Why are Microcredit Interest Rates in sub-Saharan Africa so Persistently high?

Testing the Predictions of Theoretical Models

by

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ABSTRACT

The microfinance industry is progressing towards becoming a core of financial inclusion in the sub-Saharan African (SSA) region. Despite the recent growth of microfinance in the SSA, that industry is seemingly characterised by high lending rates. Those high rates have become a hotly debated topic amongst microfinance stakeholders. It is against this background that this study first investigates the factors that influence the persistently high microcredit interest rates in SSA; it does so by utilising a panel dataset assembled from the Microfinance Information eXchange (MIX) market, the Heritage Foundation, and the World Bank, covering the period 2003 to 2011. Secondly, this study examines the determinants of financial inclusion in SSA, using a cross-sectional dataset obtained from Statista and the Global Findex for the year 2014.

Several empirical approaches are used in the study: Bayesian Model Averaging, fixed effects, Generalised Method of Moments, and Ordinary Least Squares. The results reveal evidence of the following: (i) the operating costs associated with providing small loans, unexploited economies of scale, and institutional deficiencies all contribute towards increasing the microcredit interest rates; and (ii) volatile macroeconomic fundamentals exert undesirable effects on the microcredit interest rates. Second, a methodical analysis of the relationship between outreach to the poor and the financial performance of microfinance institutions (MFIs), produced the following findings: (i) providing smaller microcredits is associated with lower operating profit, and the exact opposite is true; and (ii) outreach to the poor clients is significantly related to a stronger financial performance. Third, the results of the determinants of financial inclusion demonstrate that illiteracy negatively affects financial inclusion in SSA.

Overall, the study’s empirical findings suggest that the following approach is needed to promote low microcredit interest rates. First, MFIs must be supported to expand outreach, and adopt digital technology to drive operational efficiency; second, countries in SSA must strengthen the prevailing weak institutional environment in the region; and third, macroeconomic policy regimes must be moderated, particularly by maintaining low and stable inflation rates. In relation to financial inclusion, countries in SSA must be committed to fighting functional illiteracy. All this could contribute to a financial inclusion agenda and towards poverty eradication in the SSA region.

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It is certainly not possible to provide an exhaustive list, but I would like to thank all those academic staff as well as my fellow graduate students, who played a critical role during the period of this research.

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ABBREVIATIONS AND ACRONYMS

ATM	Automated Teller Machine
BCEAO	Banque Centrale des Etats de l'Afrique de l'Ouest
BMA	Bayesian Model Averaging
CCU	Co-operative and Credit Union
CGAP	Consultative Group to Assist the Poor
CPI	Consumer Price Index
FE	Fixed Effects
FINCA	Foundation for International Community Assistance
GDP	Gross Domestic Product
GMM	Generalised Method of Moments
GNI	Gross National Income
HF	Heritage Foundation
HHI	Herfindahl-Hirschman Index
KKM	Kaufmann, Kraay, Mastruzzi - Index of Institutional Development
LAC	Latin America and the Caribbean
M2	Broad Money Supply
MENA	Middle East and North Africa
MFI	Microfinance Institution
MIX	Microfinance Information eXchange
MNC	Multi-National Company
MPR	Monetary Policy Rate
NBFI	Non-Banking Financial Institution
NGO	Non-Governmental Organisation
OLS	Ordinary Least Squares
RB	Rural Bank
ROSCA	Rotating Savings and Credit Association
SSA	Sub-Saharan Africa
USD	United States Dollar
WB	The World Bank
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1 Research Background

Empirical studies suggest a strong and positive relationship between economic growth and financial sector development (Levine, 1997; Levine, Loayza, & Beck, 2000; Levine, 2004, p.865; Menyah, Nazlioglu & Wolde-Rufael, 2014). Those studies reveal the importance of greater financial intermediation in the development of the financial sector, and in reducing poverty (Agenor, 2000, p.475; Jalilian & Kirkpatrick, 2002). Moreover, empirical evidence based on household data show that access to basic financial services, such as savings and credit, can have a positive effect in improving the standard of living of poor people (Dupas & Robinson, 2013a; Sharma & Puri, 2013).

Generally, financial penetration in Africa is low, with about two-third of the adult population lacking access to formal banking services (Demirgüç-Kunt, Klapper, & van Oudheusden, 2015, p.388). Against this background, the microfinance sector started gaining momentum in Africa in the early 2000s. Since then, the industry has been growing at a steady pace and is increasingly becoming a core of financial inclusion in the African continent (Zins & Weill, 2016). Also, microfinance products have evolved from providing only microcredit to offering a wide range of services such as microsavings, microinsurance and microenterprise training (Banerjee, Chandrasekhar, Duflo & Jackson, 2013; Banerjee, Duflo, Glennerster & Kinnan, 2015; Ledgerwood, Earne & Nelson, 2013; Mersland & Urgeghe, 2013; Robinson, 2001). Figure 1.1 reports on the evolution of the microfinance industry in SSA from 2003 to 2012.

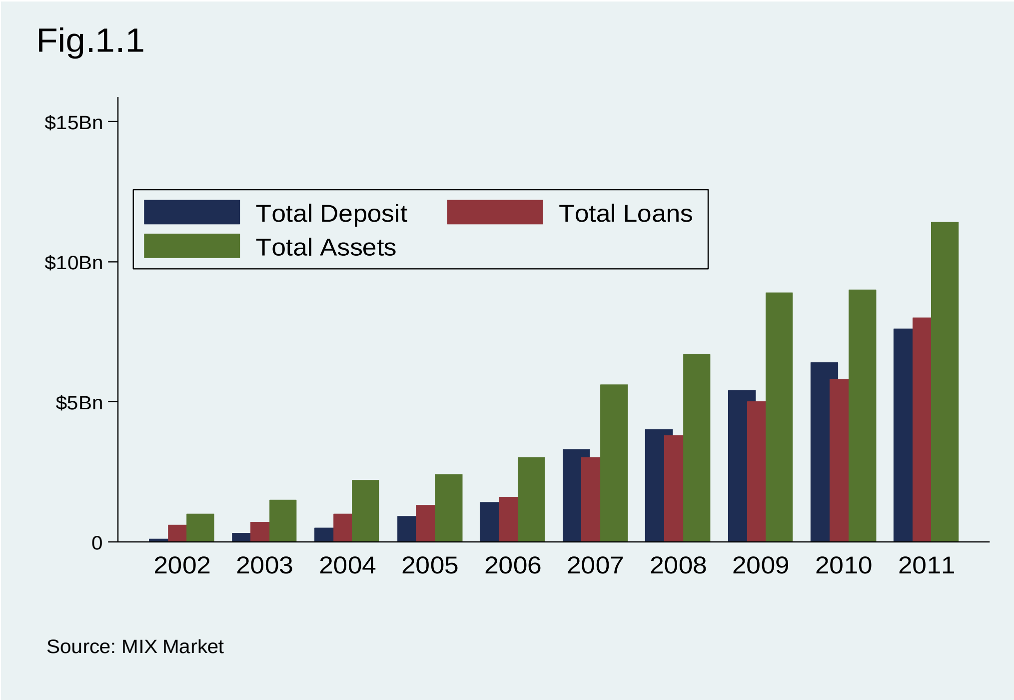

Fig. 1.1: Evolution of microfinance in the SSA region over the period 2002 to 2011. The data on which this graph is based, is from the full sample sourced from the MIX market over the period 2002 to 2011.

Despite the positive growth of the microfinance industry in the SSA region, microcredit clients are usually charged high microcredit interest rates. These high rates are an ongoing problem for microcredit clients (Mader, 2013; Mersland & Strøm, 2010, 2011). This is indicated in Figure 1.2 below, which shows the average annual microcredit lending interest rates between 2003 and 2011, worldwide. Figure 1.2 shows that countries in SSA, taken together, charged slightly higher microcredit interest rates relative to other regions of the world. The rates used for our analysis include loan related fees, such as insurance and loan application fees. This measure reflects the actual cost of the loan. It is important to note that South Africa and Zambia have skewed the average microcredit interest rates for Southern Africa. Thus, some MFIs in South Africa and Zambia reported interest rates exceeding 100 percent during the period under consideration. If South Africa and Zambia are excluded from the regional analysis then Southern African annual interest rates averaged about 32 percent between 2003 and 2011. It should be noted that in all the four regions (i.e. Asia, LAC, MENA, and SSA), inflation and commercial bank lending rates averaged 8 and 20 percent, respectively (Cotler & Almazan, 2013).

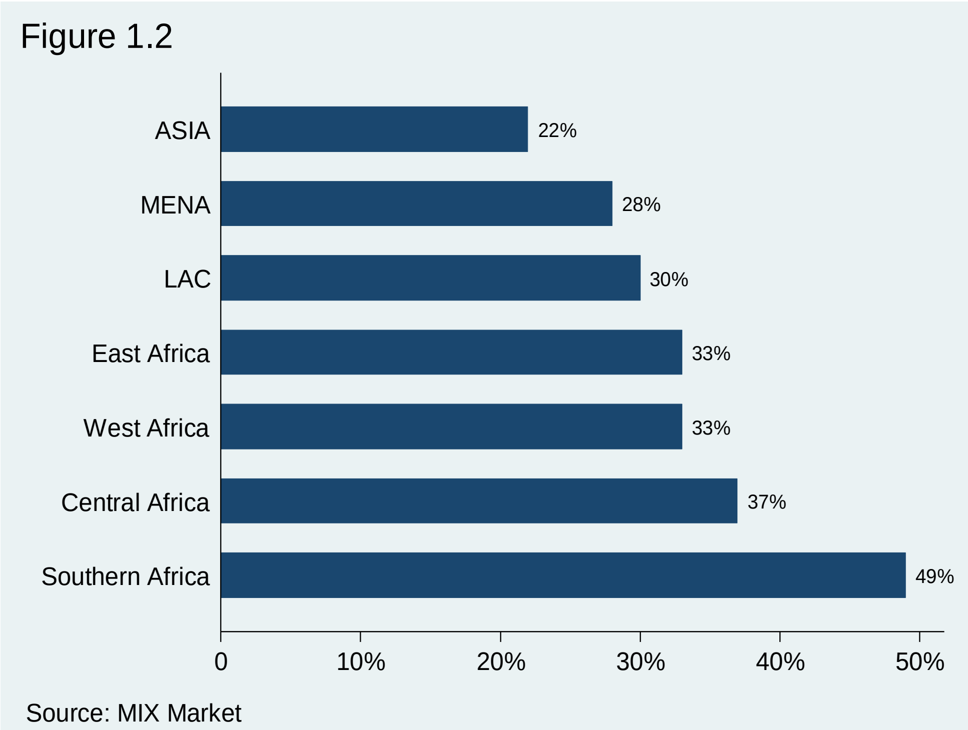

Fig. 1.2: Microcredit interest rates worldwide between 2003 and 2011, using the MIX market dataset for that reporting period.

The persistently high microcredit interest rates are often the subject of intense debate in the microfinance industry (Agier & Szafarz, 2013; Hudon & Ashta, 2013; Roberts, 2013). The controversy involves two competing groups.[1] The first group, the welfarists, view the provision of microcredit as a tool to alleviate poverty, and argue that MFIs must be subsidised to foster low lending interest rates in the industry (Collier & Dollar, 2002; Sachs, 2006; Woller, Dunford & Woodworth, 1999). The second group, the institutionists, contend that market forces must determine the lending interest rates in the microfinance industry, in order to promote sustainability of the industry (Bateman, 2010; Bateman & Chang, 2012;

[1] The commercialisation of the microfinance industry came to public attention in 2010. This was after hundreds of suicides of micro-borrowers, in 2010, in Andhra Pradesh in India (Mersland & Strøm, 2011, pp.1-2).

Brau & Woller, 2004). Moreover, there is a trend for many MFIs to move towards for-profit orientation, and the latter customarily charge higher rates than non-profit oriented firms (Mersland & Strøm, 2010).[2] The welfarist and institutionist concepts are discussed further in section 3.5 of chapter 3. This study also attempts to gain a better understanding of this controversy in the microfinance industry.

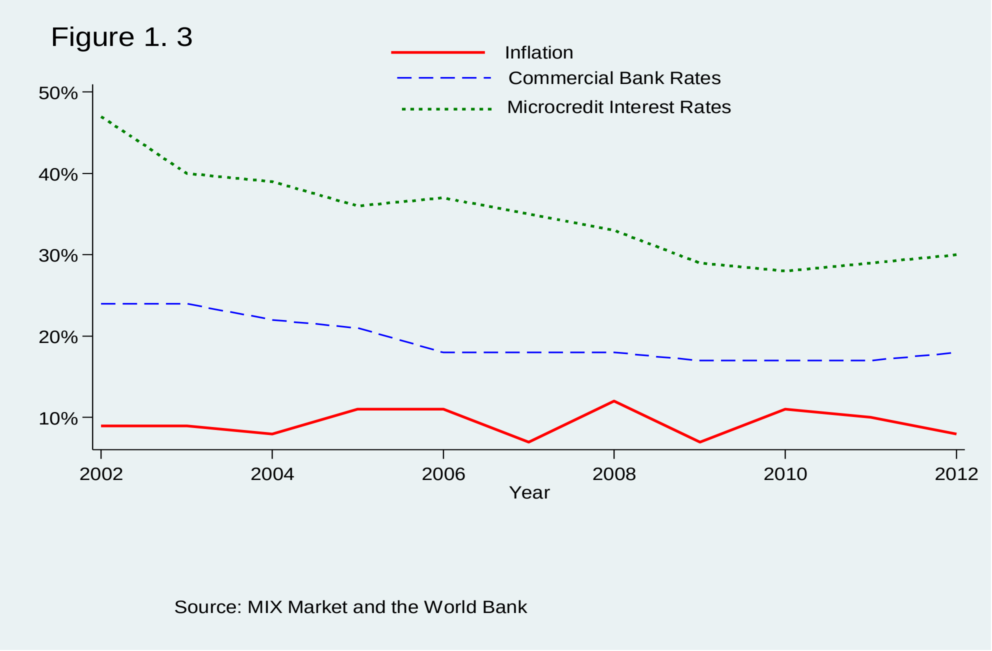

Fig. 1.3: The average microcredit interest rates, commercial bank lending interest rates, and inflation in the SSA region.

Figure 1.3 indicates the microcredit interest rates, commercial bank interest rates and inflation in the SSA region, for the period 2002 to 2012. As indicated in Figure 1.3, inflation and commercial bank lending interest rates have been fairly stable during that time but microcredit interest rates have being dropping, particularly from 2009 onwards. Plausible explanations could include: (i) the learning effect of industry players; (ii) imposition of

[2] According to the 2011 MIX market data, about 55 percent of MFIs in SSA were classified as non-profit and 45 percent as for-profit. Also, approximately 70 percent of the gross loan portfolio (GLP) was held by profit oriented MFIs (as seen in **Fig.1.1**, the gross loan portfolio for SSA in 2011 was about USD 8 billion).

microcredit interest rates ceilings in some countries of SSA; and (iii) increase in client outreach, allowing for economies of scale.

Microfinance is the second-fastest growing segment of the African financial sector; the fastest is the insurance industry (UN, 2013; World Bank, 2015). Ever since the early 2000s, the microfinance sector in the SSA region has continued to register sustained growth, averaging 15 percent per annum (MIX, 2013a). In addition, according to data reported to the MIX market in 2011, there were twice as many microsavings accounts, as there were microcredits accounts. The remarkable growth of microsavings is a clear indication that poor people can save their limited resources if they are given savings facilities that suit their needs (Dupas & Robinson, 2013b). It would seem that, the considerable growth of the microfinance industry will continue to contribute to the financial inclusion agenda in the SSA region (Demirgüç-Kunt et al., 2015, p.388).

The determinants of interest rates in the traditional banking industry have been extensively investigated (see for example: Aboagye, Akoena, Antwi-Asare & Gockel, 2008; Ahokpossi, 2013; Akinlo & Owoyemi, 2012; Beck & Hesse, 2009; Crowley, 2007; Folawewo & Tennant, 2008; Mlachila & Chirwa, 2004; Nampewo, 2013). However, relatively few studies have examined factors that influence interest rates in the microfinance industry. It is worth noting that MFIs differ from the mainstream banks in many ways; for example, target market, mission objectives, and microprudential requirements (Morduch, 1999a). To the best of our knowledge, Cotler and Almazan (2013) and Dorfleitner, Leidl, Priberny, and von Mosch (2013) are the two prominent studies that have attempted to investigate the determinants of microcredit interest rates offered by MFIs, globally; however these two studies suffer from potential methodological problems, as shown in section 1.5 of this chapter. The lack of empirical studies of microfinance in the SSA is essentially due to the youthfulness of the industry.

The rest of this chapter is organised in the following manner. Thus, section 1.2 states the research problem. Sections 1.3 and 1.4 outline the research questions and study objectives, respectively. Section 1.5 discusses the justification for conducting this research, while section 1.6 summarises the contributions of this research to the general body of knowledge. This is followed by section 1.7 which provides a short discussion of the thesis statement. Sections 1.8 and 1.9 present the study approach and the delineations plus limitations, respectively. Finally, section 1.10 presents the structure and a summary of the chapters in this thesis.

1.2 Statement of Research Problem

Overall, the financial sector in Africa is still rudimentary, heavily dominated by the banking sector, and primarily concentrated in urban and peri-urban areas (World Bank, 2015). In Africa, lack of access to formal financial institutions is a significant barrier to growth for many small businesses (Ojah & Kodongo, 2015, p.401). Consequently, more than 75 percent of households in SSA do not have sufficient collateral to pledge in order to procure a loan. This forces poor people to borrow from individual moneylenders at high interest rates and with draconian repayment conditions (Dixon, Ritchie, & Siwale, 2007). There is a strong inverse relationship between the general level of financial inclusion in a country and degree of access to the informal financial sector of the economy. It is estimated that more than 100 million adults in the SSA region use informal methods of finance, largely monopolised by unregulated private money lenders (Demirgüç-Kunt et al., 2015). This evidently shows how vast the informal financial sector is in the SSA region, which provides a possible opportunity for the formal financial institutions to enter into this untapped market.

As noted earlier, microfinance is one of the fastest-growing segments of the financial sector (UN, 2013; World Bank, 2015). However, the microfinance industry is characterised by persistently high lending interest rates. The question of what the optimal lending interest rates for the microfinance industry should be, is debated by academics, politicians, philosophers and religious leaders (Agier & Szafarz, 2013; DfID, 2004; Hudon & Ashta, 2013; Mersland & Strøm, 2011). In order to curb the industry's relatively high microcredit interest rates, a growing number of countries in the SSA have imposed interest rate ceilings. These include: Benin, Burkina Faso, Cameroon, Central Africa Republic (CAR), Chad, Côte d'Ivoire (Ivory Coast), Equatorial Guinea, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Mali, Mauritania, Namibia, Niger, Nigeria, Republic of the Congo, Senegal, South Africa, Sudan, Togo, Zambia, and Zimbabwe. It is important to note that before the interest rate ceilings were introduced, some MFIs in the SSA region were charging interest rates on microcredit higher than 100 percent.[3]

The imposition of interest rates ceilings might seem to be the simplest and immediate policy approach towards curbing the persistently high lending interest rates in the microfinance industry. This view is based on the perception that microcredit interest rates are extortionate and service users must be protected. However, that does not answer the question of why microcredit interest rates are persistently high relative to the commercial bank lending interest rates, even in countries where interest rates ceilings exist. This question is the main

[3] Cameroon and Zambia are notable examples: before microcredit interest rates ceilings (caps) were introduced, MFIs used to charge interest rates exceeding 100 percent. Cameroon introduced interest rates ceiling in 2013, imposing maximum rates of about 25 percent. Zambia introduced interest rates ceilings in January of 2013, and capped the lending interest rates at 42 percent.

focus of this study. A thorough search for literature on the effectiveness of interest rates ceilings in the microfinance industry has yielded only a limited number of related articles: these will be discussed in the next chapter. That chapter will show that interest rates ceilings suppresses the growth of the industry, and force the poor clients to revert to unregulated individual moneylenders (Hulme, 2015).

According to economic theories, significantly higher lending interest rates could point to a lack of competition in the industry, weak institutional development,[4] operational inefficiency, and other macroeconomic factors (Beck & Hesse 2009). Therefore, an empirical investigation into factors that influence microcredit interest rates in the SSA region is the first step in promoting the growth of the microfinance sector. There is reason to believe that the growth of microfinance can contribute to the financial inclusion agenda in the sub-Saharan African region (Dupas & Robinson, 2013a).

1.3 Research Questions

Extending financial services to the poor population of society requires overcoming many challenges. These include poor infrastructure, low population density especially in rural areas, high levels of illiteracy, unstable macroeconomic conditions, incoherent microprudential policies, default risks of providing small uncollateralised loans, rampant corruption and weak property rights, and high operational costs (Demirgüç-Kunt, 2012; Dupas & Robinson, 2013a; Fenske, 2013). These challenges, to a certain degree, often emerge as the main factors that influence microcredit interest rates. With these challenges in mind, this study will endeavour to address the following research questions:

[4] Institutional development in this context represents: property rights, freedom from corruption, business and investment freedom, and effective regulatory systems.

1. To what extent do (i) MFIs’ firm level endogenous attributes, (ii) country institutional development, and (iii) macroeconomic factors, influence microcredit interest rates in sub-Saharan Africa?

2. Does the pursuit of outreach consistently stifle or augment microfinance financial performance in sub-Saharan Africa?

3. What are the main determinants of financial inclusion in sub-Saharan Africa?

These three research questions are explained in detail in the next section. That section will highlight, briefly, how the research objectives are linked and how they will be achieved.

1.4 Research Objectives

The objectives of this research are as follows:

1 To investigate the extent to which MFI firm-level endogenous factors, country institutional development, and macroeconomic factors, affect the setting of microcredit interest rates in the SSA region.

2 To investigate the nature of any relationship between the pursuit of outreach and the financial performance of MFIs in the sub-Saharan African region.

3 To examine the main factors influencing financial inclusion in sub-Saharan Africa.

4 To make policy recommendations based on the study findings, and also to identify possible future research areas in the field of microfinance, particularly in SSA.

The first objective will be achieved by performing an empirical analysis using econometric techniques to identify the main factors that influence microcredit interest rates in the SSA region. The variables to be entered into the estimation models are based on the underlying theoretical predictions, as discussed in detail in chapter 3. The general aim of this empirical investigation is to gain an understanding of the main factors that explain the persistently high microcredit interest rates in the sub-Saharan Africa region.

The second objective will be achieved by building on the findings of the first one. Thus, there will be an examination of the performance of MFIs that produced at least five annual financial statements between 2003 and 2011. The aim is to analyse the nexus between outreach[5] and financial performance of MFIs in sub-Saharan Africa. More specifically, the aim is to find out the effect of different loan sizes on the financial performance of MFIs. Likewise, there is a methodical investigation of the effect of client outreach on the financial performance of MFIs in SSA. Essentially, this process of analysis will examine the trade-off between financial and outreach performance of MFIs in the SSA region.

The third objective will be to examine the main factors that influence financial inclusion in sub-Saharan Africa. The main motivation for this investigation is that microfinance institutions predominantly target the financially excluded segment of society. Therefore, a better understanding of the main factors that influence financial inclusion in SSA could promote the growth of the microfinance industry. In order to address this objective,

[5] In this context, outreach is captured in two dimensions: (i) **Breadth of Outreach** which is the number of clients served, and (ii) **depth of outreach** is the degree of poverty of the client served, depicted by the average loan size (Hermes & Lensink, 2011; Hermes et al., 2011).

reference will be made to the most recent financial inclusion surveys conducted by the World Bank in 2014. Finally, the fourth objective will be achieved by highlighting prospective future research areas, and by drawing policy recommendations from the main findings.

1.5 Research Justification

In common with any other section of the financial sector in the SSA region, the microfinance industry is still developing. Consequently, there is a shortage of studies focussing on identifying factors that influence microcredit interest rates in the region. A growing body of empirical studies in the field of microfinance focuses heavily on financial performance, and on the impact of the industry as far as poverty alleviation is concerned (for further details, see: Copestake, 2007; Cull, Demirgu¨ç-Kunt, & Morduch, 2007; Daher & Le Saout, 2013; Lafourcade, Isern, Mwangi & Brown, 2005; Mersland & Strøm, 2009; Van Rooyen, Stewart & de Wet, 2012). The following discussion identifies the gaps in microfinance literature that exclusively focusses on microcredit interest rates. This leads to a description of the reasons for conducting a regional study which focuses specifically on the SSA region.

1.5.1 Existing Gaps in the Microfinance Literature

There have been only a few studies in the field of microfinance that attempted to look at microcredit interest rates, and these did not focus on identifying factors that influence those rates (see inter alia: Fernandez, Fuetes-Callen, Serrano-Cinca & Gutiérrez-Nieto, 2016; Janda & Zetek, 2014; Mersland & Strøm, 2011; Roberts, 2013). A search of relevant literature on the determinants of microcredit interest rates produced two prominent studies: refer to Table 1.1.

Table 1.1: Studies that Investigated Microcredit Interest Rates in the SSA Region

Author/s (Year)	Study Coverage	Study Period	Total MFIs	MFIs from SSA	Sets of Variables Considered
Dorfleitner et al. (2013)	Global	2004 - 2011	712	8%	MFI specific & Macroeconomic
Cotler and Almazan (2013)	Global	2000 - 2008	1299	22%	MFI Specific only

NOTES: Table 1.1 reports on the two notable studies of the microfinance industry that investigated the determinants of microcredit interest rates across the world. The table also highlights the study period, the number of MFIs sampled, percentage of MFIs drawn from the sub-Saharan African (SSA) region, and also the categories of variables that entered the studies' estimation models.

Table 1.1 shows that the sub-Saharan Africa region represented only a small fraction of the two studies. For example, Dorfleitner et al. (2013) analysed 712 MFIs from around the world of which only 8 percent were drawn from 19 countries of the SSA region, and their study simply analysed MFI-specific and macroeconomic variables. Equally, Cotler and Almazan (2013) examined 1299 MFIs based in the developing countries of the world, and only 22 percent of those firms sampled were from SSA. Moreover, their study merely analysed MFI-specific variables. These two studies did not consider the distinctiveness of SSA. That region can be distinguished because of diverse income levels, varying levels of institutional qualities and inflation trends (Michalopoulos & Papaioannou, 2013). If one considers the Simpson Paradox, then it is possible for different segments of the overall samples to yield different results (Blyth, 1972; Wagner, 1982). Thus, for the purpose of data analysis, it would be reasonable to divide the sample used in this research into sub-samples of MFI charter types, income levels, and regions. This approach will help an evaluation of any possible variation between these different sub-samples.

The study by Cotler and Almazan (2013), seemingly suffers from two methodological weaknesses. Firstly, it captured a narrow range of variables in the estimation model:

efficiency, cost of funds, competition, average loan size and return on assets.[6] The theoretical implication is that the model might be weak, and could suffer from omitted variables bias. That bias frequently leads to imprecise regression estimates (Chiburis, Das, & Lokshin, 2012; Nickell, 1981; Park & Gupta, 2012; Torabi & Rao, 2013). Secondly, the study treated the African countries in the sample as one entity, by overlooking the diverse nature of the economies in the continent. This justifies the need to disaggregate the data in respective groups for robustness checks; for example, income levels, inflation levels, and MFI charter types.

Finally, the literature review failed to identify any single study that attempted to investigate the effect of institutional development on microcredit interest rates, particularly in the context of SSA. Consequently, this study addresses the methodological weaknesses identified in the prior studies conducted by Dorfleitner et al. (2013) and Cotler and Almazan (2013). This will be achieved by following the study objectives as defined above. As microcredits are a lifeline for the MFIs' financial sustainability, an understanding of the factors influencing microcredit interest rates is not only important for the growth and performance of the MFIs, but also for sustainability of the industry.

1.5.2 Motivations for Performing a Regional Study that focusses specifically on SSA

Today, sub-Saharan Africa is one of the poorest regions in the world. The *per capita* incomes of the poorest countries of SSA are substantially lower than those of other developing countries in the world (World Bank, 2015). Moreover, there are enormous differences in

[6] There is also a concern of multicollinearity between efficiency (operating expenses) and return on assets (ROA). Note that ROA is defined as net income less taxes over assets. Thus, it is methodically problematic to include both variables in an econometric model: the efficiency or operating expenses variable is used to create the ROA measure.

welfare, health, financial depth, economic opportunities, life expectancy and infrastructure among the SSA countries (Acemoglu & Robinson, 2010). It has been widely argued that countries of the SSA region remain poor for various reasons including the following: insecure property rights, weak business environment, rigid regulations, poor institutional structures and unfavourable geographical factors such as climate and diseases (Acemoglu & Johnson, 2005; North, 1990). Against this background, this study focusses on SSA for the following reasons:

1. The SSA region is part of the world's poorest and most underdeveloped continent, Africa, with a continental GDP that accounts for just 2.4 percent of global GDP (World Bank, 2015).

2. Almost 40 percent of adults in SSA are illiterate, of whom two-thirds are women. In addition, adult literacy rates are below 50 percent in Benin, Burkina Faso, Chad, and Ethiopia (UNESCO, 2014). These low literacy rates explain, in part, the low extent of financial inclusion in the SSA region (refer to chapter 8 of this thesis).

3. Commercial bank and microcredit lending interest rates in SSA are marginally higher than in the rest of the developing world (Cotler & Almazan, 2013). This difference in rates could be explained by endogenous attributes of the SSA region (Michalopoulos & Papaioannou, 2013).

4. Many countries in the SSA region have volatile macroeconomic fundamentals. Moreover, regional inflation generally exceeds 8 percent, and only a few countries

have maintained inflation below 8 percent since 2010: these countries include Cameroon, Senegal and Zimbabwe (World Bank, 2015).

5. Despite the SSA's large population and size, there is a lack of coherent empirical studies that focus on this region, particularly in the context of the microfinance industry. By focussing on this region, we can prescribe regional specific policy recommendations, which take into account its unique attributes (Anyanwu, 2014).

We therefore posit that these specific attributes, shared by the SSA countries, together exert a significant influence on the prevailing microcredit lending interest rates. Specifically, the relatively high levels of inflation, the volatile macroeconomic environments, weak enforcement of property rights and rampant corruption all have an upward influence on lending interest rates in the SSA region (Acemoglu & Johnson, 2005).

1.6 Significance of this Study

There are five reasons why this study makes a significant contribution to the existing body of knowledge with particular reference to the microfinance industry. First, the empirical results of this study have brought insights into the main factors that influence microcredit interest rates in sub-Saharan Africa. Thus, we now have come to understand that microcredit interest rates are mainly influenced by market forces in SSA. Also, this study has shed some light on the methodical nexus between outreach and the financial performance of MFIs in SSA. Thus, the results of this investigation indicate that MFIs can expand outreach to the poor without compromising profitability, and that there is a possibility of earning profit when serving the poorest in society; this is subject to offering loan amounts greater than USD 500. Also, this study has shown that illiteracy has a negative effect on financial inclusion in the SSA region.

Second, this study focuses entirely on sub-Saharan Africa and takes into account the distinctiveness of the region. By doing so, this study has provided new evidence that was not documented in earlier studies by Dorfleitner et al. (2013) and Cotler and Almazan (2013). For example, this study indicates that institutional deficiencies and unstable macroeconomic factors have a significant influence on microcredit interest rates in SSA. Therefore, this study has contributed to bridging this existing gap in the literature, particularly as far as SSA is concerned.

Third, from a policy perspective, this study argues that interest rates ceilings are not the best approach for fostering lower microcredit interest rates in SSA. On the contrary, the findings and recommendations are as follows. Firstly, microfinance institutions must be supported to expand outreach, and adopt digital technology to drive operational efficiency. Secondly, countries in SSA must strengthen the current weak institutional environment in the region. Thirdly, macroeconomic policy regimes must be moderated, particularly by maintaining low and stable inflation. It is through these policy recommendations that this study makes its main contribution to the body of existing knowledge, particularly in the context of SSA.

