinforcing each other, or whether they are mutually exclusive policy initiatives which cannot be simultaneously pursued. It would appear that one of the greatest challenges faced by policy makers ever since the rise of the financial inclusion agenda, has been identifying ways of fully embracing financial inclusion without compromising financial stability. In the extension credit services, the issue of stability is not much of a problem as, by default, there is a prudential limit, since not all consumers are credit worthy (Cull, Demirgüç-kunt, & Lyman, 2012). However, this is not the case with the expansion of savings, deposits and other financial services, which could potentially threaten financial stability. However, the extent to which financial inclusion affect stability has not been empirically explored.

Early studies on financial exclusion focused on household-level and macroeconomic determinants of access to finance based on country-specific survey data from developed economies like the US, UK and Canada (*e.g.* Leyshon and Thrift, 1994; 1995; Marshall, et al. 1997; Dymski, 2005; Midgley, 2005), partly due to a lack of data from developing economies. Apart from these studies being geographically biased, there is also a mixed evidence on the 'real' impact of access to finance on developmental outcomes. Further, due to endogeneity and other related statistical constraints there has been very limited endeavour towards the quantification of cross-country variations with regards to the extent and degree of financial exclusion through robust econometric modelling techniques. Moreover, the limited availability of time-series data on financial inclusion indicators makes it impossible for researchers to trace variations in financial exclusion over time. Undoubtedly, such an exercise would help to better understand the trickle-down effect of access to finance, and the extent to which it hinges on country-specific structural and macroeconomic factors, and thus provide meaningful guidance on policies and strategies to eradicate financial exclusion.

In an attempt to understand financial exclusion, two main perspectives have emerged, namely the demand-side and supply-side perspectives. The demand-side perspective emphasizes

underlying household characteristics which determine their demand or use of banking services and relies on household survey data (*e.g.* Hogarth et al. 2004, Gimet and Lagoarde-Segot, 2011, Bhanot et al. 2012). The demand-side data has been found to be invaluable in understanding sub-optimality due to demand deficiency, as it facilitates the identification of household or individual level factors that affect demand. It also facilitates the disaggregation of various services used and categorization of users according to the various forms of finance services across the financial access strand (Triki & Faye, 2013). However, it does not address the key factors underlying financial service providers' service offering decisions specifically, it fails to explain why certain services are provided or not provided. This has resulted in piece-meal intervention mechanisms, which have seen the fostering of financial inclusion being left to governments or policy makers (as they seek to address the imbalance), nonetheless without yielding any good results as this tends to reduce overall efficiency, further complicating the problem.

On the other hand, the supply-side perspective seeks to understand specific features within the banking systems and the wider macroeconomic environment that foster financial inclusion (see *e.g.* Arora, 2014; Beck, Demirgüç-kunt, & Honohan, 2009). This helps to identify supply constrained sub-optimality in financial services provision, and thus assists in the development and initiation of specific strategies aimed at reducing exclusion in a profitable manner. It also helps to identify private sector initiatives aimed at addressing the imbalance in service provision, and policy deficiencies which affect both physical and institutional infrastructure development. Nevertheless, supply-side data does not expose certain household specific factors, such as the extent to which improved access help to move households along the poverty continuum. However, existing research on financial exclusion tends to treat the demand-side and supply-side perspectives independently, and thus fall short in bringing a holistic and balanced understanding of access to financial services. To the best of the author's knowledge, no study that has examined financial inclusion from a both supply and demand perspective. This study therefore, is based on the argument that for a more comprehensive understanding of financial exclusion there is a need to look at it on a wider perspective, using data from both the demand-side and supply-side.

According to the World Bank, in order to effectively evaluate the impact of financial inclusion, there is need to go beyond household or microenterprise level and to assess its impact on wider economic indicators (World Bank, 2007). The use of macro-economic data is therefore inevitable. Unfortunately, existing macro-level studies have focused on how financial

development affects poverty. Evidence from Asian countries that show a negative association between financial development and human capital development, and a positive association between access to finance and human capital development (Arora, 2012), suggests that findings from these studies may not be generalizable to access to finance. Generally, there is a dearth of empirical evidence on the link between household wealth-level and access to finance.

To the best of the author's knowledge, the present study is the first study to statistically model financial exclusion employing both demand-side and supply-side data across the SSA region. Although cross-country studies have certain limitations, they provide meaningful complementary evidence. As noted by Demirgüç-Kunt and Levine (2009) the results of cross-country studies become even stronger with the use of dynamic panel estimates and instrumental variables to eliminate omitted variables and identification problems. Furthermore, cross-country studies, besides eliminating country fixed effects and other problems associated with country-specific studies, help to capture both the direct and spill-over effects of access to finance, a key issue in the finance-poverty nexus (Demirgüç-kunt & Levine, 2009).

This study adopts the concept of econometric modelling for household saving behaviour and market structural analysis. It goes beyond a general typology of financial exclusion to examine the unconditional effect of access to finance along the poverty distribution line, to the analysis of the extent to which cross country variations in structural and macroeconomic conditions impact on the observed differences in financial inclusion and the extent to which financial inclusion affect the overall stability of the banking system. By using both cross-sectional and panel time series data, the study capitalizes on the insights of survey research and the predictive power of quantitative research, thus broadening the analysis and filling a gap in the literature to ultimately provide a more holistic insight into financial exclusion.

1.2 Justification of the study

Economic estimates indicate that the SSA region has the highest expected economic growth potential, after Asia, over the next five years, despite a negative environment resulting from a decline in commodity prices and unfavourable global financial markets (IMF, 2016, 2017; Zamfir, 2016)**.** A number of countries in the region have, for over a decade, consistently recorded unprecedentedly high levels of economic growth; thus creating optimistic expectations of future economic performance. As alluded to above, theory suggests that it is financially inclusive economies that are expected to display higher growth rates, which may

ultimately lead to reduction in poverty. Yet more than half of the region's population lives in poverty, and less than 24% has access to the formal banking system; in contrast to 94% and 50% of the adult population that have access to the formal banking system in high income countries and world-wide, respectively (Demirgüç-Kunt et al., 2015; Guièze, 2014; World Bank, 2013). The region has the greatest proportion of population living in extreme poverty. It is the only region which has been recording an increase in poverty over the past, with the poor getting worse-off compared to other world regions. Financial inclusion, as measured by the number of adult bank account holders, varies widely within the SSA region, both at country level and within the various sub-regions, and ranges from an average of 7% for countries like Burundi, Guinea, and Niger, to about 82% in Mauritius, and on a regional basis from around 11% in Central Africa to about 51% in Southern African countries (Guièze, 2014; Mlachila, Park, & Yabara, 2013). The SSA region has the highest levels of financial exclusion, even when compared to other countries in similar income groups (Allen et al., 2011; Aterido et al., 2013; Beck et al., 2008; Demirgüç-Kunt, Beck, & Honohan, 2008). As a result financial inclusion has become a top priority within the region, and a number of countries have committed to financial inclusion as part of their key policy initiatives[11].

Furthermore, apart from the above challenges, financial systems in the SSA region rank lower than the rest of the world on virtually all indicators of development (Čihák, Demirgüç-Kunt, Feyen, & Levine, 2013; Mlachila et al., 2013). The underdevelopment of financial systems is a risky constraint in light of financial services expansion to the unbanked poor. Notwithstanding their under development, financial systems in the SSA region are predominantly bank-based, resulting in banks expanding into the entire financial services provision landscape, thus blurring their distinction from other financial institutions (Moyo, Nandwa, Oduor, & Simpasa, 2014). The role of stock markets and other non-banking institutions as a source of alternative finance is largely insignificant throughout most of the region. Moreover, the duality of economic systems in SSA and the high concentration of

[11] The World Bank has come-up with Financial Inclusion vision 2020.Of the 26 countries in the Brookings Financial and Digital Inclusion Project (FDIP) 10 are from Africa, and, with the exception of Egypt all the African countries are from the SSA region, *i.e.* Ethiopia, Kenya, Malawi, Nigeria, Rwanda, South Africa, Tanzania, Uganda and Zambia Further, among the 56 world-wide countries, that have committed to crafting and implementing National financial inclusion strategies (NFIS) either through the Maya Declaration or the Financial Inclusion Strategy Peer Learning Group (FISPLG) , 22 are in SSA, see http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTGLOBALFINREPORT/0,,contentMDK:23491959~pagePK:64168182~piPK:64168060~theSitePK:8816097,00.html for list of countries. Although some countries have not committed they have overt policies for tackling financial exclusion.

financial service providers in urban areas, typically increases and complicates the nature and extent of financial exclusion.

The post-reform transformations in the countries' banking systems led to individual economies adopting various financial sector strategies in a bid to improve the role of the financial system in expanding access to financial services. Although some researchers argue that these reforms had some positive impacts on the financial system (see, for example, Mugume, 2007; Seck & El Nil, 1993; Tornell, Westermann, & Martinez, 2004, amongst others), in general there have been mixed findings on the impact of these reforms on the efficiency of the banking systems and financial deepening (see, for example, Ahmed, 2013; Brownbridge & Harvey, 1998; Fowowe, 2013; Musonda, 2008; Ziorklui & Barbee, 2015)[12]. Further, the post-reform state of access to financial services has not been empirically explored. Due to wide variations in financial sector development and economic development, a mere comparison of individual countries' level of access to finance may be misleading as it does not account for country-specific variations in levels of development**.**

Existing studies on financial inclusion tend to look at the problem of access to finance from a firm-level perspective, however recent evidence suggests that household finance has emerged as one of the key drivers of financial markets development. With an estimated population of 1.3 billion by 2030, the significance of household consumption dynamics in SSA and their impact on growth and development indicators cannot be underestimated. It is therefore important to examine the impact of household dynamics and variations in financial infrastructure on financial exclusion in order to develop and initiate relevant policies and strategies to address financial exclusion. It is therefore important to understand the extent to which these unique socio-economic dynamics contribute to the observed heterogeneity in terms of access to financial services.

This unique interaction between low financial inclusion, low financial market and economic development and poverty, within the SSA region, makes the region an interesting case study for understanding the relationship between financial inclusion and these development outcomes. Further, existing research suggests that policy makers often have different perspectives on the type of policies to foster financial inclusion, mainly due to lack of informed research evidence (Johnson & Williams, 2016). Therefore, results from this study seek to

[12] For a more detailed literature review on the effect of reforms see Fowowe (2013)

provide overarching guidelines for the crafting and implementation of policies aimed at the development of market conditions that promote financial inclusion

1.3 Research Objectives

In view of the above, this study seeks to achieve the following broad objectives in the context of SSA;

1. To assess the unconditional partial effect of access to finance on the distribution of household wealth, and thus examine its heterogeneous impact along the wealth distribution line.
2. To analyse the extent to which cross-country variations in financial inclusion are mirrored in individual country structural and macroeconomic characteristics and the extent to which the level financial development contributes to observed levels of financial inclusion .
3. To examine the extent to which pursuance of financial inclusion affects overall stability within the banking system.
4. To identify the key policies and strategies that should be initiated to ensure inclusiveness in economic growth, without negatively affecting supply and demand of financial services or stability within the banking systems.

1.4 Brief Description of Data Sources

This study uses nationally representative surveys on households' access financial services from FinScope Consumer Surveys (FinScope). To date these surveys have been conducted in 15 African countries. Unlike other studies on consumer surveys (e.g. LSMS, MECOVI), the FinScope surveys are much broader and contain significant detail on awareness and use of financial services. In addition, because they use a standardized survey instrument it becomes possible to make comparison across countries.

However, because FinScope gathers data from a user-perspective, it only helps to answer the demand-side of access to finance, and does not assist in understanding specific supply-side factors. To address this shortcoming this study uses time-series data on a panel of countries in SSA, over the period 2004-2014. Data on wider macroeconomic indicators and access to finance was obtained from various World Bank databases, the International Monetary Fund (IMF), and specific country national statistics offices. Although most data from the World Bank date as back as 1960, the gathering of data on wide indicators of access to finance only started in 2004. In addition, data on key banking sectors variables is only available up to 2014, and

consequently the cross-country panel estimations are confined to the period 2004-2014. The selected countries are by default limited to those countries for which the required data is available.

Therefore, by using both cross-sectional and time-series data, the study seeks to simultaneously capitalize on the empirical counts of time series data and the validity of lived experience obtained via surveys.

1.5 Organization of the thesis

This thesis is divided into five chapters. **Chapter One** focuses on the introduction and background to the study and outlines the main objectives, which are examined in detail in the following chapters.

Chapter Two uses household survey data to examine the heterogeneous impact of access to finance on the wealth distribution line, using a sample of countries whose selection is based on data availability. Household surveys have become an indispensable source of data in the analysis, monitoring and evaluation of the impact of development initiatives on poverty in developing and transition economies (UN, 2005). As a result, they have become the most widely used mechanism for gathering meaningful data, and a number of organizations have come up with deliberate schemes for gathering household data for example, the World Bank has the Living Standards Measurement Survey (LSMS), the Africa Household Survey Databank, the Eastern Europe and Central Asia Household Survey Databank, the Latin America and Caribbean Household Survey , amongst others. However, although these surveys have been invaluable in assessing the dynamics of poverty, they have limited information on access to financial services. In this chapter, I therefore use data from FinScope Surveys, whose main objective is to gather information on household access to, and use of, financial services.

Although financial inclusion has gained more policy relevance as policy makers seek to transform their economies towards being more market-based, past studies have not addressed the impact of improved access to finance on poverty, as alluded to above. The few who seek to do this (*e.g.* Honohan and King, 2013) apply a linearized approximation, thus inadvertently assuming a uniform effect across all poverty levels, and failing to account for the distributional effect of access to finance along the poverty line. By extending the analysis to other statistics beyond the mean, in this chapter, I examine the potentially heterogeneous impact of access to finance along the wealth distribution line. Such an approach provides key

policy insight on the efficacy of improved access to finance as a welfare intervention strategy. Further, by limiting the analysis to surveys conducted over the period 2014-2015, although this reduces the sample of countries covered, the analysis and comparison is confined to the same period across countries, thus eliminating the problem of heterogeneity due to time variation. Using the Re-centered Influence Function (RIF) regression model, I estimate the unconditional quantile partial effects of access to finance and household poverty. Further, in order to eliminate the potential endogeneity between access to finance and household wealth level, I employ an instrumental variable quantile treatment effect approach and thus allow for a causal interpretation of the results.

The results suggest that the effect of access to finance is higher at the median level, and very low at the bottom pyramid of the wealth index. This suggests that for most countries, in the sample, increased availability to, and usage of, financial services disproportionately benefits the middle-class more than the very-poor and rich categories. Although this reduces the gap between in middle-class and the rich, it further widens the poverty gap between the poor and middle-class, which may result in a poverty trap, more-so, as the benefit appears to be higher at the 90^{th} quantile than at the 10^{th} quantile. However, the above does not appear to hold for more developed countries, where the impact is highest at the lower of margins wealth, suggesting existence of specific country structural and macroeconomic characteristics which may not only affect the efficacy of financial service provision, but may provide a limit to the extent of financial services provision.

Following from the results described in Chapter Two and theoretical evidence, **Chapter Three** seeks to examine the extent to which cross-country variations in financial inclusion are mirrored in individual country structural and macroeconomic characteristics and the extent to which the level of financial development contributes to observed levels of financial inclusion, using a wide variety of development indicators to fully expose the nature and extent of financial exclusion.

To conceptualize this, I apply the Access Possibilities Frontier (APF) framework developed by Beck and de la Torre (2007), to benchmark countries' level of financial development based on whether they fall above or below the estimated frontier level. If the extent of access to finance for a country, *X*, matches its level of financial development, it would suggest that in order to improve access to finance, country *X* should focus on developing and implementing policies that facilitate financial development, as advancing access in the presence of poorly developed financial systems might push the equilibrium to an unsustainable position which

may result in financial fragility. On the other hand, if the level of access is low relative to the country's level of financial development, policies should focus on improving the supply or demand-side or both, depending on the source of problem, in order to remedy the situation. Lastly, if the level of access is high relative to the country's level of finance development, besides implementing policies that enhance financial sector development, this would call for strong and effective supervisory and regulatory oversight in order to prevent financial fragility.

The results suggest the existence of a gap in access to finance within the SSA region. This gap is independent of whether the benchmark is based on the world average, comparable income group average, or SSA regional average data. Further, the findings suggest that improved access finance is not always good for development. There is an inverted-U curve relationship between access to finance and both economic development and financial development. This may suggest a need for country-level studies to establish the threshold level of access to finance, as this is likely to vary across countries.

The results from Chapter Three suggests that, in as much as access to finance is important, policy makers should not merely focus on expanding access to financial services, without commensurate improvements in the underlying financial sector, as this may potentially lead to fragility within the system. Therefore, **Chapter Four** seeks to examine the extent to which existing policy and efforts towards improving financial inclusion impact on the overall stability of the banking system. This has become more significant to developing countries which, for the past decade, have aggressively engaged in the expansion of financial services as an integral part of their development initiatives. However, the major challenge that has been noted by both researchers and policy makers is how to embrace financial inclusion without compromising financial stability (Calice, 2013). Currently, it is not clear whether the two policy initiatives are mutually reinforcing objectives or conflicting strategies. To examine this I use the system-GMM panel estimation model in order to eliminate bias due to omitted variables, simultaneity or country-specific effects. The results indicate that financial inclusion has a positive impact on bank stability, but that this depends on the structure of the financial system. High concentration, and lack of competitiveness within the banking systems and poor institutional framework tends to undermine the impact of financial inclusion on stability.

Finally, in **Chapter Five** I present a summary of the results and conclusions based on the analysis in the preceding sections.

Chapter 2 Financial exclusion and poverty

2.1 Introduction

Poverty alleviation is one of the top agenda items in development forums. Financial sector development has proven to be a unique and powerful intervention in poverty alleviation as it facilitates asset accumulation, efficient risk management and entrepreneurial development opportunities (Tejerina et al., 2006). The removal of financial market friction is therefore fundamental to poverty alleviation and economic growth. Consequently, improved access to finance should allow poor households to save and invest in both physical and human capital, providing a gateway to broader economic activities.

From a development economics perspective, financial system development is considered as fundamental for economic growth and poverty alleviation (Beck, Demirgüç-Kunt, & Levine, 2007; Levine, Loayza, & Beck, 2000). A number of studies suggest that financial sector development has a significant impact on poverty and income inequality in both absolute and relative terms (*e.g.* Beck, Demirgüç-Kunt, & Levine, 2007; Clarke, Xu, & Zou, 2006; Li, Squire, & Zou, 1998; Li, Xu, & Zou, 2000). Evidence shows that the development of financial systems leads to a decline in income inequality and poverty (Banerjee & Newman, 1993; Beck, Demirgüç-Kunt, & Levine, 2007; Clarke et al., 2006; Galor & Zeira, 1993; Honohan, 2005). Despite the existence of extensive empirical literature linking finance and development outcomes there is, however, limited evidence on the possible link between access to finance and poverty. It is not clear how households (and individuals) benefit from such activities.

Nevertheless, access to finance has been viewed as fundamental for poverty reduction, inclusive growth and sustainable development. According to the World Bank Development Indicators (World Bank 2006; 2008), countries with higher levels of financial inclusion had lower poverty levels. Financial exclusion is generally low in most developed countries compared to developing countries (Allen, et al, 2016; Buckland, et al. 2005; Honohan, 2008; Peachy & Roe, 2004). Financial exclusion has also been observed to be very high among poor and low income households (Dymski, 2005b; Kumar, 2012). This then suggests that access to finance is potentially related to both poverty and inequality.

General economic theory suggests that access to savings, payment and credit has a significant impact on poverty alleviation. Evidence shows that a lack of access to financial

services results in exclusion from the main financial stream, consequently increasing income inequality and poverty (see for example Aghion & Bolton, 1997; Banerjee, 2004; Banerjee & Newman, 1993; Bruhn & Love, 2014; Burgess & Pande, 2005; Demirguc-kunt & Klapper, 2013; Demirgüç-kunt & Levine, 2009). This has led to increased confidence in the transformative power of access to finance as a poverty alleviation tool (Karlan & Morduch, 2009). However, there is a lot of theoretical and empirical ambiguity on the link between improved access to financial services and poverty reduction (Ayyagari, Beck, & Hoseini, 2013; Duvendack, Palmer-jones, & Hooper, 2011; Weiss & Montgomery, 2004, 2011). Whereas some researchers suggest that improved access to credit has a significant impact on poverty alleviation (*e.g.* Pitt & Khandker, 1998), others find little or no evidence at all (*e.g.* Khan, 2009; Khandker, 2005). Moreover, some studies suggest that the impact of finance on poverty is through depth rather than the access dimension (*e.g.* Ayyagari et al., 2013; Honohan, 2008). Such evidence would be a huge surprise to both researchers and practitioners, considering the extensive initiatives and investment that have been put into improving access to financial services for the poor across the world.

However, for the poor and lower income households, the most fundamental question is whether they have access to a basic transaction account (Honohan, 2008). Indeed, conventional wisdom suggests that having a bank account provides a key initial step to financial identity, thus improving access to other financial services and products which ultimately advances the welfare of the family, security, and stability, with huge ramifications on economic development (Hogarth, Anguelov, & Lee, 2004). Therefore, access to a basic financial account has been considered to be key to meaningful social and economic participation (Leyshon & Thrift, 1995; Speak & Graham, 2000). Having a bank account provides a gateway to other financial services like insurance, investment, credit and savings, and is thus a good indicator of financial inclusion (Carbo, Gardener, & Molyneux, 2007; Hogarth, Anguelov, & Lee, 2005). Further, in some countries a basic account is also important for making and receiving local and international remittances (Honohan, 2008). Therefore, access to a bank account has been considered to be, an integral element of improved access to finance and has been widely used as a proxy for access to financial services; especially in developing economies.

Unfortunately, existing literature on access to finance and poverty has been biased towards access to credit. However, for the poor access to credit is often not of top priority, as they may be more concerned about other important welfare issues, such as consumption smoothing

and cushioning from adverse income shocks. Therefore, there is a need to consider the significance of broad access to finance on the lives of the poor. However, most studies which attempt to look at broad financial services often use proxy measures such as distance to financial institutions and durable asset ownership, among others. Such an approach tend to focus only on the effect on the poor, and not necessarily the financially excluded population. However, it is the improvement of access to finance for all excluded societal members, and not necessarily only the poor, which has become an important policy objective in both developed and developing economies.

In an attempt to disentangle the relationship, a number of approaches have been adopted. For example, Ayyagari *et al*. (2013) find a strong negative relationship between financial deepening, rather than financial inclusion, and rural poverty in India. However, financial deepening and financial access are not synonymous. It is possible for financial systems to be deep without access. The World Bank (2008) shows this using data from Colombia and Lithuania, which had similar levels of depth but wide variations in access. Studies by Beck, Levine, and Levkov (2010) and Burgess and Pande (2005), which use a quasi-experimental approach, to address selection bias problems, suggest that improved access due to bank branch regulation has a significant impact on income inequality and poverty. However, these studies focus more on the impact of bank branch regulation than access to finance *per se*. There is no convincing evidence on the extent to which improved access to finance affect poverty and income inequality.

According to the UNDP's Report of 2015 the average percentage of the population living on less than $1.25 per day in Sub-Saharan Africa (SSA) decreased from 57% to 41% between 1990 and 2015. However, despite posting a positive change, poverty is still a challenge in most SSA economies. As highlighted above, theory and empirical evidence suggests that improved access to financial services has both a direct and indirect effects to the poor. This would therefore imply that unequal access to financial services affects household consumption and expenditure patterns, with negative ramifications on poverty and inequality. However, despite the existence of direct theoretical postulations, there is limited empirical evidence on the extent to which differences in access to, and usage of, financial services impact on household outcomes - i.e. welfare and poverty.

This study uses household survey data from selected Sub-Saharan African[13] countries to examine the impact of improved access to finance on poverty in this region. The selection of countries is based on data availability. Household surveys have become an indispensable source of data in the analysis, monitoring and evaluation of the impact of development initiatives on poverty in developing and transition economies (UN, 2005). These surveys often provide the best way of gathering detailed data on the extent of financial services usage; including non-formal financial services (World Bank, 2007). As a result, they have become the most important mechanism for gathering meaningful data, and a number of organizations have come-up with deliberate schemes for gathering household data, for example, the World Bank has the Living Standards Measurement Survey (LSMS), the Africa Household Survey Databank, the Eastern Europe and Central Asia Household Survey Databank, the Latin America and Caribbean Household Survey , amongst others. Although the latter surveys have been invaluable in assessing the dynamics of poverty, they have limited information on access to financial services. This study therefore uses data from FinScope Surveys, whose main objective is to gather information on household access to, and use of, financial services.

Although financial inclusion has gained more policy relevance as policy makers seek to transform their economies towards being more market-based, past studies have not addressed the impact of improved access to finance of poverty, partly due to a lack of data on access to finance. This has been worsened by the fact that 'welfare/poverty is notoriously difficult to measure' (World Bank, 2007). This study seeks to fill this gap in the literature.

The author is aware of one similar study, namely that of Honohan and King (2013), who also use FinScope data (in their case eleven Sub-Saharan African as surveyed over the period 2004-2009), to investigate the causal relationship between access to finance and household income. However, unlike Honohan and King, who apply a linear approximation, and thus inadvertently assume a uniform effect across all poverty levels, this study examines the distributional effects of access to finance. By extending the analysis to other statistics beyond the mean, this study examines the potential heterogeneous impact of access to finance along the wealth distribution line. Such an approach provides key policy insight on the efficacy of improved access to finance as a welfare intervention strategy. Further, the study limits itself to surveys conducted over the period 2014-2015 which, although this reduces the sample of countries covered, helps to ensure that the comparison is within the same period, thus

[13] These are: Botswana, Malawi, Mauritius, Mozambique, South Africa, Swaziland, Zambia and Zimbabwe

eliminating the problem of heterogeneity due to time variation. Using newer and more robust methods of estimation, I therefore seek to assess the unconditional partial effect of access to finance on the distribution of household wealth, and thus make a significant contribution to existing literature on the links between finance and poverty.

2.2 Finance and Poverty: Theoretical and empirical considerations

The relationship between poverty and access to finance hinges on the link between economic growth and inequality as captured by the Kuznets hypothesis. According to Kuznets (1955, 1963) there is high inequality and concentration of wealth at early stages of economic development, and low concentration at high development levels, resulting in an inverted-U curve. In like manner, increased availability to, and usage of, financial services may widen economic opportunities for the poor and thus reduce income inequality and poverty (Becker & Tomes, 1979, 1986; Demirgüç-Kunt & Levine, 2009; Greenwood & Jovanovic, 1990). On the other hand, increased availability of financial services may enhance the economic position of those with high access, thus disproportionately benefiting the rich and further widening inequality, and thus increasing poverty (Demirgüç-Kunt & Levine, 2009; Greenwood & Jovanovic, 1990).

Galor and Moav (2004) were the first to theoretically show the relationship between inequality, financial market imperfection and growth during the process of development. They unify the seemingly contradictory postulations of the classical economics perspective, which posit a positive relationship between inequality and growth, and on the other hand, the financial market constraints perspective which postulates that there is a negative relationship between inequality and growth. They show that the classical economics perspective reflects the early development stage. At early stages of development, inequality is pro-growth as it allows for the allocation of resources to the owners of capital who have a higher marginal propensity to save. Consequently, improved access to finance simultaneously improves growth and increases income inequality and poverty. At later stages of development there is an increased return to human capital, and due to the complementary relationship between finance and human capital, investment in human capital becomes the major driver of growth. However, because human capital is an intrinsic element of humans, it spreads faster when shared by a larger proportion of the society. Lack of access to finance therefore denies the poor access to investment in human capital and thus increases income inequality and poverty, resulting in a Kuznets type of relationship.

Access to finance can also have an indirect effect on poverty via the labour market mechanism. Improved access to finance may enhance industry aggregate productivity and financial market allocative efficiency, both of which may significantly influence labour market demand (for both skilled and unskilled labour), and thus reduce income inequality and poverty (Demirgüç-Kunt & Levine, 2009; Gine & Townsend, 2004; Townsend & Ueda, 2006) . By increasing the demand for labour in the long-run, improved access to finance reduces income inequality and poverty. Therefore, the most significant impact of improved access to finance on poverty alleviation and income inequality is not due to a mere increase in access and usage of financial services, but rather via the indirect linkage (Demirgüç-Kunt & Levine, 2009). Further, from a human capital investment perspective, a lack of access to finance can prevent the poor from financial market participation, thus hindering their ability to develop the human capital of both current and future generations, resulting in persistent intergenerational income inequality and poverty (Becker & Tomes, 1979, 1986; Demirgüç-Kunt & Levine, 2009).

However, the relationship between access to finance and poverty is not easy to examine due to endogeneity, simultaneity, and selection bias problems. In understanding the relationship between finance and poverty, and thus to address the inherent problems of endogeneity, simultaneity and selection bias, three different approaches have emerged, namely, the general equilibrium modelling approach, the natural experiment approach, and the randomized control trial approach.

General equilibrium modelling uses modern theory which underscores the aggregate and distributional effect of financial intermediaries in models with financial friction (see for example, Galor & Zeira, 1993) and individual occupational choice (for example Banerjee & Newman, 1993), and suggests that financial intermediation is key to development outcomes. Research suggests that improved financial intermediation has a significant impact on income and productivity (Dabla-norris, et al 2015; Gine & Townsend, 2004; Greenwood, Sanchez, & Wang, 2013; Jeong & Townsend, 2008; Townsend, 2006; Townsend & Ueda, 2006). These findings suggest that inadequate access to finance results in poverty traps, income inequality and low economic growth. Evidence from general equilibrium models suggest that access to finance by the non-poor has an indirect spill-over effect on the poor.

However, these models do not fully capture the complexity of the relationship, even in the simplest economies. As shown by Jeong and Townsend (2008), findings from fitted general equilibrium models should be interpreted with caution as they ignore other factors which affect inequality and growth. Using cross-sectional data on household choices and wealth for

Thailand, Jeong and Townsend (2008) compare two models with endogenous and exogenous financial intermediary participation, and observe that although the models seem to fit the data, there are several anomalies. Due to a failure to account for heterogeneity and aggregate shocks, Jeong and Townsend established that both models overestimate the income gaps between the low- and high income subgroups, both models cannot estimate the co-movement within the subgroups, both models cannot mimic the changes in income inequality and growth *vis-a-viz* growth in finance, and both models fail to capture variations at low income levels. As a result, findings from general equilibrium models should be interpreted with caution.

On the other hand, natural experiments seek to assess the impact and outcome of a policy intervention using an exogenous policy intervention. By identifying an exogenous change in policy (or natural cause), they allow for the analysis of the impact as if the population had participated in an experiment, and thus provide a useful policy evaluation tool. Burgess and Pande (2005) and Burgess, Wong, and Pande (2005) use the Indian social banking program to investigate the impact of access to finance on poverty. Between 1969 and 1990, the Indian government initiated regulation which sought to affect bank branch location in rural areas. In order to obtain a license to open a branch in an area with a bank presence, banks were supposed to open four new branches in areas with no bank branches (mainly rural areas). Both studies established that the branch expansion into unbanked rural areas resulted in poverty reduction across Indian states. Specifically, Burgess and Pande (2005) find that rural branch expansion explains about 14-17% decline in rural poverty. Similar evidence is presented by Beck et al. (2010) on the US bank-branch deregulation policy implemented from the 1970s to the 1990s. By controlling for both year and state fixed effects and state time-varying characteristics, Beck et al., (2010) establish that branch deregulation reduced inequality by improving the income levels of the lower income groups, without negatively affecting the higher income category. Specifically, branch deregulation resulted in a 4% reduction in the Gini coefficient, explaining about 60% of the variations in inequality. However, these studies focus more on the impact of bank branch deregulation than access to finance *per se*. There is no convincing evidence on the channels through which improved access to finance affect poverty and income inequality.

A similar study was conducted by Bruhn and Love (2014) in Mexico, where Banco Azteca, a bank which targets low- and middle income groups, in 2002 opened over 800 bank branches almost simultaneously, thus establishing itself as the second largest Mexican bank in terms of branch network via its holding company - Grupo Elektra stores. The above research use a

difference-in-difference approach to compare changes before and after branch expansion, for those with and without access to the retail outlets after the expansion, and conclude that the opening resulted in a 7.6% increase in informal businesses, without changing the operations of formal businesses, and that over the two years, income levels increased by 7%. They also establish that the impact was larger for low income groups and municipalities that had relatively lower access to formal banking services. Further, they show evidence of the indirect impact of access to finance *via* the labour market channel.

A more recent experimental study is reported by Dupas, et al (2016), who use experimental evidence to examine the impact of access to bank accounts in Uganda, Malawi, and Chile. An average of 2000 respondents who live close to banks were simultaneously offered a basic savings account, with all maintenance and account opening fees being catered for, such that the customers would not pay any costs at all over a period of two years. In contrast to earlier studies, these researchers establish that although the 'free bank account' resulted in increased access to and usage of financial services, there was no reduction in poverty.

Despite the contradictory evidence on the impact of access to finance on poverty and income inequality from natural experiments, generally, the causal inference from such experiments is often not straight forward, as the assignment of subjects is not truly 'random', and the selection may be influenced by a lot of extraneous factors. It is also difficult to adequately account for baseline variations between the different groups. In addition, exogenous changes in policies are rare and very difficult to measure (Demirgüç-Kunt & Levine, 2009). Above all, it is not easy to generalize findings from policy changes in one country to suit the strategies and economic environment of other countries. As a result*, 'pure'* natural experiments are very rare and in the few instances where they can be identified, findings cannot be generalized to other economic settings.

The third approach has been the use of randomized experiments, which focuses on evaluating specific program interventions. A good example is the study by Pitt and Khandker (1998), who use a quasi-experimental survey design to examine the impact of access to micro-credit in Bangladesh, and thus adjust for bias due to unobserved village and individual-level heterogeneity. These researchers apply the eligibility criterion as an identification strategy, and compare households just-above and just-below the eligibility cut-off of one-half acre of land. They find a small but significant impact of access to credit on household welfare indicators. However, a number of researchers have criticised the identification strategy used by Pitt and Khandker. In addition, since they do not use a household panel, their study could

not handle household-level endogeneity. In a related study, Coleman (1999) addresses selection bias by comparing actual borrowers to borrowers in waiting, and establishes that access to credit had no significant impact to household welfare indicators in northern Thailand. Karlan and Zinman (2010) also address selection bias by using a random selection of loan applicants in South Africa, with both control and treatment groups are randomly selected. These authors establish that after a horizon of two years, those who had access to credit are better off. In a more recent study Banerjee, et al (2015) use a randomized evaluation of micro-credit in Hyderabad, India, where half of the 104 slums were randomly chosen for microfinance institution branch opening, while the remainder were left out. They find that, although in some cases microcredit results in business expansion, it has no impact on poverty reduction, and there is no increase in welfare both in the short-run and long-run.

Randomization has been widely employed in microfinance. Although evidence from microfinance studies is not strong, results from general equilibrium models fitted using household micro-data suggest more positive effects. However, due to problems of selection bias and endogeneity, it is rather difficult to explain whether microfinance success stories are a direct outcome of improved access to finance, or are an indirect impact of macroeconomic developments brought about by microfinance or natural growth factors. As a result, existing evidence is not overwhelming. Armendáriz de Aghion and Morduch (2006:199-200) suggests that this variation is apparent given that *'… anecdotes are culled to show the potential of microfinance, while the statistical analyses are designed to show typical impacts across the board*'.

In addition, although randomized experiments provide a powerful way of accessing the link between access to finance and welfare outcomes, they do not account for the indirect effects of access to finance (Demirgüç-Kunt & Levine, 2009). As highlighted above, evidence from general equilibrium models and natural experiments suggest that the spill-over effects are important to the poor. This suggests that the favourable effect of improved access to finance on poverty is not through direct provision of financial services to the poor (Beck et al., 2009). Therefore, it is efficiency in financial sector resource allocation, rather than improved access for the poor, which helps in poverty alleviation.

Thus, whereas theory suggests increased access to credit may widen inequality, empirical evidence seems to point in both directions. One strand of literature suggests that improved access to finance by poor and low-income households increases the stock of capital, both physical and human, leading to a reduction in poverty and inequality (see, for example Aghion

& Bolton, 1997; Banerjee & Newman, 1993; Galor & Zeira, 1993; Karlan & Morduch, 2009), while another perspective suggests improved access to finance benefits the poor indirectly, through labour market inclusion (see, for example Bruhn & Love, 2014; Demirgüç-Kunt et al., 2008; Khandker, 2005; Pagan & Pica, 2012). There is, however, no plausible evidence on the robust link between household financial penetration and poverty (Beck et al., 2009; World Bank, 2007). This inconsistency and divergence in theory suggests that the relationship between access to finance and poverty is an empirical issue worth investigating.

2.3 Data and Methodology

2.3.1 Data Source

This study uses nationally representative surveys on households' access to, and usage of, financial services from FinScope Consumer Surveys (FinScope). FinScope is an initiative of FinMark Trust, an independent organisation, based in South Africa. To date, surveys have been conducted in 19[14] African countries (13 from the Southern African Development Community (SADC) countries and 6 non-SADC). Unlike other studies on consumer surveys (*e.g.* LSMS, MECOVI), the FinScope data is much broader and contain significant detail on awareness and the use of financial services. In addition, the use of a standard survey instrument facilitates better comparison across countries.

However, because FinScope gathers data from a user-perspective, it only sheds light on answer the demand-side of access to finance, and does not assist in understanding specific supply-side factors. Evidence has shown that for stronger welfare analysis, data should be gathered at household level as compared to individual level. Households are significant users of financial services and they influence both the scale and asset mix of finance (Honohan, 2008). In addition, household data allows for control of certain household specific characteristics, thus facilitating further cross-country comparison (World Bank, 2008). This study therefore applies a cross-sectional household survey in analysing access to financial services in selected African countries, based on FinScope Survey datasets.

Significant attention is devoted to improving the quality of data gathered through FinScope Surveys. In addition to involvement of a wide range of stakeholders, the data enumerators are initially exposed to an intensive training on data gathering procedures and use of the

[14] **SADC:** Botswana, Democratic Republic of Congo (DRC), Lesotho, Mauritius ,Madagascar, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe, **Non-SADC**: Ghana, Rwanda, Kenya, Uganda, Nigeria and Togo

questionnaire. The questionnaire is also translated into local languages used in the specific countries, and modified to gather country specific data on household access to, and use of, informal, formal and semi-formal financial services. This helps to develop comprehensive metrics on household access to financial services. The use of a standard data gathering instrument facilitates cross-country comparison on basically all key indicators.

Surveys are often conducted over different time intervals, which complicates direct cross-country comparisons due to the base years being different. However, recent FinScope surveys were conducted in eight countries within the SADC almost simultaneously, namely in Botswana (2014), Malawi (2014), Mozambique (2014), Mauritius (2014), South Africa (2014), Swaziland (2014), Zambia (2015) and Zimbabwe (2014). Although not using the full number of FinScope surveys dating back to 2004 reduces the sample of countries covered, using only the 2014-15 surveys ensures for comparison over the same period and eliminates the impact of time variation. In addition, it helps to ensure that the study focuses on more recent evidence, and thus gives findings and recommendations of more current relevancy to both policy makers and the private sector.

However, because FinScope gathers data from an individual member within a household, it is at times difficult to separate whether some metrics gathered are applicable at the individual-level or household-level, especially for variables like income; this becomes even worse in instances where total household income data is not available. However, by gathering data from the user, the surveys provide adequate demand-side information, which can be used in improving access to, and usage of, financial services.

2.3.2 Measuring household poverty- the asset index

The most common and direct indicator of poverty is the use of income or consumption expenditure over time; based on the economic postulations of Milton Friedman. According to Friedman (1957), income can be divided into transitory and permanent components, with consumption being driven mainly by permanent income. Although permanent income is not directly observable, it is determined by the physical and human assets/resources accumulated over a particular time period. As a result, development economists have used money-metric indicators (i.e. income, or consumption expenditures) to measure poverty or socio-economic status[15].

[15] The most common measures is population living below $1 or $2 per day or use of *per capita* income

However, in developing economies money-metric indicators are unreliable since a greater proportion of economic activities are conducted outside the formal economy, and there exist wide variations due to seasonality and regional differences in both income and expenditure (Kolenikov & Angeles, 2009; McKenzie, 2005; Sahn & Stifel, 2003). In addition, the income approach to measuring poverty may not provide a good indicator of poverty in developing economies since a significant proportion of income is held in kind (Vyas & Kumaranayake, 2006). Further, consumption and expenditure data, besides being expensive, is often of poor quality due to measurement error, recall bias and other related factors (Kolenikov & Angeles, 2009; Sahn & Stifel, 2003, 2000; Scott & Amenuvegbe, 1990).

Although income is an ideal measure of poverty, the level of income does not give a complete picture of the total value of available resources, as households or individuals depend on both real and financial assets for their sustenance. In addition, income is not an end, but a means for wealth (Brandolini, Magri, & Smeeding, 2010). The other challenge is that people are often not comfortable in disseminating their income data. For example, in the FinScope Survey used in this study, 50.7% of the respondents in the South African survey indicated that they either didn't want to disclose or were not aware of their income level, for Swaziland this figure was 20.0%, for Mauritius 19.4%, for Botswana 17.0%, for Zimbabwe 16.1%, for Mozambique 14.6%, and for Malawi 0.32%. Clearly, this reduces the sample size with adverse impact on the results and the interpretation of findings. In an attempt to reduce non-response issues, surveys often resort to report income in brackets, which is the case for the Botswana, Mauritius, Mozambique and Malawi surveys used in this study (as attested by the low levels of non-response). However, although this reduces non-response cases, it further complicates the income structure as households (or individuals) of unique income levels tend to be clustered in one category, and further the open bracket category becomes very difficult to interpret. This results in an income profile structure which fails to cater for 'true' variation in household. For this reason income data obtained from these surveys is a bit unreliable. However, these challenges are not unique to the FinScope Surveys, but are common to all surveys.

A natural solution to this has been the use of asset-based measures to capture household variations in asset accumulation. The use of asset-based measures was initially proposed by Filmer and Pritchett (2001), and later adopted by The World Bank in a number of studies (*e.g*. Gwatkin et al., 2007; Gwatkin, Rustein, Johnson, Suliman, & Wagstaff, 2003). Measuring poverty from an asset perspective makes some intuitive sense since poverty reduction

strategies are often evaluated based on the extent to which they assist in household asset accumulation. Due to poor financial markets in developing countries household asset holding is highly correlated with income (Townsend, 2006). A study by Liverpool-tasie and Winter-nelson (2011) in Ethiopia, for example, found that asset-based measures consistently predict future poverty more accurately than income-based measures. In addition, the distribution of income generating assets has the greatest impact on income inequality (Bourguignon & Chakravarty, 2003). In the presence of market imperfection, which is often the case in developing countries, research has shown that investment in human and physical capital is determined by the distribution of accumulated wealth (Banerjee & Newman, 1993; Galor & Zeira, 1993; McKenzie, 2005). Further, the use of asset-based measures correctly captures the notion that poverty is a function of both monetary and non-monetary indicators.

An asset-based index therefore provides a better indicator of household long-run socio-economic status, since assets are acquired over time and tend to last longer. Evidence suggests that households' asset ownership structure tends to be nonresponsive to short-term economic shocks (Filmer & Pritchett, 2001; Nielsen, et al 2012; Sahn & Stifel, 2003). Households whose income is above the poverty line may be vulnerable to economic shocks if they lack a strong asset base, and conversely households whose income is below the poverty line may suffer less from an economic shock if they have a strong asset base (Nielsen et al., 2012). However, asset-based indices do not account for temporary or short-term variations in household wealth (Filmer & Pritchett, 2001; Vyas & Kumaranayake, 2006). Therefore, they should be viewed as indicators of the unobservable household long-run wealth position (Filmer & Pritchett, 2001; Filmer & Scott, 2012).

Since the FinScope datasets do not capture any information pertaining to the quantity or quality or the monetary value of household assets (as is the case with all survey data), the natural determination of weights is not possible (Sahn & Stifel, 2000). A number of approaches can be used in determining asset weight, ranging from purely arbitrary weights such as those used by Montgomery, Burk and Paredes (1997), to complex statistically determined weights (e.g. Filmer & Pritchett, 2001; Kolenikov & Angeles, 2009; McKenzie, 2005; Sahn & Stifel, 2003, 2000; Vyas & Kumaranayke, 2006).

The index used in this study is constructed based on standard of living indicators, which include infrastructural and household characteristics[16] and household asset ownership,[17] based on weights obtained via principal component analysis (PCA). The major advantage of this is that respondents often find it easy to share data on these, thus eliminating the problem of missing data and/or nonresponse.

The asset index for each household is therefore estimated as follows:

$$I_i = \omega_1 a_{i1} + \omega_2 a_{i2} + ... + \omega_k a_{ik} \qquad (2\text{-}1)$$

Where I_i is household *i's* asset index, ω's represents the weight of each asset, and a_{ik} represents the individual assets; up to the k^{th} asset.

A review of approaches to measuring welfare or poverty by Bollen et al (2001, 2002) revealed that the best fitting indicators were those constructed through PCA and, in some instances, sum of assets. PCA is a multivariate statistical procedure which reduces multiple variables to a smaller number of indicators. The main assumption is that there is a common component behind the ownership of assets that allows for PCA to determine an index as a weighted sum of individual assets. I use PCA and thus determine the weights directly from the data.

From an *n* set of correlated variables, PCA creates uncorrelated components which are linear weighted combinations of the initial variables. From a set of variables x_1 *to* x_n, the principal components can be represented as follows;

$$\begin{aligned} PC_1 &= \alpha_{11}x_1 + \alpha_{12}x_2 + \alpha_{13}x_3 + ... + \alpha_{1k}x_k \\ PC_2 &= \alpha_{21}x_1 + \alpha_{22}x_2 + \alpha_{23}x_3 + ... + \alpha_{2k}x_k \\ &\vdots \\ PCn &= \alpha_{n1}x_1 + \alpha_{n2}x_2 + \alpha_{n3}x_3 + ... + \alpha_{nk}x_k \end{aligned} \qquad (2\text{-}2)$$

Where: α_{nk} = weight of the n^{th} principal component and the k^{th} variable

PCA seeks to establish the directions of the greatest variance of the linear combinations of the variables, i.e. the orthonormal set of coefficient vectors $\alpha_1, \alpha_2 ..... \alpha_k$. The variance for

[16] These include roofing material, flooring material, house tenure (owned rented etc.), energy source, water source, whether there is a domestic servant, home security, and whether the family has often gone without meals

[17] Ownership of household durables such as television set, radio, bed, lounge suite, vehicle, etc.

each principal component is determined by the eigenvalue of the corresponding eigenvector, which is the solution to the Eigen problem for the covariance matrix Σ, i.e. finding λ's and α's such that:

$$\Sigma\alpha = \lambda\alpha \qquad (2\text{-}3)$$

The solution to the above Eigen problem gives the α's of the linear combination; $\sum[\alpha' x]$ and the eigenvalues $\lambda_1 \geq \lambda_2 \geq .... \geq \lambda_k$. The combination with the highest eigenvalue will have the largest variance. The first component is then an indicator of poverty, *i.e*. higher values will be attributed to richer households (Filmer & Pritchett, 2001; McKenzie, 2005; Sahn & Stifel, 2003, 2000). The subsequent principal components would be orthogonal to the previous and explain additional but less variation. Often the second component might give certain information about the structure of the feature being measured. Ideally the first component(s) should explain a high proportion of the variance, thus $\lambda_1 \geq \lambda_2 \geq .... \geq \lambda_k$. When this happens it would imply that the variables under consideration have a lot in common. This is indicated by the plot of eigenvalues against the index. From past studies, the first component explains 11% (*e.g.* Vyas & Kumaranayake, 2006) to 27% (*e.g.* Filmer & Pritchett, 2001; McKenzie, 2005) of the variation between asset holdings.