Fourth, this study contributes to the literature on the rigid dichotomy between the welfarist and institutionalist views on microcredit interest rates (Brau & Woller, 2004). The welfarist view is that microcredit interest rates are usurious and must be capped. Institutionalists argue that microcredit interest rates are influenced by fundamental factors. Most importantly, this study contributes to this debate by providing evidence that shows that microcredit interest rates are mainly influenced by market forces in the SSA region.

Finally, this study has contributed to the general body of knowledge by performing research in the field of microfinance. The dataset assembled for this study has been used elsewhere and some of those other studies are summarised below.

- Chikalipah, S. (2017), Institutional environment and microfinance performance in sub-Saharan Africa. *African Development Review*, 29(1), 6–27.

- Chikalipah, S. (2017). Financial sustainability of microfinance institutions in sub-Saharan Africa: evidence from GMM estimates. *Enterprise Development and Microfinance,* 28(3), 182 – 199.

- Chikalipah, S. (2017). The nexus between microcredit nominal interest rates and inflation in sub-Saharan Africa: evidence from panel vector autoregression analysis. *Enterprise Development and Microfinance,* 28(4), 355 – 370.

- Chikalipah, S. (2018). Credit risk in microfinance industry: Evidence from sub-Saharan Africa. *Review of Development Finance,* 8(1), 38 – 48.

- Chikalipah, S. (2018 - *forthcoming*). Do microsavings stimulate financial performance of microfinance institutions? Panel data evidence from sub-Saharan Africa – accepted for publication in the *Journal of Economic Studies*, 45(5).

- Chikalipah, S. (*forthcoming*). Optimal sources of financing for microfinance institutions in sub-Saharan Africa – accepted for publication in the *Journal of Development in Practice*.

To summarise: it is felt that this study has attempted to contribute to the general body of knowledge; this viewpoint is based on the five reasons stated above. This study can be viewed as a starting reference point for future work, which will focus on microfinance lending interest rates, with special reference to MFIs operating in the sub-Saharan African region.

1.7 Thesis Statements

The thesis statement for this study is drawn from the three research questions outlined in section 1.3. That thesis statement is:

"Price gouging does not explain the persistently high microcredit interest rates in sub-Saharan Africa."

This thesis statement will be addressed in line with the set objectives of this research. More specifically, it will be examined in chapters 6 and 7. This statement is decoupled, theoretically supported, and discussed in section 3.6 of chapter 3.

1.8 Research Approach

This sub-section outlines the research approach employed in the three empirical chapters: chapters 6, 7 and 8. This outline is followed by an explanation of how these three empirical chapters are interconnected.

1.8.1 An Overview of the Study Research Methodology

In order to accomplish the objectives set out in section 1.4 of this chapter, a quantitative study approach is followed, and the following estimation techniques were used: (i) Ordinary Least Squares (OLS); OLS via fixed effects (FE), Bayesian Model Averaging (BMA) and Generalised Method of Moments (GMM). These econometric techniques were developed, based on the properties of the datasets used in each of the three empirical chapters. Those datasets are described in the following paragraphs.

Chapter 6 describes an investigation into factors influencing microcredit interest rates, and uses a dataset comprising 292 microfinance institutions in 34 countries of the SSA region for the period 2003 to 2011. The data in the final sample were obtained from three international organisations. Thus, (i) Heritage Foundation (HF) provided data on the institutional development of the countries in our sample; (ii) the Microfinance Information eXchange (MIX) was a source of microfinance firm-level data, and (iii) the World Bank (WB) provided the macroeconomic data of the 34 countries in the final sample.

Chapter 7 describes an investigation into the relationship between the pursuit of outreach and the financial performance of MFIs operating in SSA. This chapter builds upon the dataset assembled for chapter 6. Nevertheless, in order to achieve the objective of this chapter, only those MFIs were analysed that had reported at least five annual financial statements to the MIX market between 2003 and 2011. This screening guarantees consistency and reduces the risk of outliers, such as newly established MFIs with limited experience of the industry. The final sample consisted of 107 MFIs drawn from 20 countries of the SSA region for the period 2003 to 2011.

Chapter 8 investigates the determinants of financial inclusion in SSA, and employs country-level data obtained from the World Bank for the single year 2014. The data was collected during the Global Findex survey conducted in 2014 on financial inclusion. The auxiliary data on the global ranking index was sourced from Statista. Therefore, the final sample incorporates 20 countries of the SSA region.

In view of the research questions for this thesis, and also the nature of the statistical data, this study is conducted on a post-positivism philosophical view, deductive in nature, and adopts a predominantly quantitative research approach. Finally, some statistical tests were performed pre- and post-estimation of the chosen econometric models and these are described in appendix 3.

1.8.2 The interconnection between the three empirical chapters

As previously stated, the main objective of this study is to investigate the most important factors that influence the persistently high microcredit interest rates in SSA. In order to achieve this objective, an empirical analysis will be performed in chapter 6. Chapter 7 will build on the findings of chapter 6, and will examine methodically the trade-off between financial and outreach and performance of MFIs in the sub-Saharan African region. The content of chapter 7 differs from prior empirical studies insofar as this chapter will investigate the effect of: (i) different loan sizes, and (ii) different thresholds of client outreach, on the financial performance of microfinance institutions in the SSA region. An empirical analysis of this nature is needed in order to evaluate, empirically, theoretical claims that unexploited economies of scale and the provision of small uncollaterised loans explain, to a large extent, the persistently high microcredit interest rates in SSA (see sections 3.2.1 and 3.6 for further details about theories of imperfect financial markets and economies of scale, respectively).

The problem statement presented in section 1.2 of this chapter refers to the lack of access to formal financial institutions in SSA; thus, microfinance is currently one of the possible ways of extending financial services to the poor. For this reason, chapter 8 includes an investigation of the determinants of financial inclusion in the SSA region. An understanding of the main factors that hinder financial inclusion in SSA could promote the growth of the microfinance industry in the region. A related point to consider is that financial inclusion is one of the United Nations' sustainable development goals. Finally, we propose that if more people were to access financial services, then this could contribute towards lowering operational costs; in this scenario, MFIs would exploit the economies of scale that could also lower microcredit interest rates.

To summarise: the three empirical chapters are linked by the points mentioned in the preceding paragraphs. It is reasonable to conclude that these three chapters (6, 7 and 8) are intertwined and contribute towards resolving the problem of financial exclusion in the SSA region.

1.9 Delineations and Limitations

This study investigates the main factors that influence microcredit interest rates in the SSA. It is not the study's objective to explore how branchless banking services in the microfinance industry, such as mobile money services, may impact microcredit interest rates in the region. There are widely-held views that mobile money services, such as M-Pesa of East Africa, reduce transaction costs considerably for the microcredit borrowers, although these views are unsubstantiated by any real evidence except at an anecdotal level. However, because of a lack of reliable data on mobile money services across the region, this study does not attempt to investigate the potential effect of those services on microcredit interest rates in SSA.

On a related note, it is not the objective of this study to explore the impact of interest rates ceilings on the microfinance industry in the SSA. Policy impact assessments require long time periods, before and after, to avoid the risk of drawing erroneous inferences (Banerjee et al., 2015).[7] Furthermore, this exercise would probably entail a wide-ranging empirical examination requiring a standalone study. Importantly, if this study were to examine the effect of interest rates ceilings, it would probably provide limited evidence because of the broader study objectives. Therefore, the aim is to adhere to the present study's core objective of investigating the main factors that explain the persistently high microcredit interest rates, relative to commercial bank lending rates in the SSA region.

As with any other study, this research has limitations. The first and perhaps most relevant is selection bias, which naturally arises because reporting financial data to the MIX market is voluntary. Hence, not all MFIs in the SSA and elsewhere provide their financial

[7] Since most countries in SSA imposed interest rates ceiling post-2013, one would need data covering not less than five years, potentially from 2013 to 2018, to conduct a robust assessment of the impact of interest rates ceilings in the SSA region.

reports to the MIX market. However, the MIX market is currently the largest data bank with more than 1800 MFIs: it is widely used, and is the oldest data depository in the microfinance industry (Assefa, Hermes & Meesters, 2013; Ayayi & Sene, 2010; Cotler & Almazan, 2013; Cull, Demirgüc-Kunt & Morduch, 2011; Dorfleitner et al., 2013; Fernandez et al., 2016; Hartarska & Nadolnyak 2007; Hermes & Lensink, 2011; Quayes, 2011; Roberts, 2013; Tchakoute Tchuigoua, 2014).[8] We therefore do not suspect any inherent bias in the MIX market datasets: refer to section 5.7 in chapter 5 for justification of this conclusion.

The second limitation is that this study is confined to the period between 2003 and 2011. This is mostly because of data availability considerations. Thus, (i) pre-2003, there were few reported data points, because the MIX market was only incorporated in 2002. This factor also applies post-2011, as the dataset was procured in 2014; at that time, the data for 2012 and 2013 were still being audited by the MIX markets.

The third limitation arises because, according to interest rate theories and specifically the yield curve, credits with different maturity dates and quality have different interest rates. Nevertheless, the MIX dataset used in this study assumed that all loans have the same maturity date and yields. This is because of the methodology employed by the MIX market to construct the lending interest rates proxy: for further details see sections 6.2.2 and 6.2.4, and also refer to equation 6.1.0 in chapter 6.

[8] Alternative depositories of microfinance data include Finca International, Oikocredit, MicroRate, and Rabobank foundation, although these are all still small.

1.10 Structure of the thesis

This thesis comprises nine chapters. Chapters two to nine are organised in the following manner:

Chapter Two provides an overview of the sub-Saharan African region with the aim of informing the readers about the study area. The main features of the chapter cover the following: the location, demography and economic fundamentals of the region and the challenges of financial inclusion. This is followed by a brief overview of the microfinance industry, mobile money services, and an outline of factors that could potentially pose risks to the region's stability.

Chapter Three discusses the main theories and concepts relevant to this study, specifically focussing on interest rates, banking, and microfinance. Because of the limited amount of literature in the field of microfinance, reference is also made to conventional banking literature. A particular point of emphasis is placed on the modern microeconomics theories, and economic models developed for financially constrained developing economies.

Chapter Four comprises a critical review of empirical literature on microcredit interest rates. As noted above, empirical literature on microfinance is limited; therefore, this chapter also reviews empirical literature on the conventional banking industry with a particular focus on sub-Saharan Africa.

Chapter Five sets out the research methodology for this study. It highlights this study's research philosophy and approach. Additionally, this chapter discusses the sources of data, the econometrics models, and statistical software used during data analysis.

Chapter Six provides an analysis of factors influencing microcredit interest rates in the sub-Saharan African region, using the assembled dataset and answering the outlined study research questions. The investigation is mainly motivated by persistently high microcredit interest rates relative to commercial bank lending interest rates in the sub-Saharan African region.

Chapter Seven concentrates on investigating the methodical nexus between outreach and financial performance of microfinance institutions in the sub-Saharan African region. The motivation for this chapter arises from chapter six, where the empirical results provide evidence indicating that outreach has a negative and significant relationship with microcredit interest rates. In the light of this, chapter seven examines the systematic relationship between outreach and financial performance of MFIs based in the SSA region, using a nuanced approach of dividing outreach into two different segments.

Chapter Eight examines the main factors that influence financial inclusion in SSA, using the most recent World Bank survey (Global Findex) conducted in 2014. The main incentive for an empirical investigation in this research area arises because MFIs mostly target the financially excluded segment of the population. Therefore, a good understanding of the main factors that influence financial inclusion in SSA can contribute to the growth of the microfinance industry.

Chapter Nine offers concluding remarks of this thesis by summarising the main findings from the three empirical chapters. The final part of this chapter also presents policy recommendations, and outlines potential research ideas for extending part of this research.

Finally, the ninth chapter is followed by the list of references cited in this research, and then the appendices. In those appendices, further details are provided on: (i) the list of all MFIs included in the sample for chapter 6 and 7; (ii) the results of pre- and post-estimation tests of the final sample; (iii) the derivation of Cook's distance estimation technique, and (iv) the Bayesian Model Averaging (BMA) equation form.

CHAPTER TWO

OVERVIEW OF SUB-SAHARAN AFRICA AND THE MICROFINANCE INDUSTRY[9]

2.1 Introduction

This chapter provides a perspective of the study region covering the following: a brief description of its location, demography and economic fundamentals, a brief overview of the microfinance industry, the extent of financial sector and bank penetration, and the mobile money services in the sub-Saharan African region. This background is necessary for a well-informed understanding of the study area and in order to draw meaningful conclusions from the findings of this research.

An examination of the challenges and risks to stability in sub-Saharan Africa will provide insight into how different dynamics and underlying vulnerabilities might converge to create conditions for instability in the region. Instability creates economic uncertainty that has a direct effect on macroeconomic fundamentals and asset prices. Consequently market and economic uncertainties often have unintended consequences on lending interest rates (Bekaert, Hoerova & Lo Duca, 2013).

The rest of this chapter is structured as follows. Thus the next section 2.2 provides an overview of sub-Saharan Africa while section 2.3 discusses economic development in the

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[9] The microfinance component of this chapter has been summarised into a book chapter to be published by Elsevier in 2019. The book chapter is titled *"*The landscape of microfinance institutions and informal finance in Africa,*"* and will feature in a book to be called *Extending Financial Inclusion in Africa*. The author therefore acknowledges some useful comments from the book editor, Professor Daniel Makina.

SSA region. Section 2.4 briefly provides an overview of the microfinance industry in that region. Section 2.5 presents details of financial sector penetration in SSA, while section 2.6 briefly outlines the development of mobile money services in that region. Section 2.7 highlights the main challenges and risks to stability in SSA, and finally, section 2.8 offers concluding remarks.

2.2 Overview of the sub-Saharan African Region[10]

The sub- Saharan African region consists of 49 of Africa's 54 countries: the other five are all Arab countries bordering the Mediterranean Sea.[11] The SSA region has a vast geographical spread and is home to a vast number of cultures and dialects; there are differences in other attributes such as frugality and borrowing habits (Michalopoulos & Papaioannou, 2013). The sub-Saharan African region is divided in four sub-regions: Central Africa, East Africa, Southern Africa and West Africa. Table 2.1 presents the classification of the SSA countries into their respective sub-regions.

The total population of sub-Saharan Africa stood at 874,841,000 on 31st December 2011 of whom 437,333,000 and 437,508,000 were males and females, respectively (World Bank, 2012). Figure 2.1 shows the distribution of population in the four sub-regions of SSA. Nigeria had the highest population in the continent of Africa and in the SSA region, with 170 million people, representing one-fifth of the entire regional population (World Bank, 2012). At the other extreme, by the end of 2011, Seychelles had the lowest population in the sub-Saharan African region with about 92,000 people. Of the total population of the SSA region, about 33 percent lived in urban and peri-urban areas, while the other 67 percent lived in rural

[10] In order to match the study period of this thesis, the analysis in this chapter does not go beyond 2011.

[11] These countries are Algeria, Egypt, Libya, Morocco and Tunisia

areas. The overall population density for the region was about 38 people per sq.km and the western coast is the most densely settled area of the region (World Bank, 2012).

Table 2.1: Classification of SSA Countries into Sub-Regions

REGIONS	COUNTRIES	TOTALS
Central Africa	Burundi, Cameroon, Central African Republic, Chad, Congo Republic, Congo DR, Equatorial Guinea, Gabon and São Tomé and Príncipe	9 (18)
East Africa	Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, South Sudan, Sudan, Tanzania and Uganda	13 (27)
Southern Africa	Angola, Botswana, Comoros, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe.	11 (22)
West Africa	Benin, Burkina Faso, Cape Verde, Code d'Ivoire (Ivory Coast), Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo and The Gambia	16 (33)
	TOTAL	**49 (100)**

NOTE: Table 2.1 presents the grouping of 49 countries of the sub-Saharan African region into their respect sub regions, which are Central, East Africa, Southern Africa, and West Africa. The figures in parenthesis indicate percentage of total.

There has been improvement in life expectancy in the region since the early 1980s (UNDP, 2012). At the end of 2011 the life expectancy in the SSA region was 56 years (Ezeh, Bongaarts & Mberu, 2012). Advances in medical technology and improving public health have helped the SSA region to witness a sharp decrease in death rates; the average death rate was 11 deaths per 1,000 people in 2011. Nevertheless, there are considerable variations between countries and this is due to the size of, as well as the regional characteristics of the SSA region (World Bank, 2012).[12]

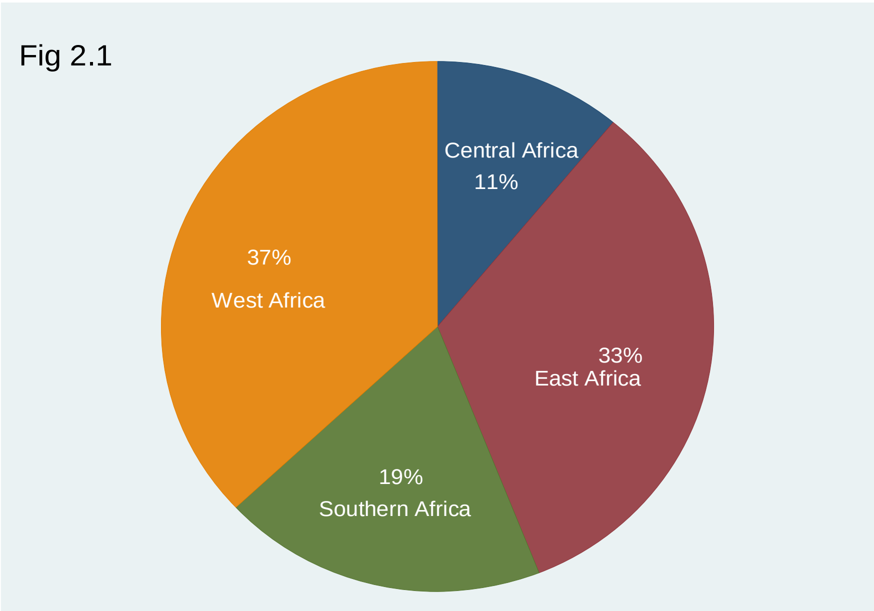

Fig. 2.1 shows the distribution of population in the four (Central, East, Southern and West Africa) sub-regions of SSA. The total population of the SSA region in 2011 stood at 875 million.

The mapping of global trends in population growth indicates that the sub-Saharan African region has the highest average growth rate of more than 2 percent. This finding is supported by a high regional fertility rate; thus, the average number of births per woman was 5 in 2011 (World Bank, 2012). Of the 35 countries in the world with the highest fertility rates, 34 are in SSA: Burundi, Mali, Niger, Nigeria and Somalia have the highest rates of all, with more than six births per woman in 2011. At the other end of the scale, Botswana, South Africa and Seychelles had an average of two births per woman in 2011 (Ezeh et al., 2012).

[12] In 1990, the death rate per 1000 people averaged 16 compared with 11 in 2011. It is worth noting that the Southern part of Africa recorded the highest death rates in 2011, averaging 13 deaths per 1000 people. Specifically, in 2011, the highest death rates, exceeding 13 per 1000 people, were witnessed in Angola, Chad, Cote d'Ivoire (Ivory Coast), Lesotho, Nigeria, Sierra Leone, and Swaziland (World Bank, 2012).

2.3 Stylised Facts about Economic Development in sub-Saharan Africa

The real annual economic growth of the sub-Saharan Africa region averaged 6 percent between 2000 and 2010. In 2011, the GDP growth rate averaged 4.4 percent across the region. In the long term, the SSA region is likely to maintain stellar economic growth because of its burgeoning youth population, growing urbanisation, increase in infrastructure investments and improving governance and business environment (Kelsall, 2013). On a slightly different note, countries in the SSA region have witnessed a surge in foreign direct investment (FDI) inflows since early 2000s (Otchere, Soumaré & Yourougou, 2016, p.652). Despite that, FDI inflow into SSA is the lowest in the world: for example, in 2011, the region received a meagre 2.4 percent of regional GDP in FDI inflows (WorldBank, 2012). It has been argued that the low inflows are because of underdeveloped infrastructure, rampant corruption and an uncertain business environment, compared to the rest of the world (Easterly & Levine, 1997; Mathur & Singh, 2011).

Almost all economies in sub-Sahara Africa depend heavily on either oil or mineral wealth. Extraction and exploration of these natural resources are the main sources of government revenue, and employment for the surrounding communities. Since the 1970s, the SSA region has seen an increase in the number of countries that depend heavily on extracting natural resources. These countries are acutely vulnerable to the "Resource Curse, and the Dutch Disease" (Larsen, 2006). This trend is increasingly evident with countries dependent on fuel and non-fuel commodities, such as cobalt, copper, diamonds and gold (Haglund, 2011, 2012; Larsen, 2006).

The Oxford Policy Management report for 2011 (Haglund, 2011) indicated that countries highly dependent on oil and mineral exports are often at risk of falling victim to the resource curse. The report identified 14 countries in the high risk category: Angola, Burkina Faso, Cameroon, Chad, Cote d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Ghana, Mali, Mauritania, Nigeria, Sudan, Tanzania and Zambia. Nine other countries are classified as either low or medium risk.[13] Furthermore, economic development studies show that commodities-dependant countries exhibit a low GDP *per capita* and low economic growth despite having substantial extractive resources (see inter alia: Brunnschweiler, 2008; Haglund, 2011, 2012; Hilson & Maconachie, 2008; Larsen, 2006; Mehlum, Moene & Torvik, 2006). However this finding is contradicted by other studies that have identified evidence of a positive effect of commodities on long-term growth in the developing countries (for details, see: Collier & Goderis, 2012; Deaton & Miller, 1995; Raddatz, 2007).

Globalisation has enabled the expansion of commerce and industry in most parts of the SSA region. However, most of the population, especially in rural areas, depend on agriculture as an important source of livelihood (Collier & Dercon, 2014; FAO, 2012). The agricultural sector employs more than two-thirds of the total workforce in the SSA region (FAO, 2012, p.25-59; WorldBank, 2012). According to the 2014 report of the Food and Agriculture Organisation (FAO), the agricultural sector accounted for about 16 percent of the regional GDP of SSA in 2010 and 2011.[14] In addition, approximately 60 per cent of the cultivated land was used for subsistence and semi-subsistence agriculture. The commonly grown foodstuffs for the local and urban markets include the following: cloves, coffee, pineapples, cotton, cocoa, sugar, tea, maize, rubber, sisal, groundnuts, palm oil, vegetables, pulse, cereals, citruses, mangoes, bananas, gum Arabic and tobacco (FAO, 2012).

[13] The nine countries in low and medium risk categories are: Botswana, Central African Republic, Guinea, Mozambique, Namibia, Rwanda, Sierra Leone, South Africa, and Zimbabwe.

[14] Food and Agriculture Organisation Report 2014 – "State of Food and Agriculture". Accessed on 15th October, 2015, and available at (http://www.fao.org/publications/sofa/2014/en/?%DC%3B%BB%03)

There are important implications for countries that depend heavily on the extraction of natural resources, mostly copper, diamonds, crude oil and gold. Thus, any weakness in the prices of these natural resources imposes negative effects on the economies of those commodity-exporting countries. One example is the 2015 slump in oil and mineral prices; as a result, countries such as Angola, Nigeria, South Africa and Zambia witnessed currency depreciation and sluggish economic growth. These episodes underline the urgent need for economic diversification away from dependency on natural resources into agriculture, manufacturing and tourism.

2.4 Overview of Microfinance in the sub-Saharan African Region

According to Miranda and Gonzalez-Vega (2011), microfinance can be described as the provision of one or more financial services such as deposit facilities, microcredit, insurance and payment services; these are offered by applying innovative credit technologies and ways of producing other services, in circumstances in which traditional banking technologies would not be profitable or sustainable. (Ledgerwood et al., 2013; Robinson 2001).

Microfinance is an emerging industry providing financial services to poor people globally. As noted in the preceding chapter, microfinance is the fastest growing segment of the financial sector in the SSA region, apart from the insurance industry (UN, 2013). Previously, MFIs focused primarily on providing uncollateralised microcredits to poor households and micro-enterprises. Recently, the microfinance industry has evolved from providing only microcredit to offering a wide range of services which include microsavings, micro-housing, microinsurance, microenterprise training, micro-consignment, and micro-franchising (Chikalipah, 2017a; Van Kirk, 2010).

Players in the microfinance industry have continued to develop more efficient methods of delivering products with the objective of meeting the increasingly diverse financial needs of the target market. One recent innovative development has been mobile money services, such as M-Pesa, which are predominantly used for money transfers (Aker & Mbiti, 2010; Mbiti & Weil, 2011; MMU, 2013).[15] In contrast to other forms of bank lending, microfinance institutions largely apply group liability lending; this approach reduces the risk of default because it allows for peer monitoring (Stiglitz, Emran & Morshed, 2011; Stiglitz & Hoff, 1990).

2.4.1. Microcredits and Microsavings

Microcredit is defined by Grameen Bank (Ghai & Bank, 1985; Yunus & Bank, 1994) as "small loans extended to the impoverished borrowers for undertaking self-employment projects that would generate income and enable them to provide employment for themselves and their families". According to Latifee (2003), microcredit referred to "programmes that are poverty focussed and that provide financial and business services to the poor people for generation of self-employment and income and it is a powerful instrument to fight poverty." A similar study by Manimekalai (2004), arrived at the same view and argued that "microcredit is always dovetailed with thrift," and therefore, microfinance is a more appropriate expression rather than microcredit (Banerjee et al., 2015).

There are two types of microcredits offered by microfinance institutions; these are microenterprise and household loans. Between 2003 and 2011, microenterprise loans

[15] A related point is that mobile money services are different from mobile banking services. To be specific, mobile money services allow users to access financial services using mobile phones without having a formal bank account. In contrast, mobile banking services allow customers to use mobile phones to manage their bank accounts.

accounted for more than 88 percent of the gross loan portfolios of the SSA region (MIX, 2013a). The profit oriented MFIs deliberately target salaried workers and micro-business owners to diversify risk and promote stable revenue growth (Caudill, Gropper & Hartarska, 2009). According to the MIX market data for 2011, the average loan size for the profit-oriented firms in SSA was in the region of USD 1,200 compared to USD 220 for the non-profit seeking MFIs.

Microsavings can be regarded as the portion of disposable income that is not consumed (Dupas & Robinson, 2013a, 2013b). Thus, microsavings are small deposit accounts with either no or small service charges; these are acclaimed as an incentive for people with lower income to save money (Grayson, Dowdle, Beck & Khatami, 2013; Morduch & Armendáriz, 2010; Stewart, Van Rooyen, Korth, Chereni, da Silva & De Wet, 2012). According to CGAP (2009), the requirement of compulsory microsavings and the mobilisation of voluntary microsavings suggests two different viewpoints. The former assumes that poor people must be taught about microsavings to promote financial discipline. The latter is grounded on the view that poor people already know about saving and what they require are appropriate products and services.

Ledgerwood et al. (2013) differentiated between compulsory and voluntary microsavings by stating that compulsory microsavings represent funds that must be contributed by borrowers as a condition for receiving a microcredit. Moreover, compulsory microsavings could be regarded as part of a microcredit product rather than as an actual microsaving product since these are so closely tied to receiving and repaying the microcredit. Conversely, voluntary microsavings do not form part of the conditions for accessing microcredit services. Moreover, with voluntary microsavings, customers can deposit and withdraw funds at liberty (Richardson, 2003).

2.4.2 Types of Microfinance Institutions

According to Nair (2001), “microfinance institutions are those that provide microsavings, microcredits and other financial services and products of small amount,” mainly to poor people, with the aim of elevating their income levels and improving their living standards. Cull, Demirgüç-Kunt & Morduch (2009a) outlined the enormous benefits that microfinancing have brought to financially excluded communities. These include: (i) savings facilities, (ii) access to microcredit, (iii) reduction of transaction costs for both lenders and borrowers via peer monitoring and group lending, and (iv) a remarkable degree of empowerment, particularly for poor women.

This study adopts the MIX (2013b) classification of MFIs. These are categorised on the basis of their established legal charters: Micro-banks (MBs), Co-operative and Credit Unions (CCUs), Non-Governmental Organisations (NGOs) and Non-Banking Financial Institutions (NBFIs).

1. Micro-bank (MB) is a licensed financial intermediary regulated by a state banking supervisory agency, mainly by the central bank. It may provide a number of financial services such as deposit mobilisation, lending, payment services and money transfers (Morduch & Armendáriz, 2010).

2. Co-operative or Credit Union (CCU) is a non-profit member-based financial intermediary that offers a range of financial services for the benefit of its members, including lending and deposit mobilisation. In many countries, CCUs are regulated either by Central banks or by the societies' regulatory authority (Omino, 2005).

3. Non-Governmental Organisation (NGO) is an organisation registered as non-profit for tax purposes. The financial services of NGOs are restricted and do not often involve mobilising microsavings from customers. NGOs are typically not regulated by banking supervisory authorities, but as a rule they would be supervised by a Charities Act or similar (Nair, 2001; Omino, 2005).

4. Non-Banking Financial Institution (NBFI) is a financial institution that provides similar services to those of a bank. NBFIs are licensed under a separate category because of low capital requirements and limitations on financial services they can offer; they are often supervised by a separate state agency (Cull, Demirgüç-Kunt, & Morduch, 2010; Morduch, 2000). In many countries in SSA, central banks have specific legislation for the microfinance industry and the NBFIs.

2.4.3 The Evolution of Microfinance Sources of Financing in the SSA Region[16]

The microfinance industry has evolved and the same applies to its sources of financing. The composition of the funding structure started changing in the mid-2000s. As shown in Figure 2.2 below, the main sources of financing for the microfinance institutions in the SSA region have been deposits, equity, and debt. Figure 2.3 presents the evolution of total funding for MFIs in that region.

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[16] This section has been developed into a journal article titled "Optimal sources of finance for microfinance institutions in sub-Saharan Africa." As of September 2018, this article has been accepted for publication in the *Journal of Development in Practice*.

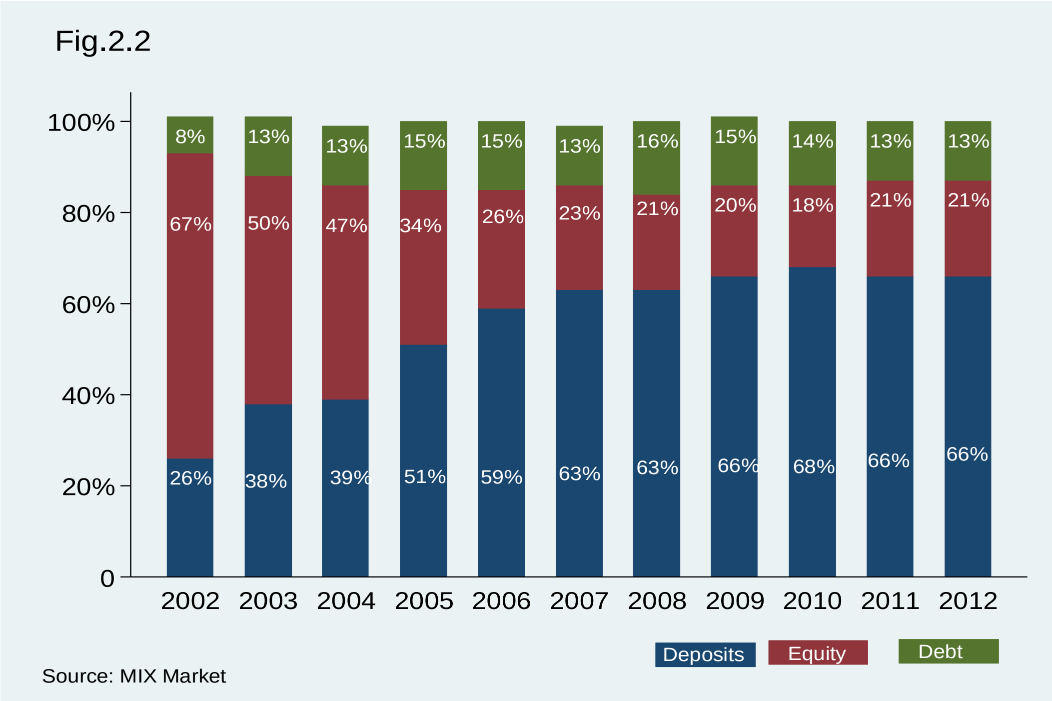


Fig. 2.2: the evolution of sources of financing in the microfinance industry in the SSA region for the period 2002 to 2012. The data used in this graph are for MFIs that submitted financial reports to the MIX markets between 2002 and 2012.

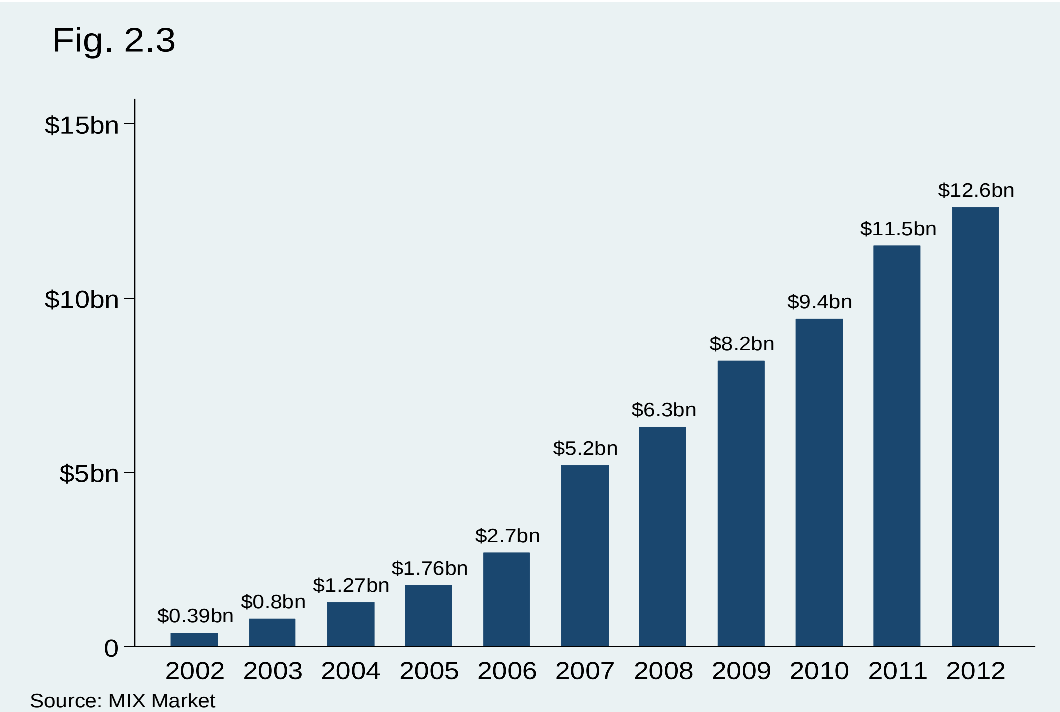


Fig. 2.3: the growth of total funding for MFIs in the SSA region between 2002 and 2012, using the MIX market data for the sub-Saharan African region. The total funding includes Deposits, Debt, and Equity.

2.4.4 Microfinance Interest Rates Ceilings in the SSA Region

As noted earlier in section 1.2 of this thesis, many countries in the SSA region have set microcredit interest rates ceilings in an attempt to curtail the industry's persistently high microcredit interest rates. Those countries include: Benin, Burkina Faso, Cameroon, Central Africa Republic (CAR), Chad, Code d'Ivoire, Congo Republic, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Mali, Mauritania, Namibia, Niger, Nigeria, Senegal, South Africa, Sudan, Togo, Zambia, and Zimbabwe (Maimbo & Henriquez Gallegos, 2014, p.7). The primary motive for imposing interest rates ceilings is based on the view that microcredit interest rates are usurious. Therefore, microcredit borrowers must be protected (Mitra, 2009).

Before these 24 countries introduced interest rates ceilings, some MFIs were charging interest rates in excess of 100 percent.[17] However, critics argue that the interest rates ceilings do not necessarily protect poor borrowers; on the contrary, ceilings hurt them as they limit access to financial services (Helms & Reille, 2004). Also, interest rate ceilings drive microfinance providers out of the market leaving the poor customers to seek alternative sources of finance, such as unregulated informal credit markets (Maimbo & Henriquez Gallegos, 2014). The body of literature on the effect of interest rates ceilings on the microfinance industry is limited. However, anecdotal evidence presented by microfinance industry experts indicates that it is difficult to enforce interest rates ceilings (Helms & Reille, 2004). Furthermore, they argue that the only way of fostering lower microfinance lending interest rates is to allow competition within the industry and to improve consumer protection (Helms & Reille, 2004; Mbengue, 2013).

[17] As indicated in chapter 1, Cameroon and Zambia are notable instances: before microcredit interest rates ceilings were introduced, MFIs charged more than 100 percent interest on microcredits. Cameroon introduced microcredit interest rates cap in 2013, imposing maximum rates of about 25 percent. Zambia introduced interest rates caps in January 2013, and capped the lending interest rates at about 42 percent.

Helms and Reille (2004) argued that when faced with interest rates ceilings, MFIs retreat from the market, forcing vulnerable and poor clients to revert to informal credit markets. These informal markets are monopolised by unregulated moneylenders and often offer loans with short maturity periods and draconian conditions. It has also being argued that interest rate ceilings reduce industry transparency, as many MFIs habitually introduce hidden fees in order to circumvent interest rates limits (Mitra, 2009). Some of these hidden fees include insurance costs, mandatory savings, and microcredit processing fees.

Helms and Reille (2004) provide the following evidence of market contraction as a result of interest rates ceilings in the microfinance industry. Thus, in 2001, Nicaragua introduced an interest rate ceiling for the microfinance industry. The growth of MFIs in that country fell by almost 30 percent and many MFIs withdrew their presence in rural areas. As a second example, in the early 2000s, the central bank of West Africa (BCEAO)[18] imposed an interest rate ceiling of about 27 percent for all non-bank lenders. As a result, many MFIs withdrew from serving the poor by increasing the average loan sizes. Moreover, many MFIs withdrew from serving clients in the rural areas. Similar events have been reported in Bolivia, Morocco, and Tunisia (Helms & Reille, 2004).

A thorough search of the literature on the effect of interest rates ceilings on the microfinance industry has yielded only a limited number of articles, all of which were anecdotal; most of these have been cited above. It would seem that this is an interesting and important issue that merits investigation in future.

[18] **BCEAO** abbreviates the **B**anque **C**entrale des **E**tats de l'**A**frique de l'**O**uest, which translates to the Central Bank of West Africa. The BCEAO serves 8 West African countries that are in monetary union: Benin, Burkina Faso, Guinea-Bissau, Côte d'Ivoire, Mali, Niger, Senegal and Togo.

2.4.5 Challenges faced by the Microfinance Industry in sub-Saharan Africa

The microfinance industry in sub-Saharan Africa faces a specific set of challenges, which often cannot be tackled with solutions meant for traditional banks (for a review of these challenges, see: Demirgüç-Kunt, 2012; Dupas & Robinson, 2013a; Fenske, 2013; Chikalipah, 2017b).[19] Those common challenges, which are specific to the microfinance industry include:

1. Costs of Outreach: the provision of financial services to the poor in society entails providing them with small loans or microsavings facilities. Moreover, the unbanked populations are often widely dispersed, which means that they can be unprofitable for MFIs unless system automation exists, with mobile money service delivery (Jack & Suri, 2014).

2. High Transaction Costs: inherently high transaction costs are a major challenge for MFIs operating in the SSA region. The high costs arise because the volume of transactions is small, but the fixed administrative costs of those transactions are high (Chikalipah, 2017b).

3. Capital Constraints: the microfinance industry has enjoyed very rapid growth and has been instrumental in extending financial services to the poor, especially to people in the rural peripherals (UN, 2013; WorldBank, 2015). Despite this rapid growth, the industry lacks the upfront investments (capital) required to purchase the necessary digital technology needed to drive operational efficiency (Morduch & Armendáriz,

[19] Note that some of these challenges were highlighted briefly in section 1.3 of this thesis. Likewise, section 8.2 reviews the challenges of extending financial services to the poor in SSA.

2010). Better operational efficiency could support the growth and profitability of the industry.

4. Regulation rigidity: a growing number of countries in sub-Saharan Africa have or are in the process of enacting industry-specific microprudential regulations for the microfinance sector (for further details, see section 4.4 in chapter 4 of this thesis).[20] In spite of that, the microfinance industry is still faced with incoherent microprudential regulations. Moreover, the regulatory environment in SSA is often weak, rigid and out-dated (Baydas et al., 1997).

5. Cultural Barriers: there are also cultural barriers which often lead to the staff and managers of some microfinance institutions perceiving the poor as being unbankable (Dupas & Robinson, 2013a). This situation is common with profit-oriented microfinance companies that target salaried workers and small business enterprises. Furthermore, commercial banks shy away from offering microfinance services because of negative perceptions which have arisen, following failed programmes by governments in providing finance to the poor. Nevertheless, these perceptions are slowly changing.

6. **Lack of Trained Personnel**: the microfinance industry often lacks efficient and trained staff at management level in the local branches and also lacks experts specialised in microcredit risk modelling. This shortcoming impedes the growth of the

[20] Since 2010, a number of countries in SSA have introduced industry-specific microprudential regulations for the microfinance sector. A four-tiered financial regulatory framework is common in SSA, and comprises: **TIER 1** for commercial banks; **TIER 2** for Credit (only) institutions; **TIER 3** for Microfinance-deposit-taking institutions (MDIs), which are allowed to take deposits from the public under supervision by central banks; and, **TIER 4** for non-deposit-taking institutions (NDIs), and small member-based institutions.

microfinance industry and hinders the extension of the microfinance services and products to the poor. Correspondingly, the lack of well-trained employees, to a large extent, leads to microcredit delinquencies precipitated by lack of understanding of the customers and the microfinance market.

2.4.6 Subsidies in the Microfinance Industry

It is estimated that international donor organisations pledge more than US$ 1 billion per annum to the global microfinance industry (Hudon, 2010). Additionally, donations and subsidies have undeniably helped to extend financial services to more than 200 million poor people worldwide (WorldBank, 2015). However, the effectiveness of subsidies in alleviating poverty remains a contentious topic in academic and policy circles (Hudon & Traca, 2011). On the one hand, some critics with egalitarian leanings argue that the poor should pay low and subsidised microcredit interest rates. On the other hand, academics with neo-classical views argue that market forces should determine the optimal microcredit interest rates (Armendariz & Morduch, 2005; Lucas, 1990).

It has been suggested that excessive subsidisation of the microfinance industry constrains sustainability regarding the provision of microfinance services to the poor and also undercuts operational efficiency (Hudon, 2010). This concern is based on the view that subsidies distort market mechanisms, and allow MFIs to remain operationally inefficient (Bateman, 2010). In contrast to this view, Hudon and Traca (2011) found evidence that the level of subsidies granted per year is positively associated with management quality. D'Espallier et al. (2013) argued that a lack of subsidies has a negative effect on the social performance of MFIs and this finding applied to all regions of the world; for example, they serve fewer women. Similarly, Armendariz and Morduch (2005) argued that “smart subsidies” are necessary to build infrastructure for the efficient operation of MFIs.

Surprisingly, there is a scarcity of empirical evidence on the effect of subsidies on microcredit interest rates. The one notable study of this topic is that of D’Espallier et al. (2013), who observed that 23 percent of the world’s MFIs operate without any form of donations and subsidies. These writers also found that unsubsidised MFIs charge higher lending interest rates than subsidised ones. We hold a firm view that subsidies and donations could possibly influence microcredit interest rates. In light of this, future studies should attempt to explore this gap in research.[21]

2.5 Financial Sector and Penetration in sub-Saharan Africa

Although nearly all sub-Saharan African countries made significant reforms to the financial sector in the 1990s, that sector remains under-developed when compared to the standards of other developing regions. In terms of financial inclusion, only about a quarter of the adults in sub-Saharan Africa have access to formal financial institutions (World Bank, 2015). Also, only five percent of the adults have a loan at a formal banking institution in the SSA region (Allen, Carletti, Cull, Qian, Senbet & Valenzuela, 2014). The extension of financial services to the poor clientele requires overcoming many challenges, especially in the rural parts of SSA. The main challenges include low population density, poor infrastructure and telecommunications, and financial illiteracy (Chikalipah, 2017b). Barriers against financial inclusion are discussed in chapter 8.

[21] It is important to note is that our dataset does not have such variables.

According to data provided by the World Bank (2012), bank penetration in terms of branches per 10,000 people is also rudimentary. Southern Africa, overall, has about six bank branches per 10,000 people, whereas West and Central Africa have about two bank branches per 10,000 people. The East African sub-region has the lowest bank account penetration in the region at 1.8 branches per 10,000 people. Similar statistics apply for Automated Teller Machines (ATMs) across the region: overall, Southern Africa has about 50 ATMs per 100,000 people, followed by West Africa with 10, Central Africa 6, and East Africa with 5.

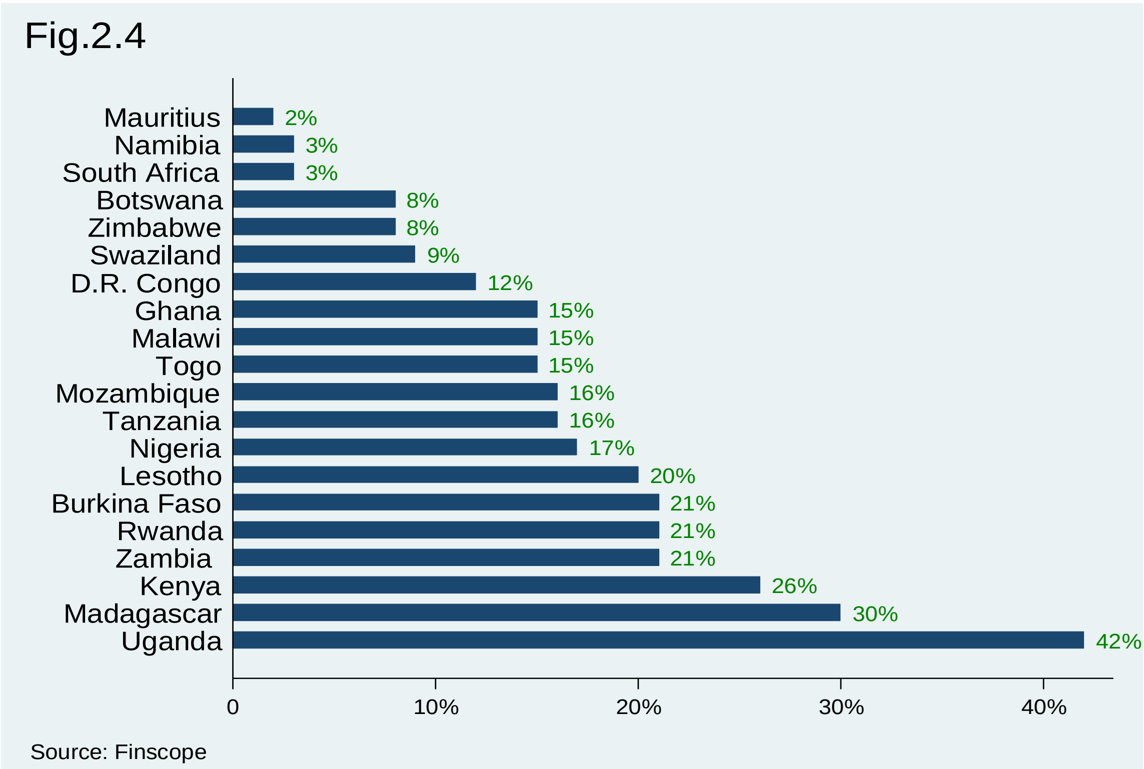


Fig. 2.4: access to the informal financial sector in the SSA region between 2010 and 2013. Data is based on FinScope customer surveys conducted by FinMark Trust in 20 countries of SSA region between 2010 and 2014 **(**http://www.finmark.org.za**).** The percentages indicate the adult population accessing the informal sector of finance.

Because of low financial inclusion rates in the SSA region, the informal finance sector naturally substitutes the formal sector. As noted previously, credit from informal sources of finance which are mostly dominated by the private moneylenders, in generally expensive, with short maturity periods and subject to harsh conditions (Aterido, Beck & Iacovone, 2013). It has been argued that extortionate interest rates and short maturity periods mean that credit from the informal sector is unattractive for working capital and investments for borrowers (Madestam, 2014). Figure 2.4 indicates the extent to which the informal financial sector is utilised in the SSA region.

There is a strong inverse relationship between the overall level of financial inclusion in a country and access to the informal financial sector of the economy (Demirgüç-Kunt et al., 2015). In Uganda, for example, 42 percent of the adult population use the informal finance market and this is almost twice the number using the formal financial sector. In contrast, Mauritius, Namibia and South Africa have the lowest percentages of the adult population accessing the informal financial sector. This is because of the high proportion of the adult population accessing the formal banking services. According to the Global Findex (2014) survey, there are over 100 million adults in the SSA region using informal methods of finance (Demirgüç-Kunt et al., 2015, p. 388). This evidently shows how large the informal financial sector is in the SSA region.

2.6 Mobile Money Services in sub-Saharan Africa

As indicated in section 1.9 the objective of this study is not to explore the effect of mobile money services on microcredit interest rates in SSA. Nevertheless, this study will now highlight the evolution of the mobile money industry in the SSA region. It will also give some insight into the extent to which mobile money services are used in the SSA countries. Moreover, mobile money services are part of the microfinance industry.

The mobile money industry in SSA is the largest in the world, accounting for more than half the mobile money services worldwide (Jack & Suri, 2014). In addition, mobile money services are increasingly becoming an important vehicle in the financial inclusion agenda in the region (Donovan, 2012). The development of mobile money banking services started in the 2000s, in Kenya with M-Pesa, which is a mobile phone-based service that facilitates money transfers and remittances, predominately among the poor. The M-Pesa platform is primarily used to transfer money between individuals and it is not a financial vehicle for savings. However, in some countries, for example Zambia, the monetary authorities are enacting regulations that will force mobile money providers to pay monthly interest on microsavings held in the mobile money accounts. Also, M-Pesa users in East Africa can purchase micro-insurance using the same user interface.

According to the World Bank Global Financial Inclusion 2011[22] report, about 67 per cent of the adult population in Kenya used a mobile telephone to receive money and 60 percent to send it. The rapid spread of mobile banking in Kenya, is partly because the parent company of M-Pesa, Safaricom, controls two-thirds of the telecom market in Kenya. On a related matter, the mobile banking industry is growing rapidly in the sub-Saharan African region, where mobile money services are available in 34 of the 49 countries of the region (MMU, 2013).

By end of 2011, there were more than 33 mobile money providers with a combined total of more than 98 million users, which is twice the number of Facebook users in the entire SSA region (Citi, 2013). In Kenya, Madagascar, Tanzania and Uganda, there are currently more mobile money accounts than traditional bank accounts (MMU, 2013). Understandably,

[22] Global Findex 2011 dataset (http://www.worldbank.org/en/programs/globalfindex)

there are mobile money providers and MFIs that are exploring collaboration, bearing in mind that mobile money services are an affordable and convenient channel that can be used for loan disbursement and repayments (Citi, 2013). Evidently, this could help overcome some operational challenges faced by the MFIs.

Despite the smooth and rapid development of the mobile money banking industry in the sub-Saharan African region, there is some downside to this disruptive technology. Generally, the mobile money services are faced with the following threats: (i) threats to security emanating from potential cyber fraud, (ii) possible breaches of customer confidentiality through data theft, (iii) money laundering and system failure especially during peak time which is during month-ends and Friday afternoons (Aker & Mbiti, 2010; Mbiti & Weil, 2011). In spite of these threats, the mobile money services offer the best and most cost-effective method that is contributing to financial inclusion in the SSA region.

2.7 Challenges and Risks to Stability in sub-Saharan Africa

The sub-Saharan African region is diverse in its history and geography as well as in political and economic development, social cohesion, and the extent and occurrence of previous destabilising episodes. The 49 countries of the SSA region face common challenges, which include the following: rapid population growth, dependence on natural resources, high prevalence of diseases, conflict over ethnicity and religion, and poverty and inequality (Ezeh et al., 2012). These challenges and risks can create instability in the region if they remain unaddressed.

1. Rapid Population Growth: moderate rates of population growth can trigger a surge in economic growth, presenting a golden opportunity for the economy to reap a demographic dividend (Downie & Cooke, 2011; Ezeh et al., 2012). This results in expansion of the middle class and growth of the working-age cohort (Lee & Mason, 2006, 2007). However, rapid population growth comes with its own challenges.

Thus, the population of the sub-Sahara African region is rapidly rising and this growth puts pressure on public services and infrastructure. The public services such as healthcare, education and municipal functions, are already inadequate in the region. Also, the workforce in the public sector is inefficiently trained. Many countries have weak infrastructure such as roads, water supply and power generation. Consequently, any attempts by the governments to overcome these challenges are made difficult because of population growth. The current rate of population growth in SSA has surpassed the carrying threshold, resulting in a socio-economic burden (Hove, Ngwerume & Muchemwa, 2013). The SSA region lacks the capacity to provide new services and build infrastructure, which are necessary for the growing population (Ezeh et al., 2012).

Finally, rapid population growth also retards economic growth because of a high ratio of young to working age people; this reduces income per head and decreases overall family savings (Brueckner & Schwandt, 2014). Also, if public services are strained because of rapid population growth, then poor health care can result (Ezeh et al., 2012; Lee & Mason, 2007).

2. Natural Resources Dependence: extractive industries are mostly owned by Multi-National Companies (MNCs). The arrival of these MNCs often cheers the members of local communities in SSA. They are seen as opportunities for new jobs, increased government revenue, a boost in income for local contractors and possibly even improvement in infrastructure.[23] It is undeniable that, when workers' salaries are re-invested in the local economy, a positive effect results and promotes the wellbeing of local communities (Haglund, 2011, 2012).

However, the literature shows that extractive industries have mixed effects on local economies (Brunnschweiler, 2008; Downie & Cooke, 2011). Host countries of these MNCs usually experience appreciation of their local currencies because of a surge in exports of commodities. As a result, their non-natural resource exports become less competitive: this situation is commonly termed the Dutch Disease. Moreover, the unpredictable nature of revenue from the MNCs increases the risk of rent-seeking and corruption among government officials (Brunnschweiler, 2008; Hilson & Maconachie, 2008; Larsen, 2006; Mehlum et al., 2006; Tiruneh, 2006).

Furthermore, there is also a risk of labour displacement and loss of semi-skilled workers who are taken away from the farming and manufacturing sectors into the extractive industries. The arrival of immigrants in search of jobs in extractive industries regularly puts pressure on surrounding communities and public services (Downie & Cooke, 2011).

Finally, countries dependent upon commodities show lower levels of economic development than countries that do not export commodities (Brunnschweiler, 2008). An increasing number of studies have reported a significant negative correlation between poor governance and the commodities-dependent countries. Likewise there seems to be a strong negative correlation between the commodities-dependent countries and GDP *per capita*

[23] It is common for MNCs to build roads, local hospitals and schools as part of their corporate social responsibility (CSR).

growth (see for example: Brunnschweiler, 2008; Haglund, 2012; Hilson & Maconachie, 2008; Larsen, 2006; Mehlum et al., 2006).

3. High Prevalence of Diseases: the sub-Saharan African region carries a significant burden imposed by a high prevalence of diseases. In many, if not all, countries in the SSA region, the health care systems are poorly-funded and under-staffed and struggle to cope with the burden of infectious, communicable and chronic diseases (Abegunde, Mathers, Adam, Ortegon, & Strong, 2007; WHO, 2013). The main causes of death in the region are infectious diseases, especially HIV/AIDS[24], tuberculosis and malaria, which account for about two-third of all deaths. Chronic diseases such as cancer, cardiovascular diseases, diabetes and respiratory diseases are also on the increase due to changing lifestyles, especially among middle-class families (Geneau, Stuckler, Stachenko, McKee, Ebrahim, Basu & Beaglehole, 2010).

Since the early 1980s, the HIV/AIDs pandemic has marked a severe development crisis in the SSA, which remains by far the worst affected region in the world. In 2011, it was estimated that 70 percent of the global population of HIV/AIDS infected people lived in the SSA region (WHO, 2014b). Furthermore, the estimated number of children orphaned by HIV/AIDS in the region is about 11 million (WHO, 2014b). According to World Health Organisation (WHO) estimates, the epidemic claims approximately 2 million lives annually. The most infected age group is the productive generation, aged between 35 and 55 years (Deeks, Lewin & Havlir, 2013; Eyitope-Ille-Ife, 2004; Fauci & Marston, 2013; WHO, 2014a). The economic and social impact of HIV/AIDS in the SSA region exceeds that of war, famine and drought (Deeks et al., 2013).

[24] HIV = Human Immunodeficiency Virus. AIDS = Acquired Immunodeficiency Syndrome. HIV is the virus that causes AIDS.

Tuberculosis (TB) is the second leading cause of death worldwide, and only second to HIV/AIDS. In 2011, there were 1.5 million deaths from the disease and 95 percent of TB deaths occur in low-income countries (WHO, 2014c). TB was, and still is, the leading killer of HIV positive patients. Unlike HIV/AIDS, TB is curable and mortality rates have therefore fallen in the past 20 years; thus, the death rates have reduced by 45 percent between 1990 and the end of 2010 (O'Grady, Hoelscher, Atun, Bates, Mwaba, Kapata, & Zumla, 2011). TB has had a heavy effect on the most productive age group and has exerted pressure on the public health care systems.

Malaria continues to be a scourge of sub-Saharan Africa and of the 500 million cases of malaria that occur worldwide annually, about 90 percent are in the region. Malaria mostly affects children under the age of five, and of the total global malaria deaths, 85 percent are children (WHO, 2013). Moreover, a child below the age of five dies of malaria every minute in the SSA region. Malaria does not just impact the future generation of the region; it also lowers economic productivity because workers are absent because of sickness (Jobin, 2014).

The burden of chronic disease is the new challenge facing the SSA region. The WHO predicts that in the next decades, the region will witness a sharp rise in death rates from cardiovascular diseases, cancer, diabetes and respiratory diseases (WHO, 2005). The rising morbidity and mortality is attributed to increased life expectancy, poverty, changing lifestyle of the growing middle-class and globalisation (Geneau et al., 2010). There is no doubt that the rising incidence of chronic diseases has an economic impact on families, health care systems and on governments.

4. Ethnicity and Religion: the sub-Saharan African region is diverse in culture and tradition. Ethnicity is perhaps the most important form of identity in the region. Some sub-Saharan African countries have suffered tensions along ethnic lines. For example, the 1994 Rwandan genocide, and the 2008 post-election massacre in Kenya, provides the clearest examples of ethnic polarisation (Kagwanja, 2009; Schaal & Elbert, 2006). Regrettably, politicians make increasing references to ethnic and tribal groupings for their advantage during elections.[25] The degree to which ethnicity is a root cause of conflict in the SSA is subject to debate; however, there is a danger that tensions similar those experienced by Rwanda and Kenya might occur and pose a risk to the stability of the SSA region.

Religion is also an important form of identification within the sub-Saharan African region. Religious differences have not emerged as a source of instability in the region. However, recent Islamic terrorist groups have targeted Christians in Kenya, Nigeria and Somalia. Furthermore, the 2011 referendum that led to splitting Sudan into two sovereign states was campaigned on religious lines; Christians in the South, and Sunni Muslim in the North. Therefore, religious differences can cause instability in the region especially if corrupt ruling elites keep manipulating the uneducated local communities (Jensen & Justesen, 2014).

5. Poverty and Inequality: in almost all the sub-Saharan African countries, poverty and economic inequalities are a source of division and potential conflict. Economic inequality is evident in different ways and two of the most important are the “rural-urban divide” and the “intra-urban divide” (UN-Habitat, 2010). Although most of the SSA region is rapidly urbanising, only Botswana and Angola have most of their population living in urban areas

[25] In Zambia, general elections are often fought on tribal lines, and the final voting patterns revealed nothing more than that.

(UN-Habitat, 2010). Elsewhere in the region, most people dwell in rural areas and depend on subsistence agriculture as a main source of livelihood (FAO, 2012; UN-Habitat, 2010).

The unequal distribution of wealth is a potent source of grievance and a possible catalyst of conflict. In 2008, unemployed South Africans killed 49 migrant workers from Zimbabwe, Mozambique and Malawi: this incident provides a recent example of citizens' strong expression of discontent with economic inequality (Hickel, 2014).

Finally, oil-producing regions such as the Niger Delta in Nigeria and Cabinda in Angola have seen a vast rise in differentials in wealth, which stoked grievances in the local communities (Downie & Cooke, 2011). If poverty and inequality remain unaddressed then violence could break out and cause instability. The Niger Delta in Nigeria is already experiencing the burning of Dutch Shell oil pipelines by local militias (Zabbey & Uyi, 2014).

2.8 Conclusion

There were four motivations for this chapter. The first of these was to provide brief facts about the SSA region, with the aim of providing a clear foundation for the following chapters. The second was to describe the state of the microfinance industry in SSA, while overviewing the microcredit interest rates ceiling and mobile money banking services. Thirdly, the aim was to evaluate the overall state of the financial sector, and to appraise the extent to which the financial industry is utilised in the SSA region. Finally, the aim was to highlight the challenges and risks to stability in the region, while providing details of some scenarios that could threaten stability in SSA, and exacerbate uncertainty in its financial markets.

Lastly, this chapter has shown that despite positive and extensive reforms to the financial sector, initiated in the 1990s, the financial sector in the SSA is still rudimentary, concentrated predominantly in the urban areas and lacking in depth. More and more development economists tend to agree, strongly, that development of the financial sector contributes to economic growth. (Barr, 2005; Berthelemy & Varoudakis, 1996; Hermes & Lensink, 2013; Levine, 1997). In view of that, the rapid growth of the microfinance industry not only promotes the financial inclusion agenda, but could also promote financial sector development in the SSA region (Hermes, Lensink & Aljar, 2009).

CHAPTER THREE

THEORIES OF BANKING, INTEREST RATES, AND MICROFINANCE

3.1 Introduction

This chapter presents the theoretical framework supporting this study and gives an overview of the authoritative studies that have shaped the analysis on banking, interest rates and microfinance. This review is not exhaustive but aims at highlighting theories, which are relevant to investigating the factors that influence lending interest rates in the microfinance industry. This is especially important if one considers that this study's research approach is post-positivistic. Although the contributions of early theories on banking and related models are acknowledged, emphasis is placed on models founded on microeconomics (for example: Allen & Santomero, 2001; Bhattacharya & Thakor, 1993; Freixas & Rochet 2008; Klein, 1971; Pyle, 1971; Santomero, 1984). Given the broad nature of early models on interest rates, this chapter makes reference to the intuitive and influential work by Fisher (1930), Keynes (1937) and McKinnon (1973) as sources of interest rates theories.

A starting point for the review of literature is to recognise why banks and microfinance institutions exist and the roles they perform in an economy (Morduch & Armendáriz, 2010; Werner, 2016). As noted previously, the basis on which the microfinance industry is founded is to provide financial services, often exclusively to the financially excluded poor people in society. It is this essential yet special function that distinguishes traditional banks from MFIs. However, these are both banks, playing a crucial role of financial intermediation, and their functions have been the central theme of theoretical as well as empirical research in microeconomics of banking (Cull et al., 2009a; Werner, 2016).

The remainder of this chapter is structured as follows. Sections 3.2 and 3.3 discuss the theories of banking and interest rates, respectively. Section 3.4 presents concepts of momentary policy and interest rates while section 3.5 outlines microfinance concepts. Section 3.6 discusses the theoretical justification for this study's methodology and empirical analysis, particularly for chapters 6 and 7. Finally, section 3.7 provides concluding comments.