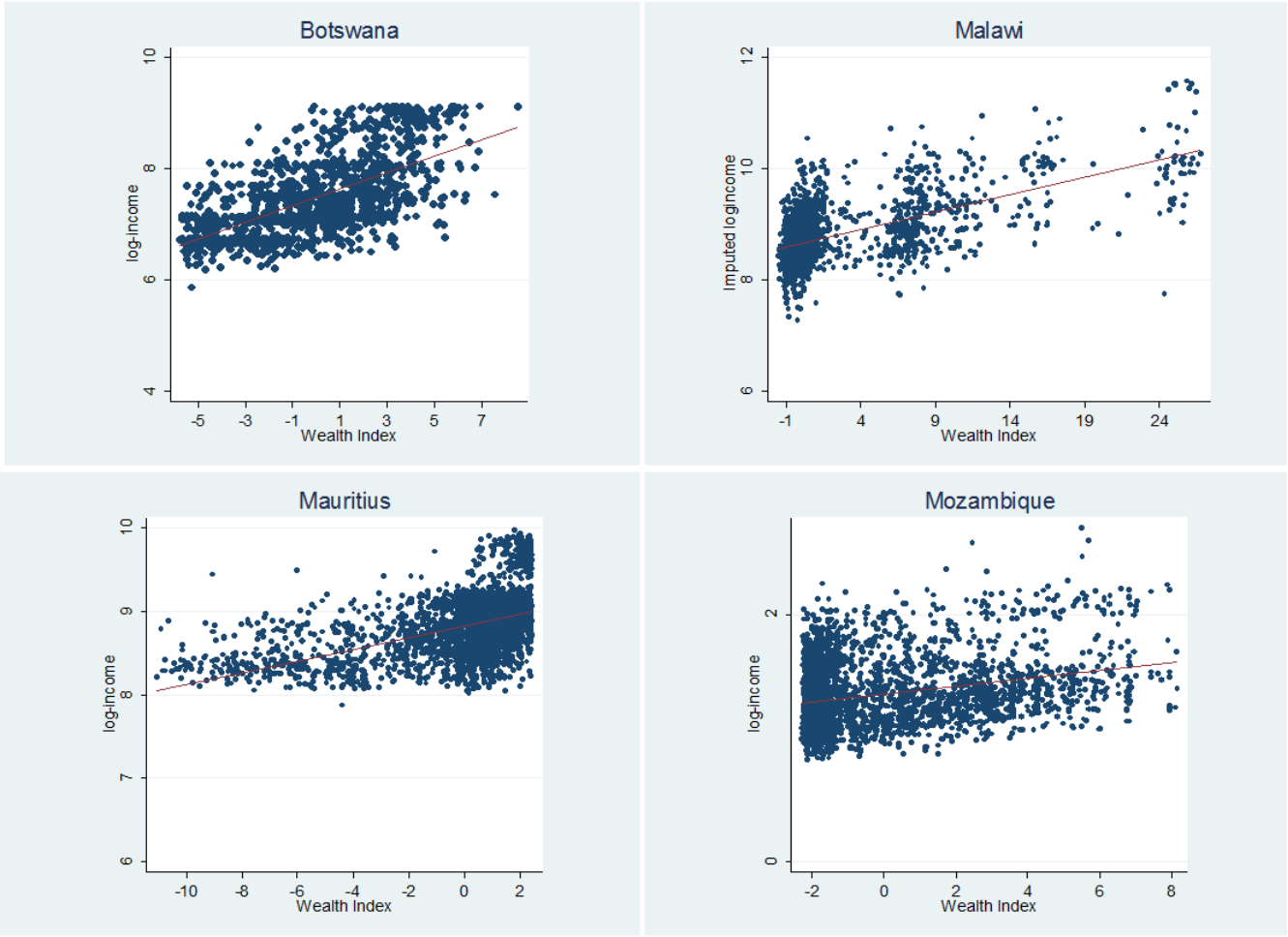
FinScope Surveys provide household-level information on housing characteristics (*e.g.* ownership and type of material used in construction), access to infrastructure and utilities (*e.g*. source of water, sanitation facilities etc.), and ownership of durable household assets. As confirmed by McKenzie (2005), the use of a combination of these three eliminates the problems of clumping and truncation[18] leading to a better estimation. Since PCA treats categorical values as continuous scaled variables, all categorical variables were recoded to binary. In instances where a variable had a low frequency, these were combined with a related category. For example, for South Africa 0.64% of respondents indicated that they used an "other toilet"- these were combined with "community toilet", whilst for Zimbabwe "borehole water" was equated to "protected well" and "unprotected well", and for Malawi "river/stream water" was equated to "unprotected spring". In instances where there were no similarities the variables were maintained as separate inputs, even if they had low frequencies.

[18] Clumping is the clustering of households in a few levels, whereas truncation refers to a narrow distribution of the index, resulting in failure to distinguish between groups close to each, *e.g.* upper-middle class and the rich, very poor and poor

The index constructed through the method above, is used as a proxy for poverty, to examine the impact of access to finance on poverty. Because some of the calculated values are negative, the calculated index is then transformed by adding a positive number of the same magnitude as the lowest negative number. Although this transformation shifts the mean, the variance remains unchanged. This might suggest that the results should be interpreted within the context of this study. However, because the distribution of the index largely remains unchanged, it facilitates cross-country comparison. Therefore, a higher index reflects higher household wealth.

To assess the extent to which the constructed index measures variation in household wealth, I first check the weights assigned to each asset, house characteristic or infrastructural facilities. A negative weight is assigned to variables that indicate poor household wealth such as use of water from the river, poor sanitation facilities, earthen floor, etc., whereas a positive weight is assigned to assets such as vehicle, tiled roof etc. For all countries this is consistent, except for a few variables - for example, in Zambia and South Africa the ownership of a house is allocated a negative weight. For South Africa this could probably be a reflection of the recent government intervention strategies for housing for all, where a number of people (especially the poor) were given free accommodation. In addition, even those who stay in shacks consider it “owned” if they are not renting. However, I expect to have this anomaly controlled for, as I include the method of acquisition, i.e. whether the dwelling was acquired via mortgage, government etc. The inclusion of the walling and roofing materials should also control for the ownership of shacks. Further, I examine the extent of correlation between the calculated wealth index and income (income is captured in logarithm to smoothen the relationship with missing values fitted via regression). As shown in Figure 2-1, there exists a positive and significant correlation between the calculated index and the household income across all countries (all correlations are significant at the 1% level).

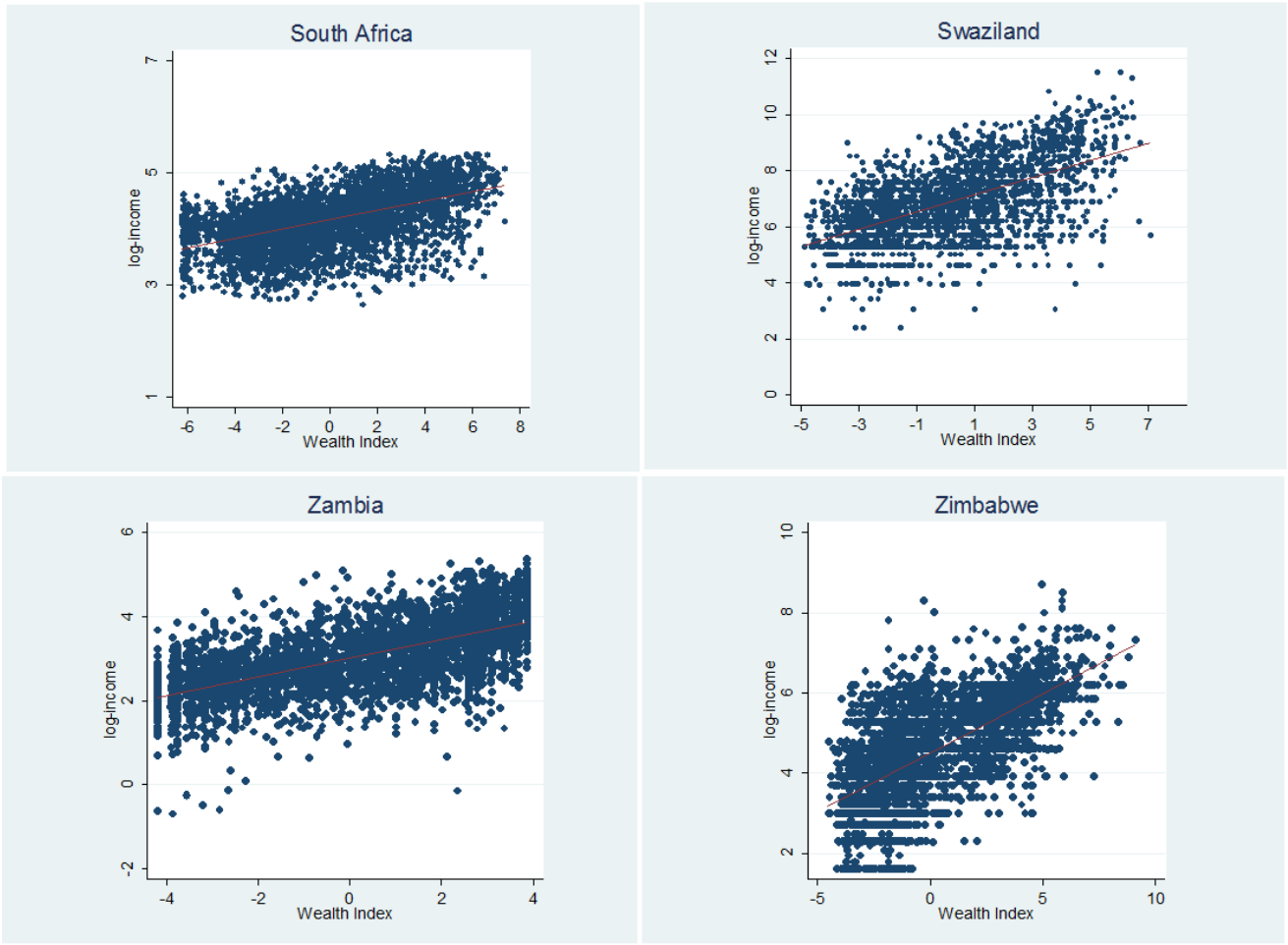
Figure 2-1: Correlation between Wealth Index and Household Income[19]



Source: Own calculations based on FinScope Survey Data

[19] Correlations for Malawi, Mozambique, South Africa and Zambia are based fitted values as income is reported in brackets. Correlation coefficients were as follows: Botswana 0.61, Malawi 0.58, Mauritius 0.47, Mozambique 0.30, South Africa 0.50, Swaziland 0.58, Zambia 0.66, and Zimbabwe 0.76

Figure 2-2 Correlation between Wealth Index and Household Income



Source: Own calculations based on FinScope Survey Data

2.3.3 Empirical Estimation strategy

This section seeks to outline the estimation approach used to examine the differential impact of financial inclusion (or access to finance) along the wealth index distribution. By application of unconditional quantile regression (UQR) methods, I investigate the heterogeneous effect of households' use of financial services on poverty and thus adopt a partial equilibrium approach. From a policy perspective, an intervention that shifts the lower-level of the wealth index distribution would be more preferable to the one that shifts the median, *ceteris paribus.* Therefore, it is imperative to employ an analytical method that go beyond the mean when evaluating policy issues in order to explore the distributional effect, and thus provide more informed policy guideline.

The aim is to model the household wealth index or poverty (W_i) as a function of access to finance *(A_i)*, underlying covariates (X_i), and the error term (ε_i) which can be represented as follows;

$$W_i = f(A_i, X_i) + \varepsilon_i \qquad (2\text{-}4)$$

For ease of identification access to finance (*A)* focuses on households who use formal and semi-formal financial[20] services, and therefore drops the informal services sub-sample. This is because non-formal financial services providers such as burial societies, savings with friends, informal month-end loans, loans from friends or relatives etc.[21], are not subject to policy and regulatory changes and their nature varies both within and across countries. Using the financial overlaps definition of FinScope, a household is considered to have access to financial services or be financially included if there is at least one household member using bank products, bank and other formal products[22] only, bank and informal products only, bank and other formal and informal products, and other formal products only.

Equation (2-4) above is estimated *via* quantile regression methods using sampling weights derived from the Population Census Survey Statistics of each country (however there is no significant variation between weighted and unweighted results). Quantile regression has proven to be better than ordinary least squares regression (OLS), as it is not sensitive to outliers (Frölich & Melly, 2013). In addition, it shows the effect of the independent variable over the entire distribution of the dependent variable, as opposed to estimates only at the mean.

Two main approaches have been adopted in quantile regression estimates, namely the conditional quantile regression (CQR) approach and the unconditional quantile approach (UQR). CQR seeks to analyse how a particular covariate affects the quantile of an outcome variable conditional on the mean of other covariates. Its major problem is that it provides within group estimates which cannot be taken to reflect the effect on the quantile of the dependent variable, and therefore the interpretation of estimates is not always straight-forward (Porter, 2015). However, policy makers are often concerned about the unconditional distribution of

[20] Semi-formal financial services have been found to be an important vehicle for mobilizing savings for household and financing of SMEs. They often provide the same functions as formal services

[21] These have various names across countries, for example , “Metshelo” in Botswana, “Chipeleganyu” in Malawi, “Stokvel” in South Africa , “Tinhlangano “ in Swaziland, “Chilimba” in Zambia and “Rounds” in Zimbabwe. However the nature of operation is fairly similar.

[22] Other formal products include insurance, and credit from non-bank financial institutions

the dependent variable. Further, recent evidence (see, for example, Borah & Basu, 2013; Maclean, et al 2014) suggests that estimates from CQR often do not provide relevant policy information, neither can they be contextualized to a population, as they tend to be limited if there are variations in the effects of conditional quantiles. On the other hand, because UQR analyses the effect over the distributions of other model parameters, it provides meaningful interpretation of results and unlike CQR the estimates are interpreted just like OLS. The UQR, therefore, seeks to provide a remedy to the shortcomings of the CQR. Furthermore the estimates from UQR are efficient, asymptotically normally distributed, and root *n* consistent, whereas those obtained *via* CQR may change with the inclusion of covariates (Frölich & Melly, 2013).

2.3.4 Identification

UQR helps to show how the distribution of the wealth index would have looked like if the entire population had access to finance, or did not have access to finance. By creating the counterfactual (*i.e.* the estimated wealth position or poverty level of non-users of financial services, if they had access to financial services), the UQR controls for a household's decision to use financial services given a set of covariates. But, since the counterfactual cannot be observed, the estimation relies on two identification strategies, namely; overlapping/common support and ignorability (or selection based on observables), to estimate the counterfactual distribution, and thus assess the effect of financial inclusion on unconditional poverty distribution.

Common support ensures that no single observable or unobservable characteristic can be used to identify a household in the financially included or financially excluded category, *i.e.* $0 < Pr[A = 1|X = x, \varepsilon = e] < 1$, whereas, the stronger assumption of conditional independence, used in OLS, is replaced by ignorability, which suggests that the distribution of random factors that affect households' wealth index is the same for both categories of households (*i.e.* those with access to finance and those without). Therefore, although there are some unobservable factors that influence household wealth, because the structural dependence of these factors is the same for both category of households, the unconditional estimates would still be valid.

Adopting the UQR perspective, I therefore examine the effect of access to finance (or financial inclusion) on poverty, as captured by the wealth index. To assess this two approaches are used. The first is the Unconditional Quantile regression or Re-centered Influence Function (RIF) regression of Firpo, Fortin, & Lemieux (2009) and Fortin, Lemieux, & Firpo (2011) which

is used to model the effects of financial inclusion along the wealth index profile. The instrumental variable quantile treatment effect (IVQTE) of Frölich & Melly (2008, 2013) is then used to allow for a causal interpretation of results, by controlling for potential endogeneity in access to finance.

A positive and significant effect would suggest that access to finance is wealth enhancing. A priori the effect of access to finance is expected to have a different impact across intervals- *i.e.* the unconditional effect is non-monotonic. If, for example, the effect of access to finance is smaller at the 90th percentile than at, the lower 10th percentile, it implies that access to finance potentially reduces inequality.

2.3.5 The Unconditional Quantile or Re-centered Influence Function (RIF) Regression Model

The UQR approach by Firpo et al. (2009) and Fortin et al. (2011) provides a more direct indicator of the marginal effect of individual covariates on the population distribution of the wealth index. It capitalizes on the strengths of both the OLS and the quantile regression methods of Koenker (2005) and Koenker and Bassett (1978), and therefore assesses the heterogeneous effects across the entire distribution of the outcome variable across the population. Holding sample distributional of other covariates constant, it extends the decomposition to beyond the mean to look at other distributional characteristics. The model derives its utility from the (re-centered) influence function (RIF) in estimating the unconditional quantile effect. By definition the *'influence function measures the relative effect of a small perturbation in the underlying outcome distribution on the statistic of interest'* (Essama-Nssah & Lambert, 2012). The influence function plays a key role in robust statistical estimation. For any distributional statistic $\upsilon(F_Y)$ the influence function $IF(Y;\upsilon,F_Y)$ is a representation of the influence of a single observation on the distributional statistic (Firpo et al., 2009). The Re-centered Influence Function (RIF) is therefore calculated as the sum of the influence function and the distributional statistic (*i.e.* $RIF(y; v) = v(F_Y) + IF(y; v)$), and its conditional expectation is given as:

$$E[RIF(Y; v)|X] = X\gamma, \qquad (2\text{-}5)$$

Where γ, is estimated via OLS

For any τ^{th} quantile (q_τ);

$$
\begin{aligned}
RIF(y;q_\tau) &= q_\tau + IF(y,q_\tau) \\
&= q_\tau + \frac{\tau - I(y \le q_\tau)}{f_y(q_\tau)} \\
&= c_{1,\tau} \times I(y > q_\tau) + c_{2,\tau}
\end{aligned}
\qquad (2\text{-}6)
$$

Where $I(.)$ is an indicator function which take a value of 1 if $y \le q_\tau$, and 0 otherwise, $f_y(.)$ is the density of the marginal distribution of the dependent variable (y), $c_{1,\tau}$ and $c_{2,\tau}$ are constants.

2.3.6 Estimation Strategy

Firpo et al. (2009) show that (under some regularity conditions) the unconditional partial effect (α_τ) is given as:

$$
\alpha_\tau = c_{1,\tau} \int \frac{dPr(y > q_\tau \mid X = x)}{dx} dF_x(x) \qquad (2\text{-}7)
$$

Under the assumptions of the linear probability model (LPM), $Pr(y > q_\tau \mid X = x) = x'\beta$. Consequently α_τ above would be given as $\alpha_\tau = c_{1,\tau}\beta$. Since by equation (2-6) above $RIF(y;q_\tau) = c_{1,\tau} \times I(y > q_\tau) + c_{2,\tau}$.

Therefore, the OLS regression model for the τ^{th} quantile is estimated as follows:

$$
\begin{aligned}
RIF(y;q_\tau) &= c_{2,\tau} + c_{1,\tau} x'\beta + u \\
&= c_{2,\tau} + x'\beta^* + u
\end{aligned}
\qquad (2\text{-}8)
$$

With $\beta^* = c_{1,\tau}\beta = \alpha_\tau$

To obtain the above I first obtain the quantiles and estimate $f_y(q_\tau)$ using the Gaussian[23] kernel density estimator, and thus estimate it non-parametrically I then use it to obtain an estimation of the RIF for each observation and regress it on the covariates. I use the RIF with bootstrapped robust standard errors, over 200 times. The obtained coefficient of access to

[23] However, I checked the sensitivity of results to using various kernel density estimation methods (results available), and there are no significant changes in coefficients due to kernel method selection and bandwidth calculation

finance (*A)* represents the 'unconditional quantile partial effect' of each of the covariates, holding the other covariates constant[24].

The RIF can also be used to derive an Oaxaca–Blinder (Blinder, 1973; Oaxaca, 1973) type of decomposition of the wealth index between the two subpopulations as follows:

$$RIF_1^{\tau} - RIF_0^{\tau} = \left(\overline{X_1} - \overline{X_0}\right)\gamma_{\tau} + \left[\overline{X_1}\left(\beta_{1,\tau} - \gamma_{\tau}\right) - \overline{X_0}\left(\beta_{0,\tau} - \gamma_{\tau}\right)\right] + \xi_{\tau} \qquad (2\text{-}9)$$

Where the first part, $\left(\overline{X_1} - \overline{X_0}\right)\gamma_{\tau}$ is the composition (explained/endowment) effect, the middle part, $\left[\overline{X_1}\left(\beta_{1,\tau} - \gamma_{\tau}\right) - \overline{X_0}\left(\beta_{0,\tau} - \gamma_{\tau}\right)\right]$ the structure (unexplained/discrimination) effect, and the last part, ξ_{τ} is an error term which indicates the extent to which the decompositions approximate the variation in the wealth index.

The above RIF estimation helps to provide a more direct link between household characteristics and access to finance, which may then assist in the formulation of policies that might enhance the effectiveness of financial inclusion strategies. It is also important to note that the coefficients obtained from RIF estimation are a local estimation of the effect of financial inclusion on poverty. Furthermore, like other similar estimation models, it is based on the assumption of zero general equilibrium effects.

2.3.7 Instrumental Variable Quantile Regression Model

Equation (2-4) above poses an estimation challenge due to potential endogeneity between access to finance and household wealth level. There is a possibility that households of high socio-economic status (as measured by their poverty/wealth index) may have a higher usage of financial services. In addition, unobserved household/individual characteristics such as higher drive for growth or development, imply that household/individual(s) with a higher wealth index may have a potentially high need for formal financial services such as insurance, a bank account etc. Research has shown that poor and low income households tend to have higher levels of financial exclusion (e.g. Allen et al., 2016; Dymski, 2009; Kumar, 2012; Peachy & Roe, 2004). This suggests that access to finance may not be exogenous. In the presence of

[24] The estimation controls for gender of household head, age of household head, age of household head-squared, marital status of household head, household-size, area (*i.e.* rural or urban), provincial dummies, education level dummies, source of income/employment sector, and mobile money usage

unobserved heterogeneity, measurement error or simultaneity, the equation (2-4), above, may not be estimated *via* OLS as it would generate inconsistent and biased estimates.

The RIF estimations above are based on the assumption that once access to finance is controlled for, there is no systematic differences in the unobserved variables between the financially excluded and financially included households after including the control variables, i.e. selection on observables. If this assumption fails, the above estimation may underestimate the real impact of access to finance on poverty. To address these problems and to recover a causal interpretation of estimates, I therefore use instrumental variable (IV) estimation.

Due to challenges in identifying credible instrumental variables, very few studies have attempted to examine the above relationship. One such study is by Honohan and King (2013) who use FinScope Survey data from 11 African countries and apply an instrumental variables approach to examine the causal impact of access to finance on income, and thus seek to solve the endogeneity problem. However, by applying a linear approximation, they assume the effect of access to finance is uniform across all poverty levels, and thus ignore the potential heterogeneous impact of access to finance. I therefore apply instrumental variable quantile regression techniques to examine the distributional effect of access to financial services, and thus expand the analysis by Honohan and King beyond the mean, to assess whether improved access to finance has a uniform impact across all levels of poverty.

Abadie, Angrist, and Imbens, (2002) and Chernozhukov and Hansen (2005) demonstrate how IV estimation maybe help to eliminate the potential estimation challenges realised above and thus estimate the conditional quantile estimate. Frölich and Melly (2008, 2010, 2013) extended this and show both theoretical and empirically how the unconditional IV quantile estimation of an endogenous binary treatment provides more meaningful results. From equation (2-4) the vector A is taken to be potentially endogenous and determined by;

$$A = \phi(Z, \eta) \qquad (2\text{-}10)$$

Where Z is a vector of instruments, and η a scalar of error terms. The aim is to examine the distributional effect of A, (a binary treatment) on W (a continuous outcome). The estimation hinges on the Local Average Treatment Effect (LATE) of Imbens and Rubin (1997), where both A and Z are considered to be binary. If W_i^1 and W_i^0 are the potential wealth index for any household, *i,* with the superscript, *1= access to finance,* and *0= no access to finance*, then the distributional impact of access to finance for the τ^{th} quantile is;

$$\Delta^{\tau} = q^{\tau}_{W^1} - q^{\tau}_{W^0} \qquad (2\text{-}11)$$

The endogeneity of A implies that the identification is through the instrumental variable, Z. Allowing A to be arbitrarily heterogeneous, implies that the effect is only identifiable to the subpopulation that responds to changes in the instrument, *i.e.* compliers. Therefore, the quantile treatment effect for the compliers (*c*) is;

$$\Delta^{\tau}_{c} = q^{\tau}_{W^1|c} - q^{\tau}_{W^0|c} \qquad (2\text{-}12)$$

Where Δ^{τ}_{c} is the unconditional partial effect of access to finance, because the conditioning is not on other covariates[25]. The bivariate quantile regression estimator is obtained *via* the optimization problem;

$$\begin{aligned} (\alpha_{IV}, \Delta^{\tau}_{IV}) &= \arg \min_{\alpha,\Delta} \sum \omega_i \rho_{\tau}(W_i - \alpha - A_i\Delta) \\ \omega_i &= \frac{Z_i - Pr(Z = 1 \mid X_i)}{Pr(Z = 1 \mid X_i)(1 - Pr(Z = 1 \mid X_i)} (2A_i - 1) \end{aligned} \qquad (2\text{-}13)$$

The solution is obtained via two separate univariate weighted quantile regressions, for A = *1*(i.e. access to finance) and A= *0* (i.e. no access to finance), where ω_i are nonnegative weights, which provide a balance between the distribution of the covariates for the financial included and excluded households. I estimate the first-step *via* local logit estimation using robust bootstrapped standard errors, over 200 times.

2.3.8 Instrument Validity

The IVQR estimate hinges much on the validity of the instrument. There is need for an exogenous variable instrument, *Z,* which will isolate the part of the endogenous variable which is not correlated with ε, and thus fix endogeneity. A valid instrumental variable should satisfy

[25] The population can be subdivided into four categories; Compliers-. $A^1_i > A^0_i$. , Defiers - $A^1_i < A^0_i$, Never takers- $A^1_i = A^0_i = 0$, Always takers $A^1_i = A^0_i = 1$, where $A = Access$. Frölich & Melly (2013) provides the following key assumptions: (i) Presence of compliers, (ii) Monotonicity, (iii) Instrument Independence (iv) Common support *0 < P(Z = 1|X) < 1*

both instrument relevance and instrument exogeneity conditions (Angrist & Krueger, 2001; Dougherty, 2007; Hall, Rudebusch, & Wilcox, 1996):

i. *Instrument relevance*: the instrument must be correlated with the explanatory variable, *i.e. corr* (Z_i, X_i) $\neq 0$. This is also referred to as first stage power. Generally, if the first-stage *F* statistic is greater than 10, the instrument is considered to be valid. If the *F* statistic is lower, inferences based on conventional normal approximating distributions would be misleading (Stock, Wright, & Yogo, 2002). An instrument which fails to fulfil this criterion is said to be weak. Using a weak instrument (*i.e.* correlation nearly zero) increases the asymptotic standard errors, leading to finite-sample bias and, fat tails, and reduces the power of the hypothesis test, even in large samples (Bound, Jaeger, & Baker, 1995; Hall et al., 1996; Shea, 1997; Staiger & Stock, 1997). With weak instruments, IV estimates may be even poorer than OLS estimates (Bound et al., 1995; Stock et al., 2002).

ii. *Instrument exogeneity:* also called exclusion restriction (Angrist & Pischke, 2008) . A valid instrument must be uncorrelated with the residuals, i.e. *corr* (Z_i, ε_i)= *0.* The IV estimate is only consistent if *Z,* has perfect exogeneity (Shea, 1997). In general, exogeneity cannot be tested[26]. It should be based on sound underlying economic theory which;
    a. explains the influence of the instrument on the endogenous variable.
    b. clearly eliminates any direct influence of the instrument on the dependent variable or potential impact via omitted variables.
    c. clearly eliminates any reverse effect of dependent variable.

Research has shown that the identification of a valid and legitimate instrument is a hard task, and often almost impossible (Bound et al., 1995; Stock et al., 2002). This study seeks to build upon the findings by Honohan and King (2013)[27] and assess the distributional effect of access to finance on poverty using a newer dataset. Therefore, borrowing from Honohan and King (2013), who used two instruments, namely, confidence in the financial sector and financial

[26] However, if there are more excluded instruments than included endogenous explanatory variable(s) (*i.e.* the model is overidentifed), the Sargan (or Hansen J) test is asymptotically distributed as χ^2 with *m-k* degrees of freedom , *m*-the number of instrument, and *k*- the number of instrumented variables, can then be used to test for overidentifying restrictions. The null hypothesis is that over-identifications are valid.Therefore, a statistically significant test would suggest over-identifying restrictions and casts doubt on the suitability of the instruments. Exogeneity can only be tested if there is a surfeit of instruments *i.e*., equation over-identified (Baum, Schaffer, & Stillman, 2003). Tests for instrument exogeneity employ the Durbin-Wu-Hausman (DWH) test, which tests for a statistically significant difference between the TSLS and the OLS estimates of β.The null hypothesis is that *Y* is exogenous. The DWH test is a joint hypothesis of model specification and orthogonality between the instrumental and the error term, and a rejection means either one or both hypotheses is not accepted.

[27]Further explanation on the plausibility and the intuition behind the exogeneity of the instruments can be found in Honohan and King (2013).

literacy. From a behavioural economics perspective, one reason why some individuals may be unbanked is distrust of banks (Bertrand, Mullainathan, & Shafir, 2004; Springford, 2011). If consumers distrust banks they may not even bother to check the products or services being offered. Lack of confidence in the financial services industry has been found to be one of the major barriers to financial inclusion (Pomeroy, 2011). If one does not trust banks they won't be comfortable in dealing with them (Bertrand et al., 2004; Pomeroy, 2011). Honohan and King (2013) use trust in banks as a proxy for financial sector confidence. The FinScope Survey asks a question to respondents on whether they trust banks with their money, to which they respond with agree, disagree and don't know. However, this question is not asked in some countries (South Africa, Zambia), and Malawi, it is only asked to the unbanked sub-sample and therefore cannot be used across the sample. This variable is therefore used for those countries where it is captured, and a score of 1 is allocated if the response is *Agree* and zero otherwise[28]. I use this to generate a variable which I call "trust".

Literature also suggest the existence of a complementary relationship between financial inclusion and financial literacy. From a behavioural-economics perspective improved financial literacy helps consumers to navigate their way through the financial markets, which otherwise they would not be able to do. Recent evidence suggests that financial literacy has both a direct and an indirect impact on access to finance as it also influences one's decision to seek financial advice (Calcagno & Monticone, 2015; Gine, Martinez De Cuellar, & Mazer, 2013). A study by Calcagno and Monticone (2015), using survey data from one of the largest banks in Italy, shows both theoretically and empirically that a high degree of financial literacy increases the probability of consulting a financial advisor. In addition it was found that financial advisors disclose more detail to knowledgeable investors, increasing the potential use of financial services. Financial literacy has been found to have a direct impact on financial planning and decision making (van Rooij, Lusardi, & Alessie, 2011).

[28] This effectively results in an over-identified model, and thus allow for the additional tests for instrument validity. As shown in Table 2.2, the Sargan Test statistic rejects the null across all countries where the *trust* variable is available. The Kleibergen-Paap Wald *rk F* statistic test for weak instrument test also rejects the null hypothesis of underidentification at the 99% level, suggesting that the instruments adequately identify the equation. Further, the Anderson-Rubin Wald and the Stock-Wright LM test both reject the null (p-value of 0.000 for both). Therefore, based on these diagnostics, the null hypothesis is rejected, implying that the smallest canonical correlation between the endogenous variables and the instrument is different from zero. This suggests that at least one of the instruments is valid. Further, I conduct separate estimations using each of the instruments, there is no significant variation in the estimated coefficient (in most instances the coefficients are exactly the same), therefore I conclude that the instruments provide valid estimations.

Empirical evidence suggests that efforts to improve access to finance should focus on improving financial literacy (Niang, Andrianaivo, Diaz, & Zekri, 2013). Improved financial literacy helps to trigger demand for financial services. From a marketing perspective, consumers can only demand products they are aware of. A number of researchers (*e.g.* Beckmann, 2013; Jappelli & Padula, 2013; Lusardi & Mitchell, 2014) allude to the significance of financial literacy on household demand for financial services. For example, Beckmann (2013) uses survey data from the Euro Survey of the Austrian Central Bank to examine the relationship between financial literacy and household savings and investment in Romania, and finds a positive and significant relationship. Further, one's level of financial literacy reflects their attitude towards formal financial services. Therefore, financial illiteracy has an adverse impact on the ability to understand and use financial products (Zokaityte, 2016). The more sophisticated one's financial sector knowledge, the higher the likelihood of being financially included (Honohan & King, 2013).

A widely accepted definition of financial literacy is by the OECD International Network on Financial Education[29] (INFE), which states that financial literacy includes '*awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial well-being'*. From this definition three dimensions of financial literacy emerge; i.e. financial capability, financial behaviour and financial attitude.

Honohan and King (2013) use a normalized index of respondents' awareness of capital markets, stock market, shares, unit trusts and any other financial instruments to measure financial literacy. This approach has been criticized as a weak proxy for financial literacy (Xu & Zia, 2012), and this study therefore adopts an approach similar to the one used by the OECD/INFE (see, for example Atkinson, McKay, Kempson, & Collard, 2006; Atkinson & Messy, 2012). In-line with OECD measures of financial literacy, the FinScope Surveys asks both direct financial literacy questions and a wide number of auxiliary questions, which seek to gather information, on:

i. affordability of products and expenditures,
ii. budget planning and monitoring,
iii. propensity to borrow,
iv. savings habits,

[29] The OECD-INFE was organized in 2008 to promote and facilitate global exchange of information on financial education (from both OECD and non-OECD countries). It uses a standardized toolkit to gather data on financial literacy and capability, and generates comparative and analytical reports to guide policy initiatives.

v. desire to evaluate financial products or services
vi. attitudes towards money/budgeting,
vii. efforts to seek financial advice,
viii. awareness of financial services/products

Although the questionnaire solicits for basically the same items across the countries, in certain instances they are modified to suit country-specific needs. In order to develop a robust indicator of financial literacy, this study adopts the by OECD/INFE recommendation also used by Atkinson and Messy (2012). This involves:

i. assessment of the significance of excluding and/or including some questions by examining how this affects the country's ranking against other countries
ii. apply factor analysis to ascertain the extent to which the questions capture the same element.

A score of 1 is assigned for each desirable financial behaviour/capability/attitude, and zero otherwise. The scores are then added such that a high score corresponds to good financial behaviour or capability or attitude. The final score is an average based on an aggregate of the three dimensions of financial literacy. The maximum value varies from country to country as the number of questions varies. Because the model only allows for binary instruments[30], a score that is above country average is considered to indicate financial literacy, and if the score is below country average one is classified as low financial literacy. A significant relationship between financial literacy score and the probability of being formally banked is expected[31].

Literature suggests that a lack of trust in banks is one of the reasons why certain individuals may not be formally banked (Allen et al., 2016; Asli Demirgüç-Kunt & Klapper, 2013a; Han & Melecky, 2014). Therefore, the first-stage F-test is expected to indicate a significant relationship between trust in banks and access to formal banking services. However, this variable is not available for some of the countries included in this study.

A number of potential instruments were considered - for example, level of education. However, because studies in labour economics suggests that wealth accumulation is often explained by the level of education, using education as an instrument might bring further complications.

[30] According to Frölich & Melly (2008) although the identification results would still hold with a continuous instrument, the estimation would not be root *n* consistent.
[31] The identification strategy may not provide a complete solution to the endogeneity problem, as there could be doubt. Practically, the estimation is valid only for the compliers sub-population.

Another potential instrument could be the distance to a bank or ATM; however the nature of the datasets and the ambiguity underlying the determination of what can be considered as a distant location in a modern society makes it difficult to use such an instrument. Of course, one might argue that financial literacy is not purely endogenous to wealth. However, because the various components used to construct the index are basic financial issues which are shared *via* ordinary media channels, I argue that the endogeneity is not straightforward. Further, I argue that the main objective of this study is not to quantify the causal impact, but to show that estimates that focus only on the median do not provide a full picture of the relationship, as they inadvertently assume a uniform effect. Therefore, the presence of endogeneity should not affect the comparison, as it is common in both estimates.

Therefore, in line with Honohan and King (2013), and based on the argument above and the test results in Table 2-3, I posit that there is sufficient exogeneity between the instrument(s) and the error term, the relationship between psychometric factors such as confidence in banks, financial literacy and long-term asset holding structure is multifaceted and thus complex to model, effectively eliminating any direct relationship between the instruments and the unobserved error term.

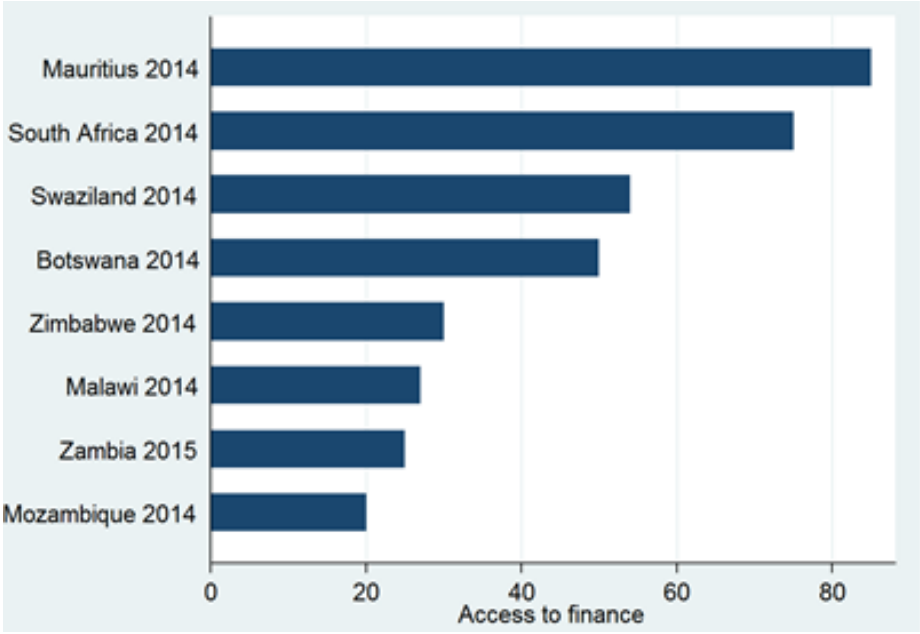
2.4 Results and Analysis of Findings

2.4.1 Descriptive statistics

The empirical analysis is based on nationally representative household surveys from eight countries within the SADC region. The sample consists of 1503 households from Botswana, 3005 households from Malawi, 4000 households from Mauritius, 3905 from Mozambique, 3900 from South Africa, 3400 for Swaziland, 8479 from Zambia, and 4000 from Zimbabwe. The data are weighted based on household sample weights derived from the respective countries' national statistics agencies. As shown in Figure 2-3, there are wide variations in access to finance across the countries in the sample[32]. In Mauritius, about 86% of the population has access to formal banking services, whereas for Mozambique the figure drops to 23%.

[32] Some of the figures above may be different from those published in the FinScope survey. The values above reflect access to both formal and semi-formal financial services.

Figure 2-3: Access to Finance



Source: Own Calculations from FinScope Consumer Surveys

In line with World rankings which suggest that Malawi is the poorest country in the World, (see for example Pasquali, 2016; Yakobe, 2015) the results suggest the existence of high poverty and inequality in Malawi. Thus, with a mean adjusted wealth index of 4.098 and a standard deviation of 5.517, there is a high proportion of low wealth index households in Malawi. This could also be evidence that the wealth index captures the key elements that determine household wealth. As shown in Table 2-1a, 2-1b and 2-1c there seems to be a difference in wealth accumulation between the banked and the unbanked population categories across all countries on average the banked population has a higher wealth index compared to the unbanked.

The data suggests that, with the exception of Mauritius, Zambia and Zimbabwe, most households in the sample are female headed. The average age of household heads is between 38 and 51 years, suggesting that, on average, all household heads are economically active. Generally there is an uneven distribution in the levels of financial literacy across the sampled countries. Whereas Mauritius, Zambia, and Zimbabwe record levels above 55%, in most countries financial literacy levels are below 50%, based on the questions asked on the major domains of financial literacy used to construct our measurement of financial literacy/capability. Interestingly financial inclusion is very low in Zimbabwe and Zambia. Since the data suggest the existence of a significant relationship between access to financial inclusion and financial literacy, the case of Zambia and Zimbabwe may indicate a problem of

structural and socio-economic imbalances. Financial literacy levels are lowest in Mozambique and Malawi, where financial literacy rates are 21% and 26%, respectively. A closer analysis reveals that in Mozambique 54% of the respondents indicated that they have never heard of interest rates, while 77% indicated that they have never heard of the term ‘instalments’, whereas in Malawi 74% of the respondents indicated that they have no knowledge of interest rates and 57% indicated they need some education on interest rates.

Although Africa is leading the world in mobile-money or mobile-banking usage, the data suggest very low usage rates for Malawi and Mozambique, at 3.1% and 3.5%, respectively. Following the success of mobile-banking Kenya, where it was initiated by the Safaricom mobile network in 2007, mobile-banking has rapidly expanded into other African countries, and in most instances with great success. According to the latest data on mobile-banking, about 12% of the adult population in Sub-Saharan Africa (SSA) use mobile-money and in some countries where mobile money is used, there are more mobile accounts than bank accounts (Demirguc-kunt, et al, 2015). The use of mobile-money has proven to be beneficial to societal members who previously had no access to formal financial products. As shown in Table 2-1a, 2-1b and 2-1c, there seems to be a high usage of mobile-money most countries, above 15% for most of these countries, with the exception of Malawi and Mozambique. The highest usage is in Zimbabwe where about 47% of the sampled population use mobile-banking services. Across all countries the banked population tends to use mobile-banking more than the unbanked population category. Again Zimbabwe is a unique case where there is high rate of mobile-money usage and relatively low level of access to bank account. According to the World Bank’s 2014 Global Findex Report (Demirgüç-Kunt et al., 2015) there is a possibility that due to the economic challenges that Zimbabwe went through, some people may have switched from formal banking with a financial institution to a mobile account, further harnessing the importance of banking sector confidence in enhancing access to financial services.

Table 2-1a: Descriptive Statistics

	Botswana						Malawi						Mauritius					
	Overall		Unbanked		Banked		Overall		Unbanked		Banked		Overall		Unbanked		Banked	
Variable	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**
Banked	0.496	0.042	-	-	-	-	0.249	0.013	-	-	-	-	0.854	0.009	-	-	-	-
Wealth Index	6.274	0.327	4.638	2.573	7.618	2.454	4.342	0.215	2.964	3.904	7.728	7.865	11.5	2.581	10.043	3.262	11.77	2.332
Female	0.574	0.052	0.527	0.049	0.621	0.063	0.421	0.494	0.394	0.489	0.497	0.5	0.763	0.022	0.695	0.461	0.742	0.437
Age of head	47.27	1.935	52.34	17.13	45.81	16.42	37	15.92	37.19	16.35	36.42	14.58	51.04	13.653	51.29	13.56	51.45	13.67
Age of head Squared	2728	1830	3033	1887	2367	1693	1622	1463	1651	1507	1539	1323	2830	1442	2814	1419	28833	1446
Financial literacy	0.394	0.030	0.151	0.358	0.623	0.485	0.264	0.441	0.19	0.392	0.482	0.5	0.587	0.492	0.262	0.44	0.648	0.478
Trust	0.567	0.035	0.347	0.476	0.767	0.423	-	-	-	-	-	-	0.855	0.352	0.585	0.493	0.906	0.292
Mobile Money	0.245	0.031	0.069	0.254	0.371	0.483	0.031	0.172	0.014	0.119	0.078	0.268	0.016	0.118	0 .017	0.129	0.0	0.0
Area	0.682	0.096	0.461	0.499	0.779	0.415	0.165	0.020	0.085	0.28	0.266	0.442	0.415	0.038	0.303	0.460	0.0348	0.476
Household-size		-	-	-	-	-	2.353	1.289	2.318	1.282	2.454	1.307	3.551	1.568	3.716	1.725	3.52	1.535
Marital Status																		
Single	0.444	0.497	0.446	0.497	0.441	0.497	N/A	N/A	N/A	N/A	N/A	N/A	0.0923	0.289	0.111	0.314	0.089	0.285
Divorced	0.015	0.123	0.009	0.093	0.023	0.151	N/A	N/A	N/A	N/A	N/A	N/A	0.062	0.241	0.081	0.272	0.059	0.235
Widowed	0.136	0.343	0.148	0.355	0.123	0.328	N/A	N/A	N/A	N/A	N/A	N/A	0.138	0.345	0.139	0.346	0.138	0.345
Level of Education																		
1	0.364	0.481	0.407	0.492	0.313	0.464	0.325	0.468	0.328	0.47	0.317	0.466	0.17	0.376	0.205	0.404	0.164	0.37
2	0.225	0.418	0.199	0.4	0.257	0.437	0.187	0.39	0.136	0.343	0.335	0.472	-	-	-	-	-	-
3	0.052	0.222	0.2	0.134	0.09	0.287	0.013	0.112	0.003	0.056	0.041	0.197	0.454	0.498	0.321	0.467	0.059	0.235
4	0.108	0.31	0.01	0.0987	0.224	0.418	0.009	0.1	0.0009	0.03	0.034	0.181	0.0823	0.275	0.016	0.125	0.138	0.345
Source of Income																		
Own Business	0.093	0.292	0.075	0.263	0.116	0.321	0.098	0.297	0.086	0.278	0.135	0.342	0.117	0.321	0.101	0.302	0.119	0.324
Farming	0.049	0.215	0.054	0.226	0.042	0.201	0.237	0.425	0.221	0.415	0.281	0.45	0.033	0.425	0.028	0.166	0.034	0.182
Pension/Grants	0.208	0.406	0.287	0.453	0.115	0.319	0.003	0.052	0	0.021	0.009	0.095	0.258	0.438	0.28	0.449	0.254	0.435
Remittances	0.214	0.41	0.272	0.445	0.144	0.351	0.033	0.178	0.028	0.166	0.046	0.209	0.251	0.178	0.461	0.499	0.211	0.408
Other/Informal	0.208	0.406	0.254	0.435	0.153	0.36	0.497	0.5	0.559	0.497	0.316	0.465	0.013	0.114	0.021	0.142	0.0112	0.108

Table 2-1b: Descriptive Statistics

	Mozambique						South Africa						Swaziland					
	Overall		Unbanked		Banked		Overall		Unbanked		Banked		Overall		Unbanked		Banked	
Variable	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**
Banked	0.188	0.42	-	-	-	-	0.746	0.413	-	-	-	-	0.565	0.5	-	-	-	-
Wealth Index	2.5	2.44	1.85	1.93	4.68	2.71	6.3	3.075	4.795	2.491	6.72	3.092	5	2.58	3.65	2.051	6.163	2.421
Female	0.469	0.5	0.43	0.5	0.58	0.493	0.481	0.495	0.494	0.5	0.41	0.492	0.543	0.5	0.477	0.5	0.576	0.494
Age of head	37.83	18.9	37.7	19.2	38.2	17.99	39.46	15.87	31.72	14	41.6	15.69	48.18	16.3	51.18	17.1	45.57	15.09
Age of head Squared	1789	1987	1791	2001	1780	1940	1809	1442	1202	1069	1979	1486	2586	1692	2912	1819	2304	1519
Financial literacy	0.168	0.41	0.09	0.28	0.61	0.489	0.417	0.497	0.155	0.362	0.53	0.499	0.305	0.45	0.168	0.374	0.397	0.489
Trust	0.118	0.32	0.09	0.29	0.21	0.409	-	-	-	-	-	-	0.702	0.46	0.558	0.497	0.828	0.378
Mobile Money	0.025	0.18	0.01	0.09	0.12	0.33	0.364	0.487	0.348	0.477	0.4	0.49	0.222	0.41	0.114	0.318	0.297	0.457
Area	0.308	0.5	0.35	0.48	0.75	0.431	0.416	0.478	0.26	0.439	0.38	0.485	0.375	0.46	0.164	0.37	0.413	0.493
Household-size	4.982	2.47	4.98	2.5	4.99	2.379	3.641	2.142	3.982	2.28	3.55	2.092	4.476	2.87	5.073	2.957	3.958	2.679
Marital Status																		
Single	0.277	0.45	0.28	0.45	0.28	0.451	0.451	0.498	0.646	0.478	0.4	0.489	0.228	0.42	0.185	0.388	0.266	0.442
Divorced	0.047	0.21	0.05	0.21	0.05	0.215	0.031	0.172	0.017	0.127	0.03	0.182	0.019	0.14	0.02	0.14	0.018	0.133
Widowed	0.082	0.27	0.09	0.29	0.05	0.215	0.088	0.283	0.042	0.201	0.1	0.301	0.13	0.34	0.161	0.367	0.103	0.304
Level of Education																		
1	0.563	0.5	0.62	0.49	0.37	0.484	0.392	0.488	0.589	0.492	0.34	0.473	0.266	0.44	0.345	0.476	0.196	0.397
2	0.212	0.41	0.14	0.35	0.44	0.496	0.351	0.477	0.247	0.431	0.38	0.485	0.249	0.43	0.262	0.44	0.237	0.425
3	0.026	0.16	0.01	0.09	0.09	0.279	0.105	0.306	0.015	0.123	0.13	0.336	0.237	0.43	0.172	0.378	0.294	0.456
4	-	-	-	-	-	-	0.042	0.201	0.005	0.068	0.05	0.223	0.093	0.29	0.013	0.111	0.164	0.37
5													0.022	0.15	0.002	0.043	0.039	0.193
Source of Income																		
Own Business	0.16	0.37	0.15	0.36	0.19	0.394	0.044	0.204	0.021	0.144	0.05	0.218	0.023	0.15	0.01	0.098	0.034	0.182
Farming	0.283	0.45	0.34	0.47	0.09	0.291	0.233	0.423	0.032	0.175	0.29	0.453	0.038	0.19	0.044	0.205	0.034	0.18
Pension/Grants	0.015	0.12	0.01	0.1	0.04	0.187	0.217	0.413	0.488	0.5	0.14	0.349	0.067	0.25	0.077	0.267	0.058	0.234
Remittances	0.288	0.45	0.31	0.46	0.21	0.406	0.122	0.327	0.329	0.47	0.06	0.244	0.31	0.46	0.409	0.492	0.226	0.418
Other/Informal	0.134	0.34	0.14	0.35	0.12	0.321	-	-	-	-	-	-	0.306	0.46	0.406	0.491	0.221	0.415
No Income	0.014	0.02	0.13	0.01	0.08		-	-	-	-	-	-	0.009	0.09	0.016	0.126	0.003	0.052

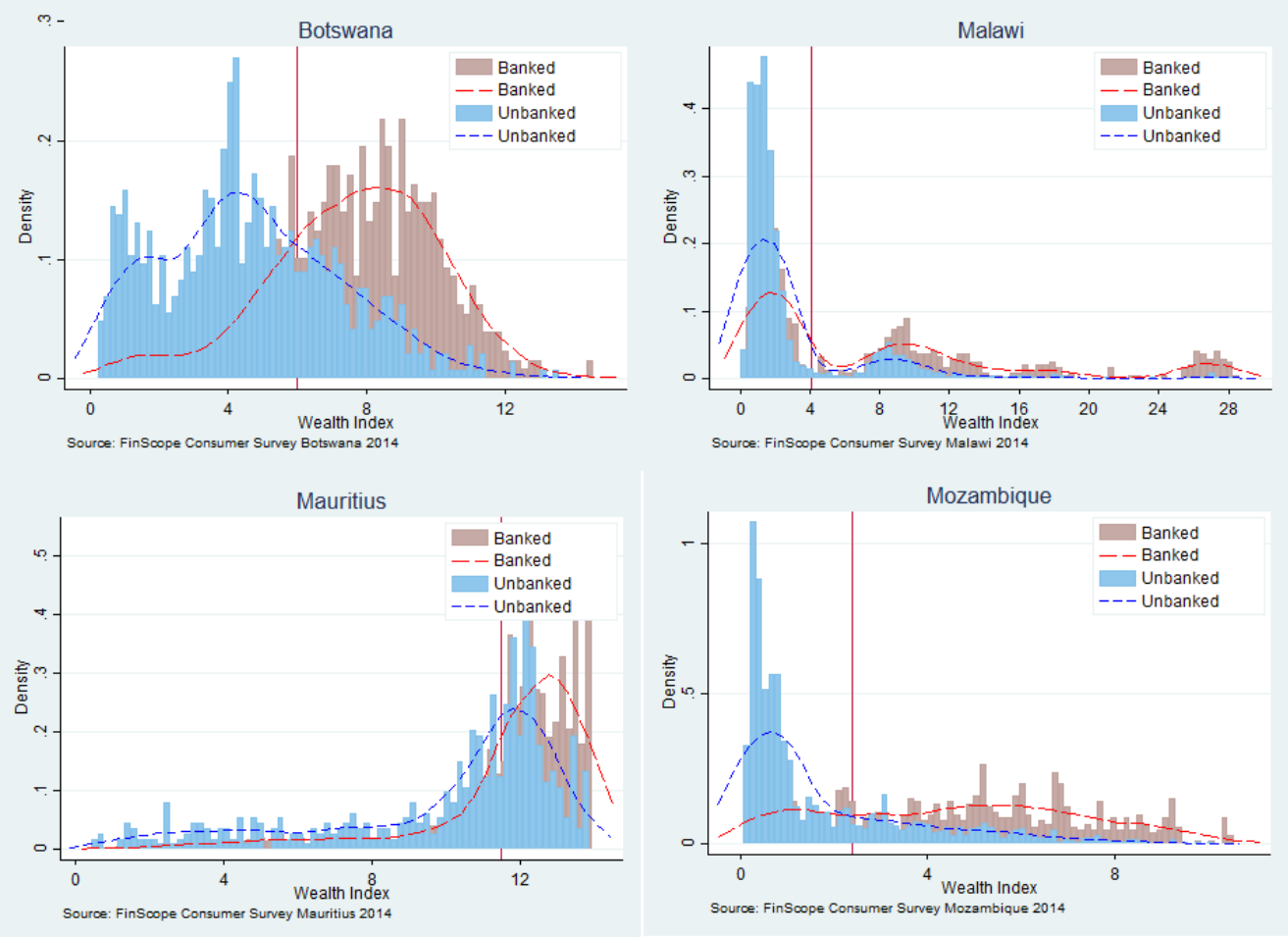
Table 2-1c: Descriptive Statistics

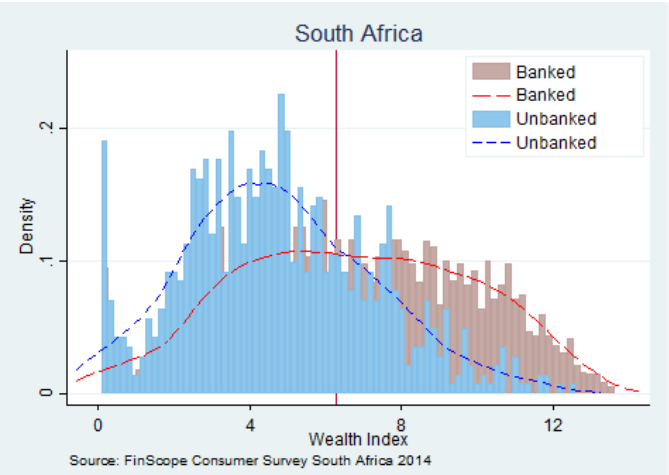
	Zambia						Zimbabwe					
	Overall		Unbanked		Banked		Overall		Unbanked		Banked	
Variable	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev**	**Mean**	**Std.Dev.**
Banked	0.248	0.439	-	-	-	-	0.305	0.462	-	-	-	-
Wealth Index	4.500	2.565	3.821	2.429	6.425	1.866	4.488	2.941	3.879	2.610	6.214	3.001
Female	0.713	0.453	0.706	0.455	0.730	0.444	0.698	0.458	0.694	0.461	0.718	0.450
Age of head	40.94	14.50	40.95	14.81	40.89	13.59	45.27	15.91	45.60	16.52	44.51	14.45
Age of head Squared	1886	1404	1896	1441	1857	1294	2302	1562	2352	1625	2190	1405
Trust	-	-	-	-	-	-	0.599	0.490	0.570	0.495	0.650	0.474
Financial literacy	0.758	0.427	0.731	0.443	0.842	0.365	0.589	0.490	0.542	0.498	0.723	0.448
Mobile Money	0.151	0.358	0.082	0.275	0.347	0.476	0.468	0.499	0.344	0.475	0.747	0.435
Area	0.452	0.388	0.404	0.104	0.589	0.340	0.330	0.476	0.273	0.446	0.509	0.500
Household-size	5.195	2.672	5.266	2.675	4.995	2.653	4.621	2.081	4.699	2.090	4.445	2.049
Marital Status												
Single	0.104	0.306	0.089	0.285	0.148	0.355	0.064	0.244	0.052	0.222	0.089	0.285
Divorced	0.084	0.278	0.092	0.289	0.062	0.241	0.073	0.260	0.072	0.258	0.076	0.265
Widowed	0.115	0.319	0.124	0.330	0.088	0.283	0.167	0.373	0.179	0.384	0.139	0.346
Level of Education												
1	0.472	0.499	0.542	0.498	0.272	0.445	0.344	0.475	0.394	0.489	0.232	0.422
2	0.226	0.418	0.203	0.402	0.291	0.454	0.522	0.500	0.518	0.500	0.531	0.499
3	0.137	0.344	0.067	0.251	0.335	0.472	0.063	0.243	0.028	0.166	0.140	0.347
4	0.020	0.140	0.006	0.076	0.060	0.238	0.0273	0.163	0.004	0.066	.079	0.269
Source of Income												
Own Business	0.171	0.376	0.170	0.375	0.173	0.378	0.171	0.376	0.171	0.377	0.169	0.375
Farming	0.213	0.410	0.247	0.431	0.118	0.322	0.311	0.463	0.358	0.480	0.206	0.405
Pension/Grants	-	-	-	-	-	-	0.033	0.177	0.016	0.124	0.0700	0.256
Remittances	-	-	-	-	-	-	0.083	0.276	0.094	0.292	0.0590	0.236
Other/Informal	0.447	0.497	0.495	0.500	0.312	0.464	0.128	0.334	0.154	0.361	0.0690	0.253

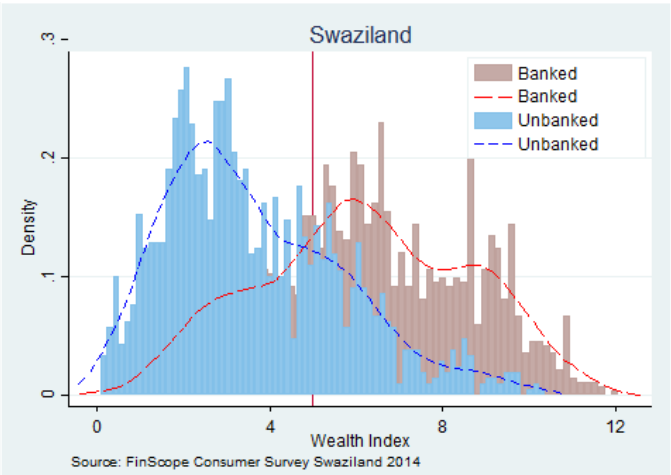
With the exception of Botswana, there are more rural households than urban households in the samples. Botswana is a special case where a significant proportion of households reside in peri-urban areas. In the 2014 FinScope survey for Botswana, 24% of the households in the sample indicated that they reside in urban areas, 39% in rural areas and 37% in an urban-village; the latter where classified as “urban” in this study, thus disproportionately increasing the urban population. Generally, across all countries within the SSA region, the bulk of the population resides in rural areas. This contributes to the poverty structure as the rural population often tends to have challenges in accessing basic necessities.

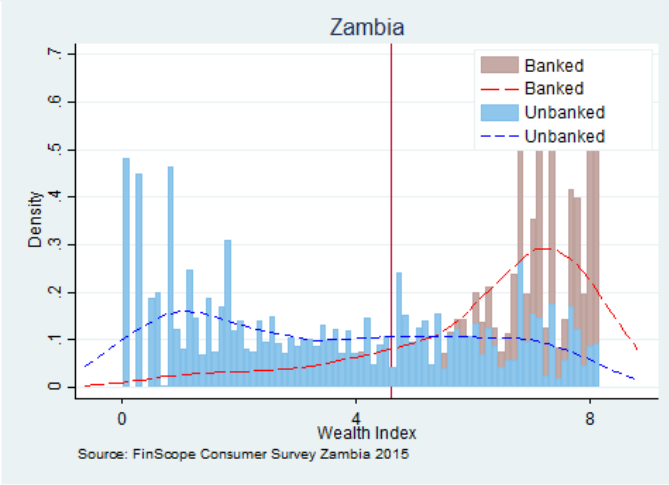
Figure 2-4 below presents a density plot of the wealth index by country, for both the banked and unbanked category (the red line represent the average wealth index for each country). For all countries, with the exception of Malawi, both the banked and unbanked sub-samples are observed across the entire distribution of the wealth index. However, in general at high levels of the wealth index there tend to be more banked households, and *vice-versa*, and this is consistent across all countries in the sample. An interesting scenario is that of Zimbabwe, where the wealth index is bi-modal. This could be a reflection of the impact of the political and economic challenges that the country has gone through, which has led to a wide variation between the rich and poor, resulting in very few households in the middle-class category.

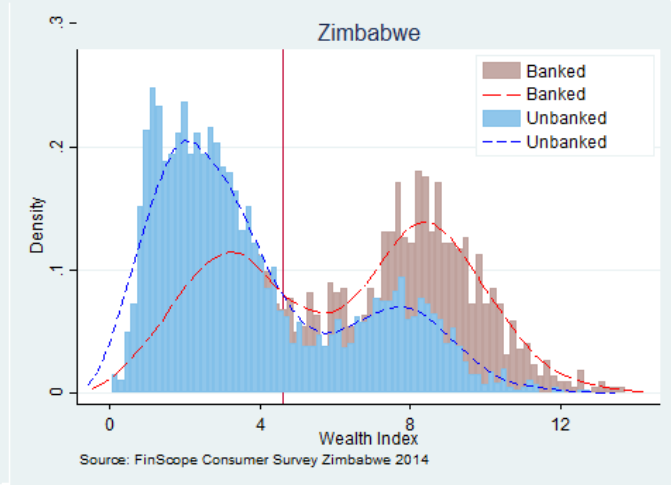
Figure 2-4: Densities of banked and unbanked wealth index levels

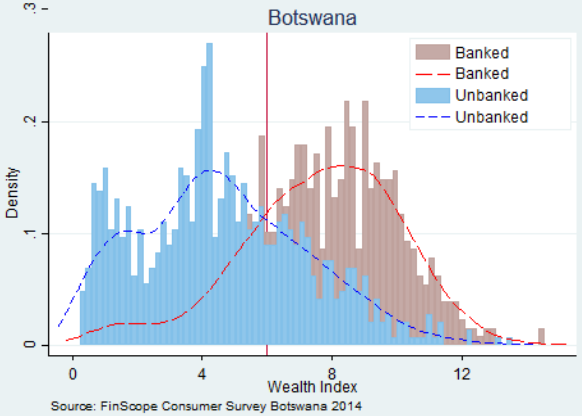


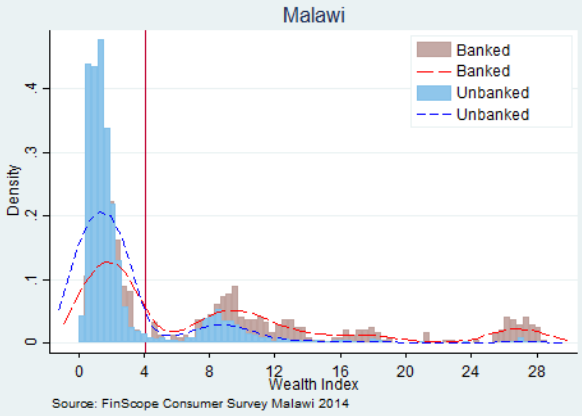

South Africa
Banked
Banked
Unbanked
Unbanked
Density
0
.1
.2
0
4
8
12
Wealth Index
Source: FinScope Consumer Survey South Africa 2014

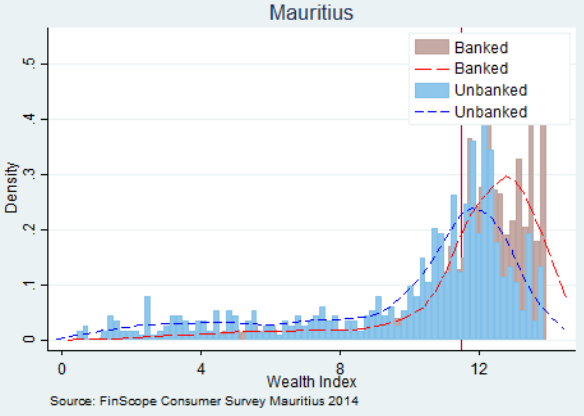

Swaziland
Banked
Banked
Unbanked
Unbanked
Density
0
.1
.2
.3
0
4
8
12
Wealth Index
Source: FinScope Consumer Survey Swaziland 2014

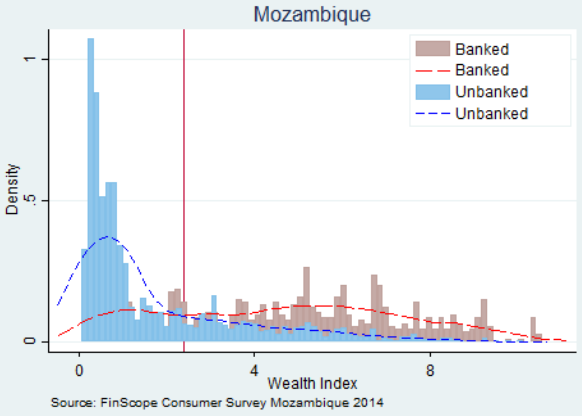

Zambia
Banked
Banked
Unbanked
Unbanked
Density
0
.1
.2
.3
.4
.5
.6
.7
0
4
8
Wealth Index
Source: FinScope Consumer Survey Zambia 2015

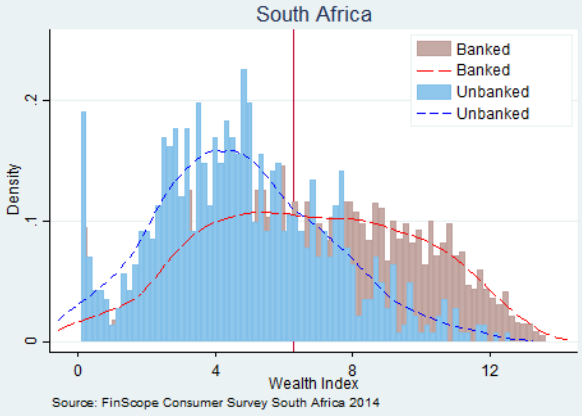

Zimbabwe
Banked
Banked
Unbanked
Unbanked
Density
0
.1
.2
.3
0
4
8
12
Wealth Index
Source: FinScope Consumer Survey Zimbabwe 2014

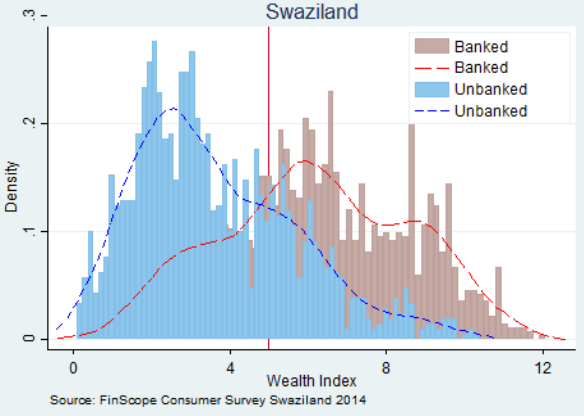

Botswana
Banked
Banked
Unbanked
Unbanked
Density
Wealth Index
Source: FinScope Consumer Survey Botswana 2014

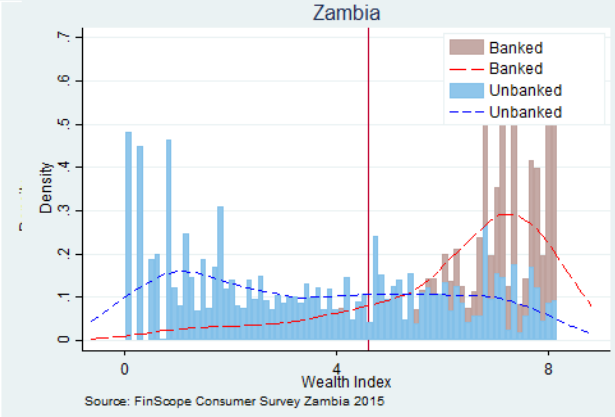

Malawi
Banked
Banked
Unbanked
Unbanked
Density
Wealth Index
Source: FinScope Consumer Survey Malawi 2014

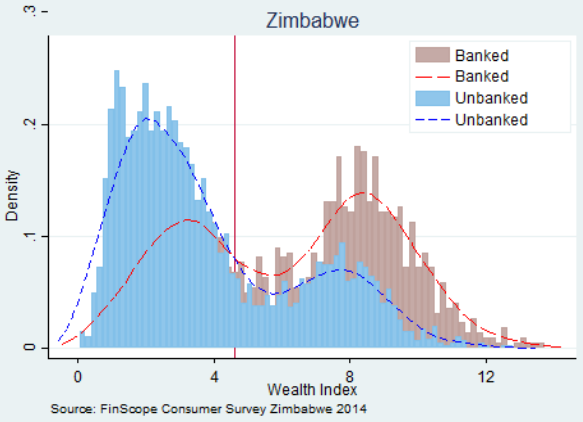

Mauritius
Banked
Banked
Unbanked
Unbanked
Density
Wealth Index
Source: FinScope Consumer Survey Mauritius 2014


Mozambique
Banked
Banked
Unbanked
Unbanked
Density
Wealth Index
Source: FinScope Consumer Survey Mozambique 2014


South Africa
Banked
Banked
Unbanked
Unbanked
Density
Wealth Index
Source: FinScope Consumer Survey South Africa 2014


Swaziland
Banked
Banked
Unbanked
Unbanked
Density
Wealth Index
Source: FinScope Consumer Survey Swaziland 2014


Zambia
Banked
Banked
Unbanked
Unbanked
Density
Wealth Index
Source: FinScope Consumer Survey Zambia 2015


Zimbabwe
Banked
Banked
Unbanked
Unbanked
Density
Wealth Index
Source: FinScope Consumer Survey Zimbabwe 2014

2.4.2 Empirical Analysis

This section analyses the unconditional quantile partial effects of the access to finance on household wealth. For robustness and in order to infer a causal interpretation, I control for the potential endogeneity in access to finance, and thus use unconditional instrumental variable quantile treatment to examine the relationship. This approach helps to explore the relationship between finance and poverty in a unique way and thus provide further insight for both policy formulation and private sector strategy implementation.

2.4.3 Unconditional quantile effects of access to finance on the wealth index distribution

Table 2-2 provides a summary of the estimated effect of access to finance on the distribution of poverty, as measured by the wealth-index model. Column 1 provides OLS estimates, which suggest the existence of a positive relationship between access to finance and household wealth. However, as highlighted above, OLS shows the estimation at the mean and does not show the variation across the distribution of the wealth index. Columns 2 through 6 provide the unconditional quantile partial effects estimates of the relationship between access to finance and household poverty. The coefficients vary across the quantiles, thus conforming the hypothesis that improved access to finance affect poverty in a heterogeneous manner. This is statistically significant at the 0.01 level across all quantiles.

Across all countries, the coefficients for the 50^{th} and 75^{th} quantiles are higher than the lower and upper quantiles. For the 10^{th} quantile the coefficients range for 0.0548 (for Mozambique) to 0.763 (for Swaziland). Except for Swaziland and Zambia, the coefficients reach a peak around the 75^{th} quantile. The highest coefficient at this quantile is 10.18 for Malawi and the lowest is 0.946 for Zambia. The quantile coefficients for Zambia and Swaziland reach their peak at the 50^{th} quantile. The regression coefficients also vary across countries suggesting existence of country-specific factors that affect the relationship. This would imply that although improved access to finance appears to enhance wealth, the net effect varies across countries within the sample.

The distribution of the coefficients is illustrated graphically in Figure 2.5, which shows a hump-shaped graphs for all countries, with the exception of Mauritius and South Africa (South Africa has an almost even distribution). As shown in the graph for very poor countries like Malawi, the effect is almost uniform up to the 75^{th} quantile. Data evidence from the World Bank and the calculated wealth index in this study suggest the existence of extreme poverty in Malawi.

This would suggest that generally improved access to formal financial services has limited effect on improving the wealth conditions of the poorer members of the society. In fact, it might even result in widening inequality, as it pushes the middle-class higher, with only a marginal effect on the poor. Generally, across all countries, the coefficients at the 90th percentile are higher than the coefficients at the 10th, which suggests that improved access to finance potentially widens inequality.

For Malawi, Mozambique and Zimbabwe the effect is zero at quantiles below the 10th percentile, *i.e.* there is no difference in household wealth levels between the banked and unbanked population. Malawi represents a special case, as shown in both Table 2-2 and Figure 2-5. Specifically, the coefficients increase from around 0.5 for the 70th quantile to 10.2 for the 75th quantile. Besides being driven by low counts (there are very few respondents within the 70th and the 80th quantile), this could also possibly be attributed to a number of other reasons - for example, as highlighted above, besides having the lowest wealth index, its poverty structure is very unique. It has the lowest financial literacy measured by our index, and the lowest levels of mobile money penetration. In addition, there no information was available on the marital status of respondents. The coefficients then increase rapidly for Swaziland and Zambia, and whilst they increase steadily for Zimbabwe to reach the maximum around the median they then drop to zero suggesting that at higher levels of wealth there is no difference between the banked and the unbanked households. The graphs also show that at lower wealth quantiles the 95% confidence intervals are below zero, suggesting the existence of non-statistically significant differences at the lower levels of the distribution. In general, the impact of access to finance appears to be higher on the median compared to other quantiles. This further highlights the importance of using quintile regression, as OLS cannot reveal such evidence because it only focuses on the median.

An interesting case is that of South Africa and Mauritius. For the former, the curve is flatter than for the other countries. This suggests the existence of a nearly even distribution of the impact across quantiles at quantiles below the 70th, after which the impact gets lower. For Mauritius, the curve is downward sloping, suggesting that improved access to finance has a higher impact on the lower quantiles than on the higher. Such results could be a manifestation of the impact of policy initiatives aimed at improving access to finance. For example South Africa's leading retail banks and the South African Post Office introduced the Mzansi account in 2004, which is low cost banking initiative targeting the poor and disadvantaged members of the society. Further this could be a reflection of the impact of an enabling environment on access to finance. Both countries have better developed economies and financial systems. This could suggest that expanding access in economies with poor financially enabling

environments may only result in widening the gap between the rich and poor, thus worsening the poverty structure.

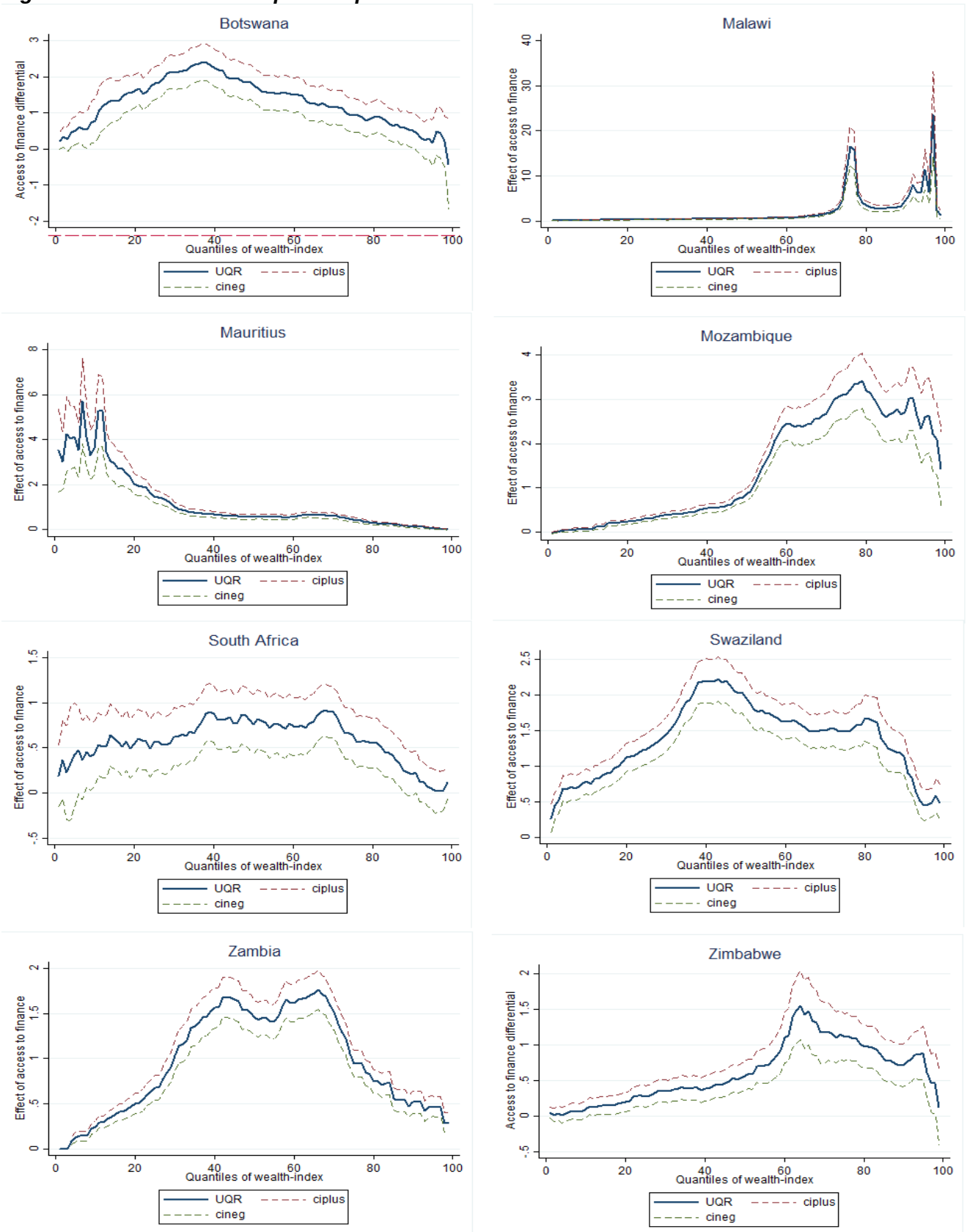
Table 2-2: Unconditional quantile partial effects

Country	(1) OLS	(2) 10th Quantile	(3) 25th Quantile	(4) 50th Quantile	(5) 75th Quantile	(6) 90th Quantile
Botswana	1.263***	0.790***	1.829***	1.758***	0.930***	0.524**
	(0.141)	(0.285)	(0.238)	(0.292)	(0.242)	(0.225)
Observations	1,313	1,313	1,313	1,313	1,313	1,313
Malawi	2.089***	0.163***	0.298***	0.510***	10.18**	4.098***
	(0.201)	(0.043)	(0.046)	(0.064)	(4.827)	(1.091)
Observations	2,693	2,693	2,693	2,693	2,693	2,693
Mauritius	1.087***	3.003***	1.378***	0.523***	0.407***	0.107***
	(0.084)	(0.811)	(0.176)	(0.062)	(0.058)	(0.026)
Observations	4,000	4,000	4,000	4,000	4,000	4,000
Mozambique	1.244***	0.055**	0.218***	0.661***	2.746***	2.554***
	(0.083)	(0.023)	(0.040)	(0.102)	(0.313)	(0.368)
Observations	3,296	3,296	3,296	3,296	3,296	3,296
South Africa	0.775***	0.543***	0.755***	0.838***	1.096***	0.539***
	(0.107)	(0.204)	(0.183)	(0.202)	(0.188)	(0.175)
Observations	3,893	3,893	3,893	3,893	3,893	3,893
Swaziland	1.050***	0.763***	1.182***	1.555***	0.935***	0.530***
	(0.079)	(0.100)	(0.118)	(0.173)	(0.145)	(0.130)
Observations	3,194	3,194	3,194	3,194	3,194	3,194
Zambia	1.067***	0.244***	0.678***	1.459***	0.946***	0.516***
	(0.046)	(0.034)	(0.069)	(0.112)	(0.090)	(0.065)
Observations	8,359	8,359	8,359	8,359	8,359	8,359
Zimbabwe	0.601***	0.091	0.274***	0.560***	1.101***	0.707***
	(0.064)	(0.061)	(0.077)	(0.113)	(0.174)	(0.162)
Observations	4,000	4,000	4,000	4,000	4,000	4,000

Note:

1. The dependent variable for each country is the wealth index. For all estimations I control for gender, age of household head, age of household head squared, household size, marital status (except for Malawi, as this variable is not captured), usage of mobile money, rural-urban dummy, provincial dummies, dummy variables for level of education, and dummies for major source of income. For robustness unconditional quantile bootstrapped standard errors over 200 times is used (shown in parenthesis).
2. *** p<0.01, ** p<0.05, * p<0.1

Figure 2-5: Unconditional quantile partial effects



Notes: UQR- Unconditional Quantile regression, ciplus- Upper confidence level, cineg- Lower 95% confidence level

2.4.4 Unconditional instrumental variable quantile effects of access to finance on the wealth index distribution

Whereas the above estimates from UQR are limited in accounting for endogeneity in access to finance, the instrumental variable quantile treatment effect helps to address this limitation. I use household financial literacy to instrument for access to finance, as shown in Table 2-3. The *F* statistic is above 10 for all countries, suggesting that there is no problem of a weak instrument. Therefore we conclude the instrument is not weak. However, some countries, *i.e.* Malawi, South Africa and Zambia, do not have data on the "trust" variable, for these use financial literacy only to instrument for the potential endogeneity. Lack of financial literacy has been found to be a barrier to the demand and use of financial services, and thus crucial for expanding financial services (Cole, Sampson, & Zia, 2011). Thus studies reveal that financial literacy has a significant effect on financial decision making, and a lack of financial literacy reduces participation in the formal financial system (van Rooij et al., 2011). Improved financial literacy therefore helps to enhance access to finance by promoting the appropriate behaviour and attitude.

As shown in Table 2-4, the results are almost similar to the previous ones, but with minor variations. Firstly, the IV estimates are higher than the *RIF* estimates, suggesting that failure to account for endogeneity results in downward-biased estimates as expected. If endogeneity was driven by non-observable factors (a common factor in household surveys) such as desire for higher wealth, individual capability or eagerness to improve overall well-being, the *RIF* estimates would be biased upwards. On the other hand, reverse causality between access to finance and household wealth would bias the estimates either downwards or upwards. This could partially explain why the IVQTE coefficients are higher.

Another plausible explanation could be regression dilution or attenuation bias due to measurement error. Ordinarily, measurement error in access to finance would not result in bias and inconsistency problems if the error is uncorrelated with the explanatory variables. However, random measurement error in the explanatory variables would bias the *RIF* estimates towards the null, and thus make them inconsistent.

Therefore, the impact of access to finance on household wealth position is larger once endogeneity is control for. However, the most profound element is the consistent estimation in both models on the impact of access to finance on the distribution of the wealth index. In-line with previous estimation the instrumental variable estimations also show that the effect is not homogenous. Improved access to finance appear to have a profound impact on the middle-income households, more than the rich and the bottom poor households. The

coefficients for the 10th quantile range from 0.142 to 6.485, and the impact on the 90th quantile range from 0.272 to 17.37. This effect is insensitive to both the kernel estimation method and bandwidth selection. Similarly, the impact is very high in poorer countries such as Malawi, where the impact at the 90th percentile is 17.37, suggesting that expanding broad access to financial services in such countries significantly widens inequality.

Table 2-3: Instrument Validity Tests

Variables	Botswana		Mauritius		Malawi	Mozambique		South Africa	Swaziland		Zambia	Zimbabwe	
First Stage Regression Results													
Financial Literacy	0.835***		0.731***		0.450***	1.040***		0.661***	0.478***		0.217***	0.263***	
	(0.0985)		(0.0677)		(0.072)	(0.0743)		(0.0846)	(0.0656)		(0.054)	(0.053)	
Trust		0.811***		1.098***			0.397***			0.677***			0.229***
		(0.0892)		(0.0774)			(0.0864)			(0.0615)			(0.0489)
F test	71.9	82.74	116.61	201.56	39.19	196.04	21.15	61.11	53.16	121.16	16.14	24.67	21.88
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Overidentification Test													
Sargan (or Hansen J) test -p-value	0.3186		0.2300		N/A	0.3444		N/A	0.1337		N/A	0.2588	
Observations	1,310	1,464	3,943	4,000	2,843	3,904	3,904	3,893	3,274	3,316	8,359	3,985	4,000

First stage regression estimates are made *via* a probit model; controlling for gender, age of household head, age of household head squared, household size, marital status (except for Malawi, as this is variable not captured), usage of mobile money, rural-urban dummy, provincial dummies, dummy variables for level of education, and dummies for major source of income the dependent variable is access to finance. Robust standard errors (p-values) in parentheses or the coefficients (for *F-test)*, *** p<0.01, ** p<0.05, * p<0.1

The IV estimates for Mauritius and South Africa again provide an interesting exception, with the results suggesting that after controlling for endogeneity, the impact of access to finance on poverty is higher in the lower quantile than all other quantiles. After, controlling for potential endogeneity, the results for South Africa suggest that the impact is significantly higher at the lower quintiles of poverty. Although the pattern for Mauritius does not change, the magnitude of the coefficients is higher for the IV estimates. As suggested, above this could be attributed to the existence of a financially enabling environment and unique interventions, such as the Mzansi account. Recent studies by Kostov, Arun, and Annim (2014, 2015) established that although the Mzansi account is limited in enabling households to move up the financial access ladder, it is quite appealing to consumers with low levels of financial literacy. The results above harness the need for deliberate product/service innovations aimed at addressing the needs of poor households. With the right products, access to finance potentially has a significant positive (reducing) impact on poverty.

Table 2-1: Unconditional instrumental variable quantile partial effects

	(1)	(2)	(3)	(4)	(5)
	10th	25th	50th	75th	90th
Country	Quantile	Quantile	Quantile	Quantile	Quantile
Botswana	2.677	4.058***	3.584***	3.393**	0.701
	(1.922)	(0.872)	(0.971)	(1.501)	(1.399)
Observations	1,313	1,313	1,313	1,313	1,313
Malawi	1.183	1.392	2.506**	7.305***	17.37***
	(0.840)	(0.855)	(1.125)	(2.220)	(2.521)
Observations	2,599	2,599	2,599	2,599	2,599
Mauritius	8.909***	5.586***	2.259***	1.328***	0.707***
	(0.570)	(0.915)	(0.551)	(0.286)	(0.231)
Observations	4,000	4,000	4,000	4,000	4,000
Mozambique	0.835**	1.850***	4.682***	6.405***	6.279***
	(0.424)	(0.565)	(0.657)	(0.484)	(0.453)
Observations	3,296	3,296	3,296	3,296	3,296
South Africa	6.485***	5.748***	5.379***	4.375***	3.494***
	(2.253)	(1.121)	(0.935)	(0.788)	(0.828)
Observations	3,893	3,893	3,893	3,893	3,893
Swaziland	1.999***	2.791**	3.734***	3.035*	1.713
	(0.739)	(1.181)	(0.820)	(1.565)	(1.278)
Observations	3,154	3,154	3,154	3,154	3,154
Zambia	3.399	2.284	0.702	-0.0147	0.332
	(4.786)	(2.718)	(2.677)	(0.731)	(0.436)
Observations	8,359	8,359	8,359	8,359	8,359
Zimbabwe	0.142***	0.232**	0.439***	0.448***	0.272**
	(0.0481)	(0.114)	(0.0340)	(0.0972)	(0.108)
Observations	3,984	3,984	3,984	3,984	3,984

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

2.5 Conclusion

Improved access to finance has become one of the key agenda items in most development forums. Although it is believed to have a significant impact on welfare outcomes, the direction of the relationship is not very straight forward, and theoretical postulations provide conflicting views. Furthermore, there is limited empirical evidence on the robust link between access to finance and household welfare indicators. This chapter described and discussed the application of quantile regression methods on country representative survey data to examine the effect of access to finance on the unconditional distribution of household wealth from eight countries in the SADC. Compared to the classical OLS, unconditional quantile estimates give a clearer description of the relative effect of access to finance on the entire distribution of household wealth.

The effect of access to finance is found to be higher at the median level, and very low at the bottom pyramid of the wealth index. These results are more aligned to the Kuznets hypothesis (Kuznets, 1955), which postulate that the relationship between economic development and inequality has an inverted-*U*-curve. This suggests that increased availability to, and usage of, financial services may disproportionately benefit the middle-class more than the very-poor and rich categories. Although this reduces the gap between the middle-class and the rich, it further widens the poverty gap between the poor and middle-class, which may result in a poverty trap, more-so, because the benefit appears to be higher at the 90^{th} quantile than at the 10^{th} quantile.

To allow for a causal interpretation, the instrumental variable quantile treatment effect is used. In line with Honohan and King (2013), I use financial literacy to instrument for access to finance. However, it is important to highlight that the instrumental variable estimates only provide a *local average treatment effect (LATE), i.e.* it is applicable to the subpopulation for which the effect is estimated. For example, there is limited information on the impact of access to finance on households who would never use financial services (voluntary exclusion), due to cultural or other reasons, regardless of their level of financial literacy. For such households the decision to be banked is independent of financial literacy levels. The results from instrumental variable estimation suggest that even after controlling for endogeneity, the Kuznets type of relationship remains significant with even higher coefficients. Thus, access to finance benefits the middle class more than other societal members, with very little impact at lower levels of the wealth index. However as highlighted in Section 2.3.7, the results should be interpreted with caution, as causal effect is only attributable to the subpopulation of compliers, and not the entire population.

These findings are in-line with Amin, et al (2003) who, using household data from two villages in Bangladesh, established that although micro-credit is effective in reaching the poor, it fails to assist the vulnerable poor households.

Although this study provides insight into the importance of access to finance on household wealth, it also suggests that in order to ensure effective poverty eradication, *via* improved access to finance, there is a need for custom designed financial services and products aimed at addressing the specific needs of the poor sub-population (for example the Mzansi account in South Africa). Improved access to formal financial services has limited effect on the welfare conditions of the poor. This would suggest that policies should focus at improving access to non-formal financial services by the poor, such as microfinance products. Indeed, empirical evidence from Bangladesh by Khandker (2005) and Pitt and Khandker (1998) suggested that microfinance and group-based micro-credit schemes have a larger impact on the poor. However, because poverty levels vary widely across countries, some intervention which may be effective in one country may fail in another. There is therefore a need to understand household dynamics, and in order to develop effective financial services and products. This gives rise to the need to examine the effect of specific products/services on household welfare at country-level.

However, development finance initiatives should not be viewed in isolation, as they are intricately linked directly to each other. As a cross-sectional survey, this study is limited in that it cannot trace how households transcend from exclusion to inclusion. This is a general concern in most studies on financial inclusion as the field is fairly new and there is limited data available on most variables.

As a result, the work described in the following chapter seeks to examine the extent to which cross-country variations in financial inclusion are mirrored in individual country structural and macroeconomic characteristics, and the extent to which the level financial development contributes to observed levels of financial inclusion, using a wide variety of development indicators to fully expose the nature and extent of financial exclusion.

Although the results suggest that access to finance has a potential positive benefit for the poor, due to the nature of the analysis, this study does not outline how to implement access to finance in a poverty reducing manner, or of the extent to which specific financial products help alleviate poverty. As more, data becomes available or is gathered over time, future studies could look into this domain and thus examine the linkage between access to finance and poverty in a broader way.

Chapter 3 : Financial system development and access to finance

3.1 Introduction

Research on financial system development has focused mainly on its determinants and its causal relation with other key indicators, such as economic growth and stock market development. There exists very limited research on the relationship between financial system development and the expansion of financial services. Anecdotal evidence suggests that the high level of financial inclusion observed in advanced economies is partly due to highly developed financial systems. However, the extent to which this has contributed to financial inclusion/exclusion has not been statistically explored. All things equal, a high degree of financial system development should enhance efficiency and effectiveness in service delivery. Therefore, an underdeveloped financial system is a potential barrier to usage of, and access to, financial services.

The relationship between the nature of financial systems and economic development becomes even more significant in the Sub-Saharan African (SSA) region where most countries face the twin challenges of under developed financial systems and low access to financial services. As shown in Figure 3-1 and Figure 3-2 the region lags behind all World regions, in all dimensions of access to finance (or financial inclusion) and financial development. Besides its banking systems ranking the lowest in terms of size, depth and other indicators of development, the region also has the lowest levels of access to finance. According to the 2014 World Bank Global Financial Development Report, although about half the world population was considered as unbanked, in SSA this number increases to 75% (World Bank, 2013). Furthermore, the region ranks very high in terms of liquidity and banking sector concentration, both of which can possibly be linked to a low level of financial system development. In addition, financial systems in SSA are largely dominated by banks, a situation which research evidence suggests could have a negative impact on access to finance (Beck, Demirgüç-Kunt, & Singer, 2013).

Figure 3-1: Access to Finance-Regional Comparison[33]

Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016

Key*:* ECA- Europe & Central Asia, EAP-East Asia & Pacific, MENA-Middle East & North Africa, SA-South Asia, LAC-Latin America & Caribbean, NA-North America, SSA-Sub-Saharan Africa

[33] The comparison is slightly distorted due to missing data for North-America is some of the variables, as shown above.