3.2 Theories of Banking

During the last three decades, the theories of banking have undergone huge configuration due to financial innovations, advances in information economics and option pricing (Beck, Chen, Lin & Song, 2016). However, a full understanding of the role that banks play in a financial system is one of the fundamental issues in economics and more precisely, in the theories of banking (Werner, 2016). This chapter does not delve into differentiating the three types of banking theories: (i) the financial intermediation theory of banking; (ii) the fractional reserve theory of banking, and (iii) the credit creation theory of banking (Werner, 2016). Yet, after careful consideration of these three banking theories, one could confidently claim that the microfinance industry falls under the intermediation theory of banking, which mainly involves collecting deposits and then lending them out. This also extends to non-deposit taking MFIs, which collect funds from investors and then lend them out. The intermediation role of banks is discussed below.

3.2.1 Theory of Imperfect Financial Markets[26]

This section examines the theory of imperfect financial markets and the consequences for financial intermediation, in the context of the microfinance industry. This issue is particularly important if one bears in mind that more than two-thirds of adults in SSA are financially excluded from formal financial services (World Bank, 2015). According to banking theories, banks exist because of imperfections in the financial markets. Consequently, financial intermediation would have lost its *raison d'être* if financial markets were totally perfect. Thus, we posit that the imperfect financial markets in SSA have a very large bearing on financial intermediation and setting of microcredit interest rates (Armendariz & Morduch, 2005).

Theoretically and empirically, it has been established that imperfect financial markets can influence financial intermediation and exert significant effects on the macroeconomic fundamentals (for related evidence, see: De Gregorio & Sturzenegger, 1997; Pringle, 1974; Stiglitz & Weiss, 1981). Specifically, imperfect markets are strongly associated with volatile financial markets, high inflation and an environment of persistently high interest rates (Beck & Hesse 2009). Furthermore, it has been shown that imperfections in the financial market create incentives for moral hazards in the credit markets, particularly in the microfinance industry, where most small loans are provided without any collateral (Stiglitz & Weiss, 1981).

[26] See section 3.6 of this chapter for further details regarding financial market imperfections and credit markets.

3.2.2 What is a Bank?

A bank is a licenced and regulated financial institution that perform a financial intermediation role in a financial system, by granting loans and accepting deposits from the public (Freixas & Rochet 2008). From an operational point of view a bank takes deposits at a relatively low interest rate and make loans at a higher interest rate; the difference between the interest rates applicable to loans and deposits is termed the interest margin or the intermediation cost, which is paid by the customers (Werner, 2016). The interest margin covers a bank's operating expenses and profits (Heffernan, 2005).

The focus of banking institutions can vary and so do the banking methods. In order to cater for complex and diverse banking needs, distinctive kinds of banks exist. Thus, the banking industry consists of the following types of bank: central banks, investment banks, commercial banks, microfinance institutions, and cooperatives banks (Mishkin, 2007, ch.2).

(I) Central banks: also known as reserve banks or monetary authorities, are institutions at the apex of the banking system that are mandated to manage state currency, money supply and interest rates. These banks also regulate and supervise financial institutions and act as a lender of last resort to local banks (Goodhart, Hartmann, Llewellyn, Rojas-Suarez & Weisbrod, 2013). In many countries, the core mandate of central banks is price stability achieved by managing inflation within a set target.

(II) Investment banks: primarily assist corporations and government in raising capital by underwriting and by acting as the agent in the issuance of financial securities. Also, investment banks are involved in mergers and acquisitions and provide other ancillary services, such as financial consultancy and wealth management. Investment banks are also deeply involved in trading financial securities (Freixas & Rochet 2008, pp.15-17).

(III) Retail and Commercial banks: provide fundamental banking services to businesses and individuals. Their main activities involve accepting deposits from the public and providing loans.[27] The deregulation of financial markets has forced commercial banks to compete with investment banks in the money markets, bond underwriting and financial advisory (Beck et al., 2016; Werner, 2016).

(IV) Microfinance Institutions: as mentioned earlier, microfinance institutions are regulated and licenced under different regulatory authorities, and in accordance with the firm's established legal charter. Apart from offering microcredit, MFIs also provide ancillary products such as microsavings, micro-insurances, micro-housing units, micro-franchises and micro-enterprise training (Cull et al., 2009a).

(V) Cooperative banks: are licenced, regulated and established mostly under the relevant Societies Act of a particular country. A cooperative bank is governed by its articles of association and its purpose, essentially, is to provide cheap credit to its members. Cooperative banks, in the SSA region, form part of the MFIs and are an important source of credit for poor communities (Morduch & Armendáriz, 2010).

[27] Other services provided by the banks include debit cards, savings and fixed term deposits, loans and mortgage facilities.

3.2.3 The Banking Models

The main functions of a bank are to collect funds in the form of deposits from customers with surplus funds, then lend those funds in the form of credit to customers with a funding deficit (Freixas & Rochet 2008, p.15; Mishkin, 2007, p.5). An understanding of the roles that banks play in an economy can be derived from the many banking models which together form the theory of the banking firm (Baltensperger, 1980).

The Mont-Klein model (Klein, 1971), considers the equilibria achieved in the banking industry under different market conditions: perfect competition, monopoly and Cournot oligopoly. The basic assumption of the model is that the bank has two primary activities: mobilising deposits and issuing loans. The Mont-Klein model can be simplified as per equation (3.1) and in order for the bank to participate in this activity it should seek to maximise profit under the constraint:

$$\sum_j \pi_j = rL - rD - C(d,l) \qquad (3.1)$$

Where: π represents the total revenue of bank j in a given period (year), rL is interest from loans, rD is interest paid to depositors, and $C(d,l)$ is the cost of managing deposits and loans. Klein's (1971) proposition for equation (3.1) is that the "optimal deposit rate rD is independent of the loan market and vice versa and if the r increases, both r_L and r_D increases.

Bhattacharya and Thakor (1993) reviewed the contemporary theory of financial intermediation and concentrated on gaining an understanding of why financial intermediaries exist, the credit allocation, the contractual nature of new and advanced bank services offered and the optimal design of bank regulations. Their study borrows the analytical framework of Pyle (1971), and argued that a bank is in the position to maximise profit only if:

$$rL > [rD + C(d, l)] \qquad (3.2)$$

In the microfinance industry, equation (3.2) can be re-written to take into account some MFIs that are non-profit seeking, and grounded on the welfarist theory of poverty alleviation. Here, the non-profit MFIs operate under the profit constraints represented either by:

$$\sum_i r\, L_i = \sum_i C(l)_i \qquad (3.3.1)$$

or

$$\sum_i r\, L_i < \sum_i C(l)_i \qquad (3.3.2)$$

Where i = (1…m) and m represents the various types of costs that banks incur in managing loans only, $\sum_i C\,(l)_i = C\,(l)$ and $\sum_i rL_i = rL$.

Therefore, equation (3.3.1) would represent an MFI operating at breakeven point and making neither a loss nor profit. Equation (3.3.2) would reflect an MFI making losses because the cost of providing loans exceeds the returns on the gross loans portfolio.

Equations (3.3.1) and (3.3.2) are based on the assumption that an MFI is not licensed to accept microsavings from customers.

The bank intermediation margin is represented by p, which is the sum of total income receipts less interest related payments; this is given by equation:

$$p = \sum_{j} (rL - rD)_j \qquad (3.4)$$

In equation (3.1), the general proposition for a competitive bank is to set the volume of loans and deposits so that the intermediation margins equal the marginal costs ($p = MC$), where p is the intermediation margin and MC is the marginal cost. Furthermore, it is assumed that rD $\uparrow \Rightarrow$ D $\downarrow$ and rL $\uparrow \Rightarrow$ L $\uparrow$.

In the models by Fama (1980), there is no role for the banks in an economy if the conditions of the general equilibrium theory are satisfied: in other words, all the participating agents, who in this case are depositors and borrowers, behave optimally and the markets clear. In order for the markets to be functioning, i.e. clearing, then the following must apply:

$$r = rL = rD \qquad (3.5)$$

Therefore, there is no role for the bank in general equilibrium, since it makes no profit and has no impact on the agents. This is because the two securities, deposits and loans as shown in equation (3.5), are perfect substitutes and yield optimal returns (Llewellyn, 1999). This leads to discussion of theories of why banks exist, which is the scope of the next section.

3.2.4 Why do banks exist?

Despite banking being one of the world's oldest professions and tracing its roots back as far as the 14th century BC, its core functions are still preserved. Thus, contemporary banking theories divide banking functions into four broad categories: (i) offering access to payment systems, (ii) asset transformation, (iii) managing risks and processing information, and (iv) delegated monitoring of borrowers (Bhattacharya & Thakor, 1993; Freixas & Rochet 2008, p.2; Mishkin, 2007, p.5; Robertson, 1928; Tobin, 1989). The following sections explain the four pillars that have supported the functions of the banks from historical times to date.

1. Offering Access to Payment Services: in a world where transactions carry no cost, there would be no need for money like in a barter based economy. However, this situation does not apply in the real world where assets and services are exchanged for money. Banks play a vital role in a banking system by providing a payment system that manages clients' accounts and the transfer of funds between the accounts of different clients (Herzberg, 2003). Payments are transferred under safe conditions, in a short period of time and at a reasonable cost. Following the deregulation of the financial service industry and the rise of activities financing terrorism, the international transfer of funds between banks has become a centre of attention for government authorities and central bankers (Chick, 1993; Yildirim, 2002).

The evolution of mobile money transfers has challenged the dominant position that the banking industry has enjoyed for centuries as the centre of payment services (Aker &

Mbiti, 2010; Mallat, Rossi & Tuunainen, 2004; Mbiti & Weil, 2011). Despite the rapid growth of mobile money services, such as M-Pesa, the interface for money transfers, the service providers' infrastructure is exclusively supported by commercial banks (MMU, 2013). Therefore, banks will continue to play the vital role of offering payment services in the financial system of any economy for decades, if not centuries to come.

2. Transformation of Assets: Tobin (1989) stressed the need for banks in a society and outlined the advantages of financial intermediation and the bank's function of asset transformation (Brealey, Leland & Pyle, 1977). Asset transformation is a process that is achieved by converting small denominations of short-term deposits into medium and long-term credits offered to the general public and business (Freixas & Rochet 2008, p.4; Mishkin, 2007, pp.32-37).

Some countries in the sub-Saharan African region, for example Ethiopia, Kenya, Nigeria, South Africa and Zambia, permit MFIs to mobilise microsavings from customers (MIX, 2013a). The MFIs that take deposits facilitate economic activities in a financial system. They do so by playing a central role in their niche market, by transforming microsavings from the poor clientele and bundling them into loanable funds (Morduch & Armendáriz, 2010; Van Rooyen et al., 2012). Therefore, MFIs, and particularly those engaged in deposit taking, complement traditional banks in stimulating economic activities in an economy via asset transformation (Cull et al., 2009a).

3. Managing Risk: in risk management, there are three main sources of risks that affect banks: credit risk, interest rates risk and liquidity risk (Freixas & Rochet 2008, p.5; Garten, 1986; Mishkin, 2007, ch.5). The evolution of banking services in the last two decades has introduced another risk that needs mentioning: the risk of off-balance sheet operation (Cornett & Saunders, 2003). Off-balance sheet activities are exclusively accustomed with traditional banks, especially in the advanced economies. Thus, the following paragraphs concentrate on the three risks which are closely associated with the microfinance industry.

(i) *Credit risk*: is the possibility of that the borrower cannot pay back the contracted loan. Historically, when the first loan spread in the Italian towns of Florence, Genoa, Lucca, Siena, Lucca and Venice, the lines of credit were only financed during field harvests. Thus, credit was only issued to viable business activities and the credit risk was small (Bouchaud & Potters, 2000). Also, banks used to finance only fully collateralised loans; however, with time, the degree of risk of loans has increased as banks continue issuing loans without corresponding collateral (Ferguson, 2008; Papachristos, 2011).

Banks mitigate credit risk by verifying a client's income, checking credit scores and by requesting customers to pledge collateral for part of the loan (Cornett & Saunders, 2003). In the microfinance industry, credit risk is managed by peer monitoring for joint liability contracts and through periodical audits of customers and appropriate supervision (Sebstad & Cohen, 2001).

(ii) *Interest rates and liquidity risks:* Freixas and Rochet (2008, p.5), argued that the asset transformation of banks has implications for their management of risks. Banks issue liquid deposits guaranteed by illiquid loans. However, any non-correlation between the due dates of deposit withdrawals and the credit issued could in some instances lead to bank liquidity risk (Gatev, Schuermann & Strahan, 2009). An interest rate risk arises when the cost of funds (e.g. deposit interests) rises above the contractual rates of interest on loans (Angbazo, 1997).

Risks associated with interest rates and liquidity are often mitigated by prudent portfolio management strategies. According to traditional portfolio theories, the larger the portfolio of assets and liabilities, the lower the risk of breach of customer obligations (Cornett & Saunders, 2003; Tobin, 1969). In some instances commercial banks manage interest rates risks through hedging (Acharya & Carpenter, 2002). Interest rate hedging is yet to be explored by MFIs, particularly in the SSA region. However, interest rates and liquidity risks can pose a threat to deposit-taking MFIs, that collect microsavings to finance microcredits (Al Azzam, Mimouni & Sarangi, 2014; Sebstad & Cohen, 2001).

4. Delegated Monitoring: according to the theories of banking, the well-known activity which explains the existence of banks is delegated monitoring. According to Hellwig (1991), the term "monitoring" generally means "screening projects, *a priori* in [the] context of adverse selection, preventing opportunistic behaviour[28] of a borrower during realisation of a project and punishing or auditing a borrower who fails to meet contractual obligations - costly state verification." Therefore, a bank verifies and monitors borrowers with regard to information asymmetry and moral hazard (Merton, 1995). In addition, banks have special

[28] Which is Moral hazard.

skills and have invested in technology that enables them to evaluate creditworthy customers and monitor their projects (Mayer, 1988).

Monitoring of customers is necessary to mitigate credit risk and ensure the repayment of loans. Diamond (1984) developed a theoretical model in which he pointed out that monitoring is a public good that only banks have the incentive to provide, as they have the required economies of scale and can reduce the cost of monitoring by diversification. According to Diamond's (1984) model, if monitoring is to be efficient for a bank then:

$$E[\bar{R}\,] > (1 + r) + k \qquad (3.6)$$

Where: $E[\bar{R}\,]$ is the expected cashflow from contractual repayments of loans, while r is the interest rate on loan obligations and the cost of monitoring customers is denoted by k. The Diamond (1984) theorem was not specifically developed with the microfinance industry in mind. However, we postulate that Diamond's delegated monitoring theorem, specified in equation (3.6), is also applicable to MFIs; after all, MFIs are also banks and only differ slightly from traditional banks on the target market. Thus, equation (3.6), addressing the delegated monitoring of borrowers by non-profit oriented MFIs, could also be presented as follows:

$$E[\bar{R}\,] \leqq (1 + r) + k \qquad (3.7)$$

Finally, the emergence of credit rating agencies has challenged the banks' monopoly and the comparative advantage of delegated monitoring (Mayer, 1990). Thus, rating agencies can also provide information about the credibility of loan applicants. It is worth noting that the services of credit rating agencies are yet to be utilised in the microfinance industry in many countries of the SSA region. Nevertheless, some countries including Kenya, Nigeria and South Africa, currently use credit rating services for some microcredit applicants.

3.3 Theories of Interest Rates

In finance, the term “interest rate” is defined as “price paid for use of capital” in any financial market (Friedman & Schwartz, 1982). According to the traditional classical theory presented by Carver (1916), “interest rate reaches equilibrium where savings, which represents the supply of new capital or investment, is equal to the demand for it.” In the words of Taussig (2013, p.62), interest rates “settle at a point where the marginal productivity of capital suffices to bring out the marginal instalment of savings.” Furthermore, there is an inverse relationship between interest rates and investment behaviour: thus, a fall in interest rates automatically stimulates investment, and the opposite applies when interest rates rise (Friedman & Schwartz, 1982; Jorgenson, 1963).

Fluctuations in interest rates and inflation have a significant effect on microcredit interest rates. Therefore, it is important to examine the relevant microeconomic and macroeconomic theories of interest rates. These are discussed below.

3.3.1 McKinnon Theory of Interest rates

The contention of self-financed capital formation for “financially constrained” developing economies led to the development of a complementary model, whereby a high rate of interest on deposits encourages savings, and this finances the "costly indivisible fixed capital" (McKinnon, 1973).

The hypothesis for McKinnon's theoretical framework predicts that "money and investment are complementary due to a self-financed investment, and that a real deposit rate is the key determinant of capital formation for financially constrained developing economies" (McKinnon, 1973). The hypothesis conveys a dual process, in which the demand for real money (savings) depends directly, *inter alia,* "on the average real return on capital, and the investment ratio to GDP rises with the real deposit rate of interest" (McKinnon, 1973).

More recent literature engages the McKinnon (1973) model in a single equation framework, either money demand or an investment equation. For example: De Melo and Tybout (1986), Edwards (1988) and Morisset (1993) concentrated on the investment equation. However, Harris (1979); Thornton (1990); and Thornton and Poudyal (1990), focused on modelling a demand function for money. Whereas, Fry (1978) borrows the complementarity hypothesis of the McKinnon (1973) models and estimated both investment and the demand for money function.[29] All of this literature supports the model by McKinnon (1973) of self-financed capital formation for financially constrained developing economies, as follows (for simplicity, time invariant scripts are omitted):

$$M/_P = \Psi\,[Y, R_c, R_d - \pi^e] \qquad (3.8)$$

Therefore: $\Psi_Y > 0, \Psi_{R_c} > 0, \Psi_{R_d-\pi^e} > 0$

[29] Investment denotes a quantum of savings

Where the demand for real money is represented by M/P, which depends positively upon real income Y. The real rate of interest on deposit is $R_d - \pi^e$ (where R_d denotes deposit rate, and π^e represents expected rate of inflation), and the real average return on capital is represented by R_c. Furthermore, equation (3.8) assumes that: (i) the demand for money is allocated to finance capital formation in economies where bank credit is constrained; and (ii) there is a need to hedge against inflation in order to preserve the real value of savings (McKinnon, 1973).

The McKinnon (1973) complementarity hypothesis received heavy criticism from Shaw (1973), who argued that the hypothesis does not hold because “investors are not constrained to self-finance.” In addition, Shaw held a debt-intermediation view by specifying a vector of real opportunity costs[30] of holding money in equation (3.8).

McKinnon’s (1973) theory was developed for financially constrained developing economies and underscored that the relaxation of an “administered interest rate” would boost capital formation, since high deposit rates attract savings and stimulate investment. This study finds the McKinnon (1973) theory to be rather problematic in the context of sub-Saharan Africa, because that theory is based on an assumption that the greater part of the population is financially intermediated into the banking system. In the context of SSA, only about one-third of the adult population holds a bank account with a formal banking institution. Therefore, an increase in deposit interest rates will not lead to any significant increase in savings, because of the high percentage of money that is in circulation but not intermediated into the banking system (Allen; et al., 2014; Sayinzoga, Bulte & Lensink, 2014).

[30] Real yields on all types of interest bearing securities

Despite its flaws, McKinnon's complementarity hypothesis remains one of the key financial theories which apply to developing economies. Empirical studies provide evidence showing that the real rate of interest has a positive effect on money and investment, which justifies McKinnon's emphasis on the significance of favourable financial conditions in the economic development process (Harris, 1979; Thornton, 1990; Thornton and Poudyal, 1990).

3.3.2 Fisher Theory of Rate of Interest

Fisher's (1930) theory of real rate of interest is important for the inflation-targeting models. The theory's framework provides a rationale for the view that the role of monetary policy is to manage inflation expectations, in order to retain interest rates at a stable level that will stimulate savings and investment. Subsequent studies by Smithin (2003) and Cottrell (1994), emphatically endorsed the use of this concept. The Fisher model of interest rates at the aggregate level is given by:

$$i = r^* + E[\pi] \qquad (3.9)$$

Where: i is the nominal interest rate, r^* is the real interest rate after adjustment for inflation, and $E[\pi]$ is the expected inflation. Therefore, in equation (3.9) above, r^* denotes the required real rate determined independently in the loanable fund market: any expected increase in the rate of inflation will lead to an increase in the nominal rate of interest, and vice versa. This means that if r^* and $E[\pi]$ are known then i can be determined, and the same applies to $E[\pi]$ and i: if these are known, then r^* can be determined. Furthermore, if at time $t = 0$, the economy is at full employment equilibrium with no inflation expected then $i_0 = r^*$.

If at time $t = \mathbf{1}$, the central bank is expected to expand the money base in time **2**, then, following the increase in money supply there is some degree of inflation expected and this is given by:

$$E_1[\pi_2] = m_2 \qquad (3.10)$$

So that at time $\mathbf{1}, i_0 - E_1[\pi_2] < r^*$. Therefore, according to Fisher (1930), if the aggregate real income expands at rates which surpass the expected real amount of money that needs to be reimbursed, then " so too the expected amount of real aggregate income to give up in the future if one borrows now" (Fisher, 1930). This exerts an upward pressure on the "money-rate on money" and Fisher argued that if "inflation is going on, one will see rising prices and rising profits, and will be stimulated to borrow capital unless interest rate rises, and this willingness to borrow will itself raise interest rates" (Fisher, 1907).

Theoretically, i should grow instantaneously to reimburse for $E_1[\pi_2]$ and no real effect should occur from the monetary expansion because the required and expected real rates are equal as seen in equation (3.11):

$$i_1 - E_1[\pi_2] = r^* \qquad (3.11)$$

Where: i should be $i_1 > i_0$. Fisher also indicated that due to monetary expansion by the central bank, inflation will occur; this hypothesis was supported by Keynes (1937).

Fisher assumes that r^* is given by technology and taste and that r^* is a physical rate of return. Conversely, in the analysis Fisher recognised that r^* is essentially calculated in "money terms and that price expectation matter for the decision; the rate of return over cost is the monetary expression of r^* and is the most important variable for investment" (Fisher, 1930).

Keynes (1937) was the first authoritative writer to have difficulties with Fisher's explanation of interest rates and the business cycle. Keynes' criticisms of Fisher's theorem rests on three points. Firstly, Keynes argued that what should be compared is the money rate not the real rates, because the former is only "observable and the liquidity position is important, and capital gain and losses should be included in the yield rate calculation." Secondly, Keynes argues that capital assets are usually the ideal substitute for monetary assets and liquid non-monetary assets. Thirdly, Keynes' final criticism of Fisher's explanation of what drives the interest on money is as follows: "changes in interest rates do not reflect changes in the opportunity cost induced by inflation in the present or future consumption arbitrage, they reflect changes in uncertainty that affect the stock equilibrium between liquid and illiquid asset." The substantial criticisms of the Fisher theory that were expressed by Keynes were also supported by Hahn (1982), Harrod (1971) and Kregel (1985).

Despite these criticisms, the Fisher theorem is still relevant and applicable in modern financial activities, especially in computing the yield to maturity of bonds and also in predicting nominal and real interest rate behaviour (Mishkin, 1992). It is worth noting that the Fisher theory of the rate of interest is not applicable to macroeconomic problems (e.g. business cycles) or to microeconomic problems as the theory fails to insulate against the depreciation of purchasing power (Barro, 1997).

Finally, interest rates are traditionally not affected by inflation; this only happens if the central bank incorporates the interest rate into the function of inflation (Svensson, 1999). Therefore, the essential issue in setting interest rates is not much about inflation but the central bank monetary policy - because liquidity take precedence over purchasing power (Woodford & Walsh, 2005).

3.3.3 Keynes Theory of Rate of Interest

Keynes (1937) described the rate of interest as “the reward of parting with liquidity for a specified period of time.” According to Keynes (1937), the rate of interest is influenced by “the demand for and supply of money.” Keynes added that there are motives behind the desire to hold money (or liquidity preference): the transaction motive, precautionary motive and the speculative motive. Keynes’ liquidity preference doctrine regards the interest rate equilibrium at that level when the demand for money is equal to the supply. This also applies to the loan market where the net demand for credit at different rates of interest is in direct proportion to the quantity of investment at a different rate of interest. The Keynes theorem can algebraically expressed as:

$$MV_u = L(Y, r) \qquad (3.12)$$

Where: M represents the quantity of money in circulation, V_u is the income velocity of circulation, L denotes the demand for money resulting from the transaction, speculative and precautionary motives, Y is the money income and r is the rate of interest.

From equation (3.12) it can be deduced that the rate of interest is governed by the demand for, and supply of, money in an economy. This can be expressed in the "LM *curve*". The "LM" denotes a scenario in which $L = M$ with L representing the demand for money, and M being the supply of money.

The formulation of the neo-classical and Keynesian models provide an adequate theory of the rate of interest. From the neo-classical theorem one can derive the income savings-schedule and investment-demand schedule at different levels, which yields the Hicksian "IS *curve*" (Hicks, 1980). The "IS *curve*" represents a situation in which $I = S$, where I indicates investments and S is savings (Hansen 1953; Hicks, 1980).

The "LM *curve*" and the "IS *curve*" are utility functions involving two parameters: income and the rate of interest. Therefore, income and the rate of interest are jointly determined at a point of intersection of these two curves. At that point, investment equals savings and the demand for money is in equilibrium with its supply. Therefore, the determinate theory of interest is based on the investment demand function, savings function, liquidity function, and the quantity of money (Hansen, 1951).

The Keynes (1937) theory of rates of interest was subsequently modified by Hansen (1953) and Hicks (1980); nevertheless, it plays a pivotal role in modern monetary policy settings around the world. However, the theorem is subject to various criticisms. Firstly, it has been pointed out that the rate of interest is not only a monetary phenomenon but can also be influenced by real forces of capital productivity. Second, the liquidity preference theory does not explain the "prevailing rate of interest in the market instantaneously" (Alves Jr, Ferrari Jr & De Paula, 1999). Third, the Keynesian theory of rate of interest only explains the short run level of interest and gives no indication of the long run rate of interest. Finally, the

Keynesian theory of rate of interest assumes that only supply and demand govern the rate of interest, which is simplistic because many other factors affect the rate of interest by influencing the supply and demand for money (Alves et al., 1999; Arestis, Dunn & Sawyer, 1999; Friedman, 1972). Despite these criticisms from the empirically oriented macroeconomists, the Keynesian framework of rate of interest remains a widely applied tool in monetary policy and macroeconomic modelling.

3.4 Monetary Policy and Interest Rates

Monetary policy can be defined as the process by which the central bank, currency board or other government regulatory authority determines the size and rate of money supply (Bernanke, 2010; Taylor, 2012). The principal objective of monetary policy is to preserve the value of money by keeping inflation low, stable and predictable (Svensson, 1999). The monetary policy mandate is achieved by utilising a set of instruments such as adjustments in monetary policy rates (MPR), open market operation and changing the statutory reserve requirements of commercial banks (Taylor, 1999). Empirical evidence shows that monetary policies have only a transitory effect on interest rates (Taylor, 2012). In light of that, we postulate that monetary policy mechanisms have direct and indirect effects on the microcredit interest rates (Ahlin, Lin & Maio, 2011). The association between monetary policy and interest rates is explained further in the sub-sections below.

3.4.1 The Taylor Rule and Monetary Policy

The Taylor (1993) Rule is a monetary policy rule that specifies the extent to which the monetary authority should adjust nominal rates of interest in reaction to fluctuations in inflation, economic output or economic trajectories. The Rule connects the level of the policy rate to any deviation of inflation from its target and to any economic output gap. Initially, the Taylor Rule was a demonstration of the United States desirable policy rule that came into perspective from academic studies. The Taylor Rule has become a widespread measure for evaluating the monetary policy position in both developed and developing countries (Woodford, 2001).

The Taylor Rule is a valuable benchmark for measuring monetary policy performance. The policy rates were consistent with that Rule during the period of “Great Moderation” between the early 1980s and mid-2000s: an era typified by low inflation and stable macroeconomic fundamentals. This should be contrasted with the situation in the 1970s, which was an era of ‘great inflation;’ then, the policy rates in most advanced economies were below the levels prescribed in the Taylor rule. The same applies to the period post-2008 financial crisis. According to Taylor (2012), the sustained “monetary accommodation suggested by this deviation has been identified as a potential causal factor in the build-up of financial imbalances” before and after the financial crisis of 2008. Additionally, the “deviation reflects another change in the policy regime,” an assumption that was strongly rejected by Bernanke (2010). The Taylor (1993) rule is constructed using the following equation form:

$$i = r^* + \pi^* + 1.5[\pi - \pi^*] + 0.5y \qquad (3.13)$$

Where: i represents the nominal policy rate, r^* is the long run or equilibrium real rate of interest, π^* is the central bank’s inflation objective, π is inflation in the current period, and y is the current period output gap.

The proposition of the Taylor (1993, 2012) Rule suggests that a central bank's prime objective is to "stabilise inflation within its target and economic output around its potential." Furthermore, "positive deviation of the two aforementioned parameters from their set target would be related with a tightening of monetary policy, and the opposite holds, for negative deviation[s] associated with loosening of monetary policy" (Orphanides, 2003).

The Taylor Rule is one of the most important tools at the disposal of central banks and it integrates important properties of other desirable rules from the new classic macroeconomic models. However, it is important to be aware of the limitations of applying the analysis based on the Taylor Rule, in monetary policy. First, the Taylor Rule might not capture, adequately, risks to financial stability and their macroeconomic implications. Therefore, the Taylor rule is likely to have a "downward bias during financial booms and an upward bias during financial busts" (Ascari & Ropele, 2009). Secondly, the Taylor Rule should be applied with caution as it involves assumptions about unobservable concepts which might be erroneous, specifically the "indication that monetary policy is accommodative might in part reflect a drop in equilibrium real interest rates" (Ascari & Ropele, 2009; Kozicki, 1999). Finally, the Taylor Rule does not capture changes in statutory reserve requirements, which are one of the key monetary policy instruments often applied in many economies of the SSA region. In addition, the Taylor Rule does not take into account the central banks' balance sheet policy: the large balance sheet assets held by the central banks (such as the BOE, BOJ, ECB, and the US Fed) might indicate scope for further easing of monetary policy, which can be achieved either by lowering long-term interest rates or by moderating appreciation of the local currency (Davig & Leeper, 2007).[31]

[31] **BOE** signifies Bank of England, **BOJ** stands for Bank of Japan, **ECB** denotes the European Central Bank, and the **US Fed** depicts the Federal Reserve Bank of United States of America (USA).

3.4.2 Inflation-Unemployment Trade-off and Monetary Policy

The standard models of inflation-unemployment dynamics indicate that any changes in monetary policy tend to push inflation and unemployment in opposite directions (Mankiw, 2001; Rudd & Whelan, 2007). There is a long standing traditional suggestion to the effect that: [a] "trade-off between inflation and unemployment, the so-called Phillips curve, exists and that it holds only in the short run" (Blinder, 1997).

There has been disagreement within academic cycles on the significance of the inflation-unemployment dynamics, and as a result there is a wide range of opinion on this subject. The following brief review of studies provides some background. Thus, Lucas and Sargent (1981) claimed in their study of 'After Keynesian Macroeconomics' that the "breakdown of the simple Phillips curve in the 1970s exposed the bankruptcy of the prevailing Keynesian paradigm." However, Blinder (1997) termed the consistency of the modern Phillips curve the "clean secret" of macroeconomics. Recently, Stock and Watson (1999) examined various methods of inflation forecasting and claimed that the forecasts produced by the Phillips curve are more accurate than those based on other variables such as interest rates and commodity prices. It is hard to argue at this point whether the Phillips curve should be "downgraded to the trash bin of macroeconomics intellectual history" (Mankiw, 2001).