Figure 3-2: Access to Finance & Financial System Development-Regional Comparison

Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, *The World Bank-Global Financial Development Database June 2016*

It is therefore important to understand the nature and extent of the relationship between financial system development and observed levels of financial exclusion. This can be effectively achieved by benchmarking the level of access to finance for individual countries against their level of financial system development, as opposed to a general cross-country comparison which may ignore heterogeneity in financial system development across countries. Due to the wide variations in financial development within the SSA region, a simple cross-country analysis may be potentially biased, as the relationship hinges on a number of structural, economic development and other country-specific factors.

Existing literature on access to finance can be categorized into two main domains. The first domain focuses on the interaction of the financial system and firm-level dynamics (*e.g.* Beck & Cull, 2014b; Beck & Demirgüç-Kunt, 2006; Beck, Demirgüç-Kunt, & Maksimovic, 2004; Beck, Demirgüç-Kunt, et al., 2013). For example Beck, et al. (2013) used data from The World Bank's Enterprise Surveys for 33 countries from developing and emerging economies to examine which types of financial institutions ease access to finance for small to medium sized firms and established that the dominance of banks in a financial system results in lower access. However, contrary to theoretical expectations, they find no evidence that the size of financial institutions affects access. Another related study by Gimet and Lagoarde-Segot, (2012) examines the relationship between financial structure and firms' access to financial services using a panel of 138 countries over the period 2002–2009. Specifically, it considers the significance of banking sector size on access to finance and thus further examines the key characteristics of financial systems that enhance the link between these systems and access to finance. These researchers' findings suggest that, instead of focusing on banking sector size, there is a need to improve capital market development, enhance competition and institute effective regulatory and supervisory policies in order to effectively promote access to finance.

Although this domain brings more insight into the main characteristics of financial systems which enhance access to finance, focusing on small firms limit the economic-wide applicability of findings and policy recommendations. Following the seminal work of Campbell (2006), on the importance of household finance, studies have shown that households are key participants in financial markets, with a significant impact on both the size and composition of financial assets (see, for example, Guiso & Sodini, 2012; Haliassos, et al 2011; Thomas, 2010; Tufano, 2009). Moreover, recent developments in financial markets, especially the global financial crisis[34], have shown that households are significant users of financial services and products.

[34] Although there are several factors that contributed to the crisis, the subprime mortgage market is often considered as the key factor

Further, given their large numbers, households have a significant impact on financial systems (Cull et al., 2012). Therefore, in examining access to finance household-level dynamics should not be overlooked.

The second domain on access to finance focuses on the relationship between access to finance and micro-level development outcomes such as savings, consumption, entrepreneurship and reduction in financial constraints (*e.g.* Aterido, Beck, & Iacovone, 2013; Banerjee, Duflo, Glennester, & Kinnan, 2015; Honohan & King, 2013; Mckenzie & Woodruff, 2008; Rhine & Greene, 2006; Swamy, 2014). Although micro-level dynamics provide important insight, they are limited in scope, as they explain individual behaviour of economic agents, as opposed to the aggregate economy. Evidence from these studies suggests that access to finance has a significant impact on micro-level indicators of development, however the extent to which these are transferred to the wider economy has not been statistically explored. However, there is limited empirical evidence on the macro-level impact of financial inclusion.

As alluded to above, evidence from both developed and developing economies suggests that economies with underdeveloped financial systems and a low level of economic development tend to have low levels of financial inclusion. As shown in Chapter 2, for SSA countries with a high level of financial sector development such as Mauritius and South Africa, improved access to finance seems to have the highest impact on poverty at the lower quantile of the poverty continuum, whereas in countries with under developed financial systems, improved access to finance appears to widen the gap between the poor and the rich. A study by Bhattacharya and Wolde (2010) established that the low access to finance observed in the Middle East and North Africa (MENA) countries, is one of the main factors that contribute to their lower economic growth compared to other regions. Using a structural investment model, Love (2003) established that financial development impacts growth *via* a reduction in financial constraints as financial constraints tend to decrease with improvements in financial development. This again points to the need for a deeper understanding of the factors that affect financial inclusion at the macro-level.

One study which seeks to address this gap in the literature is by Allen et al. (2014), which examines the gap in financial development and financial inclusion in African countries given their level of economic development. It seeks to answer the question: given the level of economic development in Africa, what should be the level of financial development and financial inclusion? Although their evidence is mixed, Allen et al. (2014) suggests that there is a significant financial development and financial inclusion gap in Africa. Specifically, their

study shows the existence of a gap in access to credit, but no evidence of a gap in access to accounts. However, because the study is based on survey data, it does not examine variations in financial inclusion over time, and thus falls short in understanding the structural and macroeconomic factors that contribute to changes in the gap. Further, it examines the existence of the gap based on the level of economic development, whereas the study that forms the subject of this chapter examines the existence of the gap based on the level of financial and economic development. Thus, the present study seeks to establish the level of access to finance given the countries' level of both financial and economic development.

Driven by the understanding that financial inclusion depends not only on the level of economic development, but also the extent of financial systems' development, I examine whether there exists a statistically significant gap in financial inclusion in SSA. To conceptualize this, a benchmarking model is used to predict the level of financial inclusion based on the nature and level of both economic and financial system development. If the extent of access to finance for a country *X* matches its level of financial development, it would suggest that in order to improve access to finance, country *X* should focus on developing and implementing policies that facilitate financial development, as advancing access in the presence of poorly developed financial systems might push the country to an unsustainable position which may result in financial fragility. On the other hand, if the level of access is low relative to the country's level of financial development, policies should focus on improving either the supply or demand-side or both, depending on the source of problem, in order to remedy the situation. Lastly, if the level of access is high relative to the country's level of finance development, besides implementing policies that enhance financial sector development, this would call for strong and effective supervisory and regulatory oversight in order to prevent financial fragility.

Although it would appear to be much easier and straightforward to examine the gap in access to finance by benchmarking countries based on levels of economic development and/or to conduct a simple regression with a dummy for SSA countries, both approaches are avoided in this study, as they do not provide a systematic analysis of the gap. In addition, using an SSA dummy does not allow for a detailed examination of the structural and policy factors that affect the financial inclusion gap within the region. Therefore, using fixed effects regression, this study examines the main structural and policy factors determining the gap between the actual and predicted levels of access to finance. Unlike Allen et al. (2014), who exploit country cross-sectional variations, and thus do not to control for distortions due to omitted variable bias, the application of fixed effects panel data analysis controls for unobserved country-specific fixed characteristics.

This study is an extension of existing literature on benchmarking, initially developed by Beck, Feyen, Ize, and Moizeszowicz (2008), which has since been applied in a number of studies (*e.g.* Barajas, Beck, Dabla-Norris, & Yousefi, 2013; Beck & Feyen, 2013; Cihak, Demirgüç-kunt, Feyen, & Levine, 2013; Čihák, Demirgüç-Kunt, Feyen, & Levine, 2012). However, all of these studies focus on benchmarking financial systems and/or financial development, without a focus on access to finance. I extend the application of benchmarking to financial inclusion, in order to examine financial inclusion over time against a benchmark estimated *via* regression of a panel of countries. The benchmarking is based on the idea that there are certain factors within the financial system which determine the attainable level of financial inclusion. It therefore provides a cross-country comparison of how countries perform in terms of financial inclusion against similar countries, and thus identifies the extent of over or underperformance across countries. This can be used as a basis for future country-level studies.

I apply the Access Possibilities Frontier (APF) framework developed by Beck and de la Torre (2007), to classify countries' level of financial development based on whether they fall above or below the estimated frontier level. To facilitate this I draw insight from similar work by Barajas et al. (2013) and Beck and Feyen (2013), who redefine the APF framework to look at the Financial Possibilities Frontier (FPF), and use the FPF concept in benchmarking financial systems. In addition to examining the gap in financial inclusion, I also apply a decomposition developed by De la Torre, Feyen, and Ize, (2013) to examine the development of the various indicators of access to financial services, and thus classify them according to their elasticity to initial income, returns-to-scale and growth.

The current study can also be viewed as an extension of the growing body of work on the determinants of financial inclusion. However, whereas existing literature examines micro-economic determinants of financial inclusion and emphasize the significance of household-level dynamics such as education, household size, income etc. in access to finance (*e.g.* Hogarth & O'Donnell, 2000; Johnson & Nino-Zarazua, 2011; Osei-assibey, 2009; Rhine & Greene, 2006), this study examines the importance of macro-level structural and institutional factors in enhancing access, and thus provides more evidence from a policy and regulatory perceptive.

Further, findings suggest that improved access to finance is not always good for development. There is an inverted-U curve relationship between access to finance and both economic development and financial development. This suggests that, in as much as access to finance is good for development, policy makers should not merely focus on expanding access to financial services, without commensurate improvements in financial sector size and other

indicators of financial sector development, as this may result in a negative impact. This may call for country-level studies to establish the threshold level of access to finance, as this is likely to vary across countries.

The results, from this study also suggest the existence of a gap in access to finance within the SSA region. This gap is independent of whether the benchmark is based on the world average, comparable income group average, or SSA regional average data. Further analysis suggests that there is evidence of constrained sub-optimality due to both deficiency in demand, or inefficiency in supply, of financial services. Therefore, demand-side polices should focus on increasing the bankable population by improving both awareness and usage of financial services and products within the region. This may include, among others, financial literacy programs or deliberate interventions by policy makers, such as, for example, the Mzansi account in South Africa. On the other hand, policies aimed at eliminating supply-side deficiencies should focus on improving market structures within the banking systems. The opening of the markets for foreign entry, which although at face value might appear to be detrimental to access, could potentially be beneficial in the long run. Foreign bank presence may bring a number of benefits, such as reduced concentration, more competitive and efficient banking systems, among others, which ultimate result in improved access to financial services.

3.2 Review of the Literature

Studies in financial exclusion reveal wide variations in the level of exclusion across countries (*e.g. Chaia, et al, 2009;* Ardic, et al. 2011; Sarma & Pais, 2011; Demirgüç-Kunt & Klapper, 2012a; 2012b). Generally, there is low financial exclusion in most developed countries compared to developing countries (Kempson, 2006; Honohan, 2008; Demirgüç-Kunt and Klapper, 2012). Therefore, this would suggest that an underdeveloped financial system typically results in reduced availability of finance and at higher costs to users. On the other hand, well-developed financial systems facilitate information gathering, resulting in a reduction in information asymmetry, which then may lead to improvement in access to finance. This suggests the existence of country specific factors, such as variations in physical and financial infrastructural development, market structure, degree of competition, macroeconomic variables and regulatory framework, which affect financial exclusion.

Economic theory and empirical evidence suggests that financial infrastructural development leads to improved service provision. It is foundational for allocative, productive and dynamic efficiency (Claessens, 2009), and forces financial institutions to adopt technologically advanced systems to reduce operational costs, consequently broadening access to financial services. As such, developed financial sectors tend to allocate funds more efficiently than less

developed ones (Wurgler, 2000). On the other hand, focus on financial infrastructural development may force financial institutions to ignore building long-term customer relationships (Boot & Schmeits, 2006; Rajan, 1992) and a relaxation in lending standards, leading to a collapse in the financial system (Claessens, 2009; Dell, Detragiache & Rajan, 2008). Therefore, there is a lot of complexity and ambiguity on how financial infrastructural development affects access to financial services.

However, evidence on the relationship between finance and growth suggests that the impact of finance may-be non-linear (see Law and Singh (2014) for a detailed summary of literature on the non-linearity relationship between finance and growth). On the other hand, evidence by Rioja and Valev (2004) and Arcand, et al, (2015) suggests that improvements in financial markets have heterogeneous effects across countries. They find that at high levels of financial development, improvements in financial markets have a positive but small effect, at intermediate levels, the effect is positive and large, and the effect is uncertain at low levels of developments. Such evidence suggests that improvements in financial markets, if not well-monitored, may outgrow the economy they seek to serve.

Following the exposition of moral hazard and adverse selection effects on the demand and supply of financial services by Stiglitz and Weiss (1981), development economists have been able to place financial services users within an institutional context, increasing the role of institutions in determining financial exclusion. Institutional analysis places a rational consumer within a dynamic institutional context and looks at demand and supply factors, affecting financial markets. Beck and de la Torre (2007) suggest a theoretical framework for examining the key institutional factors that affect access to finance. They note that, although it is clear that the problem of access to finance is an outcome of market frictions (*i.e.* information asymmetry, transaction costs and uncertainty). It is not always easy to identify these frictions, as the observed outcome is a constrained optimum as economic agents (*i.e.* households and firms) seek to maximize utility and profit functions subject to constraints from market frictions. Based on this, Beck and de la Torre (2007), categorize market frictions into supply-side and demand-side frictions. Demand-side market frictions emanate from both economic and non-economic (*e.g.* self-exclusion) factors. They classify supply-side market frictions into two categories: transaction costs based frictions and frictions due to idiosyncratic and systemic risks. In the presence of fixed transaction costs, financial services providers can exploit economies of scale - either through high-volume or high-value transactions. However, Beck and de la Torre (2007) note that in developing economies, due to lack of economies of scale and network externalities, financial institutions tend to settle for high-value transactions, thus ignoring the majority of the population.

The problem of access to financial services in developing countries is further exacerbated by a triad challenge of smallness (*i.e*. small market size, small financial institutions and small transactions). As a result, it becomes difficult and expensive to serve the unbanked population, as the market can only accommodate a few players, resulting in less competition and unprofitable institutions. In addition, because the institutions are relatively small they cannot benefit from economies of scale, and the size of the transactions increases operational costs with marginal increases in profits. This would suggest that underdeveloped financial systems and economies might be limited in their ability to expand financial services.

Limited access to finance due to supply problems is driven by either variation in what Beck and de la Torre (2007) call 'state variables', or individual institution management capabilities at a given level of 'state variables'. 'State variables' are defined as factors beyond the control of a financial institution which often remain static over a long period of time, such as: market size, macroeconomic fundamentals, technology, income, transport and communication infrastructure, regulatory and informational framework and other related factors. Financial services outreach is limited by risk inherent in the economy, namely default risk, macroeconomic instability, and weak institutional quality or legal framework. As a result, financial services are priced beyond the reach of many.

3.3 Conceptual Framework

Based on the above, Beck and de la Torre (2007) propose an Access Possibilities Frontier (APF) framework for examining access to finance problems and the identification of appropriate policy interventions. The APF is the maximum proportion of the population that can be potentially served by financial institutions for a given set of 'state variables', determined by aggregate supply and demand. Viewed from an APF perspective, financial exclusion is either demand-driven, or an outcome of inefficiency in the supply system. Demand-driven financial exclusion is a result of non-economic factors which result in self-exclusion from the demand schedule. As a result, the equilibrium level would be lower than the APF, *i.e.* the banked population would be lower than the bankable population, given the 'state variables'.

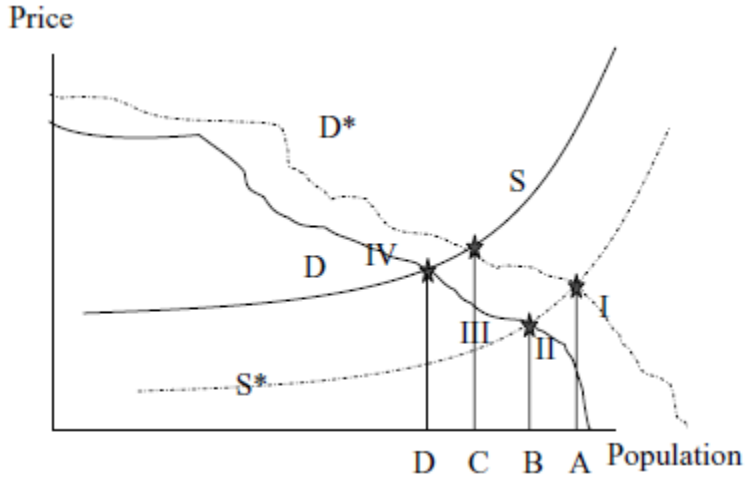
The second form of financial exclusion is a result of constrained sub-optimality. This is mainly due to inefficiency in the supply system, which also pushes the banked population below bankable levels, given the 'state variables'.

The third form of financial exclusion results when the bankable population is low relative to countries with similar characteristics. This happens when a country lags behind in certain 'state variables', which is often the case with most developing economies. Poor 'state

variables' increase systemic risk, leading to further reduction in service provision due to high default probability, and the loss given default. Under the APF framework, this situation can be overcome by exploiting scale economies through either sufficiently high-volume or high-value transactions, exhibiting a trade-off in the supply schedule. Poor 'state variables' result in financial institutions being forced to cluster in high-value transaction regions (*e.g.* urban areas) due to high switching costs coupled with poor 'state variables' in low-value transaction regions (*e.g.* rural areas), leading to inefficiency in the supply system.

The above can be illustrated graphically, as shown in Figure 3-3 below, where D*, D, S* and S represent potential demand, actual demand, potential supply and actual supply, respectively. The first access problem outlined above is represented by point II (*i.e.* the actual frontier is lower than its potential due to non-economic factors), while point III and IV both represent constrained sub-optimality, and point I is a situation where the bankable population is low relative to comparable countries.

Figure 3-3 Access Possibilities Frontier



Source: Beck and de la Torre, (2007) page 88

Therefore, the nature of financial exclusion becomes complicated in the presence of both demand deficiency and inefficiency in supply. According to Beck and de la Torre, (2007), in developing economies the APF is often far below the constrained optimum. By distinguishing between the supply and demand-side constraints, the APF helps to classify policies based on the direction to which they shift the frontier towards its structural fit level, (*i.e.* upwards or downwards). Further, it helps to understand how operating above the structural frontier is unstainable and may lead to financial fragility.

Policies based on the APF are categorized into three types as follows:

i. *Market harnessing policies*

These policies focus on preventing the financial system from operating above the sustainable equilibrium resulting in rapid service expansion, which may result in financial fragility. This overshooting of financial services can also be an outcome of poor governance, a weak supervisory framework, and lack of market discipline.

ii. *Market enabling policies*

These policies are applicable if the country is below the frontier. This is mainly an outcome of irregularities within the system, *e.g.* low demand (due to financial illiteracy, or lack of viable projects - due to macroeconomic instability, or a lack of competition, or a highly restrictive regulatory environment). Depending on the underlying causes, there is either a need to improve demand (for example through awareness campaigns), or incentivising service providers to ensure efficient service delivery. From the supply-side, Beck and de la Torre (2007) suggest that this is a manifestation of lack of innovation due to insufficient competition, which can be managed by improving a country's foreign entry policy and/or allowing non-banking players to enter the field.

iii. *Market developing policies*

If the frontier is too low relative to similar countries, policies should focus on expanding the frontier through structural reforms, aimed at improving the quality of institutions and state variables. Poor state variables would suggest a need for structural reforms, while the problem of small scale would suggest the need to take advantage of economies of scale and diversification provided through globalization. High population dispersion would suggest use of innovative banking mechanisms such as branchless banking and technology.

This study therefore exploits the APF concept and use benchmarking to examine the extent to which the predicated and actual levels of access to financial services vary across countries within the SSA region, based on the level of their financial and economic development, and thus examine the extent to which a country is under/over performing in access to finance. Such an analysis helps in the identification of the type of policies to be implemented to enhance access to finance.

3.4 Data and Methodology

3.4.1 Data

This study uses data obtained from a number of sources. Financial inclusion data is obtained from the International Monetary Fund (IMF)'s Financial Access Survey (FAS),

which is a database of supply-side data on geographic coverage (outreach) and usage of financial services around the world, and provides data from 2004-2016. Although this database does not provide demand-side data, it helps to track variations in access to finance over time. The World Bank's Global Financial Inclusion Index (Global Findex) is a demand-side survey database of how households use financial services. To date two waves of this survey have been conducted, in 2011 and 2014. However, due to its limitations in terms of coverage and the dimensions of access to finance this study uses the former database. Nonetheless, for robustness purposes the benchmarking results are compared with indicators obtained from the Global Findex. There are minor variations on the magnitude of coefficients, although the direction of the relationship is fairly similar.

To facilitate analysis, I collect data on a number of policy factors which have been found to have an effect on costs and risks of financial services provision (*i.e.* macroeconomic stability, legal and institutional framework) and indicators of financial and economic development. Data on macroeconomic indicators is obtained from various World Bank databases. Thus, I use the World Bank's Global Financial Development Database (GFDD), as well as the Financial Development and Structure Dataset (commonly referred to as the Financial Structure Database) for all financial system indicators. Both databases cover the period 1960 to 2014[35]. Because of the data restrictions imposed by the coverage of the FAS, the GFDD and the Financial Structure Database, this study therefore focuses specifically on the period 2004 to 2014. I also use data from the World Bank's World Development Indicators for other structural factors which determine market size (*i.e*. per capita income growth, population size, population density, dependency ratio and rural population concentration). For indicators of legal and institutional frameworks, I use data from the Word Governance Indicators (WGI)[36] (see Kaufmann, Kraay, & Mastruzzi, 2009, 2011 for details).

One challenge of cross-sectional regression as used in Chapter 2 of this work is the potential distortion due to omitted country specific indicators. In this part of this study, I

[35] See Beck, Demirgüç-Kunt, & Levine, (2000) and Čihák et al., (2013) for a detailed explanation of the datasets

[36] The WGI provides individual governance indicators for more than 200 countries over the period 1996-2015 on six dimensions of governance, namely Voice & Accountability, Political Stability & Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. I then use principal component analysis (PCA) to reduce it into a composite indicator which I call Institutional Quality. From the data the first component is the only one whose Eigen value is greater than 1 (5.0149) and it explains 85% of the variation across the variables. The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy gives a value of 0.9062 thus implying adequate commonality to warrant PCA. The results indicate that on average the SSA has a low ranking on the Institutional Quality Index, the lowest ranking Region is South Asia.

therefore use panel data analysis and thus control for unobserved country-specific fixed characteristics. Due to restrictions in data (2004-2014), I use annual frequencies without smoothening the noise

3.4.2 Identification strategy

As alluded to above, the concept of benchmarking is based on the idea that there are certain factors within the financial system which determine the attainable level of financial inclusion. It therefore provides a cross-country comparison of how countries perform in terms of financial inclusion, against similar countries, based on the level of financial and economic development. A study by Beck, Demirgüç-Kunt, Laeven, and Maksimovic (2006), on the determinants of financing obstacles for firms established that countries with developed financial systems and higher economic development had lower obstacles, and concluded that financial and economic development appear to be the key country characteristics that explain variations across countries. Further Beck, Demirguc-Kunt, and Martinez-Peria (2007) find evidence of an economicaly and statitically significant relationship between economic development (as measured by per capita GDP) and ATM and bank branch outreach. This suggests that financial inclusion is not only a function of bank behaviour, but also depends on the overall level of economic activity.

Although there exists wide variations across countries, the identification strategy is based on the assumption that the financial system plays the same role in countries with similar or comparable levels of financial market friction, therefore, after controlling for specific factors, the level of financial inclusion is largely comparable across countries.

Following Barajas et al., (2013); Beck, Feyen, Ize, and Moizeszowicz, (2008); De la Torre et al., (2013); and De la Torre, Feyen, and Ize, (2014), I avoid use of a panel estimation as it blends variations across time and across countries, and estimate the model in a two-step process. The initial estimation uses quantile regression to relate access to finance to financial and economic development, and an array of country-specific factors which excludes market structure, institutional quality and policy variables. The results from this estimation are used to estimate the benchmark level for each component of access to finance per country over the period of the study, which also allows for the identifaction and decomposition of growth patterns in access to finance.

As highlighted by Barajas, Beck, Dabla-Norris, & Yousefi, (2013), although the benchmark obtained above is not directly equivalent to the frontier[37], it however represents a structural depth line, *i.e.* the level based on unique structural country characteristics which are not directly related to policies and/or the financial sector. Therefore, difference between the predicted and actual and level of financial of financial inclusion can then be related to various policies. However, the benchmark should not be viewed as an absolute measure; it is a relative indicator as it hinges on the sample distribution of the variables.

The second estimation involves identification of the gap in access to finance for selected indicators of access to finance (defined as the difference between the actual levels of access to finance to the model estimated level) . The gap is estimated in three different ways: in the first instance the benchmark includes 180 (see apendix for list of countries) countries across the world from all income categories. The selection of countries is driven by data availability. The second benchmark uses 45 countries within the SSA region across all income groups, and the third estimation only considers countries at the same level of economic development as most SSA countries, *i.e.* Low-Income and Lower-Middle Income countries (60 countries). To test the postulations of the APF, the sample is narrowed down to focus specifically on the SSA region, and thus relate the gap to a set of market structural, institutional, and policy-related variables, in order to examine their impact on reducing the gap between a country's ideal and actual level of access to finance.

The benchmark is estimated via quantile regression (50th percentile) to eliminate the impact of outliers based on a country-year panel using the following specification:

$$FA_{i,t} = \sum_{i=1}^{n} \beta_1 FD_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t} \qquad (3\text{-}1)$$

Where: FA - Indicators of access to financial services, for country, *i,* indexed over time, *t.*

In line with standard practice, I divide the indicators into *usage indicators* and *outreach indicators*, and thus separately examine the two components of access to finance[38]. An

[37] The gap does not directly account for long-term and deep-rooted institutional characteristics of countries. Including these measures poses two main challenge (i) endogeneity of measures to the outcome variable and (ii) measurement problems about the institutional indicators (Barajas et al., 2013)
[38]Indicators of usage of financial services include the number of loan accounts per 1,000 people, number of borrowers per 1,000 people, number of deposit accounts per 1,000 people, number of depositors per 1,000 people, outstanding loans as a percentage of GDP, and outstanding deposits as a percentage of GDP. Financial services outreach indicators include number of bank branches per 1,000km^2, number of bank branches per 100,000 people, number of bank ATMs per 1, 000km^2, and number of bank ATMs per 100,000 people.

alternative approach would be to combine the various indicators into a composite index. However, I discard this option as it only highlights deficiency in financial access without identifying the specific dimensions that require improvement. Further, it falls short in explaining how the significance of the various components vary with economic development and financial development. As shown in Tables 3-1, 3-2 and 3-3 above, the SSA region is below the world average, and ranks lowest on all indicators of access to finance.

X - Country-specific factors which include indicators of economic growth and development and an array of other structural indicators as explained in section 3.4.3.

FD - Financial development index. Its calculations are explained in Section 3.4.3 below.

If the estimated coefficients of both per capita GDP and the financial development index are significant, this may suggest that the two complement each other in the provision of financial services. The relative size of the coefficients can be used as an estimate of the relative importance of economic development and financial development in enhancing access to financial services as explained above.

3.4.3 Explanatory Variables

Measuring financial development is not an easy task, as financial services are provided by a number of institutions. However, most studies often use bank-based and/or stock market based indicators, as the two play a key role in most economies. However, in developing economies banks are the main source of finance due to under-development in other sectors of financial markets (Ariss, 2009). A number of studies confirm that this is also the case within the SSA region (*e.g.* Allen, Otchere, & Senbet, 2011; Beck, Senbet, & Simbanegavi, 2015; Gulde, Pattillo, Christensen, Carey, & Wagh, 2006; Mlachila, Park, & Yabara, 2013; Moyo, Nandwa, Oduor, & Simpasa, 2014; World Bank, 1989). Furthermore stock market indicators are not readily available for some countries in the SSA region. Therefore, I use bank-based measures to capture financial development.

To gauge financial development, I use a specification initially developed by Demirguc-kunt and Levine (1996) in measuring stock market development, subsequently adopted by Ndikumana, (2000) in the construction of a financial development index[39]. I use de-meaned

[39] Various approaches have been adopted in measuring financial development. For example, Samargandi, Fidrmuc, and Ghosh (2015) use Principal Component Analysis (PCA) to develop an aggregate index of liquid liabilities (M3) to nominal GDP, commercial bank assets to total assets and

values of the indicators and thus compute the index in two stages. First, I obtain the de-meaned value for each indicator, I, for country, *i.* I then use the simple average of the de-meaned values to calculate the overall index for any country, *i,* in period, *t,* as follows:

$$FD_{it} = \frac{1}{n}\sum_{j=1}^{n}\left[100*\left(\frac{I_{j,it}}{\bar{I}_j}\right)\right] \qquad (3\text{-}2)$$

Where $I_{j,it}$ = indicator of financial development

$\bar{I}_j$ = sample mean of the indicator *j*

n= number of indicators used.

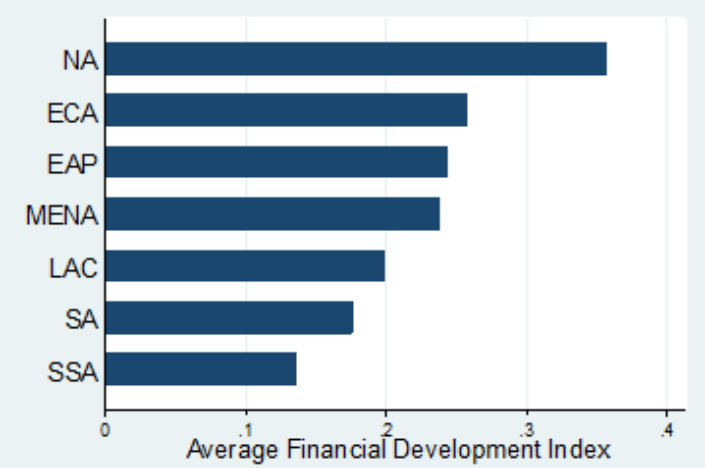
Whereas Ndikumana (2000) uses measures of size and depth only to capture financial development, I expand these to include indicators of efficiency, and thus use seven indicators, covering three components of the financial system, namely; size, depth and efficiency[40]. Financial sector size is captured through the proportion of banking assets to GDP (i.e. bank assets to GDP) and liquid liabilities (M3) to GDP. Empirical literature suggests private credit as a proportion of gross domestic product (GDP) is the most appropriate proxy for financial depth. In line with this, I use domestic credit to the private sector as a percentage of GDP, I also include the proportion of total assets held by deposit money banks to GDP which according to the World Bank is a more comprehensive measure than domestic credit to the private sector to GDP. To capture the significance of commercial banks and central banks, I include central bank assets to GDP and the ratio of total assets held by deposit money banks to deposit money bank and central bank claims on domestic nonfinancial sector (*i.e*. percentage deposit money bank assets to deposit bank assets and central bank assets). These capture the importance of banks in the supply of finance. Finally efficiency is captured through the ratio of bank non-interest income to total income and the proportion of overhead. The choice of the above indicators is based on past studies.

bank credit to the private sector to GDP. Ergungor (2008) uses two indices: one constructed as a product of log domestic private credit to GDP and bank credit to GDP, and another *via* PCA, and takes the first PCA as an indicator of financial development. He concludes that the two produce similar results.

[40] Although it is acknowledged that measures of depth and size tend to focus more on banks and thus ignore the impact of non-bank financial institutions, the data coverage on non-bank financial institutions is very limited. For a more detailed discussion on measures of financial development, see Demirgüç-Kunt & Levine (1996); Levine (1997); and Lynch (1996) . Another emerging trend is to include indicators of access to finance in the construction of an index for financial development. However, because the purpose of this study is to examine the extent to which financial development or underdevelopment has contributed to low levels of access to finance in the SSA region, I ignore this approach, and thus separate access to finance from broader or traditional indicators of financial development.

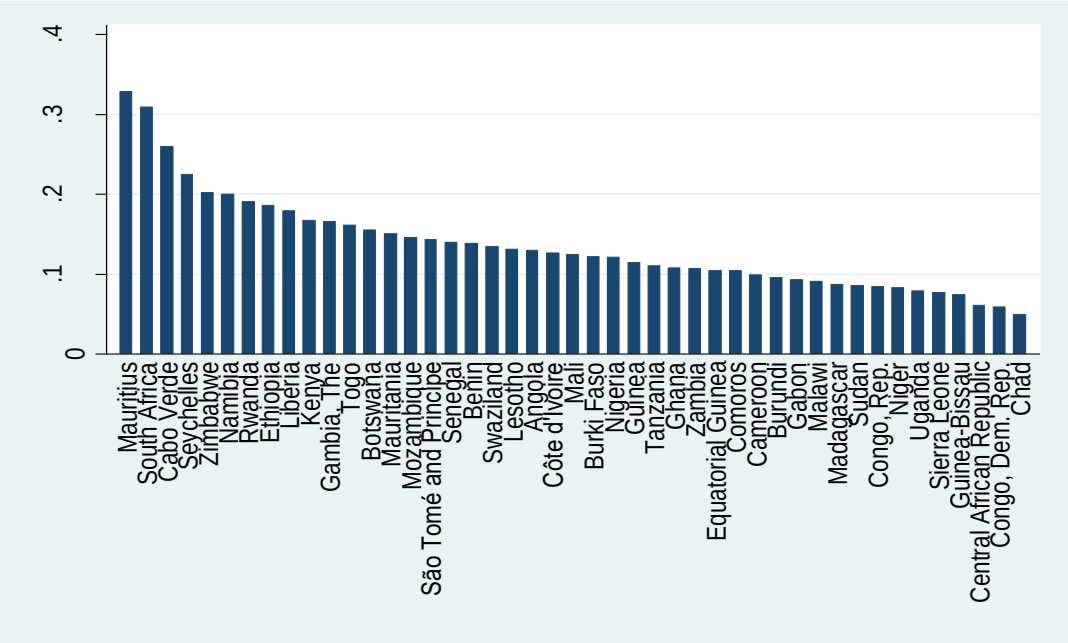
To avoid negative values I then normalize the index obtained in equation (3-2) using min-max normalization[41] such that it ranges between 0 and 1. As alluded to above, I expect a positive and significant relation between financial inclusion and financial development, *i.e.* developed financial systems should foster financial inclusion.

Figure 3-4: Financial Development Index-Regional Comparisons



Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016
Key*:* ECA- Europe & Central Asia, EAP-East Asia & Pacific, MENA-Middle East & North Africa, SA-South Asia, LAC-Latin America & Caribbean, NA-North America, SSA-Sub-Saharan Africa

Figure 3-5: Financial Development- SSA countries



Source: Own calculations from the World Bank-Global Financial Development Database June 2016

[41] Another option would be to use standardized values. However, normalization was preferred, as it helps retain the same positive scale.

Figure 3-3 and Figure 3-4 show the average normalized Financial Development Index (FDI) per region and for countries in the SSA region over the period 2004 to 2014; respectively. The data suggests that the SSA region has the lowest level of financial development and that the most developed region is the North American region. Within the SSA region Mauritius and South Africa rank highest, whereas the Democratic Republic of Congo (DRC) and Chad rank lowest. Further, the graph in Appendix 2 on page 167 shows a comparison of individual countries, as shown in the graph countries within the SSA (shown in maroon) are bunched to the right of the graph, suggesting that most countries within the region rank lowest (although there are a few with relatively high levels of development).

Country-specific structural factors include *log-GDP per capita* (both demand and supply of financial services are expected to vary with income levels). Theory suggests a close association between financial inclusion and economic development and growth (Beck & Demirgüç-Kunt, 2008; Karlan & Morduch, 2009). All factors constant, the demand and usage of financial services should be higher in more developed economies. Looked from another perspective, more developed economies are expected to have better access to financial services due to economies of scale. Therefore, a positive relationship is expected between indicators of access to finance and development. To capture this relationship the study uses initial GDP per capita (logged). Therefore the coefficient can be interpreted as an indicator of 'sequencing', implying that indicators with a higher coefficient become more important with the level of economic development.

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Evidence suggest that financial inclusion results in accelerated *economic growth* in an inclusive manner (Mohan, 2008). In a study of African economies over the period 1988-2007, Andrianaivo and Kpodar (2012) established that recent developments in technology have an indirect impact on economic growth *via* improved financial inclusion. A recent study by Barajas, Chami, and Reza (2016) on the finance-growth nexus suggests that the heterogeneity observed across countries on the impact of financial development and economic growth can be explained by understanding variations in access to financial services across countries. To control for this I use growth in GDP *per capita*. In line with past studies a positive relation is expected between growth and access to finance. However, I take the analysis a step further to examine how the significance of the various indicators of access to finance evolve as economies grow, by analysing the elasticity of the indicator with respect to economic growth. A higher coefficient would suggest that the indicator becomes more important as an economy grows. Such a decomposition is valuable as it helps policy makers in developing economies to identify which indicators should be prioritized in order to enhance

growth. Again, borrowing from the terminology of De la Torre et al. (2013), I refer to this as the 'buoyancy' of the access to finance indicators.

Financial institutions will only find it worthwhile to expand their service provision if there is a significant market for their product. In line with other studies (for example Barajas et al., 2013 and Beck & Feyen, 2013), I use *population size and the dependence ratio* as a proxy for market size. A larger population size is expected to promote improved access to financial services due to scale effects, which potentially result in efficient service provision in bigger economies compared to smaller ones, whose population may be more highly dispersed and/or less urbanized. A higher coefficient would therefore suggest higher 'returns to scale' (De la Torre et al., 2013). This would imply that the indicator is more significant in countries with larger population size. The *log-age-dependency ratio* (*i.e.* the share of non-working population to total population) is used to control for variations in demographic patterns and the resulting impact on consumers' demand and use of financial services. All factors constant a high dependency ratio reduces the demand and usage of financial services, which may potentially impact on development. Both variables are expressed in logarithms in the model estimation.

Because the *global financial crisis* resulted in disruptions in access to finance in affected countries, I control for this by including a dummy for banking crises as obtained from the latest (2016) World Bank's Financial Development and Structure Database by Beck, Demirgüç-Kunt, and Levine (2000).

Following the seminal work of Sachs and Warner (1999, 2001) on the natural-resource curse hypothesis, which is based on the evidence that, contrary to expectations, natural resource abundant economies tend to grow at a slower rate, the natural-resource curse puzzle has drawn interest from a number of researchers (see for example, Hodler, 2006; James & Aadland, 2011; Kronenberg, 2004; and Ploeg, 2011, among others). There has been increased research interest on the impact of resource abundance on other development indicators. One such study is by Beck (2011), who examines the impact of natural resource abundance on access to finance (both outreach and usage) from a number of countries across the world (actual sample size varies between 114 and 64 depending specification). The study established that, although banking systems from resource-rich economies have, on average, higher profitability, liquidity and capitalization levels, this does not translate into improved access to finance, as they simultaneously exhibit low access to loans and limited bank outreach (although the evidence on bank outreach is weak). Such evidence suggests that the

natural resource curse may also hold when it comes to access to finance. To control for the natural-resource curse, I use *Natural Resources Rents as a percentage of GDP*[42]*.*

Recent innovations in technology and the mobile phone industry have enhanced access to financial services. To control for innovations in the provision of financial services a dummy variable, which takes a value of 1 if the country has mobile-money services and zero otherwise, is included. Data on mobile money is obtained from the World Bank's Financial Access Survey database Although the use of mobile money is almost becoming a worldwide phenomenon, it has had a greater impact on access to finance and economic growth in African economies (Allen et al., 2014; Andrianaivo & Kpodar, 2012; Beck & Cull, 2014; Clarke et al., 2006). According to the World Bank's Global Findex Database of 2014, whilst 2% of the adult world population use mobile money, 12% of the adult population in SSA use mobile money (Demirgüç-Kunt et al., 2015). The report further states that in most SSA countries (where mobile money is used), the number of adults with a mobile money account exceeds those with a bank account. With the increased innovation and competition in the mobile phone industry, the mobile communications industry and other support industries (e.g. software developers), mobile money has the potential of being the main driver of financial inclusion in the near future. Therefore, all factors constant, a positive and significant relationship is expected between mobile money and access to financial services.

Contrary to general specification in other benchmarking exercises (*e.g.* Barajas et al., 2013; Beck, Demirgüç-kunt, & Levine, 2010; Beck & Feyen, 2013), I do not control for offshore financial centres, so that the estimate is not driven by a few countries[43]. However, I include an interaction between financial development and economic development to capture the dynamic relationship between the two variables. I posit that the impact of financial development on access to finance depends on the level of economic development.

However, since the benchmarking exercise above is relative, it may exclude some potentially important factors, and like all benchmarking exercises, it hinges on the sample distribution of the variables used, and can be affected by endogeneity among the chosen variables. More specifically, financial development may not be strictly exogenous in the above specification. However, it provides the best approximation for benchmarking countries over a period of time.

[42] The value of natural resources is often estimated in *via* their economic rents- *i.e.* resource rents. It is calculated by deducting the extraction/production costs (including a normal return capital) from gross extraction revenue. Total natural resources rents include, hard and soft coal rents, natural gas rents mineral rents, forest rent and oil rents. Data is obtained from World Bank development indicators

[43] In SSA, only Botswana, the Cape Verde Islands, Ghana and Mauritius are classified as offshore financial centres by either the IMF or the OECD.

As highlighted by Beck and Feyen, (2013) and De la Torre et al., (2013), benchmarking does not hinge on the identification and isolation of the specific ways in which the variables interact. Based on the argument by De la Torre et al.(2013), I argue that if the effects of access to finance on both financial development and economic development have a longer lag than the reverse, policies on financial access would have a temporary impact on access to financial services, which cannot be fully explained by the broad indicators of financial development and economic development. Nevertheless, to avoid confusion, I interpret the results as partial correlations and thus avoid drawing any causal inferences based on the estimations.

The derived benchmark and the subsequent gap that would be identified for each indicator provides valuable information on the quality of policies aimed at promoting access to financial services, and any deviations from the benchmark can be interpreted as institutional and/or policy differences.

While the APF concept and the taxonomy of policies, based on equation (3-2) above, may be important for policy formulation and strategy implementation, the existing heterogeneity across countries in terms of structural, macroeconomic and institutional characteristics should not be overlooked. Therefore, there is a need to identify key policy and structural factors that appear to be pivotal in shifting the APF either inward or outward. Thus, while recommendations based on the above analysis may be relevant to a number of SSA countries, their relative significance may vary both across countries, and within a country over time, and as such the evolution of financial access strategies may not be perfectly replicable across countries.

3.4.4 Examining the Gap

I define the gap for any indicator of access to finance as the extent to which the country's actual level exceeds its expected/predicted benchmark level. Using the above equation, I derive the model expected level of access to finance (benchmark), which when compared to the actual-level gives, the estimated gap in access to financial services. Conceptually the gap can be viewed as the difference between the actual and the predicted level of access to finance for each indicator as estimated by the model. It is represented as[44];

$$GAP_{it} = FA_{it}^{actual} - FA_{it}^{predict} \qquad (3\text{-}3)$$

[44] The gap can also be represented as $GAP_{it} = FA_{it}^{actual} \div FA_{it}^{predict}$, where if $GAP_{it} > 1$, the financial system would be over performing, whereas if $GAP_{it} < 1$, the financial system would be underperforming.

Based on the above, a positive GAP_{it} indicates over-performance, and a negative GAP_{it} indicates underperformance.

In-line with the APF, and in order to facilitate policy formulation, the study uses the results from equation $GAP_{it} = FA_{it}^{actual} - FA_{it}^{predict}$

(3-3(3-3) above to examine the relationships between the gap, GAP_{it} for each indicator and a number of institutional and policy factors. Countries are grouped according to their income groups in order to allow for an examination of how the various access to financial inclusion indicators vary based on the level of development. The initial sample consist of 180 world countries across all income categories; selected based purely on data availability. However, a dummy is included to control for transition economies as these may have a different development trajectory. The sample is then reduced to focus only on the SSA region and thus assess if the variations across income groups hold for the SSA sub-sample. Further, I reduce the sample to focus only on Low Income Countries (LICs) and Lower Middle Income Countries (LMICs), thus focusing only on countries within the same income group as most SSA countries[45].

The aim is to trace how the financial access gap in SSA varies compared to: *(i)* average world levels, *(ii)* average levels within the region and *(iii)* average levels of similar income countries. I then shift attention to focus only on five indicators, i.e. outstanding loans with commercial banks (% of GDP), outstanding deposits with commercial banks (% of GDP) , number of ATMs per 1000km^2 , number of ATMs per 100,000 adults, and branches of commercial banks per 1,000 km$^{2\cdot}$, mainly because these variables have wide cross-country coverage within the SSA region. This restriction also allows for examination of both usage and outreach indicators. It is also important to look at both bank branch coverage and ATM coverage, as their relative significance may vary with development and technological innovations.

To examine the extent to which the observed differences in the GAP_{it} reflect variations in structural and policy factors, I estimate a cross-country regression based on the calculated GAP_{it} over the period under study, using the following regression;

$$GAP_{it} = \alpha X_{i,t} + \varepsilon_{i,t} \qquad (3\text{-}4)$$

[45] This however eliminates some countries within the SSA region which are in the Upper Middle-income category, namely; Angola, Botswana, Gabon, Mauritius, Namibia and South Africa.

Where GAP_{it} - is as calculated above

$\varepsilon_{i,t}$ - is the error term, and

X_{it} - is a set of explanatory variables, which include the following:

i. *Market structure*- this includes competition, market power and bank ownership. Amongst the indicators of bank market structure, competition or market concentration has been considered as a key determinant of performance (Chong, Lu, & Ongena, 2013). Both theory and empirical evidence suggest conflicting results on the impact of market power on access to finance, and as a result two opposing hypotheses have emerged.

The *market-structure hypothesis*, which considers competition as exogenous, suggests that increased market power or concentration in financial services leads to market imperfection and higher transaction costs (Berger & Hannan, 1989). Strong market power results in the so-called *X-inefficiency,* of Leibenstein (1966), leading to a reduction in the equilibrium quantity of available funds (Pagano, 1993). This results in a reduction in both outreach and usage of financial services and products. Using an overlapping generations model with production, Guzman (2000) confirms that monopoly in banking depresses the equilibrium capital stock, resulting either in increased credit rationing or excessive monitoring of loaned funds, both of which result in reduced access to finance. Competition, or the existence of larger number of banks, makes them more efficient and innovative, whereas lack of competition leads to the so-called 'quiet life' effect (Love, Soledad, Pería, Martinez-Peria, & Peria-Martinez, 2014). Therefore, viewed from this perspectives, increased competition in the banking sector improves availability of finance (Carbo-Valverde, et al., 2009)

On the other hand, the *information-based hypothesis* of Demstez (1973), which hinges on the efficacy of information in capital markets, suggests that the presence of information asymmetry (which leads to adverse selection, moral hazard and hold-up problems) and agency costs has a negative impact on access (Love et al., 2014; Marquez, 2002; Petersen & Rajan, 1995). Although the *market-structure hypothesis* suggest that competition may lead to increased access (following an increased number of service providers) it simultaneously leads to the dispersion of borrower-specific information, leading to inefficient customer screening mechanisms and higher transaction costs, which may reduce outreach and discourage usage (Marquez, 2002). In contrast, although the concentration of banks (*i.e.* lack of competition) may reduce loanable funds, it increases

incentives to screen borrowers leading to a more efficient distribution of financial resources (Cetorelli & Peretto, 2012). Petersen and Rajan (1995) show that high market power reduces information asymmetry, forcing banks to focus more on developing long-term relationships thus improving availability of finance. Therefore, this view suggests that the higher the market power the more consumers will have access to financial services.