One model that has attracted much recent attention is the "New Keynesian Phillips Curve." This is a dynamic extension of the static new Keynesian model of price adjustment, which is built on two simple approaches. The first approach assumes "firms follow [a] 'state-contingent rule' – i.e. they can change prices at any time if they believe it is profitable to do so given the costs of adjustment" (Mankiw, 2001; Roberts 1995). The second approach is to assume that firms follow a 'time-contingent rule;' in other words, they adjust prices on a schedule, possibly influenced optimally by the environment they face (Roberts 1995). According to the new Keynesian Phillips curve model, the firm's desired price that would maximise profit at period in time is given as:

$$p_t^* = p_t - \alpha[U_t - U^*] \qquad (3.14)$$

Where: all prices in equation (3.14) are expressed in logarithms. Equation (3.14) can be interpreted as: the firm's desired price p^* which depends on the general price level p and the deviation of unemployment from its natural rate $U - U^*$. The proposition is that the firm's desired price, $p^* - p$, rises in periods of economic expansion, and the opposite applies in periods of economic contraction. This applies because firms experience an increased demand for products during periods of higher level of economic output where marginal costs are pushed up; as a result, firms raise relative prices, and vice versa (Mankiw, 2001). Building on the equation (3.14), the full New Keynesian Phillips curve model can be represented as:

$$\pi_t = E_t\pi_{t+1} - \{\alpha\lambda^2/(1-\lambda)\}\,[U_t - U^*] \qquad (3.15)$$

Where: $\pi_t = p_t - p_{t-t}$ is the inflation rate, λ is the rate of arrival of price adjustment, α denotes "the reaction or responsiveness of desired relative prices to economic activity," while $U_t - U^*$ is the deviation of unemployment from its natural rate and $E_t\pi_{t+1}$ is the future expected inflation (Mankiw, 2001). From equation (3.15) one can derive a Phillips curve, where current inflation is a function of expected inflation in the next period and the deviation of unemployment from its natural rate. Mankiw (2001) argued that if expected inflation is held constant, then higher unemployment leads to lower inflation.[32]

The inexorable inflation-unemployment trade-off has a secure place in macroeconomics and monetary policy. The consensus of empirically oriented macroeconomists is that "monetary policy influences unemployment temporarily and that monetary policy determines, and has gradual effect, on inflation" (Ascari & Ropele, 2009; Blinder, 1997; Orphanides, 2003; Roberts 1995; Rudd & Whelan, 2007; Stock & Watson, 1999).[33] It is essential to note that because of chronic unemployment in the sub-Saharan African region, the inflation-unemployment trade-off does not apply there.

3.4.3 The Nexus between Inflation and Yields on Treasury Bills Rates

The interaction between significant macroeconomic parameters such as inflation and rates on treasury bills affects savings, rates of interest rates and investments (Hahn, 1982; Svensson, 1999). If monetary policy authorities are to engineer the right policies to attain the desired objectives, then the central bankers will need to have full insights into where the key macroeconomic variables such as inflation and treasury bill rates are heading in the near future (Beltran, Kretchmer, Marquez & Thomas, 2013; Haubrich, Pennacchi & Ritchken, 2012). Real interest rates, inflation expectations and nominal interest rates are some of the fundamental input parameters when central banks need to execute monitory policy (Cottrell, 1994).

[32] Furthermore, Mankiw (2001) argued that the "coefficient of inflation [in equation (3.15)] depends on two variables: the rate of price adjustment $\boldsymbol{\lambda}$ and the responsiveness of desired relative prices to economic activity $\boldsymbol{\alpha}$. Furthermore, "the parameter α is sometimes said to reflect 'real rigidity' because many models of real rigidities, such as real wages stuck at non-clearing level can be used to justify a small value of $\boldsymbol{\alpha}$". Therefore, equation (3.15) shows small $\boldsymbol{\alpha}$ representing real rigidity and small $\boldsymbol{\lambda}$ representing nominal rigidity. This contributes to explaining why inflation does not react to unemployment in the short run."

[33] In other words, monetary policy has a long-run effect on inflation.

Theoretically, a monotonic relationship exists between inflation rates and treasury bills rates (Haubrich et al., 2012; Beltran et al., 2013). These move together because the inflation rate is the starting benchmark figure for computing the treasury bills rate, the so-called risk-free rate. Furthermore, according to Fisher (1930),“the expected rate of interest on financial assets should move one-to-one (i.e. arm’s length) with expected inflation.” In a related study, Fama (1976) concurred with the ‘Fisher effects’ and his hypothesis states that “the expected real return on treasury bills is constant through time, and that the inflation-related uncertainties in the real returns on treasury bills are associated with the type of risk that the market compensates.”

The nexus between inflation and treasury bills rates is yet to be explored empirically although there is a large body of literature that focuses on the relationship between bond yields of different maturities and inflation rates (for related studies, see: Fama, 1981; Ibbotson & Sinquefield, 1976; Park & Reinganum, 1986). Nonetheless, there is increasing empirical evidence to indicate a long-run equilibrium relationship between the inflation rate and the treasury bills rate of interest (Beltran et al., 2013; Fama, 1976; Haubrich et al., 2012; Park & Reinganum, 1986).

Finally, because of the monotonic relationship between inflation and rates of treasury bills, only inflation will enter our estimation model. It should be noted that inflation and rates on treasury bills capture exactly the same effect on lending interest rates (Beltran et al., 2013).

3.5 Microfinance Paradigms

In this section we discuss the theoretical background that applies to the microfinance industry. This discussion is particularly important because these theories have implications regarding the setting of microcredit interest rates. Thus, a review of microfinance literature reveals two prevailing schools of thought: the welfarist and the institutionalist (Brau & Woller, 2004; Hulme, 2000; Le, 2004).[34]

The Welfarists' Approach: the Welfarists belong to the poverty lending school of microfinance and their emphasis is on depth of outreach; in other words, extending microfinance services to many poor clients (Brau & Woller, 2004). The welfarist perceives microfinance as a policy apparatus for reducing levels of poverty, with the core objective of empowering economically disadvantaged communities. Furthermore, Welfarists argue that MFIs should aim to serve many poor clients, even if this is not profitable. According to the Welfarists, any operational deficit must be recouped from funds provided from the donors' community, governments and social investors (Collier & Dollar, 2002; Sachs, 2006; Woller et al., 1999).

It should be noted that non-profit oriented MFIs rely extensively on donor support and government subsidies (Abate, Borzaga & Getnet, 2014; Morduch, 1999b). In addition, most non-profit MFIs, such as NGOs and Cooperatives, charge relatively low lending interest rates when compared to the profit-oriented MFIs (Roberts, 2013).

The Institutionalists' Approach: the institutionalists belong to the financial system school of microfinance and advocate for financial self-sustainability of MFIs. According to Woller (2002), the main objective of the institutionalist approach is financial deepening of

[34] In some literature the *institutionalists* are referred to as the *capitalists*.

MFIs and followers of this approach advocate for commercialisation of the microfinance industry. In this context, financial deepening implies creating self-sustainable financial intermediation for the financially excluded. The institutionalists' approach is based on the view that in most instances, donor funding is not guaranteed; therefore, unless MFIs are financially self-sustainable then they cannot continue serving the poor indefinitely (Brau & Woller, 2004).

According to the microfinance literature, profit-oriented MFIs charge slightly higher lending interest rates than non-profit firms. This is because profit-oriented MFIs have to cover their operating costs by charging market rates (Hartarska et al., 2010; Roberts, 2013). Furthermore, their loan sizes are comparatively large and they primarily focus on serving micro-enterprises and salaried workers (Hartarska & Nadolnyak 2007).

One finding that can be deduced from these two competing schools of thought is that MFIs with a welfarist approach charge marginally lower lending interest rates in view of their social objective of poverty alleviation (Roberts, 2013). Also, non-profit seeking MFIs rely mainly on external financial support for sustainability. In contrast, MFIs premised on the institutionalist approach charge slightly higher lending interest rates in order to cover their operating costs and remain self-sustainable (Roberts, 2013). Also, profit-oriented MFIs often strive to remain profitable without needing external financial support from donors (Brau & Woller, 2004).

3.5.1 Microfinance Credit Lending Models

A wide range of microcredit lending models is being used by MFIs around the world. These models are closely related to each other and in most instances, MFIs feature two or more models in their operations (Morduch & Armendáriz, 2010). The following models are the most popular ones used in the microfinance industry of SSA.

(I) Grameen Bank Model: this (GBM) model is based on the "voluntary formation of small groups of at least five people to provide mutual binding group guarantees in lieu of the collateral required by the traditional banks" (Ghai & Bank, 1985). The GBM has successfully removed the traditional banking practice of requiring collateral and replaced it with a mutual trust based on collective responsibility of the group members (Yunus & Bank, 1994).

MFIs employing group lending schemes usually have relatively low loan delinquencies (Copestake, 2007). This is mainly because of the low risk of group members, who screen and select each other to make homogenous groups, who often share similar probabilities of loan repayment. Additionally, MFIs incur lower administrative costs with group lending because of peer monitoring; after all, group members are jointly liable for repaying the entire loan (Tchakoute-Tchuigoua, 2010).

(II) Micro-bank Model: this is a straightforward credit-lending model where microcredit is issued directly to borrowers either as a household microcredit or as a micro-enterprise loan. This model does not require formation of groups or generating peer pressure to ensure repayment of the loan. Micro-bank lending methodology forms the largest part of microcredit programmes and it generally involves equipping microcredit borrowers with complementary services to enhance their micro-enterprises skills. The most common short courses are cash flow management, savings techniques, record keeping, cost control and inventory management. (Cull et al., 2009a; Morduch & Armendáriz, 2010). The micro-bank model attracts all categories of microfinance institutions including NGOs, Cooperatives, Credit Unions, Micro-Banks and Non-Banking Financial Institutions (Caudill et al., 2009; Roberts, 2013).

(III) Village Banking Model (FINCA): the village banking model was first pioneered by the Foundation for International Community Assistance (FINCA) in the 1980s in Bolivia by John Hatch (Hatch & Hatch, 1989). Village Banks are community-based credit and saving associations. They comprise of between 25 and 50 low-income individuals who are seeking to uplift their standard of living through self-employment activities" (Hatch & Hatch, 1989).

An external funder usually provides the starting capital for a village bank. The village bank repays the entire loan principal and interest to the loan provider. After paying off the initial loan to the external provider, the village bank automatically qualify for a second round of loan disbursement (Caudill et al., 2009). A village bank is run by its members who run the bank, select their members, elect their executives and enact "their own by-laws" (Dalla-Pellegrina, 2011).

The drawbacks for this model are as follows. First, there is the over-dependence of village banks on external funding, which puts the model at risk if the funds are not disbursed into the village bank. Second, there is the possible adverse effect of the strengthening of foreign currency; after all, most external funding is repaid in foreign currency (Al Azzam, Mimouni & Sarangi, 2014; Mutua & Oyugi, 2005; Painter & MkNelly, 1999; Silwal, 2003). In some instances, village banks charge an optimal lending interest rate as their survival depends on repaying the initial loaned capital to the external provider and also achieving self-sustainability (Caudill et al., 2009).

(IV) Cooperative and Credit Union Model: a cooperative is an independent association of individuals amalgamated voluntarily to achieve their economic, social and cultural needs through a "jointly-owned and democratically controlled" enterprise (Rock, Otero & Saltzman, 1998). A credit union is a "unique member driven, self-help financial institution" (Kirkpatrick & Maimbo, 2002). A credit union is controlled by its members with the common goal of saving money together and it provides microcredits to group members at a reasonable rate of interest. The group members are individuals having a common bond that can be, for example: (i) working for the same employer, (ii) belonging to the same church, (iii) labour union, or (iv) living in the same community (Labie & Périlleux, 2008).

The credit union and cooperative models are closely related to Rotating Savings and Credit Associations (ROSCA). In a nutshell, a ROSCA involves group of individuals coming together and make regular and recurring contributions to a mutual fund (Besley, Coate & Loury, 1993). The group members then agree that one designated member should receive the lump sum at the end of each monthly circle. After receiving the lump sum, that group member pays it back in regular monthly contributions. The main difference between the Credit Unions or Cooperatives and ROSCA is that with ROSCA, group members pay back the loaned funds without interest (Besley et al., 1993; Van den Brink & Chavas, 1997).

The findings of empirical studies show that credit unions and cooperatives are MFIs with comparatively low levels of lending interest rates when compared to other types of MFIs (Roberts, 2013; Tchakoute-Tchuigoua, 2010). This is because credit unions and cooperatives are owned by their members and furthermore, the legal charter of these firms often stipulates that they should be non-profit making (Besley et al., 1993).

(V) The Non-Governmental Organisations (**NGO) Model**: these play an important role in microcredit markets in the SSA region. Their role not only includes financial intermediation but also involves creating awareness about financial literacy and the importance of microcredit to community members (Dichter, 1999). The NGO model is mainly employed by NGOs and religious organisations, with the sole objective of poverty alleviation in the poor communities. Similarly, the lending methodology for this model involves providing loans to individuals and small businesses. The MFIs that operate in accordance with the NGO model are mostly financed by international aid agencies (Woller 2002; Woller et al., 1999).

The NGO model is based on the Welfarist school of thought, which views microfinance as a conduit for poverty reduction. The Welfarists argue that MFIs should be able to serves a large number of poor clients at the lowest possible lending interest rates even if this means that the MFI might not be profitable (Collier & Dollar, 2002; Sachs, 2006; Woller et al., 1999).

3.6 The Theoretical Foundation for this Thesis

The empirical analysis of this thesis is based on underlying theoretical predictions. Additionally, the estimation models used in this thesis are constructed on the relevant theories. Those underlying theories supporting this study are outlined below.

1. **Small firm theories**: these rely on the general theory of economies of scale, with careful consideration of the behavioural assumption of cost minimisation. Cost minimisation is applied both to small and big firms (Silberston, 1972) and its sources include: the division of labour, the integration of systems, the learning effect, and the

economy of massed resources. The cost minimisation assumption focuses on efficiency and effective resource utilisation. In the microfinance context, the long-term objective of MFIs is to provide their core services at the lowest possible cost.

According to theory and also confirmed by empirical evidence, small firms do not exploit possible economies of scale, and therefore, experience higher operating costs and lending interest rates than larger ones (Gilligan, Smirlock & Marshall, 1984).[35] This report builds upon this theory and proceeds to evaluate the potential impact of pursing outreach to the poor in the microfinance industry in the SSA region (Hermes & Lensink, 2011). Finally, consideration is given to the credit risk of providing uncollateralised microcredits to poor people, based on the risk-return trade-off. Theoretically, it assumes that risk lenders are recompensed by higher lending interest rates (Ross, 1976).

2. New institutional economics theories: these theories have evolved since the Walrasian general equilibrium theory (Hahn, 1978). Reference is made to the new institutional development theories while concentrating on the transaction costs of market failures and incomplete financial markets (Coase, 1998). The institutional environment contributes to a country’s overall economic development (Kaufmann, Kraay, & Mastruzzi, 2010; 2011). It has been argued that institutional failures explain, to some extent, why Africa remains underdeveloped and poor (Galiani & Sened, 2014, pp.11-19).

[35] Plainly, this theory does not preclude the likelihood of large firms (MFIs or Banks) experiencing diseconomy of scale as they become large.

North (1990) and Acemoglu and Johnson (2005), argued that a weak institutional environment aggravates market uncertainty. Some indicators of weakness are: inefficient contract enforcement, unsecured property rights and rampant corruption, all of which exacerbate the moral hazard in the loan market (Stiglitz & Weiss, 1981). A recent cross-country study of the microfinance industry by Chikalipah (2017a) found a negative relationship between the institutional environment and the financial performance of MFIs in the SSA region. There is consensus in the literature that institutional quality has a critical effect on the financial development process (Assane & Grammy, 2003; Scully, 1988).

3. Macroeconomics Theories: previous sections of this chapter discussed how inflation impacts interest rates. This provides background to theories underpinning the other three macroeconomic variables. Thus, the neoclassical model developed by Swan (1956) and Solow (1956) provides the closest link between interest rates and the rate of economic growth. The theoretical model postulates that positive economic output has a significant influence on interest rates by means of savings and investment. The financial development theories indicate that a well-developed financial market promotes economic efficiency through financial intermediation (Schumpeter, 1934).

As mentioned previously, an unstable macroeconomic environment has a negative effect on microcredit interest rates (Beck & Hesse, 2009). One would expect inflation, GDP growth, and financial developments to impact microcredit interest rates in the SSA. The impact of competition on microcredit interest rates will be studied. The market-based theory predicts that a competitive market place promotes operational efficiency (Motta, 2004; Shaffer, 2004). Therefore, one would expect macroeconomic factors to have a significant effect on microcredit interest rates.

3.7 Conclusion

The main objective of this chapter was to provide a brief review of theories that are relevant and related to the focus of this thesis. The motivations for this chapter were as follows. First, to explore the theories of banking and to provide an overview of different types of banks and why banks exist. Second, to conduct a critical review of interest rates theories and to determine their applicability to the microfinance industry. Third, to present and discuss fundamental microfinance concepts. Fourth, to highlight the implications of monetary policy for interest rates and inflation, and finally, to provide the underlying theoretical arguments that support the methodology and empirical analysis used in this study.

Finally, it has been shown that some theories of banking and interest rates are directly applicable to the microfinance industry and also to the financial sector of the region. It is shown that some theories are too simplistic for the SSA region; for example, the banking framework by McKinnon (1973), which is based on the assumption that a large part of the population have bank accounts and therefore, an increase in the interest rates on deposits results in a corresponding increase in bank deposits. This proposition does not seem to apply in the sub-Saharan African banking system, bearing in mind that in the SSA region, only about one-third of the adult population holds a bank account at a formal financial institution.

CHAPTER FOUR

SURVEY OF EMPIRICAL LITERATURE

4.1 Introduction

The literature on microfinance, like the industry itself, is still at an early stage of development. Most microfinance studies are abstraction of reality, but they pose an important challenge to academia and to the industry itself. Despite the attitudes of the international donor community towards the impact of microcredit, the reasons for the persistently high microcredit interest rates in SSA are poorly understood (Rosenberg, Scott, William & Tomilova, 2013). The low level of research could possibly be explained by the youthfulness of the industry. The purpose of this chapter is to conduct a focussed survey of empirical literature. Recent studies by Dorfleitner et al. (2013) and Cotler and Almazan (2013), provide an important starting point for that survey. Empirical literature on the traditional banking industry is then reviewed briefly, with emphasis on identifying the determinants of commercial interest rates margins in the SSA region.

Factors that influence microcredit interest rates are classified into three categories: MFIs-specific (i.e. firm level) factors, institutional development, and macroeconomic factors. These three sets of factors are aligned to the three pillars of our theoretical predictions outlined in the previous chapter in section 3.6. Additionally, the three sets of theories (small firm, institutional and macroeconomic) provide the basis for our empirical analysis. Before the three sets of factors are examined, it is important to perform a detailed review of the two notable microfinance studies by Dorfleitner et al. (2013) and Cotler and Almazan (2013).

It is important to note that some of the research papers cited in this chapter, and also elsewhere in this study, might have been published in low-ranked journals. The low-ranked scientific journals often publish bad research articles, which lack methodological rigour. The objective of this thesis is not to judge the quality of microfinance studies that relate to the focus of this study; therefore these studies are included in the literature review to ensure depth of coverage, and also to highlight areas where there are gaps in the research. Additionally, and where appropriate, papers that were published in low-ranked scientific journals are highlighted.

The remainder of this chapter is structured in the following manner. The next section 4.2 reviews the two notable microfinance studies, mentioned above, which exclusively investigated the determinants of microcredit interest rates. Section 4.3 presents empirical findings focusing only on MFI-specific factors whereas Section 4.4 discusses those findings with emphasis on institutional development. Section 4.5 considers empirical studies concentrating on macroeconomic factors and a summary of all relevant empirical studies in the microfinance industry is presented in section 4.6. Section 4.7 reviews relevant empirical studies in the commercial banking industry, with emphasis on sub-Saharan Africa. Concluding observations are presented in section 4.8.

4.2 Determinants of Microcredit Interest Rates - Two Notable Studies

The starting point for the survey of literature concerning the microfinance industry is to review the two notable studies by Dorfleitner et al. (2013) and Cotler and Almazan (2013). These two studies exclusively investigated the determinants of microcredit interest rates, but with a broad scope.

(1). Dorfleitner et al. (2013) investigated the determinants of microcredit interest rates by utilising the MIX market dataset. Their study used an unbalanced panel data from 712 microfinance institutions drawn from 72 developing countries and covered the period from 2004 to 2011. After estimating an OLS via fixed effects (and controls for time and country effects) model, their study concluded that operating expenses have a significant influence on microcredit interest rates offered by MFIs worldwide.

The study by Dorfleitner et al. (2013), has two important methodological weaknesses, which this thesis finds to be problematic, especially in the context of SSA. These weaknesses are outlined below.

> Firstly, the sub-Saharan African region was inadequately represented in their overall sample. Moreover, of the 712 microfinance institutions sampled, only 8 percent were based in the sub-Saharan African region and only about 19 countries were included in the final analysis. The main concern is that the overall conclusion might be erroneously extrapolated to the SSA region. This concern arises because, as stated above, SSA formed only a small part of the overall sample. Furthermore, the countries of SSA have wide disparities in income, institutional development and their general levels of financial development. Thus, in accordance with the Simpson-Yule effect, it is important to disaggregate the dataset in these groups to assess possible variations between them (Blyth, 1972; Wagner, 1982).[36]
>
> Secondly, the study did not attempt to investigate the effect of the countries' institutional development on microcredit interest rates in SSA (Acemoglu & Johnson,

[36] The Simpson-Yule effect is often referred to as the Simpson Paradox.

2005; Assane & Grammy, 2003). This shortcoming will be discussed in detail in section 4.4 below.

(2). The second study is by Cotler and Almazan (2013), who analysed the determinants of the lending interest rates in the microfinance sector by using an unbalanced panel dataset, which consisted of 1299 MFIs operating in 84 developing countries during the period 2000 to 2008. The study used Generalised Least Squares (GLS) with Fixed Effect, after taking into account the results provided by the Hausman test. Their panel estimation results indicate a positive and significant relationship between finance costs and microcredit interest rates among the MFIs sampled. However, the study by Cotler and Almazan (2013) has methodological errors, as detailed below.

Firstly, it used only a narrow range of variables: efficiency (operating expenses), competition, cost of funds, average loan size and return on assets. The theoretical implication is that the model might be weak as a result of omitted variables bias and the coefficients of the included variables could be spurious (Chiburis et al., 2012; Nickell, 1981; Park & Gupta, 2012; Torabi & Rao, 2013).[37]

Secondly, there is concern regarding a methodological flaw bordering on multicollinearity between efficiency, captured using operating expenses, and return on assets (ROA). This arises because operating expenses are used to construct the ROA measure and the ROA is defined as net income less taxes over assets. Therefore, it is

[37] Even though the study only considered firm-specific factors in the empirical analysis, there are other important variables at firm level that could influence the lending interest rates. These include: portfolio at risk (PAR) and duration and the time the MFI has been in existence (firm’s age). Also, the study did not attempt to consider the effect of institutional development and macroeconomic variables on the microcredit interest rates.

methodologically problematic to include both variables in an econometric model (Wooldridge, 2010, pp.70-76).

Finally, as in the case of the study by Dorfleitner et al. (2013), there was no attempt to consider the distinctiveness of the all regions around the world, in particular the SSA region. Moreover, the representation of the sub-Saharan African region in the study sample was low with only about 22 percent of the total MFIs sampled being from that region.

4.3 MFIs-specific factors and Microcredit Interest Rates

The work by Copestake (2007) indicated that serving the wealthier clients often costs less than serving poorer ones. Therefore, pursuit of outreach[38] decreases the profitability of MFIs, leading to upward pressure on lending interest rates (Janda & Zetek, 2014). Evidence of this presents mixed results. Thus, a study by Hermes and Lensink (2011) provides a recent review of empirical studies focusing on the outreach and profitability trade-off. In a related study, Cull et al. (2007) investigated whether there is a trade-off between the depth of outreach and profitability of MFIs.[39] The study found that it is possible to earn a profit while serving the poor, but a trade-off emerges between profitability and serving the poorest in society.

Hermes et al. (2011) examined the trade-off between sustainability and outreach, using the MIX dataset comprising of 435 microfinance institutions and covering the period

[38] As previously highlighted, depth of outreach in this context represents the degree of poverty of the clients being served; average loan size normally used as a proxy.

[39] In banking, profitability is highly correlated to interest rates: a bank's main source of revenue is interest related charges. A related point to consider is that, in some sub-Saharan African countries, bank charges contribute significantly to bank revenue. For example: Zambia, Malawi and Democratic Republic of Congo.

1997 to 2007. Their study found strong evidence indicating that depth of outreach is negatively related to operational efficiency. Similarly, Morduch et al. (2009); and Hoque, Chishty and Halloway (2011) documented evidence of such a trade-off especially in the case of profit-oriented MFIs. Furthermore, Rosenberg et al. (2013) noted that providing small uncollateralised loans to the poor clientele is exorbitantly costly. In contrast, Ayayi and Sene (2010) found that the expansion of outreach does not have a significant influence on the financial sustainability of MFIs.

Bosire, Mugo, Owuor, Oluoch & Kakiya (2014) investigated factors that influence a wide interest rate bands in the microfinance industry of Kenya.[40] Their study used data from 27 MFIs operating in Kenya and it covered the period 2005 to 2008. Thus, an empirical analysis was performed, based on the theoretical classical model developed by Fisher (1930). It was found that the growth prospects and finance costs of MFIs are the main factors that influence interest rates bands in Kenya. Furthermore, the study claimed that most of the factors that influence wide interest rate bands in commercial banks do not influence interest rate bands in the Kenyan microfinance industry. The main shortcoming of this study is the potential omitted variable bias which arose because some key explanatory variables were omitted: the size of MFIs, the number of years the firm was in operation since inception, and outreach captured using the number of clients served. In view of these shortcomings, the findings of the Bosire et al. (2014) study seem to suffer from omitted variable bias.

Roberts (2013) explored the influence of the profit orientation of MFIs on the effective interest rates, using the 2009 MIX market dataset which comprised 358 global MFIs submitting social performance reports. Their study finds a positive relationship between the

[40] Interest rate band is the differential or margin between lending rates and deposit rates in a given time period (Klein, 1971).

profit orientations of MFIs and lending interest rates; in other words, profit-oriented MFIs charge slightly higher interest rates than non-profit MFIs.[41] This contrasts with a finding of a study by Mersland and Strøm (2009): they analysed 278 MFIs in 60 developing countries in the period 1998 to 2007 and concluded that if an MFI adopts a for-profit status, then the impact on its financial performance is effectively nil.

Baltensperger (1980) claimed that the smaller the loan size, the greater the interest rate applied, and vice versa. This is because of the high transaction costs of handling small loans, which have to be covered by charging high lending interest rates (Nakamura, 1993). Consequently, commercially oriented MFIs mainly target established small business enterprises and salaried workers with large loan sizes (Natamba, Mangeni, Nakabuye, Akankunda & Agasha, 2013). In a related study, Agier and Szafarz (2013) concluded that smaller microcredits usually do not yield enough returns to cover the administrative and finance costs of providing them. Gonzalez (2008) argued that an increase in loan size from 10 percent of Gross National Income (GNI) *per capita* to 20 percent can be expected to reduce operating expenses as a percentage of gross loan portfolio by about 7 percentage points.

An increasing number of empirical studies in the microfinance industry have identified a negative but significant relationship between loan sizes and microcredit interest rates. This means that the smaller the loan, the higher the microfinance lending interest rates (see for instance: Cotler & Almazan, 2013; Dorfleitner et al., 2013; Janda & Zetek, 2014; Mersland & Strøm, 2011; Roberts, 2013). These studies underscore the importance of taking into account the average loan size of MFIs when examining factors that influence microcredit interest rates in the sub-Saharan African region.

[41] Roberts (2013) also claimed that profit-oriented MFIs have to pass on the entire costs to microcredit borrowers, hence higher lending interest rates relative to the non-profit seeking firms.

According to the learning effect theorem, firms become more efficient as they mature Janiak & Rudek, 2008). A study by Gonzalez (2008) indicated that the efficiency of an MFI is strongly related to the amount of time it has been operating, after screening out the effect of other variables. Moreover, the effect is strongest in the first six years of institutional history. The study also identified an inverse relationship between efficiency and lending interest rates; in other words, as efficiency increases, the lending interest rates drops. Equally, Basharat, Hudon and Nawaz (2015) claimed that financial efficiencies have a positive and significant impact on microcredit interest rates. In a related study, Hartarska and Nadolnyak (2007) claimed that efficiency improves in the first five years of the MFI’s existence and then begins to level off as most of the internal processes are tested and implemented. The same observation was reported by Nwachukwu and Asongu (2015). In stark contrast, Mersland and Strøm (2009) found no time limit in improving the efficiency of MFIs and concluded that the longer an MFIs continues to operate, the more efficient it becomes.

Similarly, Kar and Swain (2014) conducted a study using an MIX market dataset that contained 379 MFIs based in 71 developing countries, between 2003 and 2008. They established that microcredit interest rates have a significant and positive effect on the financial performance of MFIs. Furthermore, they argued that loan delivery methods have a significant effect on financial performance, and that individual-based lenders are prone to mission drift when compared to village banks. Abdullah and Quayes (2016) investigated the relationship between targeting women borrowers and the financial performance of MFIs, using a global dataset obtained from the MIX market comprising 892 MFIs: they claimed that MFIs which increase their proportion of women borrowers are likely to find that this has a statistically significant positive effect on their financial performance.

These studies clearly show a lack of consensus on the kind of relationship between the age of MFI and its financial performance, especially in terms of microcredit interest rates. Nevertheless, an increasing number of microfinance empirical studies show that as an MFI matures, its lending interest rates start to decline as a result of improved efficiency and better customer relationships with borrowers (Barry & Tacneng, 2014; Cotler & Almazan, 2013; Dorfleitner et al., 2013; Fernandez et al., 2016; Mersland & Strøm, 2011; Roberts, 2013). This interesting and unresolved relationship between the age of an MFI and the microcredit interest rates that it offers, invites further empirical investigation.

4.4 Institutional Development and Microcredit Interest Rates

In this section, consideration is given to institutional development, with particular focus on the microfinance context. This section also provides a review of microfinance literature on competition and regulation. It should be noted that there seems to be no single study of the microfinance industry that has explicitly explored the impact of institutional development on microcredit interest rates. Therefore, we rely on studies, which explored the relationship between institutional development factors and the financial performance of MFIs. It is believed that this approach is reasonable if one considers that higher lending interest rates could often lead to better financial performance.

The regulation of economic and financial activities is justified, according to the financial literature, as a policy mechanism to limit the effect of market failures (Goodhart et al., 2013; Hudson, 2013). While developing a guide for microfinance investors, Forster et al. (2010) acknowledged that client protection is critical in the microfinance industry because of the vulnerability of poor people to exploitation. In some countries of the SSA region, there are regulations and prudential reforms specific to the microfinance industry; these protect service users and also help MFIs to mobilise microsavings (Arun, 2005). Thus, between 2011 and 2012, there were 27 countries in SSA which had microprudential regulations specific to the microfinance sector. Another seven countries were regulating MFIs, either with banking or Non-Bank Financial Institutions (NBFIs) laws. Five countries were drafting specialised microfinance laws (MIX, 2013a).[42]

These microprudential regulations, together with supervision of microfinance institutions, have become increasingly important in view of the rising number of microfinance institutions in the region that mobilise deposits from relatively poor clients (Hartarska & Nadolnyak, 2007). Therefore, protection of clients' deposits is an important policy issue, regardless of the costs that microfinance institutions have to incur to implement regulatory requirements (Cull, Demirgüç-Kunt & Morduch, 2009b, 2009c, 2011).