The impact of competition on access to finance has therefore been found to be ambiguous (Cetorelli & Peretto, 2012). According to Cetorelli and Gambera (2001) and Cetorelli (2001), market structure has heterogeneous effects on access to finance (in multiple dimensions) leading to complexity and ambiguity on the extent to which it affects access to finance. Whereas some type of users may benefit from concentrated ownership, some face further constraints in access. Therefore, it is difficult to pre-determine which effect would ultimately dominate (Cetorelli & Gambera, 2001). To examine this relationship I use the top 3 bank concentration ratio (k_3), captured as the proportion of assets held by the three largest commercial banks as a share of total commercial banking assets. An alternative would be to use the Herfindahl–Hirschman index (HHI) or the top 5 bank concentration ratio ($k_{5\%}$). However, these are dropped as they are not available for most countries within the SSA region. Further, a study by Alegria and Schaeck (2008) on the sensitivity of bank concentration measures to sample sizes and distribution specifications established that for sample sizes below 50 the k_3 and HHI are less sensitive, but the k_3 has the least sensitivity. I also use the Lerner Index to capture market power. The Lerner Index compares output pricing and marginal costs, and is a widely used measure of bank market power[46]. A lower index indicates high competitiveness.

The impact of market structure also varies depending on the nature of financial institution ownership. In developing countries there exists strong information asymmetry between foreign and domestic financial institutions – where locals often find it easier to penetrate the market (Ariss, 2010; Sengupta, 2007). This is based on the view that foreign-owned banks tend to be more profit oriented and thus focus on specific profitable customer segments as opposed to improved broad access to financial services (Gormley, 2010; Mian, 2006). Therefore, foreign-owned banks have been blamed for 'cream-skimming'

[46] The Lerner Index (degree of monopoly power) is based on the fact that profits are maximised when marginal revenue equal marginal costs, i.e. $c'(X) = r'(X)$, where $r'(X) = p + \frac{dp}{dX}X : p - c'(X) = -\frac{dp}{dX}X$.

Therefore, the Lerner Index $(\mu) = \frac{p - c'(X)}{p} = \left(-\frac{dp}{dX}X\right) \div p = -\frac{1}{\varepsilon}$, since at equilibrium $p = c'(X) = r'(X)$, where p is the market price, ε is price elasticity of demand. Therefore $\mu = 0$ indicates perfect competition

and ‘cherry-picking’ (Sengupta, 2007), whereas domestic banks, due to better access to information and better enforcement mechanisms, may be better positioned to extend financial services to informationally opaque customers (Beck et al., 2004; Detragiache, Tressel & Gupta, 2008; Sengupta, 2007). Foreign ownership has also been found to exact a negative impact on bank efficiency, resulting in higher costs of service delivery (Lensink, Meesters, & Naaborg, 2008; Lensink & Naaborg, 2007, 2008). In addition, centralized control in foreign-owned banks tends to reduce penetration into remote areas.

However, some researchers suggest the above is not always true. Laeven (2003) finds that liberalization of financial markets (which includes the easing of foreign entry barriers) results in a reduction in financial constraints for small firms. The entrance of foreign banks potentially enhances competition and efficiency, resulting in increased access to finance (World Bank, 2007). Because foreign banks often focus on large and profitable customers, their entrance divert the strategic focus of smaller domestic banks to other market segments that they would have previously neglected (Bonin, Hasan, & Wachtel, 2005; Claessens, Demirgüç-Kunt, & Huizinga, 2001)

To examine this I use the proportion of foreign banks to total banks, where a foreign bank is defined as one with at least 50% of shares owned by foreigners[47]. As argued by Claessens et al. (2001), it is the relative number of foreign banks that matters, rather than their market share.

ii. Institutional Quality

Institutional quality affects the manner in which economic agents behave and interact, and thus has a significant impact on shaping the economic behaviour of market participants. A weak institutional framework results in dysfunctional markets, increases uncertainty, and results in misallocation of resources (Demetriades & Law, 2006). An improved institutional framework results in improved governance structures, elimination of bureaucracy, rule of law and reduction in corruption, among others (Bräutigam & Knack, 2004). Therefore, a poor institutional environment increases information asymmetry and complicates contract enforcement, resulting in non-price screening and monitoring techniques, thus reducing both outreach and usage. Knack and Keefer (1995) find a positive relationship between institutional quality indicators and development outcomes.

[47] Another potential measure is the percentage of banking assets owned by foreign bank assets, which captures not only the presence of foreign banks but also the magnitude of their operations. However, this variable was dropped due to missing data in some countries. In addition, as highlighted above Claessens et al.(2001) find that the number of banks is more important than their market share.

The APF suggests that disequilibrium in access to finance can be due to weak institutional framework. Further, Klein (1971) suggests that the impact of market structure on bank behaviour should be interpreted in the context of institutional quality (*i.e.* bank regulation). A country's legislative framework affects the efficiency of its financial system by facilitating (or discouraging) market participation (Sengupta, 2007). Therefore, the *market-structure hypothesis* suggests that strong regulation can be productive, whereas the *information hypothesis* suggests that strong regulation is counter-productive (Berger & Hannan, 1989). Empirical evidence suggest that high institutional quality may become a barrier to entry, thus reducing contestability, leading to lower competition and efficiency (Beck, Demirgüç-kunt & Maksimovic, 2004). I use an index[48] generated from the data Worldwide Governance Indicators (WGI) from the World Bank by Kaufmann et al., (2009, 2011) to measure institutional quality - a lower index indicates a poor institutional environment.

iii. Macroeconomic condition

Macroeconomic instability increases macroeconomic risk, and increases the cost of finance. Therefore, the higher the macroeconomic risk the higher the proportion of households and firms without access to finance. The APF suggests that policies aimed at enhancing macroeconomic stability are key to creating a market-enabling environment for improved access to finance. I use inflation as a proxy for macroeconomic condition, such that a higher value indicates poor macroeconomic environment, and *vice-versa*[49]. Empirical research by Boyd, Levine, and Smith (2001) indicates that inflation has a negative impact on bank operations. However, Rousseau and Wachtel (2002) find that although high levels of inflation reduce the impact on financial intermediation, very low levels of inflation have a negative impact. Therefore, a priori it is difficult to determine the nature of the relationship.

iv. Country structural factors

All factors constant, high population density should reduce the cost of service delivery due to economies of scale. According to the APF concept poor 'state variables' force financial institutions to cluster in high-value transaction regions, and this is more prevalent in economies where a large proportion of the population resides in rural areas (which generally have poor state variables). To test this hypothesis, I use the population density,

[48] The WGI measures governances using six dimensions, namely: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption for over two hundred countries and territories. A normalised composite index is estimated as the first principal component of the six indicators. See Appendix.. for a detailed explanation

[49] Although a better indicator of macroeconomic stability would be the volatility of inflation or exchange rate volatility or a combination for the two, I do not use these due to data availability problems.

(*i.e.* number of people per square km of land area) and the rural population concentration ratio, calculated as the proportion of rural population to total population. This data is also obtained from the World Bank Development Indicators Database

To control for omitted country fixed effects, equation (3-4) above is estimated via a fixed-effects model using SSA countries. Although the original sample consists of 45 countries, the actual number varies with different specifications due to missing variables in some countries. Before applying the fixed-effects model a Hausman specification test was conducted. The test statistic is asymptotically chi-squared distributed, under the null hypothesis that there is no systematic difference between the random effects and the fixed effects model coefficients. Therefore, acceptance of the null hypothesis suggests that the estimation should be made using the random effects model.

In all five specifications, the null hypothesis was rejected, suggesting that the fixed-effects model is the most appropriate.

3.5 Data Analysis

3.5.1 Descriptive Statistics

Table 3-1 and Table 3-2 provide a summary of the access indicators and explanatory variables used in this study, respectively. Table 3-1 indicates that the SSA region does not only rank far below world average in indicators of financial inclusion, but also ranks lowest on virtually all indicators financial inclusion, except on branches of commercial banks per 1,000 km^2 where it is ranked second lowest. It is ranks below average, even when compared to other countries in similar income groups. A number of studies also allude to the same (see for example Allen et al., 2011; Aterido et al., 2013; Beck et al., 2008; Demirgüç-Kunt, Beck, & Honohan, 2008). Therefore, although financial inclusion has been considered as a global challenge, the situation in SSA requires immediate action. There is need for united effort from both policy makers and private sectors towards improving financial inclusion within the region.

Table 3-1: Summary Statistics- Indicators of Access to Finance

Variable	World				EAP	ECA	LAC	MENA	NA	SA	SSA	LICs
	Obs	Mean	Min	Max	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Outstanding loans with commercial banks (% of GDP)	1905	42.67	0.101	226.316	56.803	61.105	39.975	40.563	57.292	32.298	18.842	22.57
Loan accounts with commercial banks per 1,000 adults	862	286.34	0.393	2296.950	222.225	566.021	387.581	242.277	NA	81.240	80.602	91.20
Borrowers at commercial banks per 1,000 adults	873	174.51	0.018	1156.050	292.748	290.143	200.019	185.379	NA	70.779	42.872	59.59
Outstanding deposits with commercial banks (% of GDP)	1906	46.57	0.133	266.895	63.830	50.731	47.624	31.105	58.619	42.604	26.570	30.93
Deposit accounts with commercial banks per 1,000 adults	1093	1103.62	1.256	7984.030	1424.429	1967.464	926.336	968.654	NA	571.379	379.632	489.7
Depositors with commercial banks per 1,000 adults	841	526.80	0.409	3371.490	737.501	1091.447	640.056	631.761	NA	449.920	223.363	321.2
Branches of commercial banks per 100,000 adults	1896	19.39	0.122	289.835	15.938	36.257	20.092	14.363	29.683	9.183	5.792	7.325
Branches of commercial banks per 1,000 km^2	1896	30.29	0.011	1216.670	39.972	53.564	18.795	35.532	5.371	30.181	6.069	6.553
Automated Teller Machines (ATMs) per 100,000 adults	1725	40.48	0.012	290.143	48.626	64.442	38.294	28.983	195.182	7.137	10.109	10.36
Automated Teller Machines (ATMs) per 1,000 km^2	1725	68.90	0.003	3869.870	227.295	66.126	34.203	67.838	19.734	30.462	10.470	8.903
Number of Countries	180				24	49	32	20	2	8	45	77

Key: EAP- East Asia & Pacific, ECA- Europe & Central Asia, LCA- Latin America & Caribbean, LICs- Low Income Countries, MENA- Middle East & North Africa, NA- North America, SA- South Asia, SSA- Sub-Saharan Africa

Source: International Monetary Fund - Financial Access Survey 2016

Table 3-2: Summary Statistics- explanatory Variables

		World				ECA	EAP	MENA	SA	LAC	NA	SSA	LICs
Variable	**Obs**	**Mean**	**Std.Dev.**	**Min**	**Max**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
Financial Development Index	1980	0.210	0.119	0	1	0.258	0.244	0.237	0.176	0.198	0.356	0.136	0.147
Log-GDP per capita	1955	8.433	1.499	5.323	11.61	9.474	8.401	8.959	7.183	8.717	10.79	7.036	7.011
Per Capita growth	1964	2.635	4.741	-62.2	50.12	2.682	3.420	1.378	4.467	2.336	0.879	2.664	3.067
Top 3 bank concentration	1573	71.52	19.82	22.08	100	70.63	70.48	75.21	57.16	69.75	53.46	76.52	73.02
Top 5 bank concentration	1322	81.59	15.74	30.24	100	81.24	78.14	87.33	68.88	79.24	66.96	86.94	81.39
Bank deposits to GDP	1865	49.85	43.80	2.224	479.7	61.78	60.15	65.28	41.03	49.35	94.57	24.84	30.75
Boone Indicator	1688	-0.072	0.152	-2.00	0.596	-0.102	-0.051	-0.049	-0.100	-0.0622	-0.066	-0.057	-0.0686
Lerner Index	1282	0.280	0.132	-0.59	0.939	0.226	0.345	0.378	0.271	0.277	0.276	0.295	0.284
Foreign bank assets (%)	1171	39.08	33.40	0	100	44.67	19.46	8.657	14.30	42.30	10.70	57.66	43.33
Foreign banks (%)	1356	41.82	28.15	0	100	44.83	30.86	19.61	12	46.65	33.85	54.19	46.20
Inflation	1883	19.69	563.1	-35.8	24411	4.403	4.819	6.316	7.737	6.048	2.069	60.56	40.12
Dependency ratio	1937	61.50	18.72	16.33	112.7	47.96	57.55	54.24	64.32	56.87	46.84	84.22	75.79
Population size	1980	3.7e+07	1.4e+08	28891	1.40e+09	1.790e+07	8.88e+07	1.88e+07	2.00e+08	1.80e+07	1.70e+08	1.85e+07	4.11e+07
log-Population size	1980	15.69	1.989	10.27	21.03	15.73	15.73	15.95	16.99	14.85	18.44	15.77	16.02
log-dependency ratio	1937	4.073	0.305	2.79	4.725	3.864	4.017	3.926	4.139	4.029	3.846	4.416	4.300
Rural population to total population	1969	45.01	23.08	0	91.45	33.55	51.73	26.06	71.44	40.98	19.31	61.37	62.10
Bank crisis	1980	0.0525	0.223	0	1	0.165	0.0152	0	0	0.00852	0.227	0.006	0.008
Natural Resources	1842	10.33	20.81	0	344.2	3.239	17.15	21.19	1.727	5.767	2.438	15.02	13.37
Population density	1980	172.2	544.4	1.61	7715	114.2	404.6	185.1	442.7	129.0	18.58	95.13	123.6
Institutional Quality Index	1980	-3.4e-09	2.259	-4.67	5.222	1.469	0.188	-0.733	-1.479	0.198	4.133	-1.435	-1.567
Number of Countries			180			49	24	20	8	32	2	45	77

Key: EAP- East Asia & Pacific, ECA- Europe & Central Asia, LCA- Latin America & Caribbean, LICs- Low Income Countries, MENA- Middle East & North Africa, NA- North America, SA- South Asia, SSA- Sub-Saharan Africa

Source: Own Calculations from The World Bank

Table 3-2 shows that on average the region has the least developed economies and the least developed financial sectors. As alluded to above, the SSA region has the least developed financial sectors, even when compared against countries within similar income groups. On average the South Asian (SA) and the East Asia & Pacific (EAP) have recorded the highest levels of growth over the period under review. Although the banking sector in the SSA region is the smallest in terms of size (as measured by total Bank deposits to GDP), it has the highest proportion of foreign banks and the most highly concentrated banking systems; on average the top-5 banks, in the sample countries, control 87% of total banking assets and 77% of the banking assets are controlled by the top-3 banks. Similar observations have been made by Moyo et al. (2014) and Gulde, Pattillo, Christensen, Carey and Wagh (2006). In addition, more than half of the banking assets are controlled by foreign banks. In these, the region is worse-off than countries in comparable income groups.

After South Asia, the SSA region has the highest proportion of the population residing rural areas, the highest dependency ratio and the lowest income *per capita*; further complicating the poverty structure. These factors potentially have a significant negative bearing on household income and the demand for financial services. By contrast, countries in the North American region, have a relatively low proportion in rural areas, with high *per capita* income. Such unique features within the SSA region suggest the region is an ideal candidate for examining the dynamic interaction between the dual effect of financial and economic under performance on access to financial services.

Figure 3-6 through Figure 3-9 on pages 99 and 101 below shows the relationship between the indicators of access to finance and economic development (measured by per capita GDP) and financial development (measured by the financial development index); respectively. In line with the *"vanishing effect hypothesis"* of Rousseau and Wachtel (2011), the data suggests the existence of a positive but non-linear relationship between indicators of access to finance and the two main variable of interests. This suggests existence of a threshold effect in access to finance. Therefore, although there is a positive relationship between access to finance and both economic and financial development at early stages of development, higher levels of financial and economic development are associated with less access to finance. This relationship is even worse in the case of financial development, where after the threshold, any improvements in access to finance appear to have a negative association with financial development. Similar findings have been established by Arcand, et al, (2015); Law and Singh (2014); Rioja and Valev (2004) and Rousseau and Wachtel (2011) when examining the relationship between financial deepening and economic growth. This would suggest that improved access to finance has a potential of outgrowing the real economy it seeks to serve.

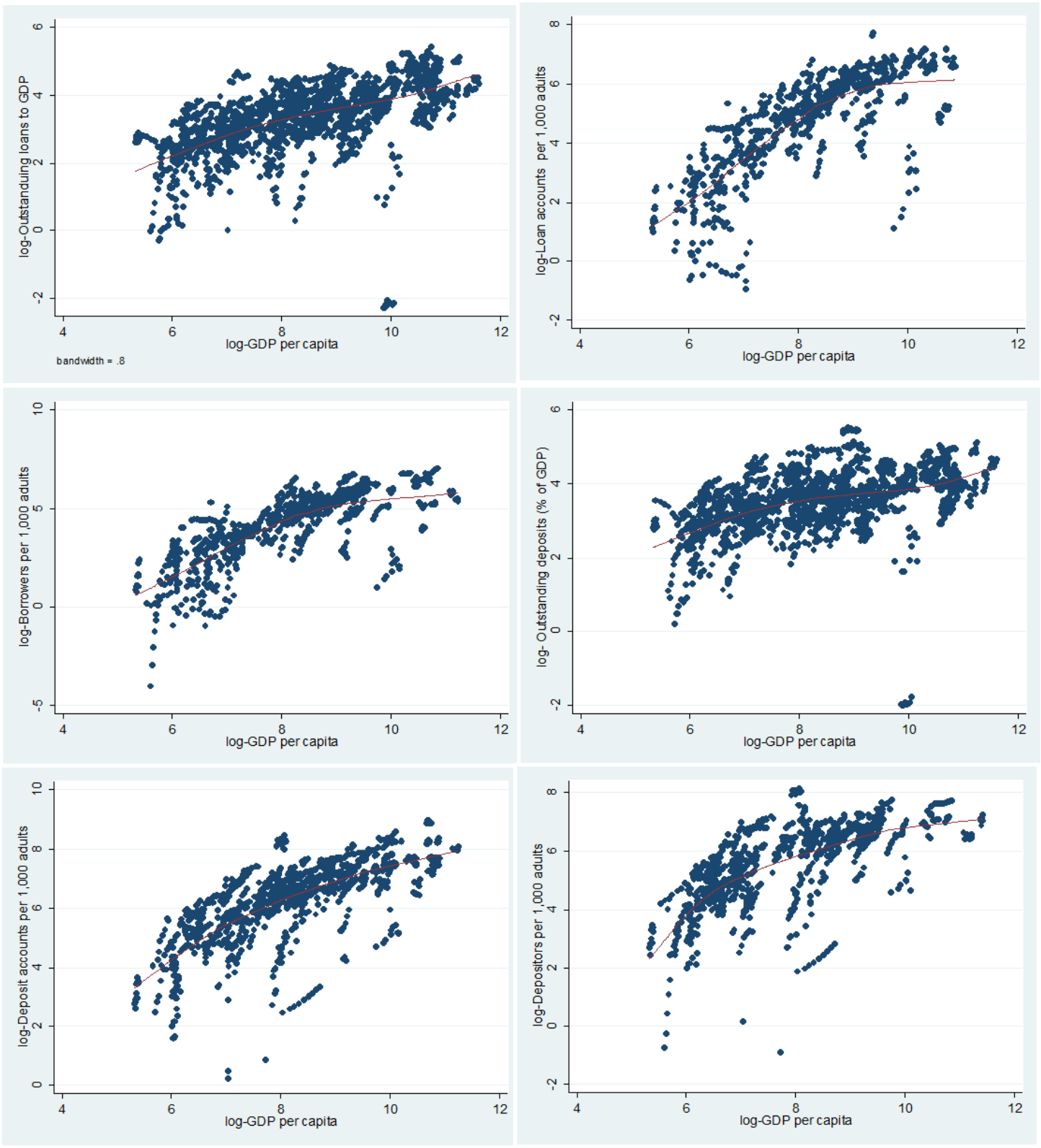
Such a relationship would explain recent events such as the global financial crisis and the Asia crisis, which both emerged as an outcome of financial services expansion. Further, this attests to the postulations of the APF, which suggest that once the equilibrium frontier position is reached continued pressure on increasing access to finance may result in financial fragility.

More-so, this substantiates the argument put early in this study that for more appropriate and meaningful comparison, access to finance shown be interpreted in the context of both financial development and economic development. Therefore, merely knowing the level of access to finance without an understanding of the level of development does not provide meaningful comparison.

Hence, an ideal benchmark should be estimated based on the level of both economic and financial development. Ignoring this fundamental reality might lead to the development and implementation of policies that fail to account for the optimal capacity, which may lead to an equilibrium level that would be beyond the APF. Expansion of financial services above the optimum level jeopardizes efficiency, and potentially results in financial crisis (Beck & de la Torre, 2007). Therefore, for effective policy formulation, it is important to understand whether the system is at the frontier, below it, or unsustainably above it, in order to design and implement effective policies for inclusive development and growth. Consequently, this study incorporates both financial and economic development and their squared values in generating the benchmark. The derived benchmark is then used in examining the extent to which a country under- or over-performs its expected benchmark level of access to finance, and the key policy and institutional variables that countries should focus on in order to close the gap.

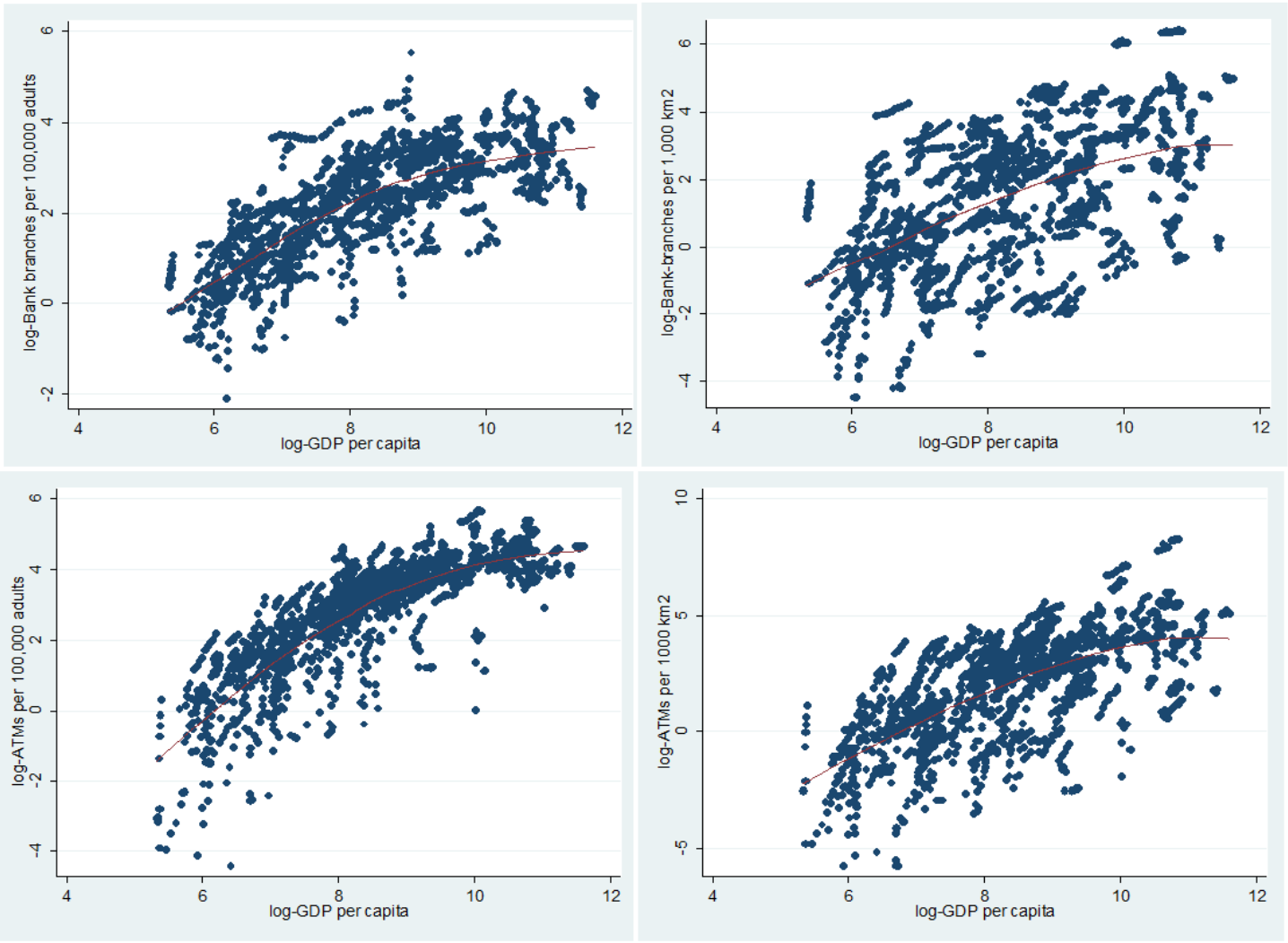
Table 3-3 and Table 3-4 show the correlation between the explanatory variables used for both estimations. The results suggest the existence of a positive and strong correlation between the logarithm of *per capita* GDP (log-GDP) and financial development, and a negative relationship between log-GDP and the logarithm of the dependency ratio. Therefore, to avoid collinearity problems, the model estimation uses lagged values of per capita GDP; thus effectively examining the impact of initial *per capita* GDP on access. This formulation also facilitates the analysis of the financial access path followed by countries at different stages of initial development.

Figure 3-6: Relation between access indicators and per Capita GDP



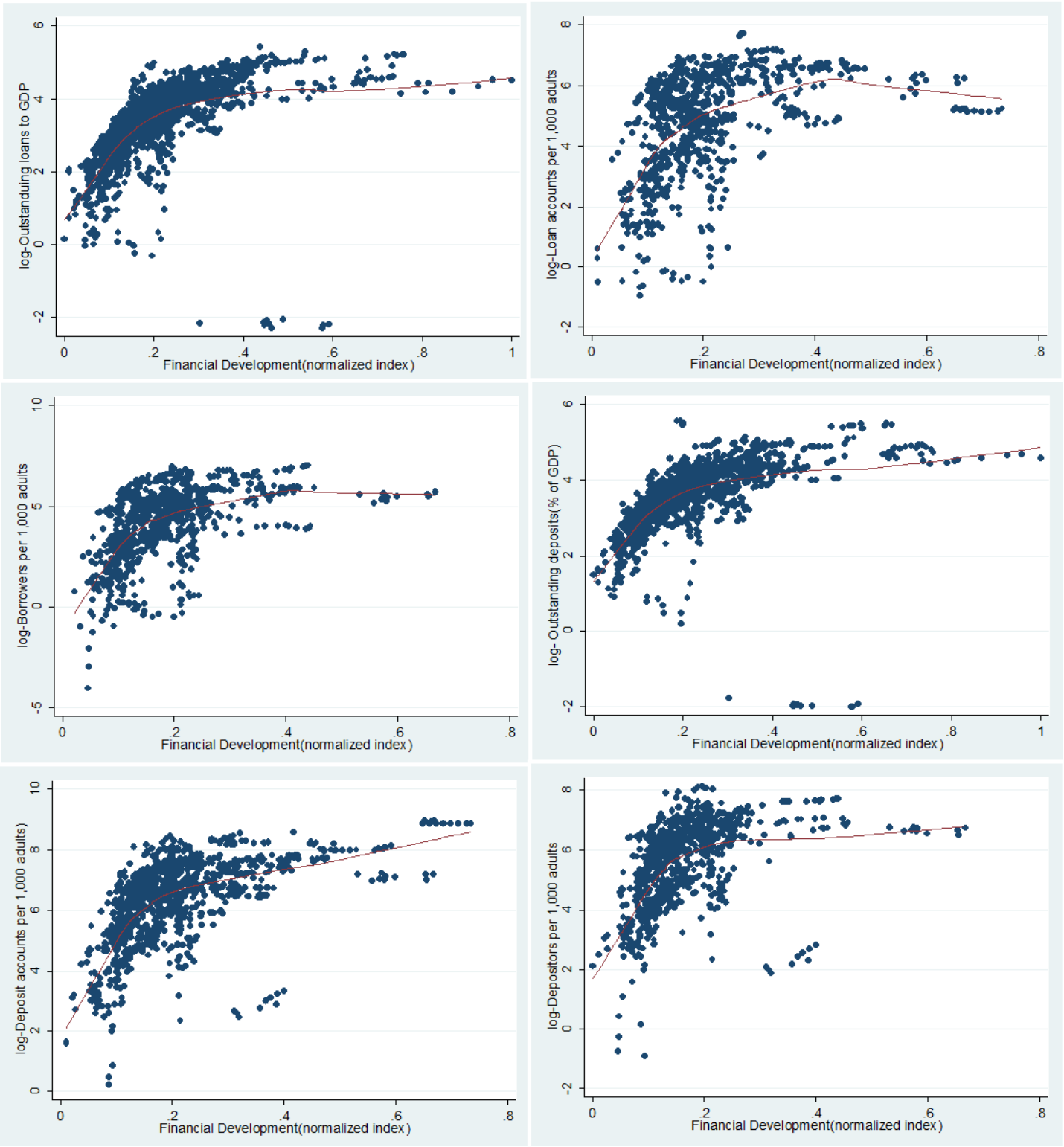
Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, Using Global Average Data

Figure 3-7: Relation between access indicators and per Capita GDP



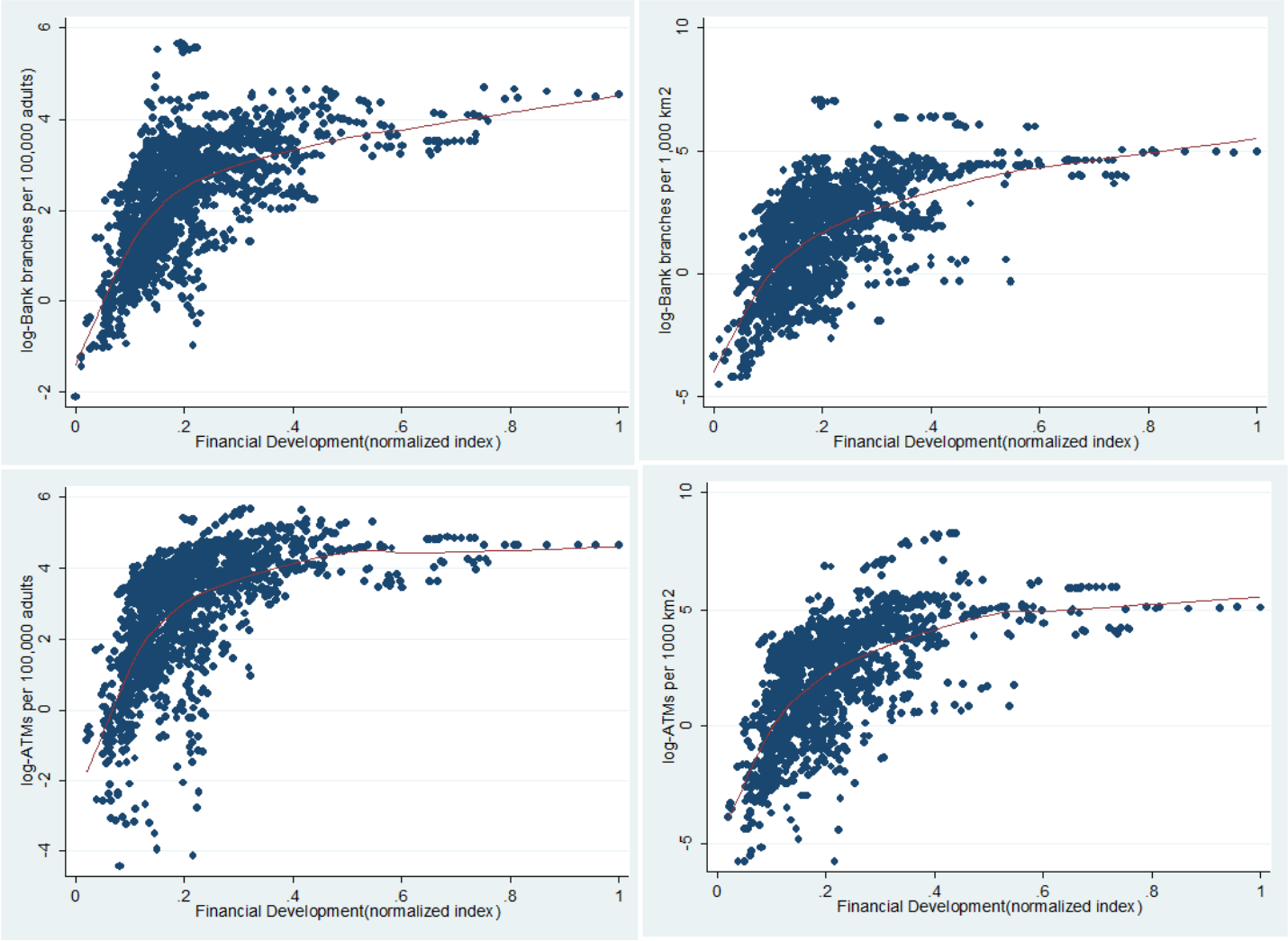
Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016 Global Average Data

Figure 3-8: Relation between access indicators and Financial Development



Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, *The World Bank-Global Financial Development Database June 2016 Global Average Data*

Figure 3-9: Relation between access indicators and Financial Development



Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, The World Bank-Global Financial Development Database June 2016 Global Average Data

Table 3-3: Correlation- Benchmarking variables

Variable	Financial Development Index	log-GDP per capita	Per capital GDP growth	log-population size	log-dependency ratio	Banking crisis	Natural Resources
Financial Development Index	1						
log-GDP per capita	0.6020	1					
Per capita GDP growth	-0.1891	-0.1665	1				
log-population size	-0.0298	-0.1099	0.1049	1			
log-dependency ratio	-0.4300	-0.7012	0.0535	0.0213	1		
Banking crisis	0.2582	0.2689	-0.1514	0.0740	-0.1381	1	
Natural Resources Rents to GDP	-0.2600	-0.1638	0.0720	-0.0313	0.1969	-0.0742	1
Mobile Money	-0.0738	-0.1263	0.0077	0.1074	0.1097	-0.0458	-0.0479

The above correlations are based on figures for all the world countries with available data (180 countries). However, the size of the correlation vary when looking at the SSA and the Low- and Lower-Middle Income group sub-samples.

Table 3-3 is a summary of the correlation between the variables used in the benchmarking. The results suggest existence of a positive correlation between financial development and *per capita* GDP, suggesting that highly developed banking systems are associated with high economic development. On the other hand there is a negative associating between financial developments natural resource rents to GDP. Further, a high dependency ratio is associated with low financial and economic development. From the magnitude of the correlation coefficients we can infer that there are no collinearity problems between the benchmarking variables.

Table 3-4: Correlation-GAP analysis variables

	Variable	1	2	3	4	5	6	7
1	Bank Asset concentration	1						
2	Foreign banks	-0.190	1					
3	Inflation	0.031	-0.288	1				
4	Boone Indicator	0.030	0.018	-0.047	1			
5	Rural population to total population	0.219	-0.011	0.185	-0.015	1		
6	Population density	-0.091	-0.105	-0.011	0.108	0.230	1	
7	Institutional Development Index	-0.150	0.237	-0.208	-0.316	-0.248	0.301	1

Notes: Above correlations relate to the SSA sub-sample

Table 3-4 provides a summary of the variables used in the analysis of the gap in access to finance. Bank asset concentration is measured through the top-3 asset concentration. Another common measure is the top-5 asset concentration, however this is discarded due to missing values. Although the correlation between the Boone Indicator of bank competition and the top-3 asset concentration is positive, it is neither statistically nor economically significant, suggesting that the two potentially capture different elements of market behaviour. Overall, the correlations suggest collinearity is not a problem. The results suggest a negative association between inflation, and almost all other variables except for rural population and bank concentration.

3.5.2 Benchmarking

Table 3-5, Table 3-6 and Table 3-7 on pages 103, 1034 and 1045 below provide benchmark results based on World, Sub-Saharan Africa and Low- and Lower-Middle Income countries (LLMICs) averages, respectively. The results are generally consistent with expectations. However, because of the manner of the estimations, I avoid attaching any causality and thus interpret the estimations in terms of associations.

Table 3-5: Regression Based on all Countries

VARIABLES	(1) Deposits to GDP	(2) Loans to GDP	(3) ATM per 1000km^2	(4) ATM per1000 adults	(5) Bank branches per 1000km^2	(6) Deposit accounts per 1000 adults	(7) Depositors per 1000 adults
Financial Development	17.45***	8.290***	4.644	-2.709*	5.953**	1.361	22.62***
	(0.835)	(1.270)	(3.674)	(1.477)	(2.883)	(3.419)	(2.681)
Log- GDP per capita	-0.103	0.453***	2.814***	4.134***	1.556***	1.907***	1.855***
	(0.0875)	(0.150)	(0.359)	(0.215)	(0.320)	(0.386)	(0.221)
Financial Development-squared	-4.846***	-11.24***	-7.946***	-6.015***	-10.63***	-4.256*	-11.51***
	(0.729)	(0.841)	(2.237)	(0.807)	(2.753)	(2.421)	(1.017)
Log- GDP per capita-squared	0.0149**	-0.0296***	-0.146***	-0.208***	-0.0902***	-0.0912***	-0.0729***
	(0.0061)	(0.0103)	(0.0246)	(0.0131)	(0.0219)	(0.0266)	(0.0149)
Per capita growth	7.01e-05	-0.0020	-0.0135	-0.0159***	0.0188**	-0.0080	-0.0011
	(0.0022)	(0.0021)	(0.0091)	(0.0038)	(0.0089)	(0.0055)	(0.0032)
Financial Development x Log- GDP per capita	-1.032***	0.359**	0.588	0.828***	0.800*	0.278	-1.610***
	(0.119)	(0.176)	(0.511)	(0.178)	(0.433)	(0.475)	(0.296)
Log- Population size	-0.0227***	-0.0209***	0.0445**	0.0422***	-0.0237	-0.0242**	-0.0550***
	(0.0041)	(0.0049)	(0.0206)	(0.0085)	(0.0231)	(0.0113)	(0.0111)
Log- Dependency ratio	-0.184***	-0.515***	-1.824***	-0.345***	-1.847***	-1.088***	-0.995***
	(0.0416)	(0.0508)	(0.173)	(0.0935)	(0.196)	(0.116)	(0.0998)
Banking crisis	-0.197***	0.0856***	0.0465	0.0585	-0.141	-0.0212	0.561
	(0.0308)	(0.0291)	(0.201)	(0.0396)	(0.149)	(0.128)	(0.766)
Natural Resources rents to GDP	-0.0001	-0.0024**	-0.0512***	-0.0086***	-0.0389***	-0.0214***	-0.0061**
	(0.0007)	(0.0011)	(0.0057)	(0.0024)	(0.0055)	(0.0028)	(0.0026)
Constant	3.095***	2.537***	-5.423***	-16.55***	1.183	1.501	-0.342
	(0.444)	(0.680)	(1.805)	(1.150)	(1.761)	(1.660)	(0.854)
Observations	1,771	1,770	1,605	1,605	1,755	1,019	795
Pseudo R-squared	0.4622	0.4942	0.4448	0.5746	0.3492	0.4935	0.4641

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3-6: Regression Based SSA Countries Only

VARIABLES	(1) Deposits to GDP	(2) Loans to GDP	(3) ATM per 1000km^2	(4) ATM per 1000 adults	(5) Bank branches per 1000km^2	(6) Deposit accounts per 1000 adults	(7) Depositors per 1000 adults
Financial Development	9.359**	-2.406	17.78*	7.268	33.28***	22.78***	36.47***
	(4.112)	(4.489)	(9.246)	(6.267)	(7.591)	(4.586)	(4.529)
Log- GDP per capita	0.353	0.657	1.927**	3.055***	-0.153	2.138***	2.159***
	(0.253)	(0.449)	(0.901)	(0.762)	(0.614)	(0.324)	(0.328)
Financial Development-squared	-42.85***	-48.16***	-47.88**	-67.84***	-42.16***	-35.52***	-45.13***
	(10.11)	(8.223)	(21.64)	(9.135)	(16.09)	(8.881)	(9.525)
Log- GDP per capita-squared	-0.0393*	-0.0609*	-0.110*	-0.170***	0.0119	-0.105***	-0.0945***
	(0.0202)	(0.0343)	(0.0627)	(0.0504)	(0.0393)	(0.0200)	(0.0200)
Per capita growth	0.0005	0.00143	0.0086	-0.0076	0.0346***	0.00593**	0.0076
	(0.0049)	(0.0029)	(0.0202)	(0.0108)	(0.0109)	(0.0027)	(0.0073)
Financial Development x Log- GDP per capita	1.623**	3.503***	1.161	3.089***	-1.099	-0.294	-2.169***
	(0.788)	(0.847)	(1.730)	(0.990)	(1.178)	(0.614)	(0.636)
Log- Population size	-0.0304**	0.0490***	-0.132**	0.0685***	-0.266***	-0.0378	-0.0147
	(0.0122)	(0.0167)	(0.0626)	(0.0245)	(0.0385)	(0.0477)	(0.0347)
Log- Dependency ratio	-0.135	0.813***	-1.996***	0.338	-2.924***	0.169	-0.873**
	(0.158)	(0.232)	(0.683)	(0.394)	(0.450)	(0.385)	(0.360)
Banking crisis	0.0681	-0.351	2.275***	-0.132	2.762***		0.864
	(0)	(0)	(0.274)	(0.0906)	(0.539)		(0)
Natural Resources rents to GDP	-0.0040*	-0.0119***	-0.0450***	-0.0239***	-0.0304***	-0.0254***	-0.0220***
	(0.0020)	(0.0037)	(0.0045)	(0.0051)	(0.00350)	(0.00276)	(0.00301)
Constant	1.843*	-5.106***	0.947	-16.38***	15.26***	-6.429***	-3.195*
	(1.041)	(1.661)	(3.276)	(2.997)	(2.765)	(1.806)	(1.835)
Observations	439	432	344	344	440	254	340
Pseudo R-squared	0.4565	0.4690	0.3995	0.5650	0.3412	0.5133	0.4216

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3-7: Regression based on Lower Middle and Low Income Countries

VARIABLES	(1) Deposits to GDP	(2) Loans to GDP	(3) ATM per 1000km^2	(4) ATM per 1000 adults	(5) Bank branches per 1000km^2	(6) Deposit accounts per 1000 adults	(7) Depositors per 1000 adults
Financial Development	8.547**	7.640*	36.90***	-3.882	26.92**	35.11***	10.69*
	(3.359)	(4.126)	(8.988)	(10.93)	(12.08)	(5.646)	(6.219)
Log- GDP per capita	1.045***	-1.015**	-4.118***	2.206	-3.347	1.859**	2.175***
	(0.372)	(0.495)	(1.347)	(1.460)	(2.094)	(0.782)	(0.457)
Financial Development-squared	-32.00***	-47.53***	-125.7***	-94.80***	-104.2***	-58.05***	-65.13***
	(4.282)	(6.172)	(15.18)	(12.86)	(18.68)	(9.738)	(13.27)
Log- GDP per capita-squared	-0.0904***	0.0623*	0.354***	-0.131	0.243	-0.0701	-0.135***
	(0.0299)	(0.0355)	(0.0959)	(0.104)	(0.150)	(0.0590)	(0.0384)
Per capita growth	-0.0039	-0.00511	-0.0244**	-0.0322***	0.0014	-0.0015	0.0169***
	(0.0032)	(0.0048)	(0.0121)	(0.0090)	(0.0127)	(0.0056)	(0.0056)
Financial Development x Log- GDP per capita	1.489**	2.124***	1.515	5.434***	2.251	-1.402*	2.598**
	(0.599)	(0.643)	(1.460)	(1.656)	(2.167)	(0.785)	(1.073)
Log- Population size	-0.0036	0.0291***	0.201***	-0.0233	0.148***	-0.0282	-0.0223
	(0.0067)	(0.0083)	(0.0282)	(0.0188)	(0.0371)	(0.0191)	(0.0197)
Log- Dependency ratio	-0.184***	-0.514***	-2.420***	-1.163***	-2.880***	-0.571***	-1.576***
	(0.0629)	(0.0821)	(0.223)	(0.174)	(0.288)	(0.186)	(0.0922)
Banking crisis	-0.311***	0.125	0.0476	0.426	-2.739	1.420***	0.695***
	(0.0855)	(0.131)	(0.654)	(0.312)	(2.804)	(0.117)	(0.107)
Natural Resources rents to GDP	-0.0002	-0.00145**	-0.0263***	-0.0013*	-0.0100	-0.0287***	-0.0003
	(0.0012)	(0.0007)	(0.0100)	(0.0008)	(0.0136)	(0.0031)	(0.0006)
Constant	-0.670	6.582***	15.38***	-4.823	18.25**	-3.122	1.187
	(1.208)	(1.798)	(5.122)	(5.234)	(7.595)	(2.659)	(1.664)
Observations	722	715	611	611	733	444	448
Pseudo R-squared	0.4858	0.4507	0.4154	0.4572	0.2989	0.4770	0.4665

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Across all estimations financial development has a positive and significant effect, except on ATM per 1000km^2 for the world and ATM per 1000 adults for both the SSA and LLMIC average. The logarithm of GDP per capita also has a positive sign; except in the LLMIC estimation of ATM per 1000km^2 and outstanding loans to GDP, where it has a negative and significant sign. This would explain the heterogeneity that exists within this income group where, although the countries are within the same level of development, their growth trajectories vary widely. In a similar estimation Beck et al. (2007) also find a positive and significant relationship between indicators of access to finance and development. The squares of both variables have different signs thus confirming the non-linearity as observed in Figure 3-6 and Figure 3-7 above. The interaction variable is also significant across all specifications, except in instances were any one of the variables is insignificant, thus correctly capturing the joint significance of financial development and economic development in determining access to finance. However, the joint significance of the variables varies with the reference sample. This would suggest that in terms of access to finance the SSA region is unique, and this does not matter whether the comparison is based on the world average or comparable economies in terms of development.

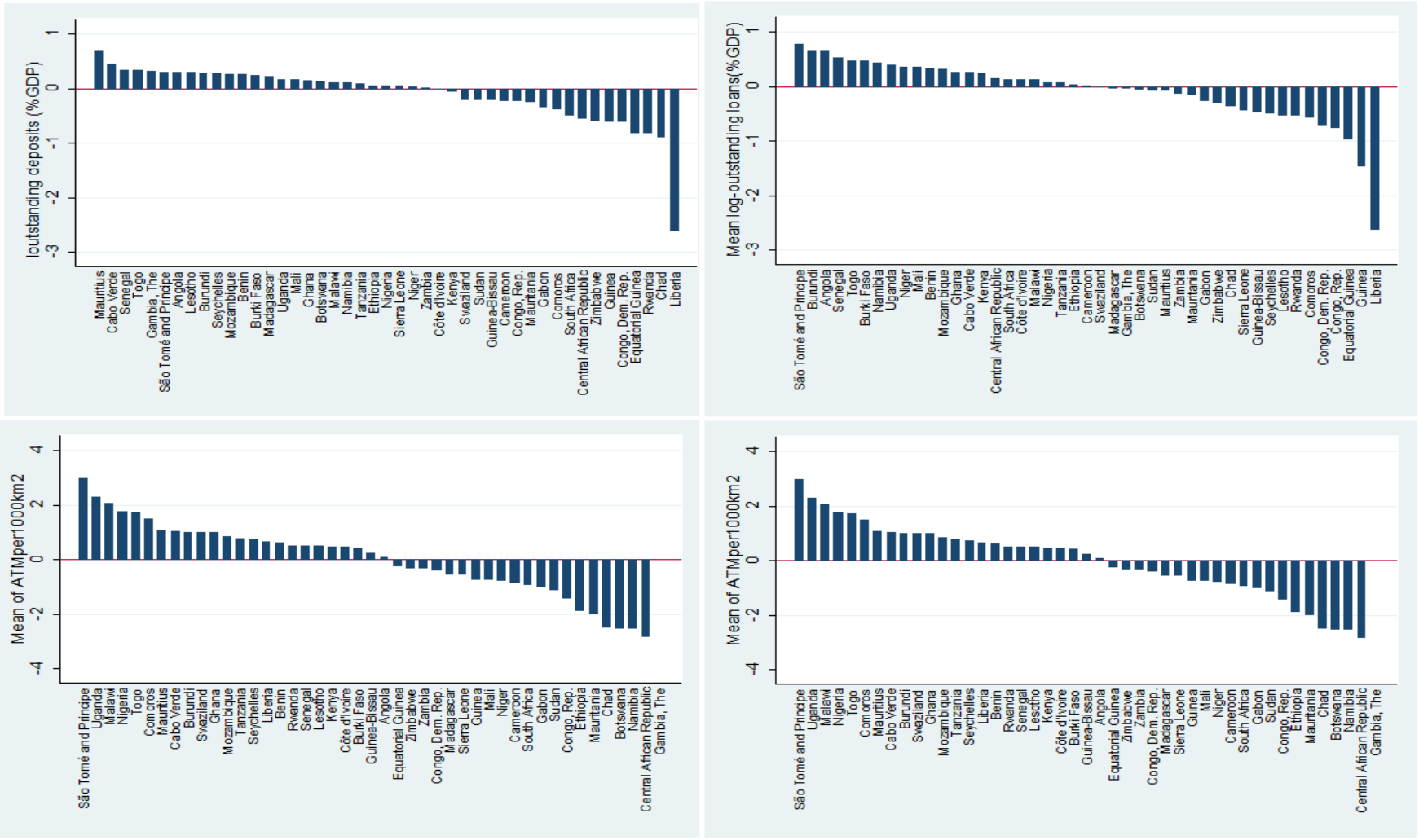
Contrary to expectations, there is a negative association between population-size and both usage and outreach indicators. This result is better explained by an understanding of, the relationship between access and the dependency ratio, which is also negative. Findings by Allen et al., (2014) also point to the same direction, although their coefficients are not significant. This would suggest that countries with large population sizes also have difficulties in extending access to financial services. This may also be understood from the view that having high population ratios result in high dependency ratios, which are associated with negative externalities such as unemployment, poverty and reduced saving, thus reducing the demand for financial services and consequently reducing supply.

Benchmark results based on the world average suggest that the banking crisis dummy has a negative and significant relationship on outstanding deposits to GDP, whereas it has a positive and significant relationship with outstanding loans to GDP. Although this may sound contradictory considering that both are indicators of financial services usage, close analysis would suggests that this is a reflection of the source of the crisis, and thus reflects a positive association with loan provision. However, the association is not significant when the benchmark is estimated using SSA and LLMICs average data. This could be attributed to the fact that most of the countries within these groups were not severely affected by the banking crisis.

Across all estimations, the coefficient of natural resources to GDP is negative. This would suggest that the natural resource curse (Sachs & Warner, 1999; 2001) also holds in access to finance, as countries with natural resource abundancy are associated with reduced access to finance. A similar conclusion was reached by Beck (2011) who found that resource-rich countries have limitations in both usage and outreach of financial services, and is more significant on firms than households. He established that a higher proportion of firms have financial obstacles and there is less bank outreach (although not significant) in countries with an abundance of natural resources. According to Beck (2011) the natural resource curse of access to financial services is attributed to inadequate investment of human and financial resources into the financial sector.

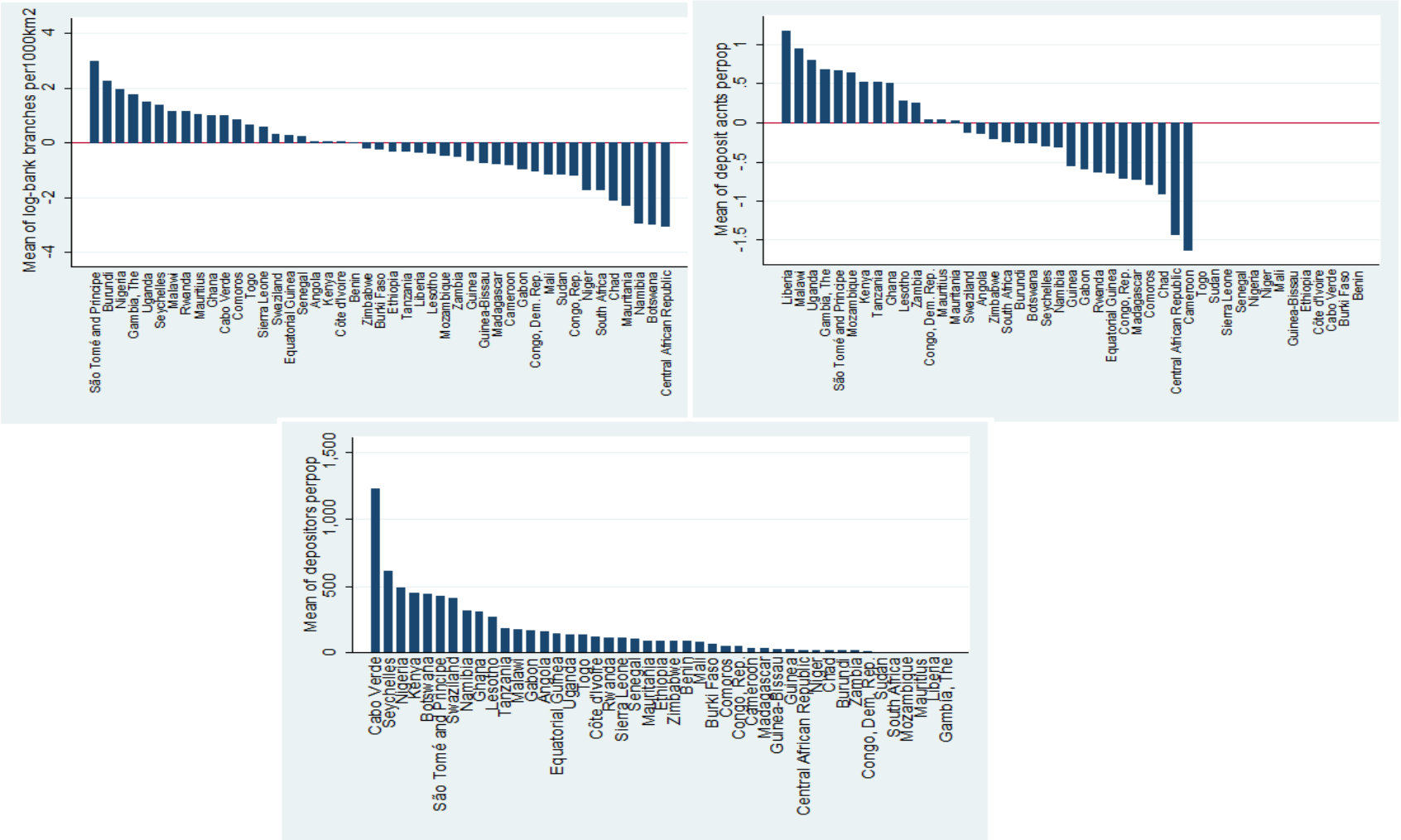
I use the results from the above estimates to benchmark for each SSA sample country, and thus identify the gap in access to finance for each indicator. The result for the gaps are as presented in Figure 3-10 through Figure 3-15, below.

Figure 3-10: Financial Access (Usage & Outreach Gap) - based on World average



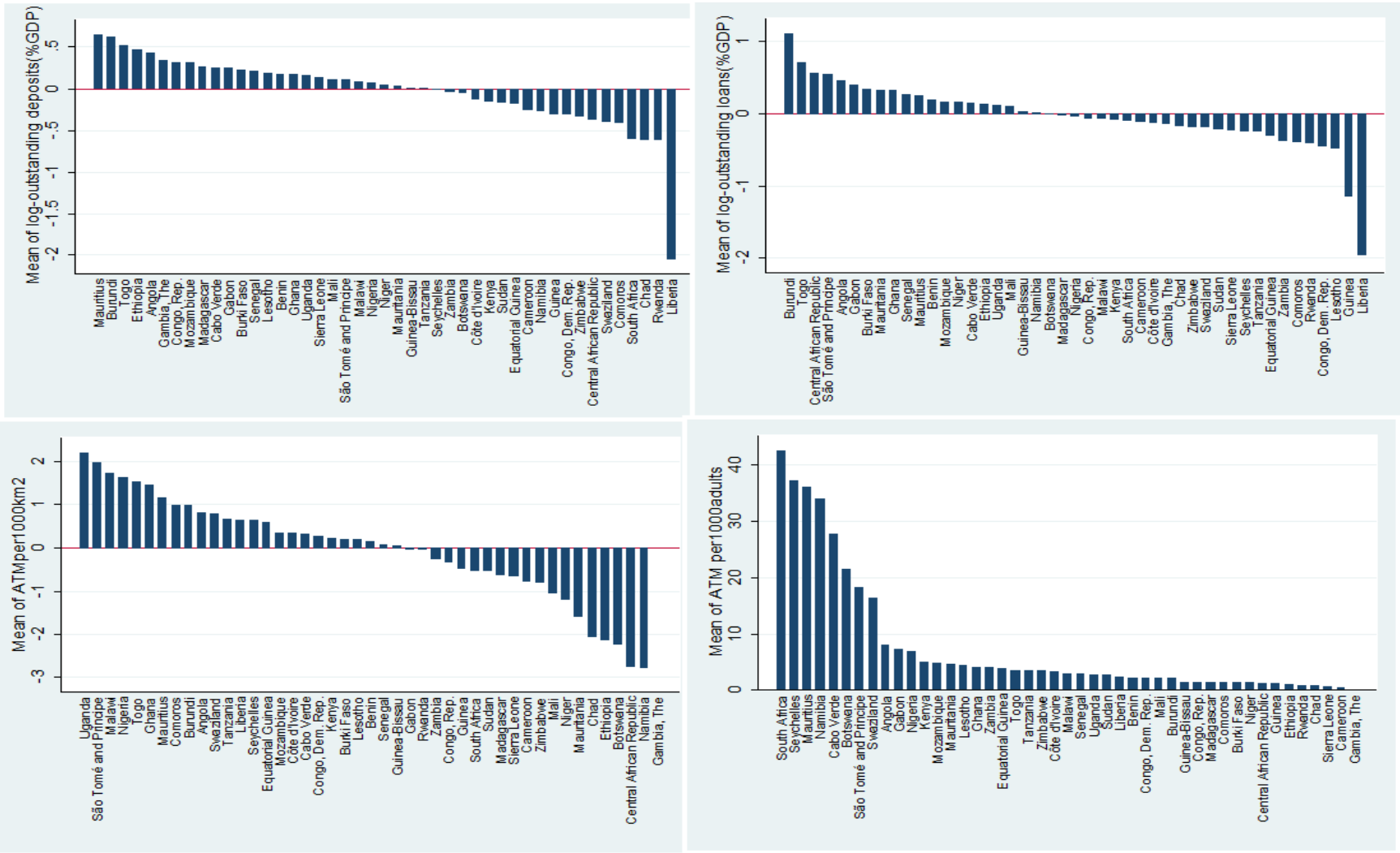
Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, *The World Bank-Global Financial Development Database June 2016 Global Average Data*

Figure 3-11: Financial Access (Usage & Outreach Gap) - based on World average



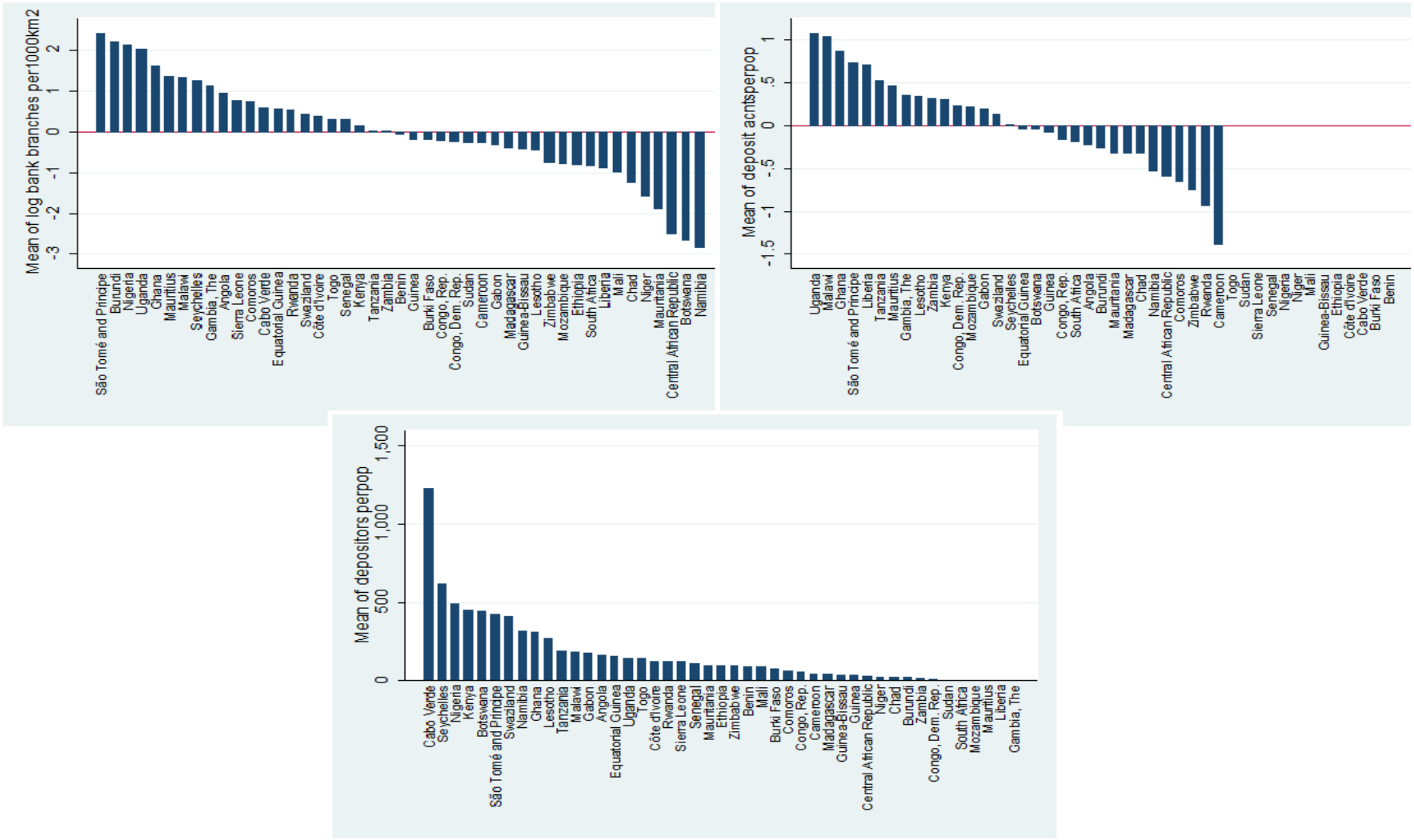
Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, *The World Bank-Global Financial Development Database June 2016 Global Average Data*

Figure 3-12: Financial Access (Usage & Outreach Gap) - based on SSA average



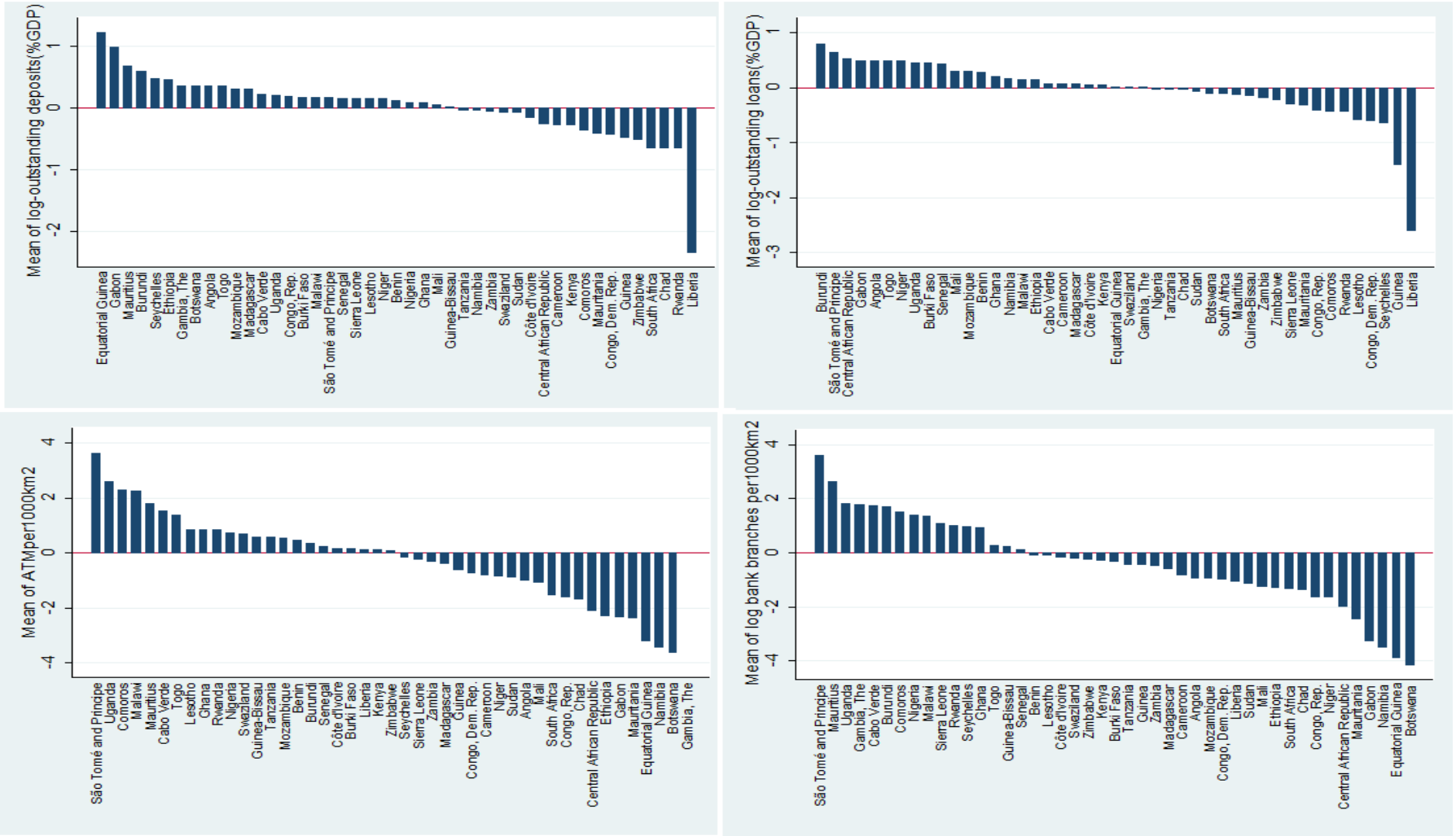
Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, *The World Bank-Global Financial Development Database June 2016 Global Average Data*

Figure 3-13: Financial Access (Usage & Outreach Gap) - based on SSA average



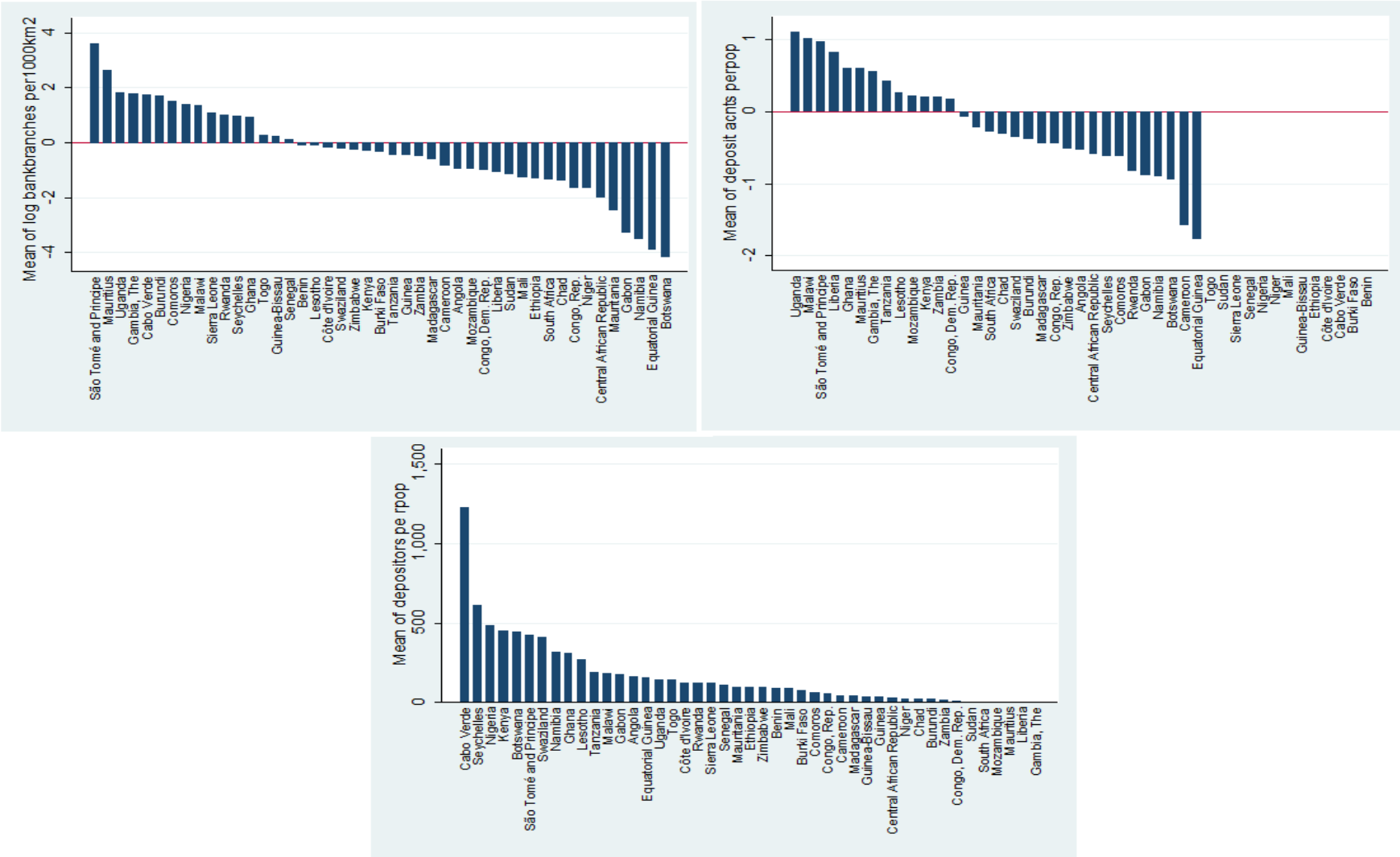
Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, *The World Bank-Global Financial Development Database June 2016 Global Average Data*

Figure 3-14: Financial Access (Usage & Outreach Gap) - based Lower Middle and Low Income Countries



Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, *The World Bank-Global Financial Development Database June 2016 Global Average Data*

Figure 3-15: Financial Access (Usage & Outreach Gap) - - based Lower Middle and Low Income Countries



Source: Own Calculations from International Monetary Fund- Financial Access Survey Data 2016, *The World Bank-Global Financial Development Database June 2016 Global Average Data*

3.5.3 Impact of market enabling environmental factors

As shown in the previous section, the results suggest the existence of a gap in access to financial services for a number of countries within SSA. A visual inspection may suggest that the relative gap is independent of whether the benchmark regression is estimated using the world average, the SSA regional average, or the comparable income group average. However, statistical test results using the Friedman test and the Student-t test (results available upon request) suggest that the reference group matters. Whereas the Friedman test only shows that there is a statistically significant difference in the gap based on the reference group, the t-test indicates that the gap is significantly higher when the comparison is based on world averages. However, for most indicators, there is no statistically significant difference between estimations made based on the SSA regional average and comparable income group average. Therefore, I conclude that there exist a significant financial inclusion gap in the SSA region and the gap widens as the reference sample increases, consistent with the observation made earlier in the study that the region lags behind world averages in most indicators. Therefore, although the region lags behind in indicators of access to finance and in both financial and economic development, its level of access to finance is not what it should be, given its fundamentals. Despite this, a few countries often appear to be at the frontier (for example Tanzania), for most indicators, whilst the remainder are either above or below the frontier. This is a clear indicator of the extent of heterogeneity across the countries within the region.

Generally, most countries have a negative gap in credit expansion (*i.e.* outstanding loans to GDP). This could partly explain why the region has not experienced any serious financial crisis in its credit market. According to the APF excessive and imprudent expansion of services in the credit market may push the frontier upwards, resulting in an unsustainable equilibrium position which may ultimately lead to a crisis.

Overall, the results confirm to our expectations, with countries like Liberia, Rwanda and Zimbabwe consistently posting a negative average gap on usage indicators, suggesting that the equilibrium point for these countries is below the optimal frontier. Such results would be expected given the socio-economic challenges, and the subsequent decline in consumer welfare, that these countries have gone through or are currently experiencing.

It is interesting to note that generally for all SSA countries there is a positive gap on the number of depositors, across all specifications *i.e.* the equilibrium point is beyond the optimal level. This would imply that most countries are over-banked or, alternatively, that the bankable population in SSA counties is lower than the banked population. This suggests the existence of constrained

sub-optimality due to either deficiency in demand or inefficiency in the supply of services. In an earlier version of their paper, Beck and de la Torre (2007), stated that in most developing economies the bankable population is often below the optimum due to network externalities and economies of scale. Therefore, policies aimed at improving access to finance should focus on increasing the bankable population, either by exploiting economies of scale or by incentivizing banks to expand services to the unbanked or by a total liberalisation of the market to increase participation by non-bank and/or foreign market participants.

Table 3-8 below shows the regression results when examining the impact of the market-enabling environment on the gap in access to finance. The number of countries varies between 28 and 29 depending on specification. To eliminate problem of outliers, the results excludes countries which had inflation levels above 60%, namely Zimbabwe where official inflation hit 1096.66% in 2006, and 24411% in 2007, according to the World Bank.

Table 3-8: Regression with market enabling policy variables

Variables	(1) Outstanding loans to GDP-Gap	(2) Outstanding Deposits to GDP-Gap	(3) ATM per 1000km^2 - Gap	(4) ATM per 1000 adults-Gap	(5) Bank branches per 1000km^2-Gap
Boone indicator	1.013***	0.540**	-2.779***	0.278	-2.118***
	(0.260)	(0.225)	(0.675)	(7.193)	(0.567)
Bank concentration	-0.003	-0.004**	-0.018***	-0.018	-0.015***
	(0.002)	(0.002)	(0.007)	(0.071)	(0.0050
Foreign banks among total banks	0.009***	0.004*	0.030***	-0.323***	0.020***
	(0.003)	(0.002)	(0.008)	(0.082)	(0.006)
Inflation	-0.005*	-0.006**	-0.0005	0.039	0.002
	(0.003)	(0.002)	(0.007)	(0.070)	(0.006)
Rural population to total population	0.018	0.008	-0.177***	-3.644***	-0.020
	(0.013)	(0.011)	(0.034)	(0.363)	(0.027)
Population density	-0.004	-0.004	0.007	-0.150**	0.0004
	(0.003)	(0.002)	(0.007)	(0.073)	(0.006)
Institutional Quality Index	0.114*	0.101*	0.204	-0.461	0.311**
	(0.068)	(0.054)	(0.185)	(1.968)	(0.144)
Constant	-0.770	0.185	10.31***	273.5***	1.612
	(1.031)	(0.869)	(2.777)	(29.60)	(2.189)
Observations	217	223	170	170	221
R-squared within	0.182	0.129	0.569	0.488	0.227
Number of countries	29	29	28	28	29

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

In line with the market power hypothesis, the results suggest that high concentration in the banking sector, as captured by the top-5 bank concentration ratio, is associated with underperformance in

both outreach and usage of financial services. This suggests that high bank market power reduces the incentive to expand financial services. However, the effect of competition, as measured by the Boone Indicator varies, whereas increased competition is positively associated with financial over performance in the usage indicators, it is simultaneously associated with under performance in the outreach side of financial inclusion. This relationship can be explained the fact that greater competition forces banks to review their lending standards in order to attract to customers, however they tend to reduce investment in physical infrastructure in order to remain profit. Therefore, the 'real effect' of competition will depend on the trade-off between reduction in outreach and increase in usage of financial services. Surprisingly there have been no overt policy aimed the expansion of physical bank networks. As highlighted by Busch (2017) policies on financial inclusion tend to focus more on the demand-side*, i.e*. increasing usage and creating consumer confidence, neglecting the physical outreach side. However, evidence from individual country experiences attest to the efficacy of physical branch network expansion as a necessary arm of improved access to financial services (see Beck, Levine, et al., 2010; Bruhn & Love, 2014; Burgess & Pande, 2005; Burgess et al., 2005, for detailed account of the impact of deregulation in the US, and bank branch expansion in Mexico and India, respectively).

A high proportion of foreign banks is generally associated with over-performance in both access and outreach of financial services, except in the proportion of ATMs per population. This would suggest that opening the banking sector to foreign competition might help countries within SSA to move towards the equilibrium. Foreign banks' entry may bring in better expertise and operational models, which may result in improved access to financial services. The fact that the presence of foreign banks has a negative coefficient with respect to outreach indicators may point to the indirect effect of foreign banks, *via* dispersion of domestic banks. Since foreign banks are often liquid and have better and more efficient operational models; their presence may push local banks out of the market (thus reducing outreach). This forces domestic banks to reposition themselves by entering a different niche in the market, which otherwise they would have neglected (thus increasing usage). However, because of lack of resources, domestic banks might not be able to expand their physical infrastructure (thus the observed negative association with ATM per population). Due to entrance of foreign banks, domestic banks may therefore retreat from the main market and, using their local advantage, focus on extending their services to informationally opaque customers, which ultimately results in improved access to financial services.

Further, an effective intuitional environment, is related to financial over performance, in both outreach and usage of financial services (although therefore is a negative relation with the number of ATMs per adult population, this is however not statistically significant). Such a relationship

would suggest that an effective regulatory and supervisory oversight in the banking sector, would be complementary to financial inclusion policies. In a majority of countries within the SSA region, bank regulatory and supervisory systems are highly under developed; like most developing and emerging economies, the region generally suffers from a regulatory burden which subsequently limits the extent of financial services expansion.

Based on the estimations, a high concentration of population in rural areas is associated with financial underperformance. Economic intuition would suggest that this is an outcome of both supply and demand factors. Due to poor development of 'state variables' in rural areas, financial institutions find it difficult to operate in such areas, leading to reduced supply. On the other hand, the rural folk generally have less demand for financial services, resulting in low usage. As a result, institutions would settle in high-value transaction areas, resulting in reduced access in low-value transaction areas (Beck & de la Torre, 2007). Therefore, there is a need to improve 'state variables' in rural areas to reduce the cost of operation for institutions. Contrary to expectations, population density does not seem to have a significant association in the gap in access to finance across all indicators.

3.6 Conclusions and Recommendations

This study applies the APF concept of Beck and de la Torre (2007) to examine access to finance in the SSA region. The APF estimates the benchmark level of access to finance based on the fundamental levels of development. It also shows the interaction between private sector strategies and government policies in expanding access to finance. Further, it highlights the interplay of regulatory and macroeconomic factors in eliminating the impediments to improved usage and the role of institutional policy in harnessing market forces to reduce imprudent and excessive expansion, especially in the credit market.

The results suggest the existence of a gap in access to finance in the SSA region, regardless of whether the benchmark is based on the world average, comparable income countries' average, or SSA regional average data. There is evidence of constrained sub-optimality, either due to deficiency in demand or inefficiency in supply of services or both. Policies aimed at improving usage should focus on increasing the bankable population through financial literacy programs and deliberate interventions by policy makers. There is a need to review existing banking sector policies to eliminate unnecessary entry barriers, thus open the markets to globalization and its advantages. Institutions can also take advantage of high rural-population concentration to rollout high-volume transactions, instead of clustering in high-value transaction areas.

On the other hand, this constrained sub-optimality may suggest that the supply of financial services is below the equilibrium level, calling for innovative methods by banking institutions in terms of both new products and the manner of service delivery. The use of agent banking and twinning with mobile-operators may go a long way in improving service delivery and reaching the currently unbanked and underbanked population. For example, the Kenyan example of agent banking, where one of the banks, Equity Bank, used retailers for its banking services (*i.e.* deposits, withdrawals and loan disbursements) and the resulting impact, is clear evidence of the extent to which such efforts may enhance financial inclusion. However, this may call for strong regulatory and supervisory oversight. Further, this may suggest a need for opening of the market to non-bank players. In most economies, there is an emerging trend of licensing deposit taking microfinance institutions. Such efforts should be encouraged, as microfinance has proven to be an effective way of extending financial services to the unbanked. The use of agent banking and twinning with mobile-operators may go a long way in improving service delivery and reaching the currently unbanked and underbanked population.

Since the results suggest that the presence of foreign banks have a positive impact on access, there is need to promote entrance of foreign banks in markets where there are some restrictions. This would suggest that current policies such as Black Empowerment Act in South Africa and the Indigenization Act in Zimbabwe should be applied with caution in relation to the banking industry, as these may have a negative impact on outreach and usage of financial services. However, there is need to reduce concentration in banking systems, as this appears to have a negative effect on access to finance. The current emergence and growth of Pan-African banks should be encouraged across all countries within the region, as it has a potential of reducing bank concentration levels and improve competitiveness in the banking sector.

Institutions can also take advantage of the high proportion of populations in rural areas to rollout high-volume transactions, instead of clustering in high-value transaction areas.

Further, findings suggest that improved financial inclusion is not always good for development. This may suggest a need for country-level studies to establish the threshold level of access to finance, as this is likely to vary across countries. An understanding of this optimal level is key to the development of inclusive policies. This suggests that, in as much as access to finance is important, policy makers should not merely focus on expanding access to financial services, without commensurate improvements in financial sector size and other indicators of financial sector development. In order to improve the intermediary role of the financial system, the quality of the financial system is foundational to improved access to finance. Therefore, there is need to

improve the institutional framework in which financial intermediaries operate, as the quality of institutions has a significant impact on shaping the economic behaviour of market participants. Research by Rousseau and Wachtel (2011) suggest that developments in the financial sector have a positive impact only when it is not done in excess, as excess finance weakens the system which ultimately results in a negative effect.

Although the analysis finds evidence of uneven financial inclusion within the region, it is important to note that the estimation may not guarantee future predictability in the estimation of a benchmark and the financial inclusion gaps derived from it. This is mainly because innovations by financial service providers and other complementary and/or competing services may result in a shift in the benchmark in a way that cannot be modelled based on the above estimation, which uses available past data.

While the APF concept and the taxonomy of policies derived from it may be important for policy formulation and strategy implementation, the existing heterogeneity across countries in terms of structural, macroeconomic and institutional characteristics should not be overlooked. Therefore, there is a need to identify key policy and structural factors that appear to be pivotal in shifting the APF either inward or outward. Thus, while the above findings may be relevant to a number of SSA countries, their relative significance may vary both across countries, and within a country over time thus implying a need for country-specific studies in future.

Further, this study estimates financial development using bank-based indicators. However, given the recent developments in African stock markets and the general role that stock markets are expected to play in development in general, it may be interesting to examine how the relationship changes with the inclusion of these variables. As more data is gathered, future work should also seek to examine the elements such as the persistence of a shock in access to finance on development indicators, or whether the observed relationship in this study is transitory or permanent.

Chapter 4 : Financial Inclusion and Financial Stability

4.1 Introduction

The global financial crisis of 2007-2008 highlighted the importance of systemic risk and financial stability, specifically in view of financial services expansion. The financial crisis not only increased the need for financial stability, but has led to further complications on framing of policies aimed at improving access to financial services (Čihák et al., 2013). This has become more significant to developing countries which, for the past decade, have aggressively engaged in the expansion of financial services as an integral part of their development initiatives.

The major challenge is to find ways of embracing financial inclusion without compromising financial stability (Calice, 2013). Currently, it is not clear whether financial inclusion and stability are mutually reinforcing objectives or conflicting strategies, although anecdotal evidence suggests that financial institutions catering for the lower-end of the market tend to better absorb crises and hence sustain financial stability (Hannig & Jansen, 2011). Financial inclusion poses both potential threats and opportunities on the overall stability of the financial system. However, there is limited empirical evidence on this relationship, partly due to a scarcity of data on financial inclusion and the fact that both financial inclusion and financial stability are complex elements determined by the interaction of a number of factors.

Financial stability is widely seen as desirable because a sound financial system is considered as fundamental to economic growth. As a result, in recent years an increased number of central banks have embraced financial stability as one of their key objectives (Oosterloo, de Haan, & Jong-A-pin, 2007). However, some theorists (*e.g.* Crockett, 1996) assert that financial stability should not be regarded as an objective - a good economy should promote and reward efficiency, and thus stability.

Various definitions have emerged in an attempt to explain financial stability. However, there is no consensus on the precise definition of financial stability. In general, most researchers and policy makers tend to agree that financial stability requires stable financial markets and institutions (Han & Melecky, 2014). The European Central Bank (2012) defines financial stability as the ability of a financial system (financial intermediaries, markets and market infrastructure) to absorb shocks that have a negative impact on the financial intermediation process. In line with this, Crockett, (1996) suggests that financial stability relates to the smooth functioning of institutions and markets that constitute the financial system. Stability therefore implies that institutions should not suddenly

collapse and cause economic damage to those who would not have anticipated it (Allen & Wood, 2006b).

Financial stability manifests itself either in fragility of financial intermediaries or in excessive volatility. A stable financial system should dampen rather than amplify economic shocks. In this regard it is generally regarded as the absence of financial instability, but this is not the same as a financial crisis (Crockett, 1996). Financial stability is key to the well-being of an economy and effective functioning of financial markets (Crockett, 1996; Klemkosky, 2013). It is the basis for rational decision making and resource allocation. Consequently, its absence creates uncertainty with huge negative ramifications on market operation (Crockett, 1996). In view of this, some researchers argue that financial stability should be considered as a public welfare/good (Allen & Wood, 2006a, 2006b; Blot, Creel, Hubert, Labondance, & Saraceno, 2015).

Financial inclusion, on the other hand, refers to the expansion of financial services to low income societal members, such as poor households and most small businesses. According the World Bank (1995), access to a bank account is a gateway to the use of financial services, and thus a key indicator of financial inclusion. The greatest challenge is that pursuance of financial inclusion often changes the composition of the financial system in terms of its clientele base, and thus introduces new transactions into the system whose idiosyncratic risk profile may not only be different, but often unknown, to providers of funds. Since the characteristics of these new players are often diverse, this potentially creates a great deal of information asymmetry between, for example, low income borrowers and financial institutions. Therefore, if not well monitored, a general improved access to the financial system can ultimately lead to financial instability. Cull, Demirgüç-kunt, and Lyman, (2012) note that expansion of financial services is different from general credit extension, because in extending credit there is a prudential limit, since not all consumers are credit worthy. However, this is not the case when it comes to increasing access to deposits and other financial services, thus posing a threat to financial stability.

Despite the significance of the relationship between financial stability and financial inclusion, very few studies have sought to examine this relationship. One such exception is the study by Morgan and Pontines (2014), which uses World Bank global data from 2005-2011 to examine how an increased share of lending to small and medium-sized enterprises (SMEs) aids financial stability. Despite the fact that the study uses non-performing loans and bank z-scores as indicators of financial stability, it is limited in that it ignores other important factors such a volatility in growth, bank loans, bank deposits, or the presence of financial crises. In addition, due to missing data on indicators of access to finance by SMEs (where the total number of observations is less than 10%

of bank stability indicators) the sample size is greatly reduced. Further, by focusing on SMEs, it ignores households, who are significant users of financial services, with a potentially huge influence on both the scale and asset mix of finance (Honohan, 2008). Moreover, most SMEs are owned by individuals whose banking profiles are reflected *via* household banking. Nonetheless, this study provides evidence that financial inclusion has a positive impact on financial stability, via an increased z-score and a reduction in non-performing loans.

Another related study is that of Han and Melecky (2017), who also use the World Bank data to examine the relationship between access to bank deposits before the financial crisis of 2008, and the growth in bank deposits during the crisis period, using cross-sectional data of 95 countries across all income categories. These researchers conclude that increased access to bank deposits helps to improve banking institutions' deposit funding base, thus making them more resilient to crises. However, despite the fact that the study uses a wide database, it is only limited to the dynamics of bank deposit growth during and around the events which led to the financial crisis, and thus cannot be generalized beyond the crisis period. Moreover, access to finance is broader than access to deposits and financial stability extends beyond deposits growth.

A more recent study is by Ahamed and Mallick (2017), who apply an instrumental variable estimation approach[50] on bank-level data for 87 countries across the world over the period 2004-2012. By examining the extent to which financial inclusion affect the volatility of the banks' return on assets and their z-score, they conclude that higher financial inclusion improves bank stability via a decline in the volatility of banks' returns on assets and increased z-scores.

The present study differs from the aforementioned studies in that, in addition to the use of macroeconomic data to empirically examine the dynamic relationship between financial inclusion and financial stability, it adopts a macro-prudential approach to bank regulation and supervision. Further, it broadens the definition of financial inclusion, in line with the perspective of the World Bank and other development institutions, by using a composite index which captures both the outreach and usage of financial services. Finally, by specifically focusing on Sub-Saharan Africa (SSA), a region that suffers from both low financial development and financial inclusion (see the

[50] Financial inclusion is instrumented *via* financial freedom, entry density and their interactions. Although statistical tests suggest the instruments are valid, there is a no strict exogeneity between the instruments and financial inclusion. Generally, a country with less stringent entry regulations and higher financial freedom is expected to have higher access to finance. Further according to the Heritage Foundation, which supplies data on financial freedom, financial freedom affects the level of supply of financial services. Therefore there is a high possibility that the results are driven by the association between the instruments and the dependent variable, instead of financial stability as concluded by the study.

previous Chapter), the study seeks to provide evidence that can inform policy in a region where this can have a significant developmental impact.

The rest of this chapter is structured as follows, Section 4.2 provides an overview of banking systems in SSA, Section 4.3 outlines the key theoretical underpinnings on the relationship between financial inclusion and financial stability, Section 4.4 describes the data and the estimation strategy, Section 4.5 presents the results and their analysis, and Section 4.6 concludes.

4.2 Banking systems in Sub-Saharan Africa

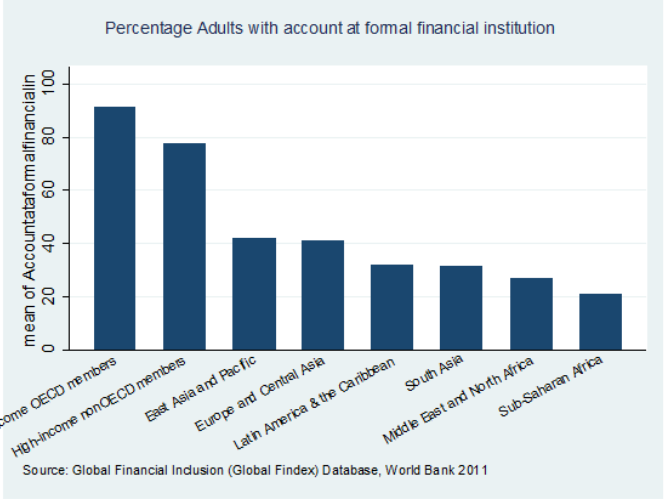
Economies within the Sub-Saharan African (SSA) region vary widely in a number of development indicators including: size, legal structures, policy framework and population density. Consequently, their financial systems are highly heterogeneous in terms of both sophistication and depth. With the exception of South Africa, its Southern African Customs Union counterparts and Mauritius, most of the 48 SSA economies are relatively small, highly underdeveloped, and bank dominated (Čihák et al., 2013; Mlachila et al., 2013; Moyo et al., 2014) . The scale of financial intermediation is relatively low, and financial markets are highly illiquid. Further as shown in Appendix 5, banking systems in SSA rank fairly high on most indicators of financial stability compared to other world regions.

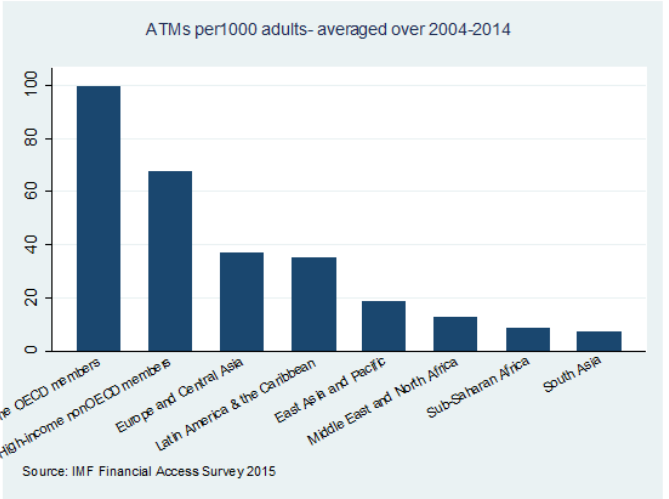
SSA financial systems rank lower than the rest of the world on most financial development indicators (Čihák et al., 2013; Mlachila et al., 2013). This has seen banks expanding virtually into the entire financial services provision landscape, blurring their distinction from other financial institutions (Moyo et al., 2014). The role of stock markets as a source of alternative finance is largely insignificant. Consequently, banks have become the main source of systemic risk - any failure in the banking system potentially poses huge negative ramifications on the entire economy.

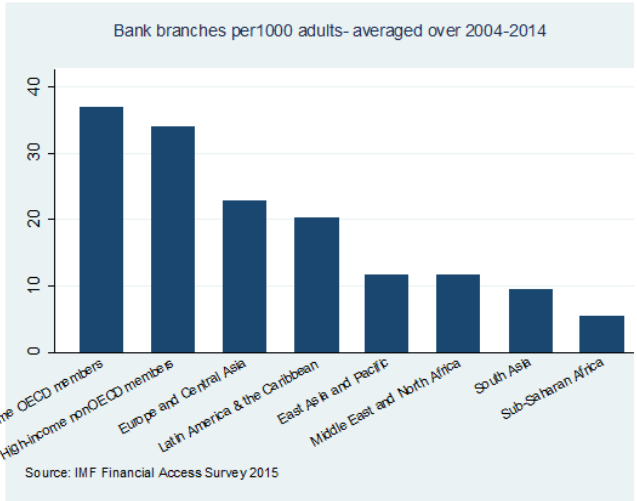
With the exception of Nigeria, banking systems in the region have shown resilience during the global financial crisis. However, evidence suggests that the Nigerian banking system crisis, although it coincided with the global crisis, originated from poor corporate governance systems (which were revealed by the crisis) rather than external shocks (IMF, 2012). Based on the nature of the banking systems in SSA, this non-response to the global financial shocks could be a manifestation of lack of integration with the world economy rather than robustness of financial structural systems *per se*. Although financial integration in some blocks within the region started around the 1990s, their impact on domestic financial systems has been limited. The development of financial systems have also been derailed by small national markets, which further reduces the rate of financial integration (Moyo et al., 2014).