A detailed study was conducted by Cull et al. (2011) to explore whether MFIs are able to maintain a good financial performance in the face of the additional costs of complying with supervision. Their study used data from the MIX market that comprised 245 of the world's largest MFIs. It concluded that the profitability of MFIs declines in complying with supervisory and regulatory requirements. Conversely, upon controlling for the non-random assignment of supervision via treatment effects and instrumental variables regressions, the study concluded that regulatory supervision is not significantly associated with profitability of microfinance institutions. Dorfleitner et al. (2013) conducted an analysis of the determinants of microcredit interest rates. Contrary to the findings of Cull et al. (2011), they

[42] **(I)**. Five countries that were drafting specialised MFI laws are Ghana, Liberia, Malawi, Sierra Leone and Zimbabwe. **(II)**. The seven countries which regulate MFIs under banking or NBFIs**,** are Angola, Botswana, Namibia, Tanzania, Somalia, South Africa and Swaziland. **(III)**. Countries with MFI-specific laws include but not limited to: Burundi, Cameroon, Central African Republic (CAR), Chad, Congo Democratic Republic, Congo Republic, Cote d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Guinea, Guinea Bissau, Kenya, Madagascar, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sudan, Uganda and Zambia.

concluded that regulation has a positive and significant relationship with microcredit interest rates. Likewise, Mersland and Strøm (2009) arrived at the counter-intuitive finding that regulation does not have a significant impact on the financial performance of MFIs. Equally, Hartarska and Nadolnyak (2007) found that regulation has an insignificant effect on the financial performance of MFIs.

Since the early 2000s, the microfinance industry has expanded considerably in the sub-Saharan African region. This strong growth has led to increased competition among firms. In some countries of the SSA region, this has led to a certain degree of saturation of microfinance providers, mostly in the urban areas (Assefa et al., 2013; Cull et al., 2009c). Assefa et al. (2013) examined the relaionship between competition and the financial performance of 362 commercially-oriented MFIs based in 73 countries between 1995 and 2008. Their study measured competition by constructing a Lerner Index (LI), and by using documented evidence, which suggested that increased competition lowered the financial performance of MFIs over the period considerd in the study. Contrasting findings were reported by Cull et al. (2009c) who found only a weak relationship between competition and financial performance after analysisng 342 MFIs in 38 developing countries.[43] A comparable study by Hermes et al (2009) claimed that competition between MFIs improves their operational efficiency. It is important to note that Hermes et al (2009) used a country-level measure of competition, rather than a measure reflecting competition at the institutional level, as used by Assefa et al. (2013) and Dorfleitner et al. (2013).[44]

[43] Moreover, the possible cause of differences in the reported results could be the choice of countries in the two studies. Specifically, Assefa et al., (2013) sampled 73 developing countries, while Cull et al., (2009b) analysed 38 developing countries.

[44] Hermes et al (2009) captured competition using the SPREAD: the difference between lending and deposit rates of commercial banks. A lower spread indicates efficient banking systems, and vice versa. On the other hand, Assefa et al. (2013) and Dorfleitner et al. (2013) captured competition using Lerner index and Herfindahl-Hirschman Index (HHI), respectively.

A study by Dorfleitner et al. (2013) measured competition using the Herfindahl-Hirschman Index (HHI), and found a negative and statistically significant relationship between competition and microcredit interest rates. Similarly, Mersland and Strøm (2011) investigated the determinants of microfinance lending interest rates by employing a Panzar-Rosse (PR) revenue test on a sample that contained 496 micro-banks in 73 developing countries for the period 1998 to 2010. Their results showed a significant and negative relationship between competition and microfinance lending interest rates. To summarise: the available evidence on the effect of competition on financial performance and lending interest rates in the microfinance industry presents mixed and contradictory findings. This is evident from the findings of the writers discussed above: see for example, the findings of Cotler and Almazan (2013), Dorfleitner et al. (2013), Assefa et al. (2013), and Mersland and Strøm (2011). Thus, the relationship between competition and microcredit interest rates warrants additional investigation, especially in the context of the sub-Saharan African region.

Having discussed the effect of competition on the financial performance of MFIs and microcredit interest rates, reference is now made to studies which investigated the effect of a country's institutional development on its microfinance industry, particularly in SSA. Thus, Chikalipah (2017a) examined the effect of institutional development on the financial performance of 291 MFIs in 34 countries of sub-Saharan Africa. That study found a positive and significant relationship between the quality of the business environment and the financial performance of MFIs in SSA. Thus, it would seem that institutional development could influence microcredit interest rates in the same way. Additionally, some studies have underscored the influence of institutional quality in determining the level of a country's economic and financial development (see, for example: Albouy, 2012; Easterly, 1997; Ross 2000; Levine et al., 2000; Rodrik, Subramanian, & Trebbi, 2004). Institutional deficiencies such as excessive bureaucracy and the prevalence of corruption explain, to some degree, why Africa remains poor (Bräutigam & Knack, 2004; Easterly, 1997).

North (1990) showed that institutional quality can either lessen or aggravate market uncertainty that arises from "incomplete information about economic agents' behaviour in the process of human interaction, and create incentives that influence socioeconomic opportunities of the economic agents." However, better institutional quality can reduce information asymmetries by channelling information about market conditions. Also, risk can be reduced by clear property rights, proper enforcement of contracts and public officials who are accountable to citizens (Peng, 2003; Stiglitz & Weiss, 1981).

The literature suggests consensus on the view that strong institutional development promotes economic growth and financial development (Barr, 2005; Beck, Levine & Loayza, 1999; Demirgüç-Kunt et al., 2004; Levine 2004, p.865; Levine, 1997; Levine et al., 2000; Peng, 2003). A growing number of empirical studies indicate that institutional quality plays a significant role in the financial development and economic growth of a country (Levine 1997; Levine et al., 2000; Levine, 2004, p.865; Menyah et al., 2014). In addition, secure property rights, a strong rule of law and clear regulations strongly promote sustained economic growth and inclusive prosperity (Hausmann, Hwang & Rodrik, 2007; Rodrik, 2006; Rodrik et al., 2004).

Hartarska (2009) argued that the cost of regulatory compliance, external governance requirements and transparency in financial reporting do not affect the financial performance of MFIs. Similarly, Ahlin et al. (2011) found no evidence to indicate that the financial performance of an MFI is significantly impacted by the level of institutional quality of a country. Hartarska and Nadolnyak (2007) arrived at a similar conclusion. However, in a contrasting finding, Crabb (2008) modelled financial sustainability as a function of both firm level and environmental context; it was found that a low degree of overall economic freedom and government intervention in the economy have a negative effect on the financial sustainability and performance of MFIs.

Tchakoute Tchuigoua (2014) examined whether institutional frameworks have an effect on capital structure and the financial performance of MFIs, using a dataset from the MIX market and World Governance Indicators (WGI), comprising 292 MFIs based in 66 developing countries for the period 2004 to 2009. The study found that institutional development has a significant effect on the financial performance and capital structure of MFIs. Earlier empirical studies by Ahlin et al. (2011); Roberts (2013); and Vanroose and D'Espallier (2013), documented comparable results indicating that institutional deficiencies affect the financial performance and growth of the microfinance industry.

4.5 The Macroeconomic Environment and Microcredit Interest Rates

The literature reflects general agreement that macroeconomic indicators play an essential role in determining lending interest rates (see, inter alia: Beck & Hesse, 2009; Were & Wambua, 2014). During the last three decades empirical studies have paid much attention to analysing these indicators. The macroeconomic variables commonly used in empirical models are as follows: inflation, GDP growth, GNI *per capita*, and level of financial development (Dorfleitner et al., 2013; Nampewo, 2013). The overall view that emerges is that the macroeconomic environment has a significant influence on the financial performance of MFIs (see: Ahlin et al., 2011; Hartarska, 2005; Janda & Zetek, 2014; Morduch et al., 2009; Roberts, 2013).

Ahlin et al. (2011) claimed that a sound investment climate requires sufficient macroeconomic stability before any meaningful microeconomic policies could gain momentum. Credit risk, for example, is influenced by economic growth, which affects the borrower’s ability to repay as well as the value of any asset pledged as collateral (Janda & Zetek, 2014). Moreover, Henley (2013, p.1), argued that Bank Rakyat of Indonesia (BRI) out-performed Gramen Bank of Bangladesh between 1980 to 2000 becauase of a rapid macroeconomic acceleration of the Indonesian economy. In addition, Indonesia averaged 5 percent growth in real GDP *per capita* between 1980 and 2000, while Bangladesh averaged only 1.7 percent. Also, the strong financial performance of the Indonesian micro-banks between 1980 and 2000 owes much to the macroeconomic boom of the Indonesian economy in that period.

Ahlin et al. (2011) examined the relationship between the financial performance of MFIs and the macroeconomic environment. Their study used data from the MIX market comprising 373 MFIs in 74 developing countries and it covered the period from 1996 to 2007. Their findings demostrated that MFIs perform better when macroeconomic growth is higher, partly because of lower default rates . The study concluded that MFIs appear to cope reasonably well with high inflation, by raising interest rates.

However, these findings were contradicted by a study by Gonzalez (2007), which made use of dataset that contained 639 MFIs taken from 88 countries over the period 1999 to 2005. The study concluded that macroeconomic development does not influence the financial performance of MFIs in a significant manner and argued that the quality of loan originator[45] is the critical success factor in the microfinance industry. Tehulu (2013) arrived at similar

[45] This relates to quality of management staff, human resources, credit policies, governance and mission objective of the MFI.

conclusion after analysing a panel dataset that comprised 23 MFIs in East Africa for the period 2004 to 2009. Likewise, Woolley (2008) investigated the resilience of MFIs to economic shocks by using panel data obtained from the MIX market for the period 2000 to 2006. The study found no significant correlation between GDP growth and the financial performance of MFIs. Moreover, Woolley (2008) suggested that microfinance may be an effective means of addressing poverty in an environment of low GDP growth.

A review of the empirical studies presented in this section do not at all seem pinned down by priori expectation, raising the need for futher coherent empirical investigation. Most specifically, there is inconclusive findings on the relationship betweeen microcredit interest rates and key macroeconomic variables, which are GDP growth, financial development and inflation. Also, there is inconclusive and contradictory evidence on the effect of competition, and the age of the MFIs, on microcredit interest rates.

4.6. Summary of Microfinance Empirical Studies

The following Table 4.1 provides a summary of the contrasting findings arising from studies of factors that influence microcredit interest rates. The contrasting evidence from these empirical studies can be attributed to different methodological approaches: for example, the study periods, the number of countries in the samples, and the estimation techniques. Reference is also made to microfinance studies focussing on the financial performance of MFIs worldwide. Note that the financial performance of MFIs is often captured using the measures of Return on Assets (ROA) and Return on Equity (ROE).

Table 4.1: Summary of Microfinance Empirical Studies

MFI-FIRM LEVEL VARIABLES		
Variable	**Effect on Interest Rates**	**Effect on ROA & ROE**
Age	**Cotler and Almazan (2013)** (-)	Hartarska et al. (2007) (+)
	Dorfleitner et al. (2013) (-)	D'Espallier et al. (2011) (Insignificant)
	Fernandez et al. (2016) (-)	Cull et al. (2009b) (-)
	Mersland and Strøm (2011) (-)	Mersland and Strøm (2009) (Insignificant)
	Roberts (2013) (-)	
Operating Expenses	**Bosire et al. (2014)** (-)	D'Espallier et al. (2011) (-)
	Cotler and Almazan (2013) (-)	Cull et al. (2009b) (-)
	Dorfleitner et al. (2013) (-)	Cull et al. (2011) (-)
	Fernandez et al. (2016) (-)	
Institution Size (Total Assets)	Roberts (2013) (-)	Cull et al. (2011) (Insignificant)
	Mersland and Strøm (2011) (-)	Mersland and Strøm (2009) (+)
	Dorfleitner et al. (2013) (-)	Hartarska (2005) (Insignificant)
		Assefa et al. (2013) (-)
		Cull et al. (2007) (+)
Portfolio at Risk (PAR)	**Bosire et al. (2014)** (+) Dorfleitner et al. (2013) (+)	Hartarska (2009) (Insignificant) Mersland and Strøm (2009) (+)
	Fernandez et al. (2016) (-)	
Microsavings (Deposits)	Dorfleitner et al. (2013) (-)	
	Roberts (2013) (-)	
	Fernandez et al. (2016) (-)	
Return on Assets (ROA)	**Janda and Zetek (2014) (+)**	
	Cotler and Almazan (2013) (+)	
Outreach (Average loan Size)	**Janda and Zetek (2014)** (-)	Ajayi and Sene (2010) (Insignificant)
	Dorfleitner et al. (2013) (-)	Hermes et al. (2011) (-)
	Cotler and Almazan (2013) (-)	Cull et al. (2007) Insignificant

	Roberts (2013) (-)	
	Mersland and Strøm (2011) (-)	
For-Profit legal Status	Roberts (2013) (+)	Cull et al. (2007) (Insignificant)
	Fernandez et al. (2016) (-)	Tchakoute-Tchuigoua (2010) (+)
	Dorfleitner et al. (2013) (-)	Tchakoute-Tchuigoua (2010) (Insignificant)
Cost of Funds (COF) (Finance Costs)	**Bosire et al. (2014)** (+)	
	Cotler and Almazan (2013) (+)	
	Dorfleitner et al. (2013) (+)	
	Mersland and Strøm (2011) (+)	
Gross Loan Portfolio	**Janda and Zetek (2014)** (-)	
	Dorfleitner et al. (2013) (-)	
MARKET-BASED VARIABLES		
Competition	**Cotler and Almazan (2013)** (-)	Mersland and Strøm (2009) (Insignificant)
	Dorfleitner et al. (2013) (-)	Assefa et al. (2013) (-)
	Mersland and Strøm. (2011) (-)	Hartarska (2007) (Insignificant)
Regulation	Dorfleitner et al. (2013) (+)	Tchakoute-Tchuigoua (2010) (Insignificant)
	Roberts (2013) (-)	Hartarska (2007) (Insignificant)
		Mersland and Strøm (2009) (Insignificant)
		Cull et al. (2011) (Insignificant)
Population Density	Roberts (2013) (-)	Cull et al. (2009b) (Insignificant)
	Janda and Zetek (2014) (-)	
Institution context (KKM Index) (Also institutional variables from Heritage Foundation)		Crabb (2008) (-)
		Ahlin et al. (2011) (Insignificant)
		Cull et al (2009b) (Insignificant)
		Chikalipah (2017a) (+)
		Tchakoute-Tchuigoua (2014) (+)

MACROECONOMIC VARIABLES		
GDP growth	**Janda and Zetek (2014)** (-)	Ahlin et al. (2011) (Insignificant)
		Hartarska (2007) (Insignificant)
		Henley (2013) (+)
		Gonzalez (2007) (Insignificant)
		Woolley (2008) (Insignificant)
Inflation	**Janda and Zetek (2014)** (-)	Hartarska (2007) (+)
	Dorfleitner et al. (2013) (+)	Cull et al. (2009b) (Insignificant)
		Hartarska et al. (2005) (-)
Unemployment	**Janda and Zetek (2014)** (-)	
	Mallick (2012) (-)	
Financial Development *(private credit/GDP)*	Dorfleitner et al. (2013) (-)	Ahlin et al. (2011) (Insignificant)

NOTES: The signs (- or +) in parentheses indicate the direction of impact. The word **Insignificant** indicates that the study found an insignificant relationship between the variables of interest. The citations in **BOLD** text represent articles that were published in low-ranked scientific journals. The letters KKM denote the Kaufmann, Kraay, Mastruzzi index of institutional development (Kaufmann et al., 2010; 2011). ROA denotes Return on Assets, and ROE represents Return on Equity.

4.7 Brief Review of Commercial Banks Literature in SSA

This section provides a review of empirical literature on the commercial banking industry of the sub-Saharan African region. The main purpose of this review is to assess whether there is a convergence between microfinance and commercial banking literature. A number of studies that focussed on the commercial banking industry have investigated factors that influence the interest rates spread.[46]

[46] The interest rates spread is the difference between the lending and deposit rates, sometimes called net interest margin.

Ahokpossi (2013) examined the determinants of bank interest margins using a dataset that comprised 456 commercial banks in 41 countries of SSA for the period 1995 to 2008. The study indicated a negative and significant relationship between commercial bank interest rates and competition. The results indicated that bank-specific factors are the main determinants of commercial bank interest rates in the SSA region; these factors include credit risks, liquidity risk and efficiency. Previous studies of this topic arrived at a similar conclusion: these include Beck and Hesse (2009); Moore and Craigwell (2003); and Sologoub (2006). Moreover, Gelos (2009) concluded that higher operating costs would logically require commercial banks to charge higher lending interest rates in order to remain profitable (see also: Angbazo, 1997; Randall 1998).

Folawewo and Tennant (2008) showed that statutory reserve requirements and the level of money supply exerted a significant positive effect on interest rates during the period 1988 to 2005 in the 33 countries of the SSA region selected for their study. The same finding was made by Akinlo and Owoyemi (2012) in a study that covered 12 Nigerian commercial banks for the period 1986 to 2007. Moreover, some other empirical studies have found a positive relationship between statutory reserve requirements and interest rates: these include Gelos (2009) and Nampewo (2013). Similarly, Mlachila and Chirwa (2004) investigated the impact of financial sector reforms on the commercial banking system in Malawi.[47] After analysing data from commercial banks for the period 1970 to 1994, the study established that reserve requirements and discount rates exert positive effects on interest rates in Malawi. In

[47] Taken as a whole, financial sector reforms in SSA were conducted mainly in the 1990s, and incorported a wide range of reforms including: the easing of entry requirements for international banks, adoption of floating exchange rates and the introduction of monetary policy instruments for the central banks. Also the reforms included the privatisation of State Owned Enterprises (SOEs) and introduction of a wide range of policies that facilitated financial market development (e.g. stock markets).

marked contrast, a study by Demirguc-Kunt and Huizinga (1998) found that reserve requirements had a negative effect on interest rates in developing countries.

Evidence on the relationship between financial sector development and bank lending interest rates in the SSA region is inconclusive. For example, Folawewo and Tennant (2008) claimed that the degree of development of the the banking sector is not an important determinant of interest rates in SSA. Similar results were obtained by Brock and Franken (2003), who argued that the level of banking sector development is insignificant in determining interest rates, and asserted that interest rates of commercial banks are largely determined at industry level. In contrast, studies by Crowley (2007), Moore (2003) and Demirguc-Kunt and Huizinga (1998) showed that the level of banking sector development significantly affects bank interest rates in the SSA region.

Finally, macroeconomic fundamentals have been shown to explain significant variations in commercial bank lending interest rates across the SSA region. For example, a study by Demirguc-Kunt and Huizinga (1998) identified a strong correlation between commercial bank interest rates and inflation, growth output and money market real interest rates. Related studies by Nampewo (2013) and Mlachila and Chirwa (2004), found inflation to be strongly associated with higher bank interest rates in the sub-Saharan African region. Likewise, Beck and Hesse (2009) explored factors that influence interest spreads in Uganda and concluded that these spreads are consistently high because of persistently high rates of government treasury bills, as well as institutional deficiencies (for further evidence on treasury bills, see: Aboagye et al., 2008; Akinlo & Owoyemi, 2012). Table 4.2, below, summarises the reviewed literature on the determinants of commercial bank interest rates spreads in the SSA region.

Table 4.2: Summary of Commercial Bank Empirical Studies in the SSA

VARIABLE	EMPIRICAL FINDINGS (Effect on the Lending Interest Rates)	
Broad Money Supply (M2/GDP*)*	Crowley (2007) (-)	**Nampewo (2013)** (-)
Interest rates uncertainty	Brock and Franken (2003) (+)	
Inflation	Demirguc-Kunt and Huizinga (1998) (+)	Mlachila and Chirwa (2004) (+)
	Crowley (2007) (+)	Folawewo and Tennant (2008) (+)
	Levine (2003) (+)	
Statutory Reserve Requirements (SRR)	Mlachila and Chirwa (2004) (+)	Folawewo and Tennant (2008) (+)
	Aboagye et al. (2008) (+)	Folawewo and Tennant (2008) (+)
	Demirguc-Kunt and Huizinga (1998) (-)	Mlachila and Chirwa (2004) (+)
	Gelos (2006) (+)	
GDP Growth	Folawewo and Tennant (2008) (-)	**Akinlo and Owoyemi (2012)** (-)
	Crowley (2007) (-)	**Nampewo (2013)** (-)
Treasury Bills	Aboagye et al (2008) (+)	**Nampewo (2013)** (+)
Bank overhead costs	**Nampewo (2013)** (+)	Beck and Hesse (2009) (+)
	Ahokpossi (2013) (+)	Angbazo (1997) (+)
	Gelos (2006) (+)	Randall (1998) (+)
	Akinlo and Owoyemi (2012) (+)	Moore (2003) (+)
	Sologoub (2006) (+)	
Institutional Development	Beck and Hesse (2009) (-)	
Bank Competition	Ahokpossi (2013) (-)	
Financial Development *(private credit/GDP)*	Folawewo and Tennant (2008) (-)	Crowley (2007) (Insignificant)
	Demirguc-Kunt and Huizinga (1998) (Insignificant)	Moore (2003) (Insignificant)

NOTES: The texts and signs (- or +) in parentheses indicate the direction of impact. The word **Insignificant** indicates that the study found an insignificant relationship between the variables of interest. The citations in **BOLD** text represent articles that were published in low-ranked scientific journals.

As can be observed, from Table 4.1 and 4.2, there are close similarities between the main factors that influence commercial bank interest rates spreads and microcredit interest rates. With a few notable exception of variables, that captured the effect of prudential regulations on leading interest rates. Many MFIs in the SSA are not deposit taking and so they are not subject to banking prudential regulations such as statutory reserve requirements, deposit insurance and capital adequacy controls. The literature survey failed to find any study, apart from the one by Beck and Hesse (2009), that investigated the effect of institutional development on interest spreads; their analysis focussed on the traditional banking industry of Uganda. This apparent gap in the literature forms one of the motivations for launching this investigation. In particular, one of the objectives of this research is to investigate the effect of institutional deficiencies on the microfinance lending interest rates in the SSA region.

4.8 Conclusion

The main purpose of this chapter was to review the literature with a focus on microfinance lending interest rates. The literature on the traditional banking industry of the sub-Saharan African region was also surveyed. It should be noted that MFIs differ from traditional banks in the following ways. First, many MFIs employ group lending methodology to overcome default risks, and this approach is not applicable in the traditional banking industry (Stiglitz & Hoff, 1990). Second, the mission of many MFIs is to alleviate poverty by providing microcredit, and this mission differs from that of traditional banks (Akpalu, Alnaa & Aglobitse, 2012; Ananya, 2010; Balkenhol, 2007; Banerjee & Duflo, 2011; Berhane & Gardebroek, 2011; Fernando, 2006; Hudon & Ashta, 2013; Morduch, 2000).

The question of what factors explain the persistently high microcredit interest rates has been addressed by Dorfleitner et al. (2013) and Cotler and Almazan (2013); however it has not been answered in a satisfactory and in-depth manner, particularly in the context of sub-Saharan Africa. Therefore, it is essential to investigate the determinants of microcredit interest rates with a sole focus on SSA, taking into account the distinctive features of the region. Additionally, there is a need to consider the effect of institutional deficiencies on microcredit interest rates. A better understanding of these interest rates dynamics is important in view of the rapid growth of the microfinance industry in the SSA region, and its contribution to the financial inclusion agenda.

The literature surveyed in this chapter points to a lack of agreement on the factors that influence the lending interest rates in the microfinance industry. For example, there is a lack of agreement on the effects on the microcredit interest rates attributable to competition, age of the MFI, loan sizes, and outreach to the poor. Finally, the literature review failed to reveal any study of the microfinance industry that provides evidence on the effect of institutional development on microcredit interest rates. These gaps in research form one of the motivations for conducting this research.

CHAPTER FIVE

STUDY METHODOLOGY

5.1 Introduction

The principal objectives of this research are as follows. First, the study aims to examine factors that influence microcredit interest rates in the SSA region. Second, the study investigates the methodical nexus between outreach to the poor and the financial performance of MFIs in SSA. Third, the aim is to determine the factors that influence financial inclusion in the SSA region. Therefore, in order to meet these three core objectives, this chapter sets out a research methodology used in the three chapters dedicated to empirical analysis. A well-structured methodology is an important part of a research programme and is a prerequisite for collecting and analysing data (Flick, 2015, p.89). Consequently, this chapter highlights the study's research philosophy and approach, and also provides the sources of data and the appropriate tools applied to analyse the data.

The next sections of this chapter are organised as follows. Section 5.2 outlines the research philosophy of the study. Section 5.3 discusses the positivist research paradigm, while section 5.4 describes the sources of data. Section 5.5 presents the econometric methods applied during data analysis. Section 5.6 data analysis techniques. Finally section 5.7 presents a description of the study limitations, before the concluding remarks are offered in section 5.8.

5.2 The Main Research Philosophies

Acording to Saunders, Lewis and Thornhill (2009), the term ‘research philosophy’ refers to the construction of the research framework, research knowledge and its characteristics. In addition, a research philosophy prescribes ways in which data should be gathered, analysed, and also used (Bryman & Bell, 2015). It is becoming increasingly common to see two research approaches, the qualitative and quantitative approaches, being used in combination (Flick, 2015, p.9). Qualitative research makes use of non-numerical data to interpret and gain an undertanding of the subject matter; the methods used in qualitative research include observations, interviews and surveys (Carr, 1994). In contrast, quantitative research involves using numerical data to understand a problem, often exploiting statistical techniques (Burton, 2007).

There are many important philosophical identities in research and these include positivism, interpretivism, critical realism, postmodernism, and pragmatism (Caldwell, 2003).[48] Table 5.1, below, presents a comparison of four different research philosophies. It has often been argued that no single research methodology is superior to another one, and many researchers use a combination of different research methods (for details, see Kaplan & Duchon, 1988). Moreover, a combination of different research approaches is applied with a view to improving the quality of research (Kaplan & Duchon, 1988).

[48] We do not delve into detailed criticisms of these research philosophies (for such details see: Caldwell, 1980 and Hill, 1968).

Table 5.1: Comparisons of Four Research Philosophies

	Positivism	Realism	Interpretivism	Pragmatism
Ontology: the researcher's view of the nature of reality or being.	External, objective and independent of social actors.	Is objective, Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist).	Socially constructed, subjective, may change, and multiple	External, multiple, view chosen best to enable answering the research question.
Epistemology: the researcher's view regarding what constitutes acceptable knowledge.	Only observable phenomena can provide credible data, and facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements.	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations, which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions.	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data.
Axiology: the researcher's view of the role of values in research.	Research is performed in a value-free way and the researcher is independent of the data and maintains an objective stance.	Research is value laden; the researcher is biased by worldview, cultural experience and upbringing. These will impact on the research.	Research is value bound; the researcher is part of what is being researched, cannot be separated and so will be subjective.	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view.
Data collection techniques often used.	Highly structured, large samples, measurement quantitative, but can use qualitative.	Methods chosen must fit the subject matter, quantitative or qualitative.	Small samples, in-depth investigations, qualitative	Mixed or multiple methods designs, quantitative and qualitative.

NOTES: Table 5.1 is adopted from Saunders et al. (2009, p.107).

5.3 Our Research Paradigm, and Rationale for Choice of Approach

In the previous section, it was mentioned that quantitative research involves applying statistical techniques to analyse numerical data. Subject to this approach, the positivism research paradigm explores social reality and is grounded on the philosophical thoughts of the French philosopher August Comte (Comte, 1880). According to Comte, “true knowledge is established on experience and can be acquired by observation and experience” (Comte, 1880). It is common to see a positivism paradigm adopting scientific methods as a means of knowledge generation (Bryman & Bell, 2015). In that respect, quantitative research using the positivism approach contributes to the general body of knowledge only when the results (solutions) for a given problem are found (Flick, 2015, p.20). In a related note, Collins (2010) argued that studies based on positivism habitually adopt a deductive approach, while an inductive research approach is commonly connected with a phenomenology philosophy.

Since the middle of the twentieth-century, there has been shift from positivism towards a post-positivism philosophy (Sarantakos, 2012). Yet, there are no major and fundamental differences between these two approaches, but only differences in degree. Positivism is an epistemological position premised on the notion that the objective of knowledge is to study observable componenets. In contrast, post-positivism rejects positivism and presents new suppositions in order to disentangle the truth, and recognises that there are errors in scientific methods (Saunders et al. 2009, p.107). There are some other minor differences between the two approaches as follows: (i) positivists are realist, while post-positivists are critical realists; (ii) in positivism, the researchers are considered to be objective, whereas post-positivism acknowledges that researchers can be biassed too (Caldwell, 2003; Weideman, 2003).

Bearing in mind the nature of the research questions outlined in chapter 1 of this thesis, and also the nature of the statistical data, it is firmly believed that this study is aligned to a post-positivism research philosophy. Moreover, that philosophy is considered to be appropriate for this study, as this study involves collecting data from different sources and producing research findings obtained by applying statistical tests. To summarise: this research is conducted according to a post-positivism philosophical viewpoint; it is deductive in nature, and adopts mostly a quantitative research approach.

5.4 The Sources of Data

In chapters 6 and 7, the study makes use of a dataset gathered from three different sources. The main source was the Microfinance Information eXchange (MIX), and was supplemented by the Heritage Foundation (HF) and the World Bank (WB). These three data sources are described in the following paragraphs.

Thus, the MIX market is currently the largest data hub where more than 1800 MFIs share their institutional data to broaden transparency and provide market insight.[49] The data relating to individual MFIs includes their financial performance indicators and financial statements. The MIX market data is available online (www.mixmarket.org), and detailed datasets are provided for a fee. The MIX market gathers and verifies financial statements and social performance indicators of MFIs worldwide. Those datasets have been used in several studies of the microfinance industry across the world (examples include: Ahlin et al, 2011; Assefa et al., 2013; Ayayi & Sene, 2010; Chikalipah, 2017a; Cotler & Almazan, 2013; Cull et al., 2011; Dorfleitner et al., 2013; Fernandez et al., 2016; Hartarska & Nadolnyak, 2007; Hermes & Lensink, 2011; Hermes et al., 2011; Quayes, 2011; Roberts, 2013; Tchakoute Tchuigoua, 2014; Woolley, 2008).

The World Bank provides free open-access data which includes a compilation of development indicators pertaining to more than two hundred countries; data from the 1960s

[49] As indicated in chapter 1, there are new and emerging microfinance data depositories, including: MicroRate, Oikocredit, and Rabobank foundation.

to date is available. The World Bank is the world's largest data depository for national, regional and global macroeconomic data. Therefore, this study uses the World Bank databank as a source of macroeconomic level data for individual countries (http://data.worldbank.org/indicator). The World Bank datasets are used extensively in empirical literature (for microfinance specific studies, see: Ahlin et al, 2011; Chikalipah, 2017a; Cull et al.,2009, 2011; Dorfleitner et al., 2013).

Finally, the institutional development indices were obtained from the Heritage Foundation and the freely-available data can be accessed at (http://www.heritage.org/index). The fundamental constituent of the Heritage Foundation data is the economic freedom index, which comprises ten freedoms in 183 countries. Those ten economic freedoms are: property rights, freedom from corruption, fiscal freedom, government spending (size), business freedom, labour freedom, monetary freedom, trade freedom, investment freedom and financial freedom. A number of microfinance studies have used this dataset, including those by Hartarska and Nadolnyak (2007), Mersland and Strøm (2009), and Chikalipah (2017a).

The dataset from the MIX market was procured for this study on 16th September 2014, with data points covering the period from 1995 to 2013. The supplementary datasets from the Heritage Foundation and the World Bank were downloaded on 20th September 2014. The following adjustments were made to the original dataset obtained from the MIX market to arrive at the final dataset used in the empirical analysis. Firstly, the number of MFIs that reported financial results between 1995 and 2002 to the MIX market was found to be relatively low; moreover, some MFIs did not include important variables, such as the total number of borrowers, toal number of assets, operating expenses, and gross loan portfolio; bacause of these shortcomings a decision was taken not to include the period 1995 to 2002 in the analysis. In the case of the period from 2012 to 2013, the MIX market was still auditing and translating the submitted financial reports. Consequently, little data was available for that period 2012 to 2013. In view of these considerations, the study uses an unbalanced panel dataset that covers the period from 2003 to 2011.