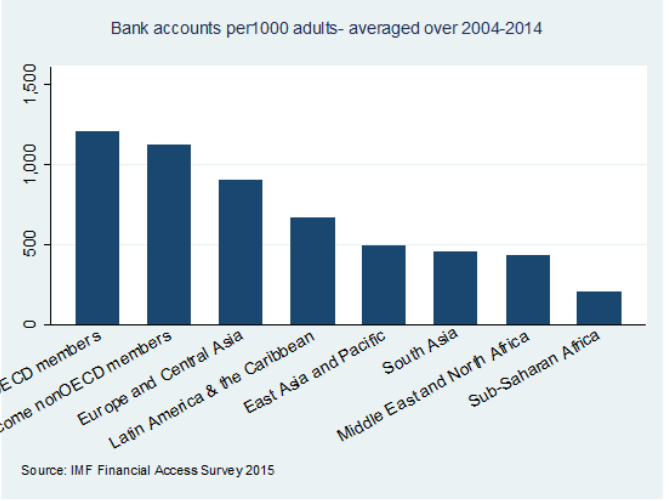
Recent evidence suggests that 88% of the world's unbanked population is in Africa, Asia, Latin America and the Middle East (Beck & Cull, 2014a; Chaia et al., 2013; World Bank, 2013). More than 80% of the adult population in SSA is unbanked (Chaia et al., 2013; Asli Demirgüç-Kunt & Klapper, 2013b). This is in sharp contrast with high income OECD countries, were only 8% of the adult population are considered unbanked (Beck & Cull, 2014a; Asli Demirgüç-Kunt & Klapper, 2013b).The region ranks lowest in terms of access to finance across all indicators, as shown in the figure below.

Figure 4-1: Access to Finance- Regional Comparison









There is severe financial exclusion in most countries. Evidence shows that most of the lending within SSA is broadly short-term, with 60% of the loans having a maturity of less than one year (Mlachila et al., 2013).

However, a number of positive developments have occurred over the last ten or so years. There has been a high growth of mobile-based banking services, creating opportunities for expansion of financial services. In addition, the region has seen a high proliferation of Pan-African Banking Groups, whose deposits account for 30% of deposits in the 13 SSA countries where they have a major presence (Mlachila et al., 2013). This does not only change the competitive climate, but also poses high potential for increased service expansion given their home market advantage. Furthermore, it makes them sensitive to changes within the region.

Although these Pan-African banks have the potential to change the landscape of financial services provision, they also pose a major regulatory challenge, especially in light of the weak supervisory capacity in most SSA economies. The greatest challenge faced by SSA is how to advance financial sector development, innovation and inclusion, without compromising on financial stability (Mlachila et al., 2013).

Whereas most studies approach banking stability from a regulatory or institutional perspective, this study focuses on financial inclusion, thus embracing a macro-prudential perspective to bank stability. Since banks are the major players in SSA economies, focusing on them help in the development of structures that improve the robustness of the financial system as a whole.

4.3 Review of Related Literature

The monetarist perspective of Friedman and Schwartz (1963) suggests that the key cause of financial instability is disruption in money supply. Therefore, financial instability is a manifestation of short comings in monetary policy. However, the advancement of financial inclusion is often backed by an active involvement of semi-formal financial services providers, *e.g.* microfinance institutions (MFIs) and corporative financial institutions (CFIs), whose regulation is still in its infancy in most developing economies. As such, expansion of services tends to undermine the efficacy of monetary policy and financial regulation, leading to increased overall financial system risk.

The relationship between financial inclusion and financial stability can also be understood from the financial stability hypothesis of Minsky (1982, 1993). According to Minsky, instability is induced by financial innovations made during periods of high optimism and prolonged prosperity. Such innovations may lead to investment in higher risk assets, thus increasing the vulnerability of the entire system (Klemkosky, 2013; Minsky, 1982). Often when institutions extend their services to lower income groups, they are forced to design innovative products to attract these groups; including a lowering of standards – good examples of which include the US subprime and Indian

microfinance crises (Khan, 2011; Morgan & Pontines, 2014). Therefore, overextension of financial services has a potentially negative impact on the portfolio of financial institutions (Khan, 2011). Minsky (1993) further states that increased complexity in financial structures and greater government involvement (which often comes with financial inclusion) leads to the financial system behaving differently. It is this change in the behaviour of the financial system which leads to instability. Viewed from this perspective, financial inclusion is a potential threat to financial stability.

From an institutional economics perspective, market irregularities are an outcome of information asymmetry in financial markets, leading to adverse selection and moral hazard. When adverse selection and moral hazard are acute, the market can shrink (Stiglitz et al., 1981). To eliminate moral hazard, financial institutions should be able to monitor and influence customer behaviour subsequent to service extension. Moral hazard implies that risk taking will not be properly priced. Therefore, adverse selection and moral hazard affect the performance of financial institutions, and thus impact negatively on financial stability (Mishkin, 1990, 1996). According to Bagehot (1873), to reduce moral hazard, financial intermediaries should lend freely against good collateral. This would suggest that expansion of financial services to the poor is detrimental to stability, as the poor and small businesses often have very diverse characteristics, thus increasing information asymmetry. Further, their lack of collateral increases moral hazard, consequently increasing the riskiness of service delivery.

Despite the above seemingly negative postulations on the impact of financial inclusion on stability, improving access to financial services potentially has a number of both direct and indirect positive effects on financial stability. According to Khan (2011) the direct effects of financial inclusion on stability can be viewed from three main perspectives. Firstly, expansion of financial services broadens the customer base, leading to a more diversified portfolio and a reduction in relative size of borrowers. Evidence from Chilean banks suggests that losses from small loans have lower systemic risk and are relatively predictable compared to larger ones (Adasme, Majnoni, & Uribe, 2006). Another study by Morgan and Pontines (2014) established that increased lending to SMEs aids financial stability by reducing non-performing loans and the probability of loss given default. In a cross-country study of 77 countries over the period 2002-2011, Beck and De Jonghe (2014) find that specialized bank-lending increases volatility and systemic risk exposures, without a commensurate increase in returns. Therefore, fostering financial inclusion ultimately leads to a wider, efficient and more diversified portfolio base, which improves resilience and financial stability (Cull, Demirguc-kunt, & Layman, 2012; Han & Melecky, 2014). This is in sharp contrast to the Minsky (1982, 1993) postulation, which posits that financial innovation may lead to instability.

Khan (2011) also suggests that financial inclusion improves both the proportion and stability of banks' deposit base by increasing dependence on core-financing, which is less volatile in economic downturns. The stability of a bank's portfolio occurs when withdrawals are random and assets are held at term (Crockett, 1996). A stable deposit base helps a bank to hold enough liquidity to meet withdrawals, and thus invest excess funds on less liquid but high yielding assets, whose returns improve bank operation. On average, low income savers have been found to exhibit stable and predictable behaviour, in both keeping and borrowing of funds, in periods of crisis (Cull, et al., 2012; Han & Melecky, 2014). Marino and Bennett, (1999) examined six major bank failures in the US from 1984 to 1992 and established that, prior to bank failures, large deposits fell significantly relative to smaller ones. Withdrawals from small businesses and poor households are motivated mostly by their individual liquidity needs – therefore, given their large numbers, they potentially contribute positively to financial system stability (Cull et al., 2012; Huang & Ratnovski, 2011). Thus, the argument is that improving broad access helps banks to achieve broader diversification, leading to enhanced stability in the overall system.

Finally, Khan (2011) states that financial inclusion improves the degree of market formalization, increasing monetary policy transparency and its effectiveness, which ultimately improves stability. In contrast, shallow markets reduce the impact of monetary policy (Calice, 2013; Christensen, 2013). This is in sharp contrast to the monetarist perspective of Friedman and Schwartz (1963). Khan (2011) argues that, instead of exposing the poor to unregulated service providers, financial inclusion ensures that they get services from regulated institutions. Evidence suggests that high market informality encourages risky lending, which causes financial instability (Cull, et al., 2012)

Further, financial inclusion promises a number of indirect benefits to financial stability. Financial inclusion avails better financial risk-managing tools to SMEs, individuals and households (Cull, et al., 2012; Khan, 2011). This improves their economic well-being and contribution to the overall economy, leading to financial stability. Since SMEs and individual entrepreneurs are often the largest employers in developing economies, improved access to finance by these groups reduces unemployment and other related negative factors, leading to reduction in business cycles, thus enhancing stability. Because low income groups are relatively immune to economic shocks, expanding services to these groups helps to absorb economic shocks (Han & Melecky, 2014; Morgan & Pontines, 2014). In addition, research on anti-laundering has shown that financial inclusion helps to combat money laundering. Therefore, in the presence of quality financial infrastructure and macro-prudential regulation, improved access to finance can boost efficiency and enhance stability (Cull et al., 2012; Prasad, 2011).

It is against this background that this study seeks to empirically examine the relationship between financial inclusion and financial stability within Sub-Saharan Africa.

4.4 Data and Methodology

4.4.1 Data

Financial inclusion data used for this study was obtained from the International Monetary Fund's (IMF) Financial Access Survey (FAS) database, which provides supply-side data for 189 countries across the world. However the major limitation of this data is that it only covers the period 2004 to 2014, and a number of countries have missing data. Therefore the selection of countries is largely determined by data availability. The study uses a panel of 39 countries from the SSA region (see Appendix 5 for list of countries), and estimates the relationship between financial inclusion and financial stability. Data on financial stability indicators was obtained from the IMF's Financial Soundness Indicators (FSI) and the World Bank's Global Financial Development Database (GFDD).

The approach used in this study differs from earlier estimations using system generalized methods of moments (SYS-GMM) in macroeconomic models, as applied by Beck and Levine (2004) and Calderon, Ching, and Loayza (2002). In both these previous studies, data was averaged over five years as a way of controlling for business cycles in estimating the long-run relationships. However, recent studies (e.g. Borio, 2014; Drehmann, Borio, & Tsatsaronis, 2011; Ng, 2011) have shown that financial cycles have a lower periodicity than business cycles. Therefore, this study uses annual data without taking any averages[51]. Such an approach also helps capture the short-term effects of financial stability, which may be purged out through averaging over longer periods. Moreover, as highlighted above, data on financial access is highly limited, and hence averaging over longer periods would reduce the sample size and potentially bias the estimates. Based on these reasons, annual data is used.

[51] Estimations were also made using bi-annual averages and produced similar results. However, diagnostic tests, mainly the Hansen test, was 1.0 in some instances, thus suggesting possible over-fitting. This could be attributed to small sample size and instrument proliferation.

4.4.2 Methodology

As highlighted above, the causes of financial stability are both exogenous and endogenous, and therefore the relationship between financial stability and access to finance is estimated *via* a dynamic panel model as follows:

$$y_{i,t} = y`_{i,t-1}\alpha + \mathbf{x}`_{i,t}\beta + \eta_i + \varepsilon_{i,t}; \qquad i = 1...n, \;\; t = 1...T_i \qquad (4\text{-}1)$$

Where: *y* is a the dependent variable, financial stability, for country *i*, at time *t*,

α and β represent the parameters to be estimated, where a positive and significant α indicates persistence in financial stability,

$y_{i,t-1}$ is the lagged value of *y*,

$\mathbf{x}$ is a vector of explanatory variables, which include financial inclusion indicators and a set of control variables;

η_i are unobservable panel effects;

$\varepsilon_{i,t}$ are idiosyncratic shocks, with variance σ^2.

4.4.3 Estimation strategy

However, the problem with equation (4-1) above is that the explanatory variables (x's) are not strictly exogenous, and that country fixed-effects are correlated with the error term. In addition, by construction, the lagged dependent variable is correlated with the η_i terms, leading to inconsistent estimation. Ordinary least squares (OLS) estimation of the above leads to dynamic panel bias as identified by Nickell (1981). For example, if a country experiences a shock to its financial stability due to factors not captured in the model, such a shock will be included in the error term. As a result, the deviation of average unexplained financial stability will be seen as lower. Endogeneity can potentially arise if a banking institution expands its service provision in order to enhance viability or gain more market power, leading to enhanced stability. Alternatively, expansion of services may be driven by hubris, which may lead to more risky operations (with negative consequences on stability). In addition, due to limited data on financial inclusion, the panel datasets are relatively small. If the data were for a longer period the effect of such a shock would dissipate, and the same will apply to endogeneity.

This study therefore applies the Arellano and Bond (1991) and Holtz-Eakin, Newey, and Rosen (1988) first differenced generalized method of moments (GMM) estimator, constructed by first-differencing to remove the panel-level effects and using instruments to form moment conditions for the model as follows;

$$\Delta y_{i,t} = \Delta y'_{i,t-1}\alpha + \Delta \mathbf{x}'_{i,t}\beta + \Delta \varepsilon_{i,t} \qquad (4\text{-}2)$$

The above transformation removes country fixed-effects, but introduces a new bias as the new error term can be correlated with the lagged dependent variable. Based on the assumption of non-serial correlation among the error terms, $\varepsilon_{i,t}$, and weakly exogenous explanatory variables, Arellano and Bond, (1991) suggest the following moment conditions;

$$\begin{aligned} &E[(y_{i,t-s})(\Delta\varepsilon_{i,t})] = 0; \;\; i = 1...n, s \geq 2, t = 3...T \\ &E[(x_{i,t-s})(\Delta\varepsilon_{i,t})] = 0; \;\; i = 1...n, s \geq 2, t = 3...T \end{aligned} \qquad (4\text{-}3)$$

Using the above Arellano and Bond (1991) suggest a two-step GMM estimator. The first estimator assumes independent and homoscedastic errors across the countries over the period. The second step uses the residual from the first step to obtain a consistent estimate of the variance-covariance matrix - relaxing the assumption of independence and homoscedasticity. This makes the two-step approach more efficient.

However, Blundell and Bond (1998) show that the lagged-level instruments of Arellano and Bond (1991) performs poorly in small samples and would be weak for a persistent autoregressive process, or if η_i and $\varepsilon_{i,t}$ become too large. Therefore, Blundell and Bond, (1998) and Arellano and Bover (1995), suggest a system estimator using moment conditions in which lagged differences are used as instruments for the level equation, in addition to the moment conditions of lagged levels, as instruments for the difference equation. Using the assumption that there is no correlation between the differences and country-specific effects in equation (4-1), the additional moment conditions for the regression in levels are as follows;

$$\begin{aligned} &E[(\Delta y_{i,t-s})(\upsilon_{i,t})] = 0; \;\; i = 1...n, s = 2, t = 3...T \\ &E[(\Delta x_{i,t-s})(\upsilon_{i,t})] = 0; \;\; i = 1...n, s = 2, t = 3...T \end{aligned} \qquad (4\text{-}4)$$

Where $\upsilon_{i,t} = \eta_i + \varepsilon_{i,t}$

Application of the above moment conditions in the SYS-GMM estimator generates consistent and efficient estimates. Indeed, simulation studies by Windmeijer (2005) and Hayakawa (2007) show

that in small samples the SYS-GMM estimator has a lower bias than the first differencing and the level estimators.

Therefore the estimation can be made under the assumption of homoscedastic-consistent standard errors (one-step estimator) or heteroskedastic-consistent standard errors (two-step estimator) (Arellano & Bond, 1991). In small samples, the two-step panel estimator may lead to downward biased standard errors, although it remains consistent, due to proliferation of instruments (Beck & Levine, 2004; Judson & Owen, 1999; Roodman, 2009b). Windmeijer (2005) suggests an adjustment which gives robust estimates of the variance-covariance matrix and performs well under simulation studies. To improve the estimation, the number of instruments are reduced by using the, *collapse*[52] command in the Stata xtabond2 routine, thus eliminate the problem of instrument proliferation and retaining more information without dropping any lags (Roodman, 2009a).

Further to supplement the SYS-GMM, the estimation is done with external instrument, i.e. banking or financial freedom[53] obtained from the Heritage Foundation. The financial freedom index seeks to assess the extent to which an economy facilitate easy and effective access to finance for both firms and people. It captures factors such as central bank independence, government involved in bank entry restriction, bank formation barriers, restrictions on financial services offering financial product offering and credit allocation. A higher index indicates a less repressive banking sector. Research evidence suggests that most of these factors have direct impact on access to finance. For example, Demirgüç-Kunt et al. (2008) find a negative relationship between banking freedom and barriers to finance, most studies find a strong relationship between banking freedom and financial depth.

This study applies the two-step SYS-GMM estimation model and correct standards errors for small-sample bias through the Windmeijer (2005) finite sample correction to examine the relationship between financial inclusion and financial stability.

[52] Large instrument collection overfits endogenous variables and weakens the Hansen test. Roodman, (2009b) provides two techniques for reducing the instrument count; (i) use only certain lags instead of all available lags - *i.e.* capping the number of instruments per period, or (ii) 'collapsing' the instrument matrix- *i.e.* combine instruments through addition into smaller sets. According to Roodman, 'collapsing' has the potential advantage of retaining more information, as no lags are actually dropped. Further, it eliminates the bias and increases the ability of the Hansen test.

[53] The index considers five broad areas which include; banking system openness, influence of government in credit allocation, market development, direct and indirect institutional ownership by the government and the extent of government regulation. It ranges between 0 and 100. The actual index is arrived at by deducting from the maximum score of 100.

However, the results the above estimation would only show the short-run estimates, the so called 'naïve' long-run coefficients (Bun, 2003; Hashem Pesaran, 1999) can be obtained by dividing the short-run coefficients by the rate of convergence, i.e. $\beta/(1-\alpha)$ [54].

4.4.4 Specification tests

The consistency of the SYS-GMM estimator hinges on the main assumptions of none serial correlation among the error terms, and validity of instrument. Autocorrelation in the idiosyncratic error term renders some lags invalid as instruments.

To test for this, the Arellano and Bond (1991) test of autocorrelation in the idiosyncratic disturbance term, $\varepsilon_{i,t}$, based on residuals from the first-difference equation under the null hypothesis of no serial correlation, is used. Since by definition $\Delta\varepsilon_{i,t}$ is related to $\Delta\varepsilon_{i,t-1}$ through $\varepsilon_{i,t-1}$, first-order serial correlation is expected. However, if the specification is correct there should be no second-order serial correlation.

Further, I perform a test of over-identifying restrictions, *i.e.* whether the instruments, as a group, are exogenous and thus valid. Due to heteroscedasticity in the error terms, I use the Sargan/Hansen J statistic, under the null hypothesis that the instruments are valid. Therefore a higher p-value suggest the instruments are exogenous. However, it may be weak if the number of instruments is more that the number of groupings (countries). Arellano and Bond (1991) suggest that their autocorrelation test (*AB* test) has greater power than the Sargan and Hansen tests to detect lagged instruments being made invalid through autocorrelation. However, it breaks down as the correlation becomes low - rejecting the null only half the time (Roodman, 2009a). Therefore I use both tests.

4.4.5 Variables

i. Financial Stability

There are a number of potential measures of financial stability, including the bank *z*-score and capital adequacy ratios (CARs), amongst others. However, the *z*-score is the most widely used indicator of financial stability (Agoraki, Delis, & Pasiouras, 2011; Čihák et al., 2013; Schaeck & Čihák, 2014). This is because it allows for comparison across institutions and is also readily

[54] It estimates the steady-state value effect.

available, even for institutions where market data is not readily available. The bank *z*-score allows for comparison of bank capitalisation and returns against the volatility of returns. It is inversely related to solvency - the higher it is, the lower the risk of bankruptcy.

The *z*-score is obtained as follows:

$$z_{i,t} = \frac{\mu_{roa} + k}{\sigma_{roa}} \qquad (4\text{-}5)$$

Where *k* is the equity-to-assets ratio, μ_{roa} is the average return on assets, and σ_{roa} is the standard deviation of return on assets as a proxy for return volatility. As specified by Hannan and Hanweck, 1988) and Boyd and Runkle (1993) the probability of bank insolvency can be given by;

$$\begin{aligned} & p(\mu_{roa} < k) = \int_{-\infty}^{k} \Phi(\mu_{roa}) d\mu \frac{1}{2} \\ & \mu_{roa} \sim N(0,1), \\ & \Rightarrow p(\mu_{roa} < k) = \int_{-\infty}^{z} N(0,1) d\mu \end{aligned} \qquad (4\text{-}6)$$

Thus if returns are normally distributed the *z*-score gives the number of standard deviations within which return realizations should fall in order to deplete equity (Čihák et al., 2013). By the Bienayme-Chebycheff inequality, even if the returns do not follow a normal distribution, the *z*-score is the lower bound probability of bank insolvency (Boyd & Runkle, 1993). A higher *z*-score therefore indicates a more stable banking system. In this regard it is a more direct measure of financial soundness (Beck, De Jonghe, & Schepens, 2011).

The *z*-score provides a plausible indicator of financial stability compared to other indicators such as stress tests or Value-at-Risk (VaR), as it is independent of the nature of the bank's operations and it captures the risk of insolvency, which has a higher impact on stability than liquidity (Čihák & Hesse, 2010; Ghassan & Taher, 2013; Maechler, Mitra, & Worrell, 2010).

However, since the *z*-score is based on accounting information it is subject to manipulation[55]. Also, as a bank-based measure the *z*-score ignores the interrelation that exists among banks, *i.e.*

[55] Some studies use other indicators of financial stability such as regulatory capital to risk-weighted assets (RCWA) or non-performing loans to total gross loans (NPL), to capture the diversity in financial stability. However, the challenge with these measures is that they are lagging indicators of soundness (Cihák & Schaeck, 2010), and thus they have to be used with caution. In addition these are not available for most of the countries in the study. Therefore I did not use them. However results based on the NPL, although it greatly reduces sample size, are generally consistent with the reported results.

contagion. In addition, the *z*-score tends to underestimate the true probability of insolvency, since it assumes that failure occurs when the loss is higher that equity (*i.e.* $\mu_{roa} < -k$). Nonetheless, empirical evidence by Demirguc-Kunt, Detragiache, and Tressel, (2008), using 39 countries across the world from all economic categories, suggests a close relation between the *z*-score and Moody's financial strength ratings.

Because the *z*-score distribution is highly skewed, the variables are transformed to the natural logarithm of the *z*-score to smoothen their distribution. I further break down the components of the z-score to examine the extent to which each drives the relationship between financial inclusion and stability, and thus look at risk-weighted return-on-assets (RROA)[56], equity-total-assets ratio (ETA) or capitalization ratio. The use of ETA can also be argued from a Basel Accord perspective, which emphasis capital base as a buffer against default. The higher it is, the lower risk of bank solvency. If financial inclusion is good for stability, it should improve both RROA, and ETA.

ii. Financial Inclusion

Financial inclusion is a multidimensional phenomenon, and there is no direct measurement. A widely accepted perspective of financial inclusion is one put forward by the World Bank, (2008), which suggests that financial inclusion is largely determined by access, usage and quality of financial services. Therefore, financial inclusion can be captured through indicators of geographical coverage and usage of financial services. Usage of financial services is largely determined by the number of adult account holders and the volume of accounts relative to the total population In line with this, this study uses the number of bank branches, number of ATMs, number of depositors, number of borrowers, outstanding deposits and outstanding loans as indicators of financial inclusion. As indicated above, all data is obtained from the IMF's Financial Access Survey (FAS) database.

However, due to the large number of indicators used and the fact that there is high correlation among the indicators, which will lead to imprecise estimates if they are all used in the model, the

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The other option is to use excessive credit growth as a proxy for financial stability. Although credit growth is important and necessary, evidence has shown that economies that have experienced rapid credit growth have experienced occasional instability (Kaminsky & Reinhart, 1999; Ranciere, Tornell, & Westermann, 2008). This is because credit expansions are often driven by high optimism leading to high debt-to-income (debt-assets) ratios, thus increasing non-performing loans and default rates as income falls. The advantage of this measure is that it is forward-looking, as opposed to lagging indicators such as NPLs. However, this option was dropped due to potential multicollinearity, as this indicator is highly related to access to finance (and thus financial inclusion). In addition, excessive credit growth may fail to capture instability if a market is already experiencing instability, as real credit would be on the decline (Drehmann et al., 2011).

[56] RROA is estimated as $RROA = ROA / \sigma_{ROA}$

indicators are initially combined into two separate indices. The first index captures geographical outreach, the second one captures usage of financial services, and finally a composite indicator is constructed which seeks to measure the overall level of financial inclusion. A number of approaches have been put forward in an attempt to develop an index of financial inclusion, ranging from simple statistical approaches to more complex methods (for example Amidžić, Massara, & Mialou, 2014; Sarma & Pais, 2011; Sarma, 2008). However, there is as yet no consensus on the best approach to measurement.

In this study, the index used is constructed along the guide lines of the Organisation for Economic Co-operation and Development (OECD) Handbook of Constructing Composite Indicators (OECD, 2008). A similar approach has been followed by, for example, Amidžić, Massara and Mialou, (2014), Chakravarty and Pal (2010) and Sarma (2008, 2012) in the construction of similar indices. The index in constructed in the following sequence: *(i)* normalization of variables, *(ii)* estimation of sub-indices, *(iii)* aggregation of sub-indices, *(iv)* normalization of final index.

The indicators of access to finance are divided into two main categories, namely: indicators of geographical outreach, and indicators of financial services usage. Geographical outreach indicators include number of bank branches per 1 000km^2, number of bank branches per 100,000 people, number of bank ATMs per 1 000km^2, and number of bank ATMs per 100,000 people. Indicators of usage of financial services include the number of loan accounts per 1,000 people, number of borrowers per 1,000 people, number of deposit accounts per 1,000 people, number of depositors per 1,000 people, outstanding loans as a percentage of GDP, and outstanding deposits as a percentage of GDP. The first four indicators of usage capture the proportion of account holders, and the last two indicate the volume of accounts. However, due to missing values in a number of countries (about half the data is missing for deposit accounts with commercial banks per 1,000 adults and loan accounts with commercial banks per 1,000 adults), and in order to retain a relatively large sample, the usage index is captured using outstanding loans as a percentage of GDP and outstanding deposits as a percentage of GDP as these are available for all countries within the sample.

Table 4-1: Correlation Financial Inclusion Indicators

	ATMs per pop.	ATM: area	Branches per pop.	Branches: area	Loans	Deposits
ATMs per pop.	1					
ATM: area	0.574***	1				
Branches per pop.	0.780***	0.587***	1			
Branches: area	0.605***	0.955***	0.754***	1		
Loans	0.794***	0.590***	0.557***	0.542***	1	
Deposits	0.677***	0.873***	0.651***	0.838***	0.808***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: ATM per pop. means ATMs per 100,000 adults, ATM: area means ATM per 1000km^2, Branches per pop. means Bank branches per 100,000 adults, Branches: area means Bank branches per 1000km^2, Loans means Outstanding loans to GDP , Deposits means- Outstanding deposits to GDP

As shown in

Table 4-1 above there exist a very strong correlation between the indicators of financial inclusion.

a. Normalization of Indicators

Since the indicators are captured in various units, each indicator is first normalized, so that the unit of measurement is immaterial. There are various approaches to normalization of variables (see for example Amidžić et al., 2014; OECD, 2005; 2008; Svirydzenka, 2016). This study applies the min-max procedure to aggregate the variables and thus address the variations in units of measurement as follows:

$$I_{i,t} = \frac{x_{i,t} - x_{\min}}{x_{\max} - x_{\min}} \qquad (4\text{-}7)$$

Where $I_{i,t}$ the normalized indicator,

$x_{i,t}$ is indicator for country, *i,* at time, *t,*

$x_{\max}$ and $x_{\min}$ are the global maximum and global minimum value for the indicator.

The above procedure restricts the indicator within the [0, 1] range. Therefore, the lowest value for any given indicator would be equal to 0, whereas the highest would be equal to 1, and the rest are scaled relative to the maximum and the minimum.

b. Aggregation of Indices

The normalized indicators are aggregated into two sub-indices, capturing the outreach and usage of financial services. Instead of using an arbitrary weighting function, the study uses principal components analysis (PCA) and thus derives the weight statistically from the data. The main objective of PCA is to explain the variance of the indicators based on a linear combination of the original data. The sub-indices are therefore determined as follows:

$$Outreach_{i,t} = \sum_{i=1}^{n} w_i I_{i,t} \qquad (4\text{-}8)$$

$$Usage_{it} = \sum_{i=1}^{n} w_i I_{i,t} \qquad (4\text{-}9)$$

Where $Outreach_{it}$ and $Usage_{it}$ are aggregate indicators of outreach and usage of financials services respectively, w_i is a weight obtained *via* PCA, which determines the extent to which an indicator influences the outcome index.

The linear aggregation helps to ensure full compensability amongst the indicators that influence the index. Therefore by construction, the index assumes perfect substitutability amongst the indicators, this would suggest that, for example, there is full compensation between access to ATMs and physical access to a bank branch, *i.e.* a country with a poor bank branch network outreach can compensate for this by increasing access to ATMs. This may not necessarily be true, especially where face-to-face contact is important, however it becomes a valid assumption where the objective is to measure the extent of outreach. The alternative would be to assume non-perfect substitutability amongst the indicators and thus use a geometric aggregation. Under this assumption, countries with unequally distributed indicators would get punished as the index would be lower. However as highlighted by Svirydzenka (2016), this tends to put high weights on a few indicators, leading to a distortion of the overall index. In addition, it would not be ideal to assign more weight to a particular indicator without a knowledge of the quality dimension.

The sub-indices are estimated as average weighted values of the normalized indices. For the outreach index the data suggests that the first component explains about 78.35% of the variation across the indicators with an eigenvalue of 3.13 (the only one above 1). Therefore the weights for the first component are used in the construction of the outreach index (the PCA factor loadings are 0.5323 for number of bank branches per 1 000km^2, *0.4971* for number of bank branches per 1,000 people*, 0.5009* number of bank ATMs per 1 000km^2, and 0.4676 for number of bank ATMs per 1,000 people). To ensure that the weights add-up to 1, the squared factor loadings from the

PCA are used. By definition, the squared factor loadings indicate the extent of variation that is explained by each factor, such that an indicator with a higher contribution on the common variation gets more weight.

As highlighted above, literature is divided on the impact of geographical outreach on financial stability. Whilst one strand of literature suggests that a reduction in distance helps to build strong relationships with customers, thus fostering a better understanding of borrower quality which leads to lower bank risk, another strand of literature suggests that increased outreach leads to higher operational costs which results in weaker banking systems. Therefore, geographical outreach is an important dimension of access to financial services.

For the usage index the data suggests that the first component is the only one whose Eigen-value is above 1, and explains about 90% of the variation across the indicators. Both variables appear to have equal contribution to the index, as they have the same factor loadings.

The final composite index is calculated in a similar way to the sub-indices, with the weights based on the sub-indices. The main assumption is that the usage index and the outreach index, although related, may capture different components of access to financial services. The final financial inclusion index (FI) is a weighted average of the outreach and usage indices, and is constructed as follows:

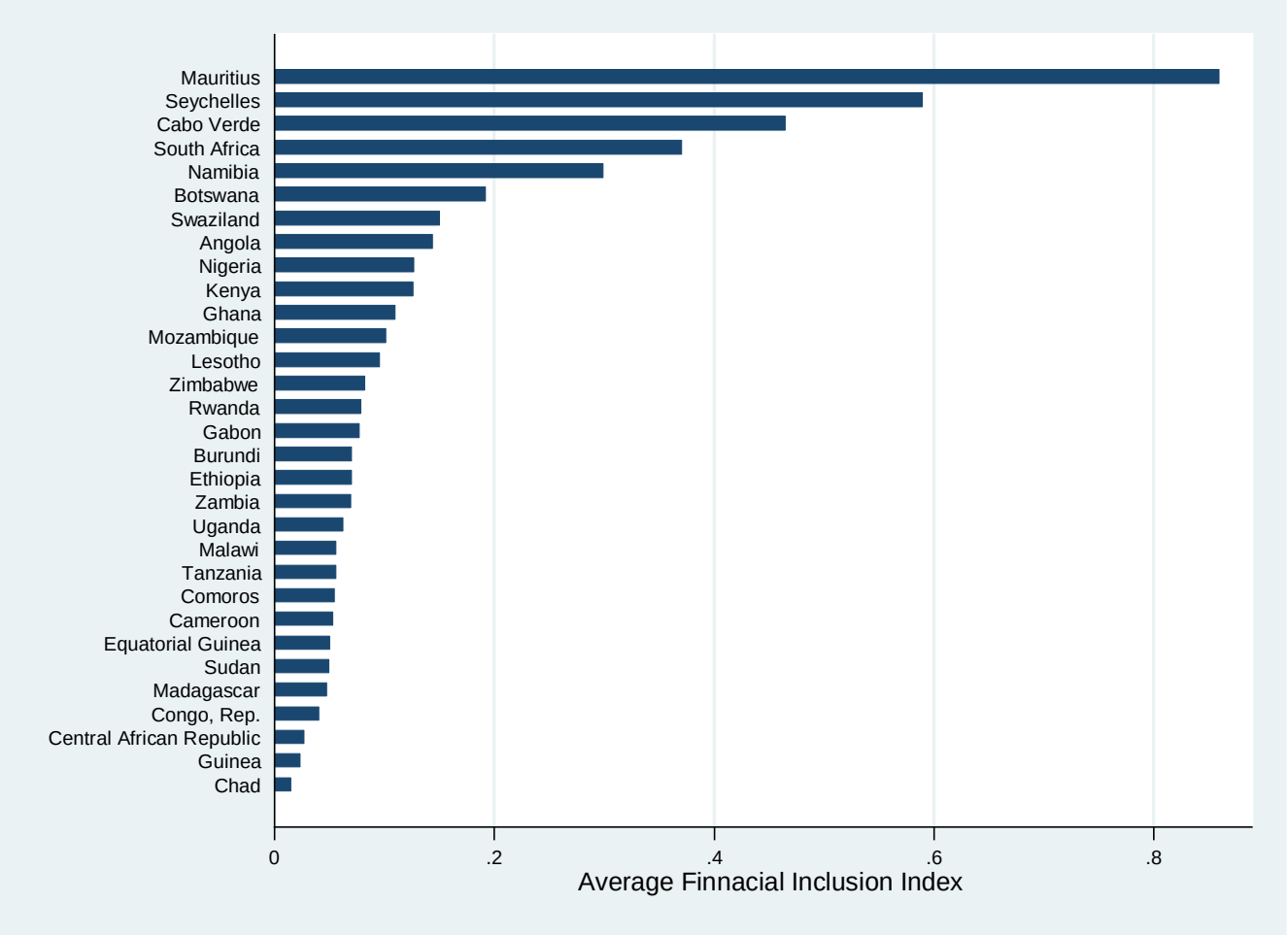
$$FI_{i,t} = \sum_{i=1}^{n} (w_i Outreach_{i,t} + w_i Usage_{i,t}) \qquad (4\text{-}10)$$

Again the weights used are the squared factor loadings to ensure that they sum to unit. The final composite index is normalized using min-max normalization as outlined above, such that any country, *i,* with the highest level financial inclusion, the composite index would be 1, and 0 if it has the lowest.

This study uses the above financial inclusion index (FI) to examine the impact of increased financial inclusion on bank stability.

As shown in Figure 4-2 below; there exist wide variations in financial inclusion across the SSA region. Mauritius has the highest average level of financial inclusion, followed by the Seychelles, whereas the Democratic Republic of Congo, Liberia and Chad have the lowest level of financial inclusion, over the period 2004-2014. Most countries, have an index of less than 0.20, further validating the argument raised earlier in this study that, there are very high levels of financial exclusion within the region.

Figure 4-2: Financial Inclusion Index (average 2004-2014)[57]



Source: Own Calculations from International Monetary Fund - Financial Access Survey 2016

4.4.6 Control variables

To improve the precision of the estimates, the analysis is conditioned on a number of control variables, and thus control for macro-economic factors and variations in banking structures across the countries. The following variables are used as controls, namely; *per capita* GDP growth, inflation, banking sector competitiveness, institutional quality, banking sector size, mobile-banking, and the existence of deposit taking micro-finance institutions.

[57] The list only includes countries where data on financial inclusion is available for more than five years. The following countries had some missing data Ghana (3 years missing), Ethiopia, Namibia, and Zimbabwe (2 years missing), Central Africa Republic, Gabon and Nigeria (1 year missing). It is possible that some rankings could have been influenced by missing data. However, the fact that Namibia ranks among the top, besides having missing data, suggests that the missing data has no significant bearing on the rankings.

i. Economic Growth

All other factors constant, good economic performance (as measured by growth) reduce the likelihood of banking sector instability. However, the neoclassical growth model posits that countries with high levels of development, as measured by GDP per capita, generally have low marginal products of capital and thus lower per capita growth rates due to diminishing returns to capital (Barro, 1991; Barro & Sala-i-Martin, 1991; Barro & Salai-Martin, 1990). As a result, higher real economic growth may be negatively related to financial inclusion, as it may be associated with poor economic development. Therefore, the impact of economic growth and development is not straight-forward, and is a bit ambiguous.

To control for growth convergence the real growth in per capita GDP ratios are used. The values are obtained from the World Bank Database of African Development Indicators and are deflated to 2005 prices. As per the norm in all growth model, after controlling for economic growth I do not control for economic development.

ii. Inflation

All other factors constant inflation should have a negative impact on bank stability, *via* its impact on the quality of bank assets (Das, Quintyn, & Chenard, 2004). However, evidence by Jokipii and Monnin (2013) from a panel VAR 18 OECD countries suggests that there is no clear relationship between banking sector stability and inflation. Therefore, is it important to control for the effect of inflation in examining the relationship between financial inclusion and stability. Inflation is measured as the annual percentage change in the consumer price index.

iii. Bank market power and competition

Two perspectives have emerged on the relationship between bank competition (and concentration) and financial stability. The *competition-fragility* view, suggests that increased competition reduces profit margins as it decreases market power, which ultimately leads to lower franchise value, forcing excessive risk taking amongst banks which results in fragility. Marcus (1984) is amongst the first researchers to theoretically show that, in the absence of effective offsetting policies, increased competition diminishes bank charter value and increases the incidence of insolvency, an assertion which is also theoretically and empirically ascertained by Keeley (1990). A number of researchers (*e.g*. Beck, Jonghe, & Schepens, 2013; Berger, Klapper, & Turk-Ariss, 2009; Broecker, 1990) also allude to the same. Conversely, in concentrated banking systems (where entry is restricted) there are high

opportunities for profits, and no incentive for aggressive risk behaviour, which leads to stability (Beck, De Jonghe, et al., 2013; Kasman & Kasman, 2015).

On the other hand, the *competition-stability* view suggests that increased market power results in higher interest charges, which potentially lead to higher non-performing loans, further exacerbating moral hazard and adverse selection problems leading to instability. Thus competitive systems are more stable than non-competitive ones. The competition-stability hypothesis, therefore, argues that more competitive banking systems result in more, rather than less, stability. Specifically, Boyd and De Nicolo (2005) modify the Allen and Gale (2000) model, by allowing for the existence of a loan market and show that there is a fundamental risk-incentive operating in an opposite direction, leading to increased risk in more concentrated banking systems. Although banks in less competitive systems, can build strong relations with customers, and enjoy a reduction in costs of information gathering, this simultaneously reduces the need to screen customers, thus increasing the risk of fragility (Allen & Gale, 2004; Beck et al., 2013; Liu, Molyneux, & Wilson, 2013)

To capture the impact of competition, I use a more recent measure of competition or market based on relative profit differences, the Boone-indicator[58] , which is the elasticity of profits to marginal costs (Boone, 2008). Unlike other measures of competition which aggregate the competitive nature of banking activities, the Boone indicator can be narrowed down to product specific and institution specific competition (Van Leuvensteijn, Bikker, van Rixtel, & Kok Sørensen, 2011). Furthermore, some measures of competition, for example, the Lerner index (or price-cost margin) have been found to exhibit some inconsistency (Boone, 2008; Bulow & Klemperer, 2002; Rosenthal,1980). However, the Boone indicator has been found to be robust and insensitive to the underlying measures used. In addition the Lerner index also have a number of missing observations thus reducing the sample size. The Boone indicator is based on the assumption that bank profitability and efficiency are positively correlated and a higher

[58] Another option is use concentration measures such as the Herfindahl–Hirschmann Index (HHI) or structural concentration indicators such as the top-3 or top-5 bank concentration ratio. These have been discarded for several reasons. The HHI, besides having fewer observations, have been criticized inability to capture variations banking sector size and failure to recognize that high concentration is often an outcome of bank mergers in response to intense competition (Van Leuvensteijn et al., 2011). On the other hand structural concentration indicators have fewer observations, which greatly reduces the sample size and thus affect the stability of the estimations. However, results estimates suggests that concentration is negatively related to bank stability.

value indicates a decline in the competitive behaviour of banks. Data on the Boone indicator is obtained from the World Bank Development Indicators Database.

iv. Banking sector size

Larger banking sectors are generally expected to be more developed and thus less prone to instability. However, as the global financial crisis has shown, excessive financial sector size may compromise stability. I use broad money (M3) to GDP to control for financial sector size. A number of studies use broad money to GDP to measure the overall size of financial activity (see, for example Asli Demirgüç-Kunt & Levine, 1996; Law & Singh, 2014; Rousseau & Wachtel, 2011). It includes total liquid liabilities in the financial system, *i.e.* currency, short-term demand deposits and debt securities (excluding central government deposits).

v. Institutional Governance

The aftermath of the global financial crisis has increased the need for effective macro-prudential regulation as a key ingredient for financial stability (Hanson, Kashyap, & Stein, 2011). Indeed, well before the crisis policy makers and researchers recognized financial system oversight as a key foundation for financial stability (Das et al., 2004; Quintyn & Taylor, 2003). The significance of financial market regulation is better understood from the New Institutional Economics (NIE) perspective of Williamson (1984, 1985), which views firms as governance structures and posits that an effective institutional framework is a pre-requisite for a well-functioning market economy. Therefore it is impossible to achieve financial stability without good governance structures. Recent evidence by Anginer, Demirgüç-Kunt, and Zhu (2014) confirms that countries with weak supervision have fragile banking systems.

Data on institutional governance is obtained from The Worldwide Governance Indicators (WGI) from the World Bank (see Kaufmann, Kraay, & Mastruzzi (2009) and Kaufmann, Kraay, & Mastruzzi, (2011) for detailed methodology). The WGI measures governances using six dimensions, namely: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption for over two hundred countries and territories. A normalised composite index is estimated as the first principal component of the six indicators.

vi. Existence of an active Microfinance sector

Existing research suggests that in most African countries informal lending (micro-credit and microfinance) is an important source of finance and plays a significant role in improving access

to finance (Adera, 1995; Aryeetey, 1997, 1998; Shem & Atieno, 2001). Microfinance helps to provide small loans and savings facilities to those who would have been excluded from formal financial services. The growth of the MFI sector has led to an increased expansion of financial services (Beck et al., 2009; Priyadarshee, Hossain, & Arun, 2010). Consequently, promotion of the MFI industry has been considered as a key strategy for improving financial inclusion in most developing economies. To control for this, a dummy variable is used which takes a value of 1 if there is a presence of deposit taking microfinance institutions (MFIs)[59] in any country, *i*, and zero otherwise. All factors constant, the existence of deposit taking MFIs is expected to enhance financial inclusion and may have a positive or negative impact on financial stability, depending on the nature of the MFIs.

vii. Mobile banking

Although mobile banking is a recent phenomenon in the provision of financial services the SSA region is leading the world in terms of mobile-money usage (Demirguc-kunt, et al, 2015). The use of mobile-banking is generally expected to enhance financial inclusion. However, because in most countries, mobile-banking operates separately from formal financial services, this may potentially be a threat to the viability of the banking system. I posit that the existence of an active mobile-banking industry has an impact on the relationship between financial inclusion and bank stability. This variable can also be viewed as a proxy for innovations in access to finance. A dummy variable which takes a value of 1 if a country has an active mobile-banking industry and zero otherwise is used.

Both variables switch from 0 to 1 with the introduction of the service in a country, and remains like that for subsequent years.The SYS-GMM also comes in handy in handling the last two dummy variables, because it is often fairly stable over time and thus allows for the inclusion of time-invariant regressors (Roodman, 2009a). Other estimators like the difference GMM estimator remove such variables.

Data for the above control variables is obtained from the World Bank's Global Financial Development Database (GFDD).

[59] Although an appropriate indicator would be volume of MFI transactions to GDP, or proportion of MFI transactions to total banking sector transactions, these are discarded as it attributes a value of zero to countries without an active MFI industry. A similar argument is also put for mobile-banking. Using actual values results in sample size reduction and thus affects the estimates.

4.5 Results and Analysis

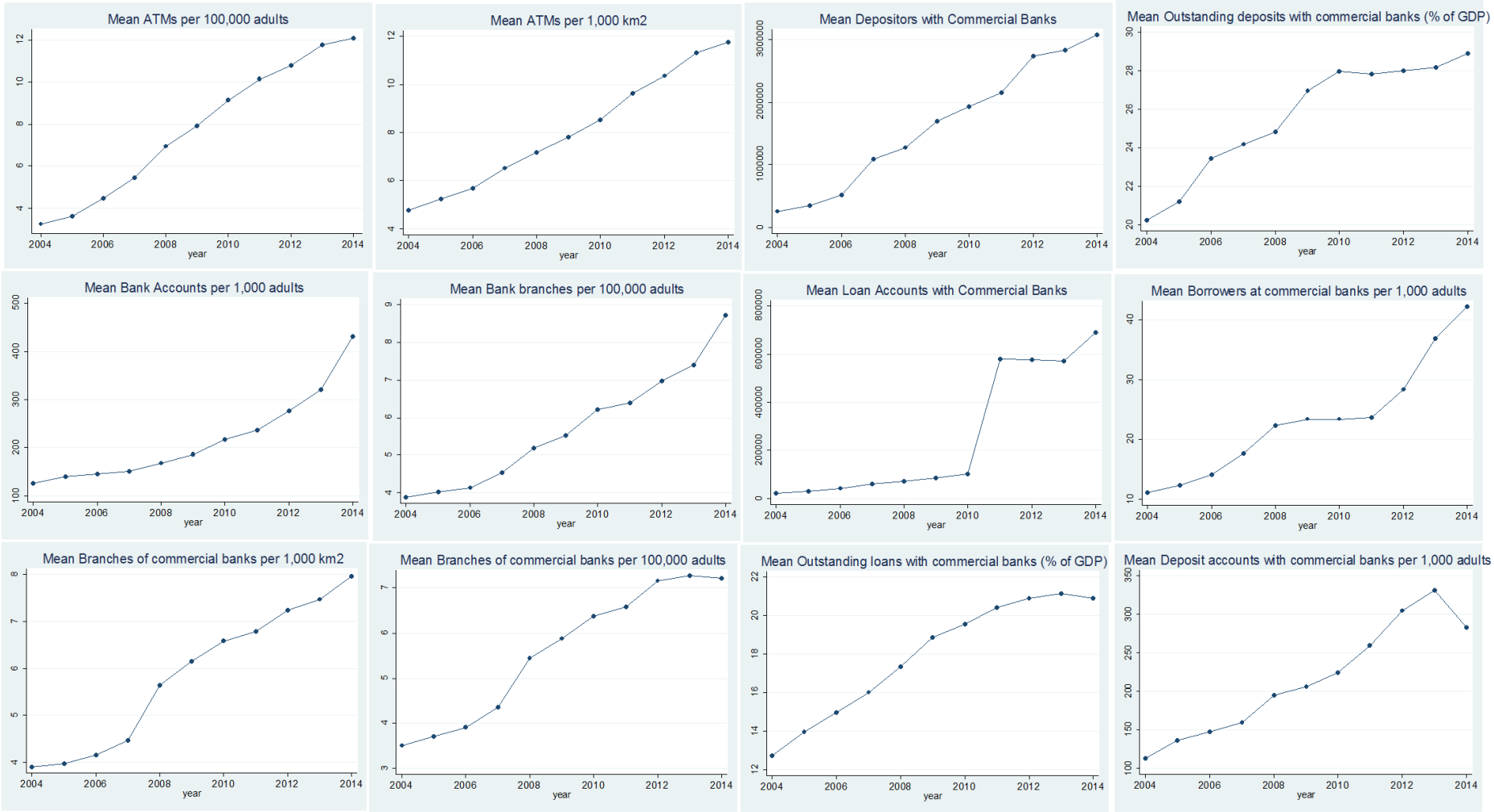
4.5.1 Trends in indicators of financial inclusion

Although the region ranks lowest in all indicators of financial inclusion, the data suggests that, over the years, there have been a steady increase in basically all the indicators as shown in Figure 4-3 below.