The original MIX market dataset comprised approximately 350 MFIs based in 36 countries of sub-Saharan Africa and covered the period from 2003 to 2011. In oder to obtain the final sample, the following steps were taken to clean the initial dataset. First, South Sudan and Zimbabwe reported insufficient amounts of macroeconomic data between 2003 and 2011 and so these two countries were completely eliminated from the final sample. Second, MFIs that submitted incomplete data, such as nil figures for total assets and gross loan portfolio, were also excluded from the final sample. After these steps were taken, the final dataset contained 292 MFIs based in 34 sub-Saharan African countries and covering the period 2003 to 2011. Chapters 6 and 7 provides further details on the properties of the dataset used in each chapter.

In chapter 8, the study makes use of a country-level data set obtained from the World Bank. The data was collected during the Global Findex survey, conducted in 2014 by the World Bank in more than 140 countries worldwide. The Global Findex survey is the world's most comprehensive database on financial inclusion. The World Bank launched the Global Findex databank in 2011, and conducted financial inclusion surveys in 2011 and 2014. Therefore, this study makes use of the most recent survey, which was in 2014. The auxiliary data on the global infrastructure ranking index was sourced from Statista. On 12th August 2015 data was available from the two sources. The final sample incorporates 20 countries of the SSA region, which is rather less than the total number of counties in that region. Several countries were excluded because they were missing certain key variables, which are relevant for the empirical analysis. For example, some of the missing key data points were for illiteracy levels and financial inclusion.

5.4.1 Research Ethical Clearance

The first two years of this study were conducted at Bournemouth University (BU) in the United Kingdom. The work was then transferred to the University of Cape Town (UCT) in the Republic of South Africa. Both BU and UCT promote high professional standards in their quality of research, and apply good moral standards and integrity. It is an important requirement for all academic staff including postgraduate researchers to adhere to research ethics. With a view to enforcing the ethical research standard, all academic staff and postgraduate researchers are required to obtain clearance from the university Research Ethics Committee before the start of any research that involves human participants. The main objectives of being granted clearance are to reduce the risk of harm to researchers and study participants, uphold the dignity of study participants and to safeguard confidentiality and anonymity of information provided by study participants.

Although this study relied solely on secondary data, and no human participants were involved, research ethical clearance was obtained. Having met all the Bournemouth University Research Ethics Committee requirements, the ethics clearance certificate number 8667 was granted on 7th September of 2015.

5.5 Econometric Specifications Applied in this Research

This study has employed four main econometric models to analyse the data, with the aim of accomplishing the objectives outlined in the first chapter of this thesis. Those four main econometrics models, which are applied in the next empirical analysis chapters, are as follows: (i) Ordinary Least Squares (OLS) estimation approach; (ii) the Fixed Effect (FE) panel regression estimation; (iii) the Bayesian Model Averaging (BMA) and (iv) the dynamic system Generalised Method of Moments (GMM) estimation technique. The BMA, FE and GMM estimation techniques are applied in chapter 6. The OLS estimation method is applied in chapter 8. Supplementary tests were performed to support the four estimation models, and the equation forms of some key statistical tests are presented in Appendix 3.

5.6 Data Analysis

The three datasets were first assembled in Microsoft Excel spreadsheets using the 2013 version; they were then exported to the Statistics and Data (STATA) software versions 12 and 14. This procedure was necessary because the datasets have different reporting formats. Therefore, pooling the data first in Microsoft Excel allowed smooth and accurate manipulation of large data files without distorting their contents.

STATA software was used because it has an advanced range of panel analysis tools. Also, STATA is user-friendly, and its users can benefit from access to online resources and technical support (Baum, 2006; Hamilton, 2012). Most importantly, we benefited from the various STATA courses provided by the Centre for Microdata Methods and Practice (CEMMAP) at the Institute of Fiscal Studies (IFS) in the United Kingdom.

5.7 Study Limitation

Studies based on empirical research often have slight limitations. Thus, this study has a minor limitation as far as the data is concerned. The MFIs voluntarily report data to the MIX market database and so any data is vulnerable to self-selection bias, to some degree. Bauchet and Morduch (2010) noted that MFIs with strong financial performances are most likely to submit their financial reports to the MIX market and the same applies to those seeking external funding. Despite this limitation, the MIX market is the largest database in the microfinance industry and is extensively used in several studies (see for instance: Ahlin et al, 2011; Assefa et al., 2013; Ayayi & Sene, 2010; Chikalipah, 2017a; Cotler & Almazan, 2013; Cull, Demirgüc-Kunt, & Morduch, 2011; Cull et al., 2011; Dorfleitner et al., 2013; Fernandez et al., 2016; Hartarska & Nadolnyak 2007; Hermes & Lensink, 2011; Hermes et al., 2011; Quayes, 2011; Roberts, 2013; Tchakoute Tchuigoua, 2014; Woolley, 2008). We do not suspect any inherent bias in the MIX market datasets, especially with the one used in this study. After all, that final dataset has data on small and large MFIs and also on poorly performing MFIs and good performers.

The third limitation arises because, according to interest rate theories and specifically the yield curve, credits with different maturity dates and quality have different interest rates. Nevertheless, the MIX dataset used in this study assumed that all loans have the same maturity date and yields. This is because of the methodology employed by the MIX market to construct the lending interest rates proxy: for further details see sections 6.2.2 and 6.2.4, and also refer to equation 6.1.0 in chapter 6.

5.8 Conclusion

The research design applied to this study was reviewed in this chapter, which covered the following issues. Firstly, the study research philosophy and approach was discussed. Secondly, the sources of data used in this research were outlined. Thirdly, the econometric methods applied during data analysis were described. Fourth, some of the diagnostic tests performed during pre-data analysis were presented. Finally, one limitation of this study was discussed.

The datasets used in this research have been assembled from four different sources. The main one was the MIX market which was supplemented by the Heritage Foundation, Statista and the World Bank. Throughout this research, the data analysis approach has been empirical, the following four estimation techniques were applied: Ordinary Least Squares (OLS), Fixed Effects (FE), Bayesian Model Averaging (BMA) and Generalised Method of Moment (GMM). Finally, this research has been conducted from a positivism viewpoint which is deductive in nature and adopts a mainly quantitative approach.

CHAPTER SIX

DETERMINANTS OF MICROCREDIT INTEREST RATES IN SUB-SAHARAN AFRICA

Testing the Predictions of Theoretical Models[50]

Discussion of Empirical Results

6.1 Introduction

The microfinance industry has witnessed a sustained rate of growth in the past two decades, and is increasingly becoming an important part of the financial inclusion agenda in SSA. However, the industry is characterised by persistently high microcredit interest rates: some microfinance stakeholders view those high lending interest rates as a poverty penalty (Bateman, 2010; Mader, 2013). In most parts of the developing world, robust debates continue to take place on the subject of high microcredit interest rates, especially in the context of commercialisation of the industry (Bateman, 2010; Mersland & Strøm, 2011). Against this background, this chapter presents an investigation into the factors that influence microcredit interest rates in SSA.

The panel regression results, estimated using the system GMM and fixed effects methods, present the following evidence. Firstly, the small firm endogenous characteristics of MFIs and the unexploited economies of scale, together go far towards explaining the persistently high microcredit interest rates in the SSA region. Secondly, the institutional deficiencies in the SSA region also contribute towards the high microcredit interest rates in that region, compared to other parts of the world. Thirdly, volatile macroeconomic

[50] An abridged version of this chapter, titled "Determinants of Microcredit Interest Rates in sub-Saharan Africa (SSA)", was presented at the First World Congress of Comparative Economics conference in Rome, Italy, on 26th June 2015. We acknowledge suggestions offered by conference participants.

environments, that are widespread in many countries of the SSA region, also exert an undesired upward effect on microcredit interest rates.

The next sections of this chapter are organised as follows. Section 6.2 revisits the dataset used in this study and also outlines the methodology. Section 6.3 presents the results of the estimation. Section 6.4 presents and discusses the robustness checks, and also addresses the endogeneity concerns while section 6.5 presents and discusses the results of the Bayesian Model Averaging (BMA). Finally, section 6.6 offers concluding remarks.

6.2 The Dataset and Brief Methodology

As indicated in chapter 5, the approach in this study is empirical and entails the use of unbalanced panel data comprising 292 microfinance institutions based in 34 countries of SSA for the period 2003 to 2011. Tables 6.1 and 6.2 report on the number of countries sampled and the summary of the final dataset for this chapter, respectively.

Table 6.1: List of countries in the Sample

1. Angola	10. Congo, **REP**.	19. Malawi	28. South Africa
2. Benin	11. Cote d'Ivoire	20. Mali	29. Swaziland
3. Burkina Faso	12. Ethiopia	21. Mozambique	30. Tanzania
4. Burundi	13. Gabon	22. Namibia	31. The Gambia
5. Cameroon	14. Ghana	23. Niger	32. Togo
6. **CAR**	15. Guinea	24. Nigeria	33. Uganda
7. Chad	16. Kenya	25. Rwanda	34. Zambia
8. Comoros	17. Liberia	26. Senegal	
9. Congo **DR**	18. Madagascar	27. Sierra Leone	

NOTES: Table 6.1 lists the counties included in this study. The acronym **CAR** denotes Central African Republic. **DR** signifies Democratic Republic, and **REP** abbreviates the word Republic.

Table 6.2: Summary of the Dataset

Panel Study Period	2003 - 2011		**YEAR**	**OBSERVATIONS**
Number of MFIs	292		2003	33
SSA Countries Covered	34		2004	50
			2005	67
PROFIT ORIENTATION			2006	121
For Profit MFIs	129		2007	140
Non-Profit MFIs	163		2008	165
	292		2009	149
REGULATION			2010	133
Regulated MFIs	236		2011	116
Unregulated MFIs	56			**974**
	292			

NOTES: Table 6.2 shows the summary of the dataset: it indicates the study period; number of MFIs and the number of countries in SSA that were sampled; number of profit and non-profit oriented MFIs; and the number of observations in the study sample. Table 6.2 also provides the numbers of regulated and unregulated MFIs in the sample for the period 2003 to 2011. See **Appendix 1** for a full list of the 292 microfinance institutions in the dataset.

6.2.1 Disaggregating the Main Sample

In contrast to the approach followed in many previous microfinance studies, this study adopts the approach of segregating the main sample into four sub-samples as follows: (i) regional subgroups, (ii) subgroups based on inflation levels, (iii) subgroups based on income level of countries, and (iv) subgroups based on the established legal charters of the MFIs. As indicated in chapter 1, this approach was adopted after considering the Simpson-Yule (Simpson Paradox) effect, which sometimes occurs when combined datasets differ from sub-samples of the same dataset (Blyth, 1972; Wagner, 1982).

As mentioned previously, the SSA region comprises 49 countries (for details see section 2.2 of chapter 2). Although they are in the same region, these countries differ greatly in many respects; for example there are major variations in income, macroeconomic fundamentals (e.g. inflation). Similarly, microfinance institutions have different missions and objectives, which are reflected in their established legal charters. These legal charters are associated with profitability and the setting of microcredit interest rates (D'Espallier et al., 2013). It is important to note that the approach of segregating the main sample into homogenous sub-samples is common, and this is reflected in the literature; see for example, Acemoglu and Johnson (2007); Loxley (2008); and Narayan et al. (2011). For these reasons, the disaggregation of the main dataset into sub-samples, for further analysis, is justified.

I. Regional Sub-Samples

In the first subgroup, the main sample is classified into four sub-regions of the SSA region, which are as follows: Central, East, Southern, and West Africa. The aim is to assess any regional variation which might arise when a comparison is made with the results of the full sample. In Table 6.3, the 34 countries of SSA included in the main sample are grouped into their respective sub-regions of sub-Saharan Africa.

Table 6.3: Regional Groupings

SUB-REGIONS	COUNTRIES	TOTALS
Central Africa	Burundi, Cameroon, Central African Republic (CAR), Chad, Congo Republic, Congo Democratic Rep., Gabon and Guinea	8 (24)
East Africa	Comoros, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda	6 (17)
Southern Africa	Angola, Madagascar, Malawi, Mozambique, Namibia, South Africa, Swaziland and Zambia	8 (24)
West Africa	Benin, Burkina Faso, Code d'Ivoire (Ivory Coast), Ghana, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo and The Gambia	12 (35)
	TOTAL	**34 (100)**

NOTES: In Table 6.3, the countries included in this study are placed into their respective sub-region of the SSA region. The figures in parentheses indicate percentage of the total.

II. Inflation Sub-Samples

In the second subgroup the countries in the main sample are classified into three distinctive inflation categories as follows: (i) low inflation countries with inflation rates less than 5 percent during the period under review; (ii) medium inflation countries with inflation between 5 and 10 percent, and (iii) high inflation countries with inflation rates exceeding 10 percent during the period under review. These inflation subgroups will help in examining any possible variations among them. In Table 6.4, the 34 countries of SSA in the main sample are shown in their respective inflation groups.

Table 6.4: Classification of the SSA Countries into Inflation Groups

Low Inflation Countries	Middle Inflation Countries	High Inflation Countries
Benin	Gambia	Angola
Burkina Faso	Liberia	Burundi
Central Africa Rep	Madagascar	Congo, DR
Cameroon	Namibia	Ethiopia
Chad	Rwanda	Ghana
Code d'Ivoire	Swaziland	Guinea
Comoros	South Africa	Kenya
Congo Rep	Uganda	Mozambique
Gabon	Tanzania	Malawi
Mali		Nigeria
Niger		Sierra Leone
Senegal		Zambia
Togo		

NOTES: In Table 6.4, the 34 countries in the main sample are grouped into three inflation categories. Thus: (i) **Low** inflation countries with inflation rates less than 5 percent; (ii) **Medium** inflation countries with inflation rates between 5 and 10 percent; and (iii) **High** inflation countries with inflation rates more than 10 percent. The period covered was 2003 to 2011. **DR** signifies Democratic Republic, and **REP** signifies Republic. Source of data used in this table: the World Bank (2011).

III. Income Levels Sub-Samples

In the third subgroup, the countries in the main sample are categorised according to their level of income, based on GNI *per capita*. The low income countries are those with GNI *per capita* less than USD 1,000. The lower-middle income countries are those with GNI *per capita* between USD 1,020 and 4,000 while the upper-middle income countries are those with GNI *per capita* between USD 4,020 and 12,500. Higher income countries are those with GNI *per capita* of USD 12,500 or more. This classification is made in order to investigate whether income levels have any material influence on microcredit interest rates determinants in the SSA region. More importantly, since the problem statement for this thesis (see section 1.2 of chapter 1) is endemic poverty and financial exclusion, the results for lower income countries are more important. Table 6.5 indicates the 34 SSA countries in the main sample, classified into their GNI *per capita* subgroups.

Table 6.5: Classification of SSA Countries into Income Groups

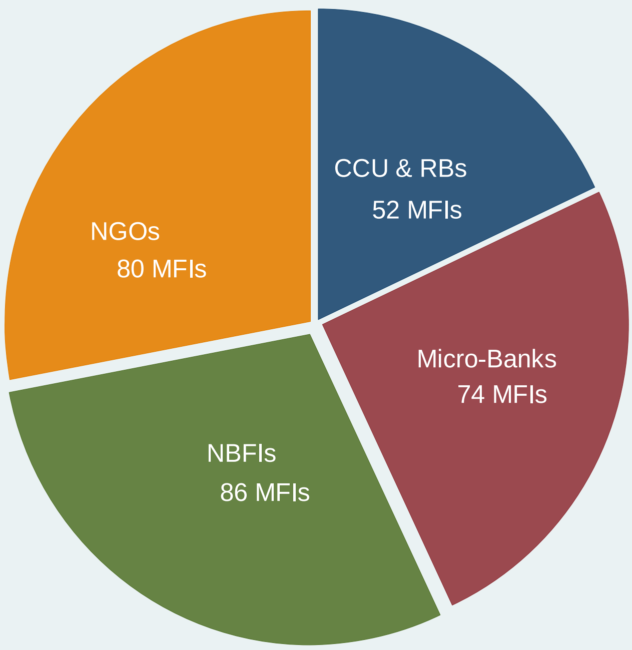
Low income countries	**Lower-middle income countries**	**Upper-middle income countries**
Burkina Faso	Benin	Angola
Burundi	Cameroon	Congo, Rep
Central African Rep	Chad	Gabon
Comoros	Code d'Ivoire	Namibia
Congo, DR	Ghana	South Africa
Ethiopia	Gambia	Swaziland
Guinea	Kenya	
Liberia	Mali	
Madagascar	Nigeria	
Malawi	Rwanda	
Mozambique	Senegal	
Niger	Tanzania	
Sierra Leone	Uganda	
Togo	Zambia	

NOTES: Source: the World Bank (2011). The income groups are classified as follows: (i) **Low income** countries with GNI *per capita* less than USD 1,000; (ii) **Lower-middle-income** countries with GNI *per capita* between USD 1,020 and 4,000; and (iii) **Upper-middle-income** countries with GNI *per capita* between USD 4,020 and 12,500. The letter **DR** denotes Democratic Republic, and REP shortens Republic.

IV. Sub-Samples of Types of Legal Charter

The fourth and final grouping classifies MFIs on the basis of their established legal charters. The study sample comprises 292 MFIs as follows: there are 52 Cooperatives, Credit Unions and Rural Banks (CCU & RB) which represent 18 percent of the study sample; 74 Microbanks represent 25 percent of the study sample; 80 Non-Governmental Organisations represent 28 percent; and; 86 Non-Banking Financial Institutions represent 28 percent of the total MFIs sampled. Figure 6.1 highlights the distribution of the 292 MFIs into their respective charter types.

Fig. 6.1



Source: Based on Study Sample (MIX)

NOTES: **Fig. 6.1** shows the distribution of MFIs with reference to established legal charters. The abbreviations **CCUs** and **RBs** denote Cooperatives, Credit Unions and Rural Banks, respectively. **NGOs** are Non-Governmental Organisations, while **NBFIs** represent the Non-Banking Financial Institutions.

6.2.2 Dependent Variable

This study makes use of a commonly used proxy for the microfinance lending interest rate: the portfolio yield. The use of this proxy is consistent and accepted in the microfinance industry. Moreover, many microfinance studies have used this proxy in a similar manner (see for example: Ahlin et al., 2011; Cotler & Almazan, 2013; Cull et al., 2007; Dorfleitner et al., 2013; Roberts, 2013; Tchakoute-Tchuigoua, 2012; Tchakoute Tchuigoua, 2014). The portfolio yield is constructed as follows:

$$IR_{i,t} = \frac{\sum_{i}[I + FC]_{i,t}}{\sum_{i=1} GLP_{i,t}} \qquad (6.1.0)$$

Where $IR_{i,t}$ is the portfolio yield of MFI i in period t, $I_{i,t}$ is the total interest income and $FC_{i,t}$ is the total additional loan-related fees received from borrowers by the MFI i in period t, while $GLP_{i,t}$ is the average gross loan portfolio of MFI i in period t. The average gross loan portfolio is calculated by adding the gross loan portfolio at the beginning and end of a financial year: the total is then divided by two (MIX, 2013a). The advantage of the microcredit interest rates measure defined in equation (6.1.0) is that it incorporates extra loan-related charges besides the agreed interest on the loan. In order to geometrically eliminate the effect of inflation from the $IR_{i,t}$ specified in equation (6.1.0), the following formula was used

$$IR_{i,t} = \left\{\frac{\left(1 + IR_{i,t}\right)}{(1 + Inflation)}\right\} - 1 \qquad (6.1.1)$$

Therefore, the microcredit interest rates ($IR_{i,t}$) entering our estimation models are inflation adjusted.

6.2.3 Independent Variables

The following explanatory variables have been selected on the basis of the underlying theoretical predictions described in sections 3.1.1 and 3.6 of this thesis. Furthermore, close attention is paid to the potential causal effects with microcredit interest rates, taking into account the distinctiveness of the sub-Saharan African region. Careful consideration is given to endogeneity and multicollinearity among variables.

MFI-Specific (Firm Level) Variables: age (Age)[51] is defined as the number of years that an MFI has been in existence; this variable measures the learning effect of the MFI.[52] Theoretically, older firms are considered to have more experienced management, and sometimes enjoy efficiency and higher profitability (Lumpkin & Dess, 2001). In a stable operating environment, an increase in operational efficiency can lower microcredit interest rates. However, due to mission drift, we predict an indeterminate association between age of the MFI and the microcredit interest rates that it offers. The Average Loan Size (Loan-Size) assesses the level of poverty of the clients served by the MFI, and indicates its depth of outreach. The logarithm of Average Loan Size (LogLoan-Size) transforms the variable into normal distribution. The consensus in the microfinance literature is that small loan amounts are mostly targeted at poor people (for details, see: Cull et al., 2007; Hermes & Lensink, 2011; Hermes et al., 2011; Mersland & Strøm, 2010).[53] Furthermore, providing small

[51] The age squared (Age^2) variable captures the likelihood of non-linear association. However, due to collinearity Age^2 was dropped during data analysis.

[52] According to MIX market methodology, MFIs are classified in three sets: **NEW** when they have been operating for between one and four years, **YOUNG** between five and eight years of existence, and **MATURE** more than eight years in operation (MIX, 2013a).

[53] Moreover, this assumption is supported by the observation that about three-quarters of the average loan sizes in the sample are less than USD 800. Approximately 56 percent of the 292 microfinance institutions sampled are non-profit seeking, and focus predominantly on poverty alleviation.

uncollaterised loans is characteristically risky mainly because of information asymmetry and high transaction costs (de Quidt, Fetzer, & Ghatak, 2016). Thus, we predict a negative relationship between microcredit interest rates and average loan sizes.

The MFI size (SIZE) is captured using the MFI total assets. The logarithm of total assets (LogSIZE) was used to normalise the variable. Moreover, the size of MFIs will capture any evidence of economies or diseconomies of scale applicable to MFIs (Gilligan et al. 1984). Modern financial intermediation theory predicts that the larger firms are in a better position to exploit the economies of scale that can reduce operating costs; this would allow for lower microcredit interest rates (see sections 3.6 and 4.3 for further details).

Outreach denotes the number of clients served by the MFI, which indicates the breadth of financial penetration.[54] The logarithm of the number of clients served by MFIs (LogOutreach) transforms the variable into normal distribution. This Outreach measure examines the assertion that economies of scale are negatively associated with microcredit interest rates (Gilligan et al. 1984).

The microsavings (Deposits) indicate the total savings mobilised by the MFI. These microsavings represent a cheap source of finance for deposit-taking MFIs (Sapundzhieva, 2011). Additionally, MFIs could benefit from economies of scope by accepting microsavings and providing microcredits. Here, the term 'economies of scope' refers to the cost savings which result from combining two or more product lines within one firm, rather than

[54] MIX markets classify outreach in three categories: **SMALL** for MFIs with less than 10,000 clients, **MEDIUM** for MFIs with between 10,000 and 30,000 clients and **LARGE** for MFIs with more than 30,000 clients.

producing them separately (Panzar & Willig, 1977). Hence, we assume that a negative relationship exists between the level of microsavings and microcredit interest rates.

Credit risk exposure has been captured using the Portfolios at Risk (PAR), measured as total loan repayments overdue by more than 90days, divided by gross loan portfolio. The PAR measure will capture the risk faced by MFIs in providing uncollateralised microcredits. According to modern portfolio theory, elevated risk exposure could lead to loan delinquencies and lower profitability (Miller & Noulas, 1997). We would therefore expect a positive relationship between credit risk and microcredit interest rates.

The cost of finances (COF) signifies the interest costs that the MFI incurs for borrowed funds, and is measured by aggregate interest costs divided by the total assets. The COF variable will capture all financing related expenses; it is for this reason that neither commercial bank lending interest rates nor treasury bills rates are included in the estimation model.[55] The efficiency of the MFI is captured using operating expenses (OPEX), measured as total operating expenses divided by the total assets. Operating efficiency enhances profitability and could contribute towards reducing the microfinance lending interest rates. Therefore, we would expect a positive relationship to exist between microcredit interest rates and operating costs (including finance costs).

Institutional Development Variables: weak institutional qualities have adverse effects on the credit market and overall economy. According to North (1990) and Acemoglu and Johnson (2005), a weak institutional environment aggravates market uncertainty and

[55] Some empirical studies, such as Dorfleitner et al. (2013), included risk free rate and finance costs of MFIs in their estimation model. Theoretically, both variables would capture exactly the same effect on microcredit interest rates. Evidently, the estimation results reported by Dorfleitner et al. (2013) reveals a positive and significant relationship between microcredit interest rates and the two variables (risk free rate and finance costs).

exacerbate the moral hazard in the credit market (see section 3.6 of chapter 3 for further details). In the following discussion, we describe the key institutional variables that could influence the microcredit interest rates in SSA.

Business Freedom (BuF) and Investment Freedom (InveF) are quantitative indices that are derived from the Heritage Foundation: each variable's index ranges from 0 (zero) where there is total repression to 100 where there is total freedom. A sound business environment promotes entrepreneurship through efficient regulations as well as simple and straightforward procedures for opening and operating a business; the opposite is also true. Likewise, investment freedom (InveF) contributes to market efficiency.[56] In the same vein, Corruption Freedom (CorrF) is a quantitative index ranging from 0 (zero) where there is rampant corruption to 100 where there is no corruption. Corruption stifles economic prosperity and exacerbates moral hazard in the microfinance loan market (Stiglitz & Weiss, 1981). The same holds for Property Rights ($PPTY_{Right}$), where 0 (zero) applies in a situation where property rights are outlawed and 100 applies where those rights are guaranteed. Protection of property rights and clear enforcement of contracts are critical, particularly in the microfinance industry, bearing in mind that MFIs provide microcredit without matching collaterals (Assane & Grammy, 2003; Scully, 1988). By taking into account the underlying theories, we postulate an inverse relationship between institutional development variables and microcredit interest rates.

Finally, competition (HHI) between MFIs in the 34 sub-Saharan African countries studied is captured using the Herfindahl-Hirschman Index (Bikker & Haaf, 2002; Rhoades, 1993). The HHI index follows the form:

[56] This is most important for microfinance institutions seeking external funding.

$$HHI_{j,t} = \frac{1}{\sum_{i=1}^{N_t^j} (X_{i,t}^j)^2} \quad \text{with} \quad X_{i,t}^j = \frac{NB_{i,t}^j}{\sum_{y=1}^{N_t^j} NB_{y,t}^j} \qquad (6.2)$$

Where: $HHI_{j,t}$ denotes competition in a particular country j in year t; $NB_{i,t}^j$ signifies the total number of microcredit borrowers of a given MFI i in country j in year t; and N_t^j represents the total number of MFIs in country j and in year t. As specified by the market-based theories, a competitive market environment promotes operational efficiency (for discussion of the effects of competition, see Motta, 2004; Shaffer, 2004). Therefore, we would expect an inverse relationship between competition and microcredit interest rates.

Macroeconomic Variables: inflation (Inflation) is defined as the annual percentage increase in the consumer price index (CPI). The CPI measures the weighted average price of a basket of consumer goods and services. Theoretical and empirical evidence indicates that persistently high levels of inflation are associated with high lending interest rates (Beck & Hesse, 2009). Therefore, we predict a positive association between inflation and microcredit interest rates. On the other hand, economic growth (Growth) is the growth rate of real GDP *per capita* in a country in a given year. As previously indicated in chapter 3, economic acceleration has a significant effect on the interest rates and the credit market (Ahlin et al., 2011; Janda & Zetek, 2014). The literature indicates that good rates of economic growth have a significant influence on interest rates, achieved via savings and investment (Solow, 1956; Swan, 1956). In light of that, we would expect to find a negative relationship between economic growth and microcredit interest rates.

Table 6.6: Definition of Variables

Variables	Notation	Measure	Data Source	Expected Impact on IR
MFI-Specific Variables				
Age	Age	Time the MFI has existed (years)	MIX	+/-
Average Loan Size	LogLoan-Size	Gross Loan/Total number of borrowers	MIX	-
Deposits	Deposits	Total Deposits/Gross Loan Portfolio	MIX	-
Finance Costs	COF	Financial expenses/Gross Loan Portfolio	MIX	+
Operating Expenses	OPEX	Operating expenses/Gross Loan Portfolio	MIX	+
Outreach	Outreach	Number of active borrowers	MIX	+/-
Portfolio at Risk	PAR	Overdue loans >90days/adjusted GLP	MIX	+
Size of MFI	LogSIZE	Total MFI Assets	MIX	-/+
Institutional Variables				
Business Freedom	BuF	Composite Index: 0 denotes total repression, and 100 is total freedom	HF	-
Competition	HHI	Herfindahl-Hirschman Index (HHI) - Own computation using MIX data	Own Analysis	-
Corruption Freedom	CorrF	Composite Index: 0 denotes rampant corruption, and 100 is no corruption	HF	-
Investment Freedom	InveF	Composite Index: 0 denotes repression, and 100 is total freedom	HF	-
Property Rights	$PPTY_{Right}$	Composite Index: 0 denotes rights are outlawed, and 100 rights are guaranteed	HF	-
Macroeconomic Variables				
GDP Growth (Real)	Growth	Annual GDP *per capita* growth rate	WB	-
Financial Development	FinDev	Money and quasi money (M2) as a % of GDP	WB	-/+
Inflation	Inflation	Consumer Price Index annual - Laspeyres Formula	WB	+

NOTES: Table 6.6 provides a description of variables, notation, measurements, sources of data, and expected signs of impact on microcredit interest rates. **IR** stands for microcredit interest rates, **WB** is the World Bank, **HF** is the Heritage Foundation, and finally, **MIX** is Microfinance Information eXchange.

The level of financial development (FinDev) is captured by money supply, which is frequently designated as **M2**. The World Bank defines **M2** as money and quasi money in circulation as a percentage of GDP. A high percentage of broad money outside the financial system implies an underdeveloped financial sector, and the opposite holds true (De Gregorio

& Sturzenegger, 1997).[57] This is a better proxy than the domestic credit supply to the private sector because that level of credit supply is disappointingly low in many sub-Saharan African countries.[58] Table 6.6, above, presents the definition, measurement, notation, and sources of data for all the explanatory variables used in this study.

6.2.4 Univariate Analysis

Table 6.7, below, presents the descriptive and summary statistics. A wide variation is evident in the microcredit interest rates (IR) charged by MFIs during the period 2003 to 2011: these ranged from a negative 25 percent to a positive 179 percent, with an average of 27 percent for the entire SSA region.[59] The negative microcredit interest rates are attributable to the proxy used in this study and outlined in equation (6.1.1). Figure 6.2, below, plots the average microcredit interest rates per country for the period 2003 to 2011. The supporting data for Figure 6.2 is given in Appendix 2.

The average age (Age) of those MFIs included in the sample is six years. The total assets (SIZE) of all MFIs in that sample averaged USD 30.8 million with the smallest firm posting about USD 2000 in assets and the largest MFI had USD 2.1 billion in total assets. The credit risk faced by MFIs in providing small, uncollateralised loans was captured by the PAR and was shown to average eight percent during the period considered in this study.

[57] For related theories, see sections 3.1.1 and 3.6 of this thesis.

[58] Specifically, of the one-third of the adult population accessing the formal financial institutions, only about 6 percent have access to bank loans (Demirgüç-Kun et al., 2015).

[59] The 27 percent interest rate is our sample average, while the 38 percent reported in chapter 1 in Figure 1.2 is based on the entire dataset published by the MIX market (refer to Rosenberg et al., 2013).