A particularly striking element is the sharp increase in loan accounts between the period 2010 and 2011, despite the fact that the number of borrowers remained largely unchanged. This could be a reflection of the impact of the Global Financial Crisis on bank lending standards, where banks preferred to extend credit to known customers, and thus restricting credit to new customers whose risk profile may be unknown, *i.e.* increasing loan accounts without increasing the number of borrowers. This could also be an indication of credit kite flying by consumers; *i.e.* opening multiple loan accounts. However, this evens out as between 2011 and 2012 the number of loan accounts remains fairly stable, whereas the number of borrowers increases significantly, thus reversing the anomaly. Further, this justifies the inclusion of both usage and access indicators in capturing financial inclusion.

The number of bank branches increased sharply between 2007 and 2008, which is the period when the World Bank published the first report emphasizing financial inclusion and, as suggested by the data, which could have awakened the need for increased financial outreach for countries in the SSA region.

Figure 4-3: Indicators of Financial inclusion- trend analysis



Source: Own Calculations from International Monetary Fund - Financial Access Survey 2016

4.5.2 Summary Statistics

Table 4-2: Summary Statistics

Variable	No. of Countries	Obs	Mean	Std.Dev.	Min	Max
Log-zscore	45	430	2.001	0.628	0.0684	3.794
ETA	45	424	0.111	0.0392	0.0067	0.339
RROA	45	423	8.098	5.299	-35.06	28.05
FI	45	391	0.142	0.179	0	1
Economic growth	45	495	2.664	4.736	-37.93	33.58
Inflation	45	490	60.56	1104	-35.84	24411
Institutional Governance	45	495	0.406	0.229	0	1
Financial Freedom	45	455	43.56	14.05	10	70
Boone Indicator	45	386	-0.0568	0.0953	-0.460	0.395
MFI	45	494	0.413	0.493	0	1
Mobile banking	45	495	0.190	0.393	0	1

Table 4-2 presents the descriptive statistics. As highlighted earlier, the result confirms that there exist wide variation in all indicators across the economies in the sample. While countries like Mauritius have sounder banking systems, countries like Mozambique have a less sound banking system.

In addition, there is perverse financial exclusion within the region. The average Financial Inclusion Index (FII) is 0.142, which would suggest that, based on the index the average level of financial inclusion is at 14.2%. As shown in Figure (4-2), above, only four countries have an average index above 50% over the period 2004 to 2014, and the majority are below 40%. This confirms the assertion that although financial exclusion is a global concern, there is a need for immediate intervention in most SSA countries.

The data also suggest the existence of poor governance structures in SSA, based on the aggregate institutional governance index (normalized to range from 0 to1). The average index for the countries under study is 0.336[60], which attests to a long standing finding by the World Bank (1989) that *'underlying the litany of Africa's (Sub-Saharan) development problems is a crisis of governance'.* Bräutigam and Knack, (2004) suggests a number reasons of reasons

[60] The global average index is 0.500. Average index for other regions as follows; Middle-East and North Africa- 0.400, Europe & Central Asia-0.645, South Asia-0.333, East Asia & Pacific- 0.526, Latin America & Caribbean-0.500

for poor governance in SSA including corruption, poor institutional framework, and under developed legal systems, amongst others.

As shown in Table 4-3, there is positive association between the measures of stability and financial inclusion, as captured through the composite index. The results also show the existence of a positive correlation between financial inclusion and institutional governance. Interestingly, the results suggest a negative association between the existence of deposit taking MFIs and financial stability. At face value this might appear to contradict expectations and recent empirical evidence on the impact of MFIs. However, this could be an indication that the transformation of MFIs into deposit taking institutions has been a reactionary move; *i.e.* countries transform their MFIs to deposit taking institutions only when their existence become a threat to overall financial stability. A number of countries have introduced regulatory and supervisory systems within the MFI sector, for example Kenya, Nigeria, Uganda and Malawi, amongst others. A similar argument can be forwarded for the negative relationship between financial inclusion and mobile-money.

In addition, the data suggests the existence of a significant positive correlation between the presence of deposit taking microfinance institutions (MFIs) and financial inclusion. There is also a strong significant correlation between regulatory quality and the existence of deposit taking MFIs, which suggests that countries with high quality regulatory systems have deposit taking MFIs, (*i.e.* have a regulated MFI industry).

Overall the correlations suggest that there is no problem of multi-collinearity among the estimation variables.

Table 4-3: Cross-correlations

		1	2	3	4	5	6	7	8	9	10
1	Log-zscore	1									
2	ETA	0.163	1								
3	RROA	0.505	0.154	1							
4	Financial Inclusion	0.354	0.075	0.391	1						
5	Growth	-0.019	-0.034	-0.038	0.021	1					
6	Inflation	-0.015	0.076	0.034	-0.101	0.064	1				
7	Institutional Governance	0.129	0.004	0.143	0.496	0.068	-0.111	1			
8	Boone Indicator	-0.057	-0.063	-0.123	-0.031	0.030	0.003	-0.206	1		
9	MFI	-0.372	-0.025	-0.285	-0.269	-0.081	0.050	-0.205	0.088	1	
10	Mobile banking	-0.068	0.152	-0.065	-0.049	-0.052	-0.028	0.139	-0.138	0.245	1

4.5.3 Financial stability and financial inclusion

Table 4-5 represents the results when financial stability is regressed against the composite index of financial inclusion. The table consists of nine columns, divided into three sets with each set representing a different measure of stability as shown in the headers. The first column of each set excludes the MFI-dummy. The second column excludes the mobile-banking dummy. The third column includes all control variables and thus the preferred estimation.

To test for overall model fit, the Wald χ^2 test is used, instead of the usual *F* test, as it applies the small-sample correction to the covariance matrix estimate. The reported p-value of 0.0000 suggest joint significance of the coefficients across all estimations. Therefore, the null hypothesis that all coefficients are equal to zero is rejected. Furthermore, based on the Sargan test, which tests for the null hypothesis that the group of instruments are exogenous, we fail to reject the null hypothesis of exogeneity and conclude that there is no significant correlation between the instruments and the residuals, thus verifying the validity of the instruments. As expected the Arellano-Bond autocorrelation test for AR (1) rejects the null of no first order autocorrelation in first differences and the test for AR (2) fails to reject the null of no second-order autocorrelation in levels, as shown by the p-values. Based on the above we can conclude that at least some of the coefficients are nonzero, that the estimation fits the data very well, and that there are no specification problems. Therefore, the SYS-GMM estimator, is consistent and unbiased.

Preliminary estimations, using separate indices indicate that there is no significant relationship between the outreach index and stability, whereas the relationship between stability and the usage index, is not straight forward. Thus, in some instances it is positive and significant, and in others it is not. Although this may suggest that financial inclusion affects stability *via* usage, results from the composite index may also indicate that the two dimensions of financial inclusion are complementary. Any initiatives to increase financial outreach would not have a significant economic impact on bank stability for as long as they would not result in increased usage of financial services. Equally, any efforts to stimulate usage of financial services without bringing the services to the people would be futile. To be effective, policy initiatives should focus on improving financial inclusion in both dimensions. Therefore, although findings from a recent study on Japanese banks by Harimaya and Kondo (2016) suggest that improving financial inclusion *via* increased branch expansion is beneficial to regional bank performance, findings from this study suggests that merely expanding bank presence without improved usage would not have a significant impact on financial stability.

Table 4-4: Regression Output- Financial Stability and Financial inclusion

	Log-zscore			ETA			RROA		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lag-stability	0.799***	0.834***	0.797***	0.541***	0.558***	0.578***	0.344***	0.423***	0.394***
	(0.102)	(0.0669)	(0.0830)	(0.0552)	(0.0477)	(0.0620)	(0.0564)	(0.0613)	(0.0681)
Financial Inclusion	0.444*	0.524**	0.835***	0.0602***	0.0573**	0.0555***	7.462***	7.392***	5.702*
	(0.227)	(0.256)	(0.200)	(0.0198)	(0.0242)	(0.0177)	(2.589)	(2.612)	(3.135)
Economic growth	0.0019	0.0024	0.0031	-0.0003	-0.0002	-4.39e-05	0.133***	0.0634	0.0762**
	(0.0040)	(0.0028)	(0.0030)	(0.0004)	(0.0003)	(0.0004)	(0.0358)	(0.0386)	(0.0380)
Inflation	0.0079***	0.0078***	0.0082***	-0.0003***	-0.0003**	-0.0002*	0.0838***	0.0885***	0.0798***
	(0.0016)	(0.0017)	(0.00171)	(9.72e-05)	(0.0001)	(0.0001)	(0.0148)	(0.0157)	(0.0168)
Mobile banking	-0.0018		0.0779*	0.0083*		0.0124***	-0.999		-1.350**
	(0.0790)		(0.0436)	(0.0048)		(0.0045)	(0.640)		(0.627)
MFI		-0.0079	0.0258		-0.0028	0.0018		-0.837*	-1.351***
		(0.0434)	(0.0452)		(0.0049)	(0.0048)		(0.446)	(0.412)
Boone indicator	0.623**	0.520*	0.492*	-0.0857**	-0.102***	-0.0813***	1.578	5.801**	2.948
	(0.257)	(0.295)	(0.287)	(0.0350)	(0.0334)	(0.0310)	(3.385)	(2.927)	(3.488)
Financial sector size	-0.0040	-0.0056*	-0.00461	-0.0009***	-0.0011***	-0.0007***	-0.0117	-0.0138	0.0014
	(0.0043)	(0.0032)	(0.0031)	(0.0002)	(0.0002)	(0.0001)	(0.0374)	(0.0379)	(0.0435)
Institutional Governance Index	0.0442	0.0376*	0.0121	-0.0005	0.0010	-0.00121	0.131	-0.0126	0.0275
	(0.0272)	(0.0203)	(0.0203)	(0.0017)	(0.0013)	(0.0015)	(0.244)	(0.215)	(0.243)
Constant	0.421***	0.398***	0.344***	0.0650***	0.0738***	0.0573***	3.901***	4.241***	4.789***
	(0.131)	(0.111)	(0.124)	(0.0083)	(0.0065)	(0.0094)	(0.901)	(0.926)	(0.819)
Long-run co-efficient	2.209	3.157	4.113	0.131	0.130	0.132	11.375	12.811	9.409
Hansen J test (p-value)	0.675	0.728	0.760	0.843	0.831	0.584	0.437	0.655	0.748
Difference-in-Hansen tests(p-value)	0.406	0.345	0.275	0.245	0.436	0.323	0.244	0.278	0.237
Arellano-Bond test for AR(1)	0.003	0.002	0.002	0.155	0.132	0.154	0.027	0.008	0.019
Arellano-Bond test for AR(2)	0.711	0.734	0.729	0.449	0.368	0.169	0.635	0.695	0.586
Wald test for joint significance(p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	249	248	248	249	248	248	249	248	248
Number of countries	38	38	38	38	38	38	38	38	38

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The estimation suggests that financial inclusion has both an economically and statistically significant short- and long-run impact on financial stability, regardless of the measure of stability. At least in the short-term, there is a positive and significant relation between financial inclusion and the indicators of bank stability. Conditional on other control variables, a percentage point increase in the composite index of financial inclusion, is associated with a 0.8 percentage point increase in the logarithm of the z-score. In addition, a 10 percentage point increase in the index, is associated with a 0.6 percentage point increase in the capitalization ratio. The last column suggests that, holding other factors constant, a unit change in the composite index may result in a 5.70 percentage point increase in the risk-weighted return on assets. The findings therefore, suggest that financial inclusion improves bank stability *via* an increase in the risk-weighted return on assets, more than in the capitalization ratio dimension. This may support the argument by Khan (2011) that increased financial inclusion may broaden the customer base, resulting in a stable bank portfolio and wider deposit base, giving the bank an opportunity to invest the excess funds in less liquid but high return assets.

Contrary to expectations, the results do not seem to suggest the existence of any significant relationship between overall bank stability and growth. According to Soedarmono, Machrouh, and Tarazi (2011) the impact of growth on bank stability may be neutralized by a lack of competitiveness in the banking sector. Therefore, this finding could be driven by a lack of competiveness within the banking system. Further, as shown in Chapter 3 of this study, banking systems in SSA have high concentration ratios, even when compared against economies within the same income group. However, there results suggest that increased growth may result in increased return on assets.

As discussed above, the relationship between inflation and bank stability is not straight forward. Whereas inflation may reduce the quality of bank assets (Das et al., 2004), there is evidence that its direct impact on stability is ambiguous (Jokipii and Monnin, 2013). The above results shade light on both propositions. Whereas inflation is negatively associated with the capitalization ratio, it is positively related to risk-weighted return on assets and overall bank stability as measured by the z-score. This could suggest that high inflation increases the nominal return to banks, thus resulting in a higher rate of return and bank z-score. However, as it erodes the real value to the banks, it reduces the quality of bank assets, resulting in a decline in the capitalization rate.

Although mobile banking has a positive association with the bank z-score and the capitalization ratio, it is negatively related to the risk-weighted return on assets. This also validates the observation by Demirgüç-Kunt et al., (2015), who point out that in most African countries where mobile banking is used, it is often the case that there are more mobile money accounts than formal bank accounts. This may suggest that in their current format mobile banking services do not compliment formal banking operations, but rather function as substitute or competitor. Therefore, there is a need to formalize the operations of mobile money services through effective regulation, which currently does not exist in most SSA countries. Further, mobile phone companies may be encouraged to operate under the oversight of registered banking institutions, and thus reduce the risk bankruptcy, and cushion bank returns.

The results also indicate existence of a negative association between the presence of MFIs and bank stability, and this effect is significant on the risk-weighted return on bank assets. This could be a reflection of the failure by banks to cater for the poor households and small businesses who may then migrate to MFIs who may better suit their needs, resulting in a reduction in banks return. However, because these are not the banks' 'core' customers, it has no impact on bank stability. Such findings would then call for a need for banks to review their product portfolios and come-up with innovative ways of serving the unbanked and underbanked members of the society.

In line with the *competition-fragility* view (Keeley, 1990; Marcus, 1984) the results suggest a positive association between lack of competitiveness and the bank z-score. Due to high market power in most banking sectors there are good opportunities for profits. Therefore, such banks may have less incentive for more aggressive and risky behaviour, thus resulting in greater financial sector stability. However, the results also suggest that a lack of competitiveness is associated with a decline in the capitalization ratio. Therefore, lack of competitiveness impact on stability *via* an increase in return, as banks are able to overcharge customers. This may suggest that this lack of competitiveness is not good for financial inclusion and long-run bank stability.

Contrary to expectations, larger banking systems appear to be more prone to bank instability. This may be an outcome of larger banking systems' high interconnectedness with the global market rather than a reflection of size *per se.* For example, in SSA only Nigeria, and to a certain extent, South Africa, felt the impact of the global financial crises, and one common

element between the two is their size. Generally, most banking systems in SSA are relatively small and isolated from regional and international contagion effects.

It is interesting to note that the institutional governance variable enters the estimation in a negative sign, although not significant. This, insignificant association, could suggest a lack of variability in the data, and thus support the assertion by Bräutigam and Knack, (2004) that most countries in the SSA region have weak governance structures. There is need for transformation in the governance of most countries in SSA to ensure that there is rule of law, high regulatory quality and reduced political interference, amongst other factors.

The above results provide insight on the relationship between bank stability and financial stability. Although the SYS-GMM estimation may perform poorly in small samples, the precautions taken above, which included the use of; orthogonal deviations, finite-sample corrected standard errors, additional external instruments, and reducing the number of instruments to avoid instrument proliferation, suggest the above results are a fair indicator of the relationship between financial inclusion and bank stability. Therefore, we can conclude that there is a positive and significant relationship between financial inclusion and bank stability.

4.6 Conclusion

This study analyses the impact of financial inclusion on financial stability in SSA for the period 2004 and 2014. Overall, the study finds the existence of very low levels of financial inclusion within the region - most countries posted an index performance of below 0.20 compared to a maximum possible of 1, Therefore, individual countries should come-up with effective ways of combating financial exclusion through, for example, the development and implementation of National Financial Inclusion Strategies (NFIS).

After controlling for variations in banking systems and general macroeconomic conditions, the results suggest the existence of a positive relationship between financial inclusion and bank stability. The results indicate that the impact of financial inclusion on bank stability depends on the competitiveness of the banking system. Specifically, lack of competitiveness tends to undermine the impact of financial inclusion on stability. To mitigate this there is a need to open the banking system to more competition, and thus improve the competiveness of the banking systems.

Based on these findings, it can be argued that financial inclusion is not only a developmental or welfare issue, but it has positive ramifications on the stability of the banking system as a

whole. However, in advocating for increased financial inclusion there is a need for tighter and more effective macro-prudential supervision and regulation to safeguard financial stability. Any financial inclusion initiatives that undermine the importance of strong macro-prudential regulations and bank supervision may not have a meaningful economic effect.

However, policy initiatives and strategies should not ignore the fact that financial inclusion is multidimensional in nature. Therefore, efforts should be aimed at improving financial inclusion from all dimensions, as the improvement in only one dimension may not translate into meaningful economic outcomes without support from other dimensions. For example, improved outreach without usage may not be beneficial.

It is also important to note that the existence of MFIs tends to undermine the stability of financial systems. Therefore, there is need for effective regulation of the MFI sector. In most SSA countries the regulation of MFIs is still in its infancy. There is a need for regulatory reform in the MFI sector, as often regulators exclude MFIs in their legislation. A number of studies allude to the importance of MFI regulation (*e.g*. Arun, 2005; Hartarska & Nadolnyak, 2007; Ndambu, 2011 and Schmidt, 2000). Specifically, Arun (2005) suggests that effective regulation of MFIs has a significant impact on the mobilisation of funds. In a cross country study of 114 MFIs from 62 countries, Hartarska and Nadolnyak (2007) also find that the regulation of MFIs may lead to improved financial performance and outreach. Therefore, it is important for policy makers to initiate and implement effective regulatory reforms in the MFI sector.

Further, there is a need for more effective regulation on mobile banking services, as they are a potential threat to bank stability[61]. Currently, in most countries where there is mobile banking, there is no direct regulation that governs the operation of mobile services, and this poses a threat to bank stability. However, the region generally has poor institutional structures.

This study therefore argues that financial inclusion should not only be promoted from a development and welfare perspective, but it potentially has positive effects on the banking system as a whole. However, like with any economic intervention, there is a possibility that too much financial inclusion may be detrimental to financial stability. As more data becomes available in future, it would be ideal to examine the threshold beyond which financial inclusion may adversely affect financial stability. Further, with more data, future studies may also

[61] For example, an increase on the deposit side of mobile-banking reduces bank deposits and thus potentially reduce the banking institutions' deposit funding base, which make them more vulnerable to crises.

examine the direction of causality and the existence of any long-run relationship between financial inclusion and stability in order to establish a mechanism of identifying policy priorities between the two. However, this could not be done with the current study as existing datasets cover a limited a time period.

Chapter 5 : Conclusion and Recommendations

5.1 Summary of Findings

This thesis examines the nature and extent of access to financial services in selected countries in Sub-Saharan Africa. Although the region has been on a high growth trajectory over the past two decades and has the highest uptake of mobile banking services in the world, the trickle-down effects of these have not been realized. The region has the greatest proportion of population living in extreme poverty and is the only one which has continued to record an increase in poverty, and a widening of the gap between the poorest and richest members of the society. In addition, there are very high levels of financial exclusion across the countries within the region. This is in direct contrast to theoretical postulations which state that high growth often result in financially inclusive economies and a reduction in poverty. Further, the financial sector is highly underdeveloped compared to all other world regions. This suggests that a mere comparison of the levels of access to finance which does not consider the level of financial development may be misleading, as it may fail to account for the region's potential capabilities and/or deficiencies in financial services provision. Moreover, because more and more countries within the region are increasingly focusing on financial inclusion it is important to understand the extent to which such efforts may impact of the overall stability of banking system; more so considering the level of financial system development.

Early studies on access to finance focused more on its household-level micro-economic determinants, using country-specific survey data. Although the impact of access to finance on poverty has strongly been emphasized by both researchers and policy makers, there is a dearth of empirical evidence linking the two. This study uses population representative surveys to examine the distributional effect of access to finance along the poverty line. Using the Re-centered Influence Function (RIF) regression model and an instrumental variable quantile estimation, I estimate the unconditional quantile partial effects of access to finance on household poverty, and thus extend the analysis to other statistics beyond the mean. Such an approach not only captures the heterogeneous impact of access to finance along the wealth distribution line, but also allows for a causal interpretation of the results. The findings suggest that although improved access to finance has a positive impact on household wealth, the impact is not uniform across the wealth distribution line. Households within the median level tend to benefit more from improved access to finance, and the benefit is lowest at the lowest quantile of the poverty distribution, thus widening the gap between the poor and the rich.

Due to wide heterogeneity in terms of both the levels of economic and financial development within the region, I argue that a mere comparison of the level of access to financial services (as is the norm) which does account for cross-country variations in the level of development, maybe inadequate. This study therefore further applies the Access Possibilities Frontier (APF) concept pioneered by Beck and de la Torre (2007), to benchmark countries' level of access to financial services based on observed variations in structural and macroeconomic conditions across countries. Using this concept I examine the extent of access to finance for a country given its level of financial development and thus help to identify key policy interventions necessary to remedy the situation.

Findings suggest the existence of a gap in access to finance within the SSA region, a measured against its potential. In addition, although access to finance is good for development, the findings suggests that too much finance may harm both economic and financial development. There is an inverted-U curve relationship between access to finance and both economic development and financial development. This may suggest a need for country-level studies to establish country-specific thresholds in the level of access to finance, as this is likely to vary across countries due variations in country specific factors.

Both theory and empirical evidence suggest that greater financial access is a 'double-edged sword'; although too lack of access to finance is not good, too much of it may result in financial fragility. This becomes even more pronounced when it comes to improving access to financial services, as there is no prudential limit on the extent of financial services provision. This has seen most central banks being faced with the twin challenges of fostering financial inclusion and maintaining financial stability. Although theory provides a number of convincing reasons on how financial inclusion may enhance financial stability, it also provides equally convincing evidence on how it may affect stability. Due to this divergence in theory, the relationship between financial inclusion and financial stability largely remains an empirical issue. Applying a system-GMM panel estimation model, this study thus examines this theoretical divergence while controlling for both economic-wide and bank-level variations across countries. Findings indicate that financial inclusion enhances stability within the banking sector. However, high market power within the banking sector and poor regulatory systems tend to undermine the impact of improved access to finance. Therefore, I conclude that it is possible to embrace financial inclusion without compromising financial stability, provided that there are adequate monitoring systems in place to guide and control behaviour within the financial sector.

5.2 Policy Implications

This study suggest that access to finance has a non-uniform impact on household wealth, therefore, for effective poverty eradication, there is a need for customized financial services and products aimed at addressing the specific needs of the poor sub-population, as their needs vary along the poverty distribution line. Findings suggest that improved access to formal financial services has a limited effect on the welfare conditions of the poor, as it inadvertently assumes that their needs are similar throughout the wealth distribution line. Because the poor are often detached from the formal economy and thus may not derive any benefit from most formal economic initiatives, policies aimed at improving access to finance, and subsequent reduction in poverty, should focus on improving the provision of non-formal financial services to the poor, such as microfinance products. This may go a long way, especially in light of the current world-wide effort on improved access to finance, such as the Financial Access 2020 vision. Indeed, empirical evidence from Bangladesh by Khandker (2005) and Pitt and Khandker (1998), suggested that microfinance and group-based micro-credit schemes have a greater impact on the poor, than other categories.

Financial services providers should focus on improving the quality, the scale and sustainability of their services. The findings from this study suggest that although access to finance is considered as good for the poor, the existing portfolio of service offerings does not seem to provide sustainable solutions to poverty eradication, as evidenced by widening of the gap between the poorest and the middle-class, further complicating the poverty structure. Such evidence would suggest that these products do not meet the unique needs of the poorer members of the societies. This could also call for a need for a variety of institutions in order to improve service offerings. For effective poverty reduction, there is a need for united efforts from the government, non-governmental organizations and the private sector. To this end a reformation in the institutional and regulatory environment is indispensable, as this will not only regulate the behaviour of financial services providers, but would also help to build consumer confidence; a key element for increased service usage. Central banks should use regulation to foster financial inclusion.

There is a need for more investment on improving the financial capabilities of the poor. This study suggest that financial literacy is instrumental to improved usage of financial services. In order to improve their financial market participation, the poor need to be educated and enlightened about various products and services available to them. Existing literature suggest a strong complementary relationship between financial inclusion and financial literacy.

Financial literacy affects access to financial services in various ways, as it influences one's decision to seek financial advice (Calcagno & Monticone, 2015; Gine et al., 2013), affects financial planning and decision making (van Rooij et al., 2011) and improves the potential for saving and investment (Beckmann, 2013; Jappelli & Padula, 2013; Lusardi & Mitchell, 2014). To this end policy makers should incorporate financial literacy programs as part of widening access to finance initiatives. In order to have a permanent impact, financial literacy programs should be customized to the various needs of different categories within the society. These financial literacy programs can also be integrated into the formal learning curriculum at both elementary and tertiary education levels, covering issues as product awareness, knowledge of financial institutions and their roles, computation of simple financial calculations.

However, because poverty levels vary widely across countries, some intervention methods, which may be effective in one country may fail in another. There is therefore a need to understand household dynamics, in order to develop effective financial services and products. There is need for a follow-up study to examine the effect of specific products/services on household welfare at country-level. However, it is important to understand that, although access to finance is a necessary condition for poverty alleviation, it is not a sufficient condition and as such it should not be viewed as a substitute for other intervention measures.

On the other hand, the observed constrained sub-optimality may suggest that the supply of financial services is below the equilibrium level, calling for innovative methods by banking institutions in terms of both new products and the manner of service delivery. The use of agent banking and twinning with mobile-operators may go a long way in improving service delivery and reaching the currently unbanked and underbanked population. However, this may call for strong regulatory and supervisory oversight. Furthermore, this may suggest a need for opening of the market to non-bank players. In most economies, there is an emerging trend of licensing deposit taking microfinance institutions. Such efforts should be encouraged, as microfinance has proven to be an effective way of extending financial services to the unbanked.

Since the results suggest that the presence of foreign banks have a positive impact on access, there is need to promote entrance of foreign banks in markets where there are some restrictions. This would suggest that some current policies, such as Black Empowerment Act in South Africa and the Indigenization Act in Zimbabwe should be applied with caution in relation to the banking industry, as these may have a negative impact on the outreach and usage of financial services. However, there is need to reduce concentration in banking

systems as this appears to have a negative effect on access to finance. The current emergence and growth of Pan-African banking institutions should be encouraged across all countries within the region as it has a potential of reducing bank concentration levels and improving competitiveness in the banking sector, ultimately resulting in improved access to financial services.

This study further shows that financial inclusion is not only a developmental and welfare issue, which should be promoted in order to improve the livelihoods of the people, but that it has positive benefits to individual financial institutions and the banking sector as whole. Therefore, in order to come up with sustainable ways of improving access in a manner that would benefit the poor and unbanked members of the society within the countries in the SSA region, the adoption of a market system approach to financial inclusion is inevitable. The market systems approach to development seeks to implement sustainable models without crowding out support structures, and thus benefit the poor by incentivizing service providers in order to improve quality, product variety and returns and thus create value throughout the value chain. This can be implemented by recognizing and promoting the development of key support systems such as mobile phone penetration, financial market development, and improvements in information and risk sharing mechanisms without undermining the significance of effective macro-prudential regulatory and supervisory oversight.

In addition, policy initiatives and strategies should not ignore the fact that financial inclusion is multidimensional in nature. Therefore efforts should be aimed at improving financial inclusion from all dimensions, *i.e.* outreach, usage and efficiency, as any improvement which undermines any one of these dimensions may not translate into meaningful economic outcomes.

However, like with any economic intervention, there is a possibility that if there exists too much of financial inclusion relative to the economy, it may push the supply of financial services resulting in the market settling into an unsustainable equilibrium position which may lead to financial fragility. As more data is gathered, future studies may employ quantitative models to establish this threshold position in order to maintain financial stability.

5.3 Suggestions for future work

This thesis examines the nature and extent of financial exclusion (or inclusion) in Sub-Saharan Africa using both cross-sectional and panel time series data over the period 2004 to 2014. Although the results suggest that improved access to finance has a positive impact on poverty,

due to the nature of the survey datasets the study could not identify how future financial inclusion strategies could be implemented in a poverty reducing manner, neither did it identify which specific financial products could have a larger and more significant impact on poverty than others. As more data is gathered through FinScope surveys and other related mechanisms, it may become possible for future studies to focus more on these issues. Further, currently the interaction between poverty and access to finance has largely been left to empirical evidence, but there still exists a lack of formal theoretical models relating these two concepts. Future studies may therefore seek to examine the theoretical relationship between the two, perhaps in a general equilibrium framework incorporating household preference behaviour, decision making and planning - both in the short- and long-term.

By using bank-based measures of financial sector development, this thesis also examined the extent to which the level of financial development helps to explain the observed levels of financial inclusion. However, in the most recent past there have been some positive developments in a number of African markets, specifically with regards to increased stock markets activity. It may be interesting to examine how the findings of this study change with the inclusion of these variables. In addition, policy makers might be interested in understanding how a shock or major shift in financial inclusion affects other development indicators and the extent to which the relationship modelled in this study is transitory or permanent. Future studies can therefore seek to model such relationships.

Finally, as more data is gathered on financial inclusion and/or more sophisticated estimation models are developed, it would be important to establish whether the impact of financial inclusion on stability has a threshold effect, and/or whether there is any cointegration between financial inclusion and bank stability, thus suggesting the existence of a long-run relation. Also it would be ideal to examine the direction of causality between financial inclusion and stability. Further, because the current study uses panel data estimation methods it does capture unique country specific relations. There is a possibility that certain relationships observed in this study may vary from one country to another. Therefore future studies may seek to ascertain the extent to which these relationships hold in country-specific settings. However, like any economic intervention, there is a possibility that too much financial inclusion may be detrimental to financial stability. It would therefore be of interest to examine the threshold beyond which financial inclusion may adversely affect financial stability. However, this could not be done with the current datasets, which only cover a limited time period.

Appendices

Chapter 2 Appendices

Appendix 1: Construction of Financial Literacy Index

Country	Coding	Min	Max
Botswana	1. Financial Decisions making		
	Person responsible for making - 0- if "Not involved"; 1 if "Involved or made collectively by household"	0	1
	2. Do you follow financial news- 0- if “never” or “rarely”, 1- if “always” or “often”	0	1
	3. Getting Financial Advice- 0- if ‘others’; 1- if ‘Bank/insurer, Broker, Financial Planner, Media, or Family member’	0	1
	4. Awareness of banking, insurance and financial products in Botswana		
	a. ATM(1-yes; 0-no)	0	1
	b. Credit Card (1-yes; 0-no)	0	1
	c. Savings / transaction account(1-yes; 0-no)	0	1
	5. You work to a budget (1- Agree, 0- Disagree, or Don’t Know)	0	1
	6. You save regularly (1- yes, 0- No)	0	1
	7. You have a good idea of what interest /returns you get on the money you use(1-Agree; 0- Disagree, or Don’t Know)	0	1
	8. You are quite aware of money and financial matters (1- Agree, 0- Disagree, or Don’t Know)	0	1
	9. Are you currently saving or investing money? (1-Yes, 0-No)	0	1
	10. Financial literacy Score- Sum of the above	0	12
	11. Financial literacy (1- if 4.5 and above, 0-otherwise)	0	1
Malawi	1. Awareness of financial products		
	a. Debit card (1-Know or Heard about it; 0-Never heard of it)	0	1
	b. Savings account (1-Know or Heard about it; 0-Never heard of it)	0	1
	c. Current account (1-Know or Heard about it; 0-Never heard of it)	0	1
	d. ATM- (1-Know or Heard about it; 0-Never heard of it)	0	1
	e. Know interest rates- (1-Yes, 0-No)	0	1
	f. Collateral- (1-Know or Heard about it; 0-Never heard of it)	0	1
	2. Knowledge - Personal budget (1-Know or Heard about it; 0-Never heard of it)	0	1
	3. Plan/budget on how to spend your money- (1-Yes, 0-No)	0	1
	4. Keep records of your spending (1-Yes, 0-No)	0	1
	5. Who is responsible for household financial planning (0-not Involved, 1- directly involved, or collective decision)	0	1
	6. Seek financial advice	0	1
	7. Knowledge of interest rates (1-yes, 0-No)	0	1

	8. Financial literacy Score- Sum of the above 9. Financial literacy (1- if 6 and above, 0-otherwise)	0 0	12 1
Mauritius	1. Financial Decisions making- Person responsible for making - 0- if "Not involved"; 1 if "Involved or made collectively by household" 2. Seeks financial advice- (1-Yes, 0-No) 3. How often do you keep to your plan on how to spend your money? (1- Always, Often, 0- Never, Sometimes) 4. How often do you keep record of your spending? (1- Always, Often, 0- Never, Sometimes) 5. Do you, when you can, save?(1-yes, 0-No) 6. Knowledge of interest rates (1-yes, 0-No) 7. Financial literacy Score- Sum of the above 8. Financial literacy (1- if 3.00 and above, 0-otherwise)	0 0 0 0 0 0 0 0	1 1 1 1 1 1 6 1
Mozambique	1. Knowledge of financial terms a. Bank loan (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) b. Savings account (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) c. Debit card (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) d. ATM (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) e. POS (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) f. Microcredit (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) g. Instalment (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) h. Bank Charges (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) i. Interest rate (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) j. Exchange rate (1-Heard of it, 0- Heard of it but no idea what it is, Never heard of it) 2. Seeks financial advice (1-yes, 0-No) 3. Financial literacy Score- Sum of the above 4. Financial literacy (1- if 5.5 and above, 0-otherwise)	 0 0 0 0 0 0 0 0 0 0 0 0 0	 1 1 1 1 1 1 1 1 1 1 1 11 1
South Africa	1. You have a written-up plan or budget of your spending and earnings (1-Yes, 0-No) 2. You keep track of your spending (1-Yes, 0-No) 3. Household budgeting behaviour – (1- Track both income and expenditure; 0- only track income or do not track at all) 4. Financial attitude or perception	0 0 0 0	1 1 1 1

	a. Do you save (1- if Save at bank, non-bank informal, informal group, keep money at home, 0- do not save)	0	1
	b. Spending behaviour- (1- Often within means, 0- always over spends)	0	1
	c. You find language used in financial paper work confusing (0- yes, 1-No, Do not Know)	0	1
	d. Seeks financial advice (0- yes, 1-No, Do not Know)	0	7
	5. Financial literacy Score- Sum of the above	0	1
	6. Financial literacy (1- if 3.5 and above, 0-otherwise)		
Swaziland	1. You like to be in control of your finances and money matters (1- Agree**,** 0- Disagree, Sometimes)	0	1
	2. You often have to spend more money than you have available	0	1
	3. You keep track of your income and expenditure on a monthly basis	0	1
	4. You adjust your expenses according to your income	0	1
	5. Seek financial advice	0	1
	6. You save	0	1
	7. Often forgo consumption to save	0	1
	8. If you borrow money it is okay to pay it a bit later than agreed	0	1
	9. Financial literacy Score- Sum of the above	0	8
	10. Financial literacy (1- if 4 and above, 0-otherwise)	0	1
Zambia	1. Financial Decisions making- Person responsible for making - 0- if "Not involved"; 1 if "Involved "	0	1
	2. Seek financial advice (1- Yes**,** 0- No)	0	1
	3. You keep track of money that you receive and spend (1- Yes**,** 0- No)	0	1
	4. You know how much money you spend (1- Yes**,** 0- No)	0	1
	5. You sometimes don't buy things that you want in order to save money (1- Yes**,** 0- No)	0	1
	6. You adjust your expenses according to the money you have available (1- Yes**,** 0- No)	0	1
	7. You often have to spend more money than you have available (0- Yes**,** 1- No)	0	1
	8. Knowledge of savings(0- Savings is the money that is left over/ Don't know, 1- Otherwise)	0	1
	9. You avoid borrowing money if you can (1- Yes, 0- No/Don't know)	0	1
	10. Financial literacy Score- Sum of the above	0	9
	11. Financial literacy (1- if 4.5 and above, 0-otherwise)	0	1
Zimbabwe	1. Plan/budget on how to spend your money (1- Yes, 0- No)	0	1
	2. Keep to the plan you make for using the money (1-Yes,0-No)	0	1
	3. Keep records of your spending (1-Yes,0-No)	0	1
	4. Financial Decisions making- Person responsible for making - 0- if "Not involved"; 1 if "Involved or made collectively by household"	0	1
	5. Seek financial advice (1-Yes,0-No)	0	1

	6. Perception on finances:	0	1
	a. You like to be in control of your finances and monies (1-Yes,0-No)	0	1
	b. You often have to spend more money than you have (1-Yes,0-No)	0	1
	c. You know what your financial situation (1-Yes,0-No)	0	1
	d. You keep track of your income and expenditure (1-Yes,0-No)	0	1
	e. You adjust your expenses according to your income (1-Yes,0-No)	0	1
	f. You go without certain things to be able to save (1-Yes,0-No)	0	1
	g. You believe you have to save for difficult times (1-Yes,0-No)	0	1
	h. You believe it is better to save (1-Yes,0-No)	0	1
	7. Knowledge of financial terms (1-Yes,0-No)	0	1
	8. Financial literacy Score- Sum of the above	0	15
	9. Financial literacy (1- if 4.5 and above, 0-otherwise)	0	0

Chapter 3 Appendices

Appendix 2: List of countries used in the study

East Asia & Pacific:
Australia, Brunei Darussalam, Cambodia, China, Fiji, Indonesia, Japan, Korea, Republic, Lao PDR, Malaysia, Micronesia, Fed. States., Mongolia, Myanmar, New Zealand, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Thailand, Timor-Leste, Tonga, Vanuatu, Vietnam

Europe & Central Asia:
Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Luxembourg, Macedonia, FYR, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, San Marino, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Ukraine, United Kingdom, Uzbekistan

Latin America & Caribbean:
Antigua and Barbuda, Argentina, Bahamas, The Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela, RB

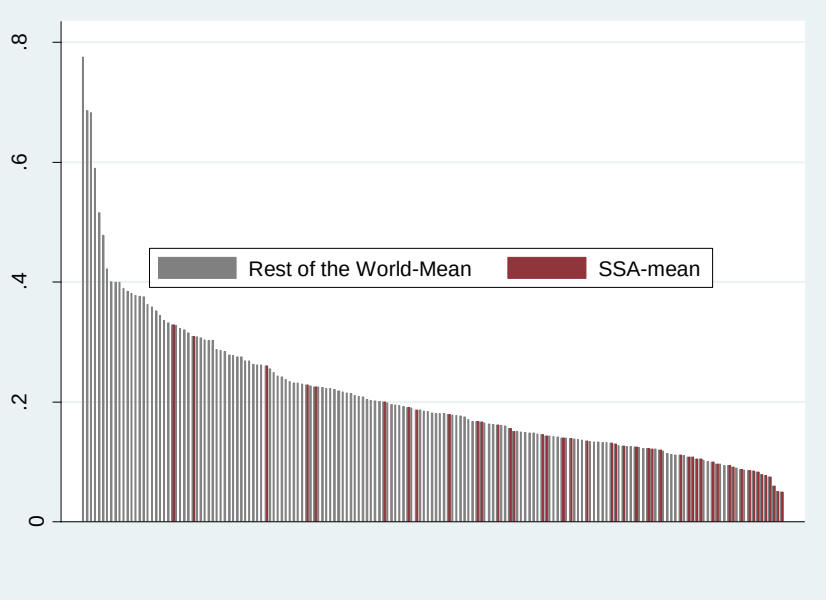
Middle East & North Africa:
Algeria, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates, West Bank and Gaza, Yemen

North America: Canada, United States

South Asia: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka

Sub-Saharan Africa:
Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Congo Republic, Côte d'Ivoire, Equatorial Guinea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Principe, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe

Appendix 3: Financial Development- SSA vs Rest of the World



Source: Own calculation from World Bank Development Indicator 2016

Appendix 4: Dimensions of Governance

Aggregate indicators are based on a number of underlying variables, gathered from a variety of existing data sources. The indicators are categorized into three main dimensions of governances as follows (source:(Kaufmann et al., 2009, 2011)

(a) The process by which governments are selected, monitored, and replaced:

1. *Voice and accountability (VA)* – capturing perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

2. *Political stability and absence of violence/terrorism (PV)* – capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

(b) The capacity of the government to effectively formulate and implement sound policies:

3. *Government effectiveness (GE)* – capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

4. *Regulatory quality (RQ)* – capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

(c) *The respect of citizens and the state for the institutions that govern economic and social interactions among them:*

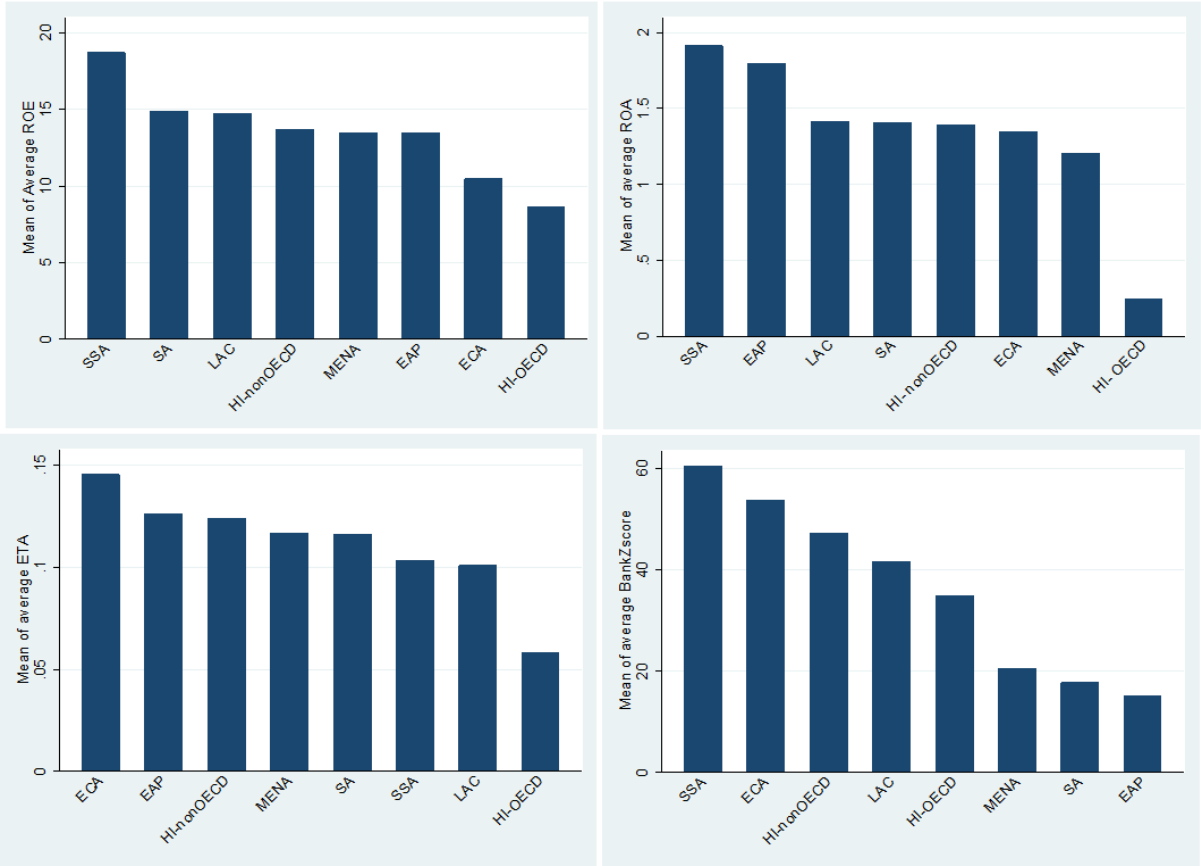
5. *Rule of law (RL)* – capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract

enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

6. ***Control of corruption (CC)*** – capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests

Chapter 4 Appendices

Appendix 5: Selected indicators of Financial Stability: Regional Comparison



Source: The World Bank-Global Financial Development Database

Key: ROE- Bank Return of Equity (after tax), ROA- Bank Return on Assets (after tax), ETA- equity-total-assets ratio (a.k.a capitalization ratio) , EAP- East Asia & Pacific, ECA- Europe & Central Asia, LCA- Latin America & Caribbean, HI-nonOECD- High Income non-OECD members, HI-OECD- High Income OECD members, MENA- Middle East & North Africa, SA- South Asia, SSA- Sub-Saharan Africa

Note: The above calculations are based on data from 2004 to 2013, calculations could also have been affected aby missing data for some countries

Appendix 6: List of SSA ccountries used

	Country	Income Group
1	Angola	Upper-middle-income economies
2	Benin	Low-income economies
3	Botswana	Upper-middle-income economies
4	Burkina Faso	Low-income economies
5	Burundi	Low-income economies
6	Cameroon	Lower-middle-income economies
7	Central African Republic	Low-income economies
8	Chad	Low-income economies
9	Congo, Dem. Rep.	Low-income economies
10	Cote d'Ivoire	Lower-middle-income economies
11	Equatorial Guinea	High income: non-OECD
12	Ethiopia	Low-income economies
13	Gabon	Upper-middle-income economies
14	Gambia, The	Low-income economies
15	Ghana	Lower-middle-income economies
16	Guinea	Low-income economies
17	Kenya	Low-income economies
18	Lesotho	Lower-middle-income economies
19	Liberia	Low-income economies
20	Madagascar	Low-income economies
21	Malawi	Low-income economies
22	Mali	Low-income economies
23	Mauritania	Lower-middle-income economies
24	Mauritius	Upper-middle-income economies
25	Mozambique	Low-income economies
26	Namibia	Upper-middle-income economies
27	Niger	Low-income economies
28	Nigeria	Lower-middle-income economies
29	Rwanda	Low-income economies
30	Senegal	Lower-middle-income economies
31	Seychelles	Upper-middle-income economies
32	Sierra Leone	Low-income economies
33	South Africa	Upper-middle-income economies
34	Sudan	Lower-middle-income economies
35	Swaziland	Lower-middle-income economies
36	Tanzania	Low-income economies
37	Togo	Low-income economies
38	Uganda	Low-income economies
39	Zambia	Lower-middle-income economies

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