Fig. 6.2

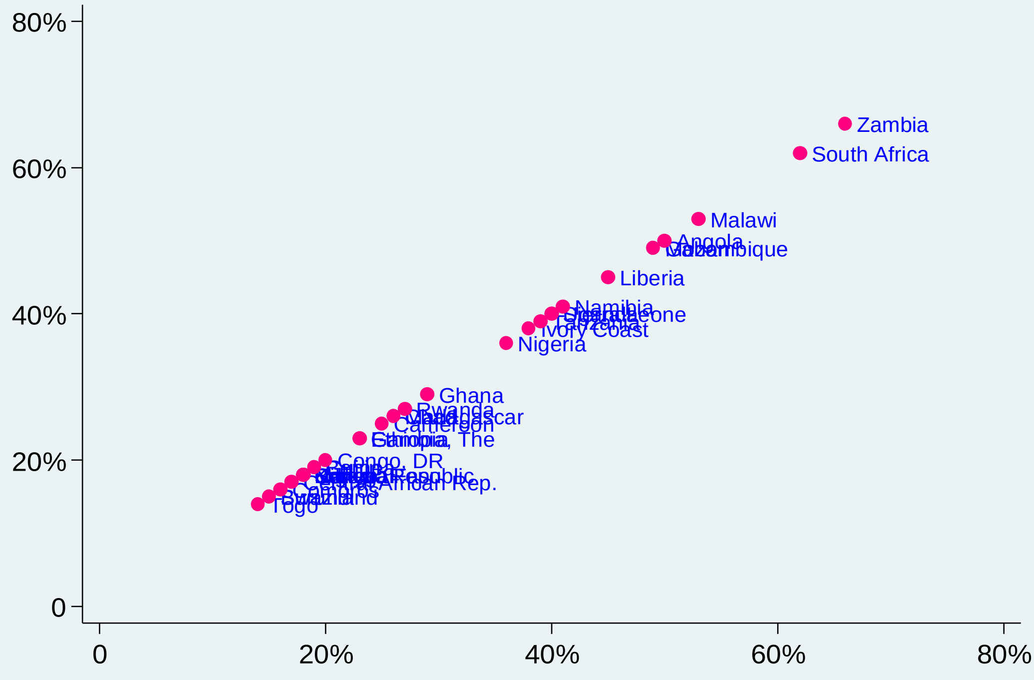


Fig. 6.2: Plots the average microcredit interest rates per country (2003 to 2011). The y and x axes represent the microcredit interest rate. The intersect point for these two lines is the average microcredit interest rates reported for each country between 2003 and 2011. Refer to Appendix 2 for supporting data for this figure.

In the case of the institutional development variables, the Business Freedom (BuF) index averaged 53 across the 34 countries sampled and with respect to the period 2003 to 2011. However, corruption is still rampant in the SSA region, with an average score of 27 for the 34 countries included in this study; this is the lowest score of all the institutional variables. On a related matter, guaranteeing property rights in the region is still a challenge as seen by the average score of 35. Inflation averaged nine percent during the period under review, and ranged from a deflation of nine percent in Chad to 44 percent inflation in Ethiopia. Finally, between 2003 and 2011, the growth rate of real GDP *per capita* (Growth) averaged 9 percent in the 34 countries sampled in this study.

Table 6.7: Descriptive Statistics

Variable	*N*	Mean	S.D	MIN	Q1	Median	Q3	MAX
MFI-specific Variables								
Interest Rates (IR)	974	0.27	0.2	-0.25	0.14	0.22	0.38	1.79
Age (years)	974	6.33	2.48	1	5	8	8	8
COF	974	0.03	0.03	-0.15	0.01	0.02	0.04	0.24
Deposits	974	0.78	1.08	0	0.22	0.52	0.97	13.79
Loan-Size (USD)	974	610.16	857.11	2	136	337	786	9262
OPEX	974	0.41	0.45	0.03	0.19	0.3	0.49	8.28
Outreach (' 000)	974	36.44	88.16	0.002	3.69	11.47	31.54	801.81
PAR	974	0.08	0.11	0	0.02	0.05	0.1	0.96
SIZE (USD Millions)	974	30.8	119	0.002	1.81	5.21	18.7	2080
Institutional Variables								
BuF	974	53.03	9.7	25.3	45.8	54.95	58.7	76.9
CorrF	974	27.55	6.71	10.0	22.0	27.0	32.0	57.0
HHI	974	20.62	10.16	1.00	11.8	18.77	27.11	37.71
InveF	974	46.08	10.47	10.0	40.0	50.0	50.0	70.0
$PPTY_{Right}$	974	34.91	9.99	10.0	30.0	30.0	45.0	70.0
Macro Variables								
FinDev	974	0.21	0.12	-0.12	0.13	0.19	0.25	1.05
Growth	974	0.09	0.11	-0.33	0.04	0.10	0.15	0.53
Inflation	974	0.09	0.07	-0.09	0.04	0.09	0.12	0.44

NOTES: Table 6.7 reports summary statistics {number (***N***) of observations, Mean, Standard Deviation (**S.D**), Minimum (**MIN**), the first quartile (**Q1**), Median, third quartile (**Q3**), and Maximum (**MAX**)} of the dependent and explanatory variables that entered the specification. The data is for the period 2003 to 2011 and incorporates 292 MFIs based in 34 countries of SSA. **USD** abbreviates United States dollars.

In a view to investigate any linear relationship between the explanatory variables, the Pearson correlation matrix test was performed and the results are presented in Table 6.8 below. If there is multicollinearity between the explanatory variables, then the statistical implication is that *p*-values of the explanatory variables might be imprecise. Theoretically, linear correlation between explanatory variables is considered to be problematic if the correlation coefficient is greater than 0.70 (Baltagi, 2008; Hsiao, 2014). In this study, all the coefficients of explanatory variables are below 0.60. Since the nominated panel data estimation methods (GMM and fixed effects) give more degrees of freedom, the problem of linear correlation between variables is reduced further (Greene, 2008; Hsiao, 2014).

Table 6.8: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Age	1.000															
(2) COF	-0.006	1.000														
(3) Deposits	0.068*	-0.036	1.000													
(4) Loan-Size	0.122*	0.057	0.111*	1.000												
(5) OPEX	-0.074*	-0.007	-0.014	-0.156*	1.000											
(6) Outreach	-0.009*	0.043	-0.045	-0.014	-0.126*	1.000										
(7) PAR	-0.028	0.008	0.038	0.052	-0.016	-0.072*	1.000									
(8) SIZE	0.145*	0.027	0.002*	0.508	-0.242	0.529	-0.093	1.000								
(9) BuF	-0.091	0.102*	-0.138*	-0.133*	0.029	0.175*	-0.028	0.011*	1.000							
(10) CorrF	-0.006	0.088*	-0.036	-0.048	0.030	-0.002	-0.049	-0.070	0.316*	1.000						
(11) HHI	0.062	0.152*	-0.069*	-0.064*	-0.093*	-0.074*	-0.060	0.020	0.155*	0.373*	1.000					
(12) InveF	0.066*	0.145*	-0.062	-0.059	0.010	-0.013	-0.047	0.010	0.271*	0.365*	0.406*	1.000				
(13) $PPTY_{Right}$	0.027	0.107*	-0.039	-0.012	0.003	-0.007	0.006	0.012	0.404*	0.563*	0.493*	0.467*	1.000			
(14) FinDev	-0.117*	0.043	-0.036	-0.212*	0.176*	-0.043	-0.059	-0.147*	0.016	0.036	0.148*	-0.107*	0.075*	1.000		
(15) Growth	-0.119*	0.005	-0.164*	-0.283*	0.008	0.055	-0.082*	-0.100	0.076*	-0.037	0.196*	0.122*	-0.035	0.345*	1.000	
(16) Inflation	-0.093*	0.027	-0.084*	-0.283*	0.025	0.149*	-0.025	-0.117	0.242*	-0.030	0.099*	0.004	0.077*	0.226*	0.227*	1.000

NOTES: Table 6.8 reports the Pearson correlation coefficient between independent variables. Readings signified by asterisks (*) indicate significance at the 5 percent level.

6.2.5 Econometric Specifications

(1). The Fixed Effects Panel Regression: in an attempt to develop an estimation method which suits the characteristics of the dataset and takes into account the presence of heteroskedasticity in the data, an OLS model estimated via fixed effects is applied. It carries the form:

$$\boldsymbol{IR_{i,j,t} = IR_{i,j,t-1} + \beta' X_{i,j,t} + \gamma' IV_{j,t} + \lambda' MV_{j,t} + \eta_i + \varepsilon_{i,j,t}} \qquad (\mathbf{6.3})$$

With that assumption that:

$$i = 1, \dots\dots.., n, \qquad t = 1, \dots\dots\dots, T_i,$$
$$E\left[\varepsilon_{i,j,t} \middle| X_{i,j,t}, IV_{j,t}, MV_{j,t}\right] = 0$$
$$E(Var)\left\{\varepsilon_{i,j,t} \middle| X_{i,j,t}, IV_{j,t}, MV_{j,t}\right\} = \sigma^2$$

Where: i indexes MFIs, j indexes country, and t indexes year and $IR_{i,j,t}$ is the interest rate of MFI i in year t, whilst $IR_{i,j,t-1}$ is the one period lagged of interest rates. $X_{i,j,t}$ represents a vector of MFI-specific (firm level) independent variables in year t for an active MFI i; $IV_{j,t}$ is the vector of institutional explanatory variables of a country j in year t while $MV_{j,t}$ represents a vector of independent macroeconomic variables of a country j in year t. η_i controls for unobserved MFIs-specific effects, whereas $\varepsilon_{i,j,t}$ is the idiosyncratic error.

(2). The Generalised Method of Moments (GMM) Estimator: The system GMM can help to identify the source of endogeneity and account for heteroskedasticity in the data.

The dynamic Blundell & Bond system GMM estimation technique (Arellano & Bover, 1995; Blundell & Bond, 2000) takes the following form:

$$\boldsymbol{IR_{i,t,j} = IR_{i,j,t-1} + \beta' X_{i,j,t} + \gamma' IV_{j,t} + \lambda' MV_{j,t} + \varepsilon_{i,j,t}} \qquad \boldsymbol{(6.4)}$$

$$\boldsymbol{\varepsilon_{i,j,t}} = \upsilon_i + \gamma_t + \mu_{i,j,t}$$

$$E = [\upsilon_i\ \mu_{i,t}] = 0$$

Where: i indexes MFIs, j indexes country, t indexes year and $IR_{i,t}$ is the interest rate of MFI i in year t, whilst $IR_{i,j,t-1}$ is the one period lagged of interest rates. $X_{i,j,t}$ represents a vector of MFI-specific (firm level) independent variables in year t for an active MFI i; $IV_{j,t}$ is the vector of institutional explanatory variables of a country j in year t; $MV_{j,t}$ represents a vector of independent macroeconomic variables of a country j in year t. $\boldsymbol{\varepsilon_{i,j,t}} = \upsilon_i + \gamma_t + \mu_{i,j,t}$ is the disturbance: γ_t are the unobservable time effects, υ_i is the unobserved complete set of MFI-specific effects and, $\mu_{i,t}$ is the idiosyncratic error. Finally, $\upsilon_i \sim \{IIN\ (0, \sigma_\upsilon^2)\}$ is independent of $\mu_{i,j,t} \sim \{IIN\ (0, \sigma_\mu^2)\}$.

The panel data is characterised by small $\boldsymbol{T}$ and large $\boldsymbol{N}$**;** in other words**,** few time periods of nine years and many individuals totalling 292 MFIs in the sample. The best estimation method designed for such a panel dataset is the two-step system GMM estimator (Arellano & Bover, 1995; Blundell & Bond, 1998; Windmeijer, 2005). Therefore, the system GMM estimator specified in equation (6.4) is applied as the preferred estimation method for the data analysis. The data diagnostic tests are reported in Appendix 3 (sections Ap. 3.1 and Ap. 3.3) and are based on the Wald statistical tests. The findings demonstrate the following: first, heteroskedasticity exists in the final data sample, and second, time and firm fixed effects are needed when running the estimation methods. Therefore, time dummies are included when estimating equations (6.3) and (6.4). As noted above, the dataset has a small $\boldsymbol{T}$ and large $\boldsymbol{N}$; in view of this**,** equations (6.3) and (6.4) are estimated using a one period lag, considering that microcredits have short maturity period; usually ranges from 6 to 12 months. Thus, one period lag of microcredit interest rates $(IR_{i,t-1})$ is enough to capture all influences of the past on the present. Also, the economic reason for lagging the dependent variable is that MFIs, in time, adapt to lending interest rates that they find optimal, and apply these rates to subsequent periods.

We experimented with the inclusion of country dummies in equations (6.3) and (6.4) to control for unobserved country characteristics and shocks that could influence the microcredit interest rates across the 34 countries. The results of the Lagrange Multiplier (LM) tests showed insignificant *p*-values of country dummy variables. In view of this outcome, it was not deemed necessary to include the country-specific dummies when estimating equations (6.3) and (6.4). Appendix 4 provides further background concerning the Lagrange Multiplier tests for the country-specific dummy variable.

Sensitivity tests were performed in order to check the fragility of the estimation models. Note that different categories of variables were captured in one estimation model: MFI-specific (firm level) variables, institutional variables and macroeconomic variables. To do so, the models specified in equations (6.3) and (6.4) were re-estimated on the separate sets of MFI-specific variables, institutional variables, and macroeconomic variables. The re-estimated results using these approaches were consistent, although the magnitudes of the coefficients were somewhat different.

6.3 Discussion of Empirical Results

6.3.1 Estimating Factors that Influence Microcredit Interest Rates – Main Results

The dynamic system GMM econometric specification was preferred because the estimator is more asymptotically efficient than the other types of GMM estimators when the panel data is small (Arellano & Bover, 1995; Blundell & Bond, 1998, 2000). Also, the one-step system GMM estimator is a robust and more reliable estimator in terms of power and error type-**I** (Roodman, 2009, p.156; Windmeijer, 2005). Table 6.9, below, summarises the regression output results of factors that influence the microcredit interest rates in the SSA region.

Before discussion of the empirical results it should be mentioned that, in Table 6.9 above, the results of column 1 are the least preferred. The fixed effects estimation was run to check the consistency of the results of the dynamic panel system GMM estimator reported in columns (2) and (3). Moreover, the fixed effect estimation method, specified in equation (6.3), is used to analyse the sub-samples in the next section of this chapter.

The system GMM estimation results consistently indicate stable coefficients. The Wald X^2 tests demonstrate the overall goodness of fit. Overall, the Hansen tests show no evidence of over-identifying restrictions. Furthermore, the output results indicate no evidence of autocorrelation in the error terms in the Arellano-Bond tests [AR (2)].

Table 6.9: Estimation Results of FE and GMM (MAIN RESULTS)

	(1)	(2)	(3)
	Fixed Effects with Robust SE	**SYS GMM (One Step)**	**SYS GMM (Two Step)**
MFI-Specific Var.			
IR_{t-1}	0.059** (0.029)	0.066** (0.030)	0.069** (0.033)
Age	-0.001 (0.002)	-0.005 (0.004)	-0.005 (0.004)
COF	0.204 (0.188)	0.232 (0.305)	0.235 (0.368)
Deposits	-0.009** (0.004)	-0.003 (0.003)	-0.006 (0.005)
LogLoan-Size	-0.010 (0.012)	-0.008 (0.011)	-0.007 (0.016)
OPeEX	0.545*** (0.085)	0.186*** (0.037)	0.196*** (0.061)
Outreach	-0.004*** (0.001)	-0.003*** (0.001)	-0.005*** (0.002)
PAR	-0.092* (0.052)	-0.051 (0.047)	-0.064 (0.077)
LogSize	0.066*** (0.012)	0.057*** (0.017)	0.063*** (0.023)
Institutional Var.			
BuF	-0.009* (0.005)]	-0.005 (0.004)	-0.006 (0.005)
CorrF	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)
InveF	-0.003 (0.003)	-0.001*** (0.000)	-0.002*** (0.000)
$PPTY_{Right}$	-0.001 (0.001)	-0.002** (0.001)	-0.002** (0.001)
HHI	-0.001 (0.002)	-0.001 (0.002)	-0.003 (0.003)
Macro Var.			
FinDev	0.013 (0.017)	0.018 (0.024)	0.019 (0.033)
Growth	0.169*** (0.067)	0.272** (0.121)	0.283** (0.128)
Inflation	0.844*** (0.067)	0.778*** (0.068)	0.781*** (0.073)
Obs.	641	446	446
R^2 (Adj. R^2)	0.726 (0.689)		
Nr. of Instruments		59	59
Wald Test		χ^2 (23) = 716.09	χ^2 (23) = 863.93
AR (1) *p*-value		0.018	0.021
AR (2) *p*-value		0.204	0.384
Hansen Test (*p*-value)		0.128	0.128

NOTES: Table 6.9 presents the results from Generalised Method of Moments (GMM) and fixed effect (FE) of estimating the factors that influence microcredit interest rates in SSA for the period 2003 to 2011. The dependent variable is the microcredit interest rates (IR). The symbol * expresses significance at the 10 percent level, ** at 5 percent and *** at the 1 percent level. The figures in parentheses represent standard errors (**SEs**). The abbreviation **Nr**. stands for Number. The GMM procedures follow Blundell and Bond (2000) and the Hansen tests are the tests for over-identifying restrictions. The Arellano-Bond tests, AR (1) and AR (2), refer to the tests that average autocovariance in residuals of order 1 respectively of order 2 is 0 (HO: no autocorrelation). The regression model estimation controls for MFI and time fixed effects. The results in column **(1)** are obtained after fitting the OLS estimator via fixed effects with robust standard errors (SEs). Equally, columns **(2)** and **(3)** apply the one-step and two-step system GMM estimators, respectively. Year dummies are included in all specifications.

The starting point of discussion is the lagged dependent variable (IR_{t-1}), which is positive and significant. This coefficient estimates the speed of adjustment to equilibrium, or conditional convergence. This indicates that microcredit interest rates in SSA are persistent, and that these interest rates return to the long-run equilibrium at a rate of approximately 7 percent per year. The robust and statistically significant coefficient of the lagged dependent variable (IR_{t-1}) also re-inforces the appropriateness of applying the dynamic system GMM estimator in this study.

Having discussed the lagged dependent variables, we turn to the coefficients that are statistically significant in columns (2) and (3): the system GMM estimates. The coefficient of operating expenses (OPeEX) is positive and strongly significant at 1 percent. The size of the coefficient, OPeEX, is large and this confirms the findings reported in the microfinance literature, which show that microcredit interest rates are influenced significantly by high operating expenses. The regression results indicate that a 1 percentage point increase in the operating costs, as a percentage of gross loan portfolios would raise microcredit interest rates by 0.20 percent. Similar findings were reported by Bosire et al. (2014), Dorfleitner et al. (2013); and Fernandez et al. (2016). Overall, operating expenses account for about 40 percent of total microfinance overheads (Rosenberg et al., 2013). The coefficients of operating expenses differ quite substantially in the fixed effects (FE) and system GMM models. This is consistent with the observation made by Nickell (1981), that a fixed effect model with a lagged dependent variable is biased. However, this observation does not distort our overall conclusion.

The pursuit of Outreach (serving more clients) by MFIs does not exacerbate the microcredit interest rates. This is evident because the coefficient of Outreach is negative and statistically significant at the 1 percent level. This finding is consistent with the theoretical proposition of economies of scale (Gilligan et al., 1984). Additionally, serving more customers reduces operating costs and this subsequently can contribute to reducing the microcredit interest rates. This empirical finding is consistent with some other microfinance studies (see for instance: Dorfleitner et al., 2013; Janda & Zetek, 2014; Mersland & Strøm, 2011; Roberts, 2013).

The coefficient of size of microfinance institutions (LogSize) is captured using the firm's total assets. The results suggest that a one-percentage increase in total assets of the MFI elevates microcredit interest rates by 0.001[60] percent. The impact is rather small, and the results could also illustrate that large MFIs aim for higher lending interest rates in the SSA region. Possible explanations for this finding could include the diseconomy of scale beyond a certain size of MFI, as well as increased regulatory and compliance costs as MFIs become big. This finding is consistent with Mersland and Strøm (2009) in the context of financial performance of MFIs. In contrast, Roberts (2013) identified a negative and significant relationship between microcredit lending interest rates and the firm size (total assets). Also, this finding could possibly explain mission drift; where large microfinance firms are converting from non-profit seeking to profit orientation (Mersland & Strøm, 2009).

The preceding discussion indicated that firm level variables are statistically significant in the preferred estimation techniques (system GMM); this finding leads on to a review of country level institutional variables. According to the institutional framework (theory), a weak institutional environment aggravates the market uncertainty which already exists because of inefficient contract enforcement, unsecured property rights, and also rampant

[60] Since the coefficient is a log-transformed variable, we divide the output results by 100 (i.e. 0.06/100) = 0.0006, which is simply 0.001.

corruption which exacerbates moral hazard in the loan market (Acemoglu & Johnson, 2005; North, 1990; Stiglitz & Weiss, 1981).

The coefficient of investment freedom is negative and significant at one percent, although the impact is small. This finding supports an interpretation that a country with economic freedom and with no constraints on the flow of investment, contributes significantly towards reducing the microcredit interest rates. This is highly plausible because capital restrictions stifle the supply of microfinance capital needed to grow the industry. Similarly, Chikalipah (2017a) claimed that a strong institutional environment promotes the financial performance of the microfinance industry, this claim was made after analysing 291 MFIs based in 34 countries of SSA.

In the case of property rights, the coefficient of property rights is negative and significant at five percent; this finding indicates that guaranteeing property rights contributes, to some degree, towards lowering the microcredit interest rates in the SSA region. This finding is rational, because a strong rule of law and secured property rights create a climate of financial market certainty in an environment where contracts are well-enforced, thus ensuring that loan market defaulters are accountable before the law (Galiani & Sened, 2014, pp.50-65). This finding is significant in terms of the nature of the microcredit industry, where participants have no assets to pledge as collateral. Beck and Hesse (2009) arrived at a similar conclusion after analysing factors that influence persistently high bank interest rates spreads and margins in Uganda.

Finally, the empirical findings confirm that an unfavourable business environment, restrictions on capital flow (investment freedom) and unsecured property rights, which are common in many countries in the SSA region, are all factors that partially explain why microcredit interest rates are persistently high in that region relative to other regions of the world (Kaufmann et al., 2010; 2011).

The economic growth (Growth) coefficient was positive and statistically significant, which illustrates that a one percent increase in GDP *per capita* growth has a corresponding positive effect on microcredit interest rates of about 0.3 percent. The most plausible explanation for this relationship could be attributed to crowding out, and supply and demand effects. According to the Keynesian theory, an increase in economic activities in an economy could encourage demand for credit which in turn could cause upward pressure on lending interest rates (Keynes, 1937). The economic linkage between inflation and economic growth could also explain this finding; thus, rapid economic growth often pushes inflation up (Jones & Manuelli, 1995).[61] If all things were equal, then MFIs could respond by increasing lending interest rates. As suggested by those theories, Janda and Zetek (2014) found a positive and significant relationship between economic growth and microcredit interest rates after analysing MFIs based in Latin America and the Caribbean states. These writers then argued that output growth generally leads to growth in real wages, resulting in increased labour costs for MFIs.

Inflation is another significant variable that supports the inference that the volatile macroeconomic environment of the SSA region exerts undesirable effects on microcredit interest rates (for related evidence, see: Beck & Hesse 2009; De Gregorio & Sturzenegger, 1997; Pringle, 1974; Stiglitz & Weiss, 1981). Thus, the coefficient of inflation is consistently and robustly significant in all the three columns reported in Table 6.9. These results indicate

[61] This theoretical reasoning is supported by data in the sample shown in Table 6.8, indicating a positive correlation between inflation and economic growth.

that an increase in inflation by 1 percent would raise microcredit interest rates by about 0.8 percent. The impact of inflation on the microcredit interest rate is substantial, and is consistent with microfinance and traditional banking literature (see for example: Beck & Hesse 2009; Dorfleitner et al., 2013). Therefore, the presence of persistently high inflation explains, to a certain degree, the higher microcredit interest rates in the SSA region. This finding seems plausible, if one considers the consequential effects of persistently high inflation on wages and overhead costs of MFIs (for similar evidence, see: Berg, O'Connell, Pattillo, Portillo & Unsal, 2015, p.63).

To summarise: this study presents strong evidence supporting the view that a volatile macroeconomic environment exacerbates the lending interest rates of the microfinance industry in the SSA region. It is therefore fair to conclude that macroeconomic moderation is essential for the growth and sound performance of the microfinance industry in the SSA region.

Some noticeable results obtained from estimating equation (6.3) deserve some brief interpretation. Therefore, the results of estimating equation (6.3) are reported in column (1) of Table 6.9. In particular, it should be noted that the coefficient of microsavings (Deposit) is negative and statistically significant at the 5 percent level. This result shows an inverse relationship between microsavings and microcredit interest rates; in other words microsavings contribute to a reduction of microcredit interest rates. This finding is rational because microsavings are a cheap source of finance for deposit-taking MFIs (for further details, see section 2.4.3 of chapter 2). Also, the coefficient of portfolio at Risk (PAR) is negative and statistically significant at the 10 percent level. This finding shows that an increase in uncollected credit has a corresponding upward effect on the microcredit interest rates. This is particularly important if one bears in mind the inherent risk associated with providing uncollateralised microcredits. Overall, credit delinquencies in the microfinance industry are low and this is mainly because of the group lending methodology used (Chikalipah, 2017a). Finally, an improvement in the business environment is found to be negatively associated with microcredit interest rates. This finding is reasonable because a favourable business environment promotes the growth and strong financial performance of business firms (Acemoglu & Johnson, 2005).

6.4 Further Results, Robustness Checks, and Endogeneity

6.4.1 Analysis based on the SSA sub-Regions

The full dataset was segregated into sub-samples as indicated in Table 6.3 of this chapter; some observations were made in some of the sub-samples. It was found that the dynamic panel system GMM estimators could not run on the four sets of sub-samples. It is for this reason that the fixed effect regression model specified in equation (6.3) was used as the main estimation technique for the four sub-samples. In what follows, equation (6.3) is estimated without lagged dependent variable. The limitations of using fixed effects with a small $\boldsymbol{T}$ and large $\boldsymbol{N}$ dataset are well understood, especially in the case of downward biased coefficients (Goddard & Wilson, 2009). However, this was the only suitable approach available to support the analysis of these sub-samples, which is needed to examine any possible variations within these subgroups. This approach is commonly accepted in empirical studies, where a coherent econometric model cannot run on the sub-samples, and so a less robust model has to be used instead (for details, see: Beck & Hesse 2009; Collier & Goderis, 2012; Hodge, 2005; Söderbom, Teal, Eberhardt, Quinn, & Zeitlin, 2015).

Table 6.10: Estimation Results (sub-Regions of SSA)

	ESTIMATION MODEL: FIXED EFFECTS WITH ROBUST SEs			
	Central Africa	**East Africa**	**Southern Africa**	**West Africa**
MFI-Specific Var.				
Age	0.014** (0.007)	-0.004 (0.004)	-0.008 (0.006)	-0.004 (0.004)
COF	1.225 (0.822)	0.423* (0.235)	1.08*** (0.379)	0.014 (0.010)
Deposits	-0.021* (0.011)	-0.013 (0.010)	-0.031 (0.022)	-0.007* (0.004)
LogLoan-Size	0.001 (0.018)	-0.039*** (0.016)	-0.011 (0.017)	-0.022* (0.012)
OPeEX	0.243*** (0.056)	0.065*** (0.023)	0.319*** (0.039)	0.971*** (0.235)
Outreach	-0.005 (0.008)	-0.004 (0.009)	-0.004*** (0.001)	-0.003*** (0.001)
PAR	-0.060 (0.105)	-0.019 (0.062)	-0.223* (0.118)	-0.068 (0.053)
LogSize	-0.017 (0.016)	0.042*** (0.015)	-0.006 (0.013)	-0.008 (0.013)
Institutional Var.				
BuF	-0.011*** (0.003)	-0.001 (0.001)	-0.001 (0.002)	-0.001 (0.001)
CorrF	-0.001 (0.006)	-0.000 (0.001)	-0.002 (0.003)	-0.001 (0.001)
InveF	-0.002 (0.002)	-0.001 (0.001)	-0.003*** (0.001)	-0.000 (0.001)
$PPTY_{Right}$	-0.000 (0.003)	-0.002** (0.001)	-0.003*** (0.001)	-0.002 (0.002)
HHI	-0.001 (0.003)	-0.043*** (0.006)	-0.007* (0.004)	-0.011*** (0.004)
Macro Var.				
FinDev	-0.099 (0.083)	-0.083 (0.104)	-0.029 (0.101)	-0.067 (0.059)
Growth	-0.672 (0.660)	0.374* (0.221)	0.595 (0.429)	0.113 (0.172)
Inflation	0.845*** (0.278)	0.739*** (0.093)	1.216*** (0.488)	1.327*** (0.178)
Obs.	94	293	157	428
R^2	0.613	0.799	0.679	0.856
Adj. R^2	0.479	0.760	0.621	0.848

NOTES: Table 6.10 reports estimation results of the main factors influencing microcredit interest rates in the four sub-regions of SSA. The dependent variable is microcredit interest rates (IR). The robust Standard errors (**SEs**) are reported in parenthesis. The symbol * denotes statistical significance at the 10 percent level, ** at 5 percent level and *** at the 1 percent level. The estimation technique is given in equation (6.3). Year dummies are included in all specifications.

We start by estimating equation (6.3) in respect of the sub-samples of the four sub-regions of SSA, and the results are shown in Table 6.10. Those results differ from the main results given in Table 6.9. For example, some of the coefficients that were significant under the estimation results reported in Table 6.9 are now insignificant, and vice versa. This observation explains, to some degree, the Simpson paradox effect, and underlines the importance of disaggregating the final sample into sub-samples. Specifically, it is found consistently and in all four sub-regions of the SSA, that operating costs and inflation have significant impacts on the microcredit interest rates. Another finding from the regional results is that old MFIs in Central Africa, captured by the Age variable, have slightly higher lending interest rates relative to young MFIs. One possible explanation for this finding could be that newly established MFIs are more likely to offer lower lending interest rates in order to gain market share. Another issue could be mission drift; where non-profit seeking MFIs are converting to profit orientation. In addition, the findings showed that increased competition in East, Southern and West Africa is negatively associated with microcredit interest rates. This finding agrees with market structure theories, and is consistent with prior findings reported in the microfinance industry literature (see for example: Assefa et al., 2013; Dorfleitner et al., 2013).

Finally, the coefficient of business freedom is negative and statistically significant at the one percent level in Central Africa. This illustrates that a strong business environment contributes to reducing the microcredit interest rates in the Central African region. That region is extremely prone to civil wars, and unfavourably ranked on the “doing business” index (Punnett, 2017). These findings underscore the importance of promoting a strong business environment for the growth of the microfinance industry in the Central African sub-region (Assane & Grammy, 2003). This finding can also be extrapolated to the rest of the sub-regions in SSA.

6.4.2 Analysis based on the Inflation Levels of Countries in the SSA Region

Countries in the SSA region have diverse economies and that is evident from the large variations that can be seen in terms of inflation rates. Therefore, the main factors influencing microcredit interest rates in the SSA region are examined using the three inflation sub-samples (Low, Medium and High categories) as described in Table 6.4 of this chapter. This approach is motivated by the substantial effect that inflation has on the microcredit interest rates as reported in Table 6.9 of our main empirical results.

The results acquired from estimating equation (6.3) on the three inflation groups are presented in Table 6.11. Overall, these results differ from the baseline estimates reported in Table 6.9. It should be noted that the coefficient of operating expenses (OPeEX) and inflation are significant in all three inflation groups, which is also consistent with the main results reported in Table 6.9. Using this approach it is found consistently that the cost of funds (COF) exert a positive influence on microcredit interest rates in the SSA region. In addition, the effect of costs of funds in the high inflation countries is rather large, indicating that MFIs face higher financing costs in those countries.[62]

[62] Nearly all countries with high inflation also have exceedingly high lending interest rates, even with commercial banks (Nampewo, 2013). For example: Malawi and Zambia in our sample.

Table 6.11: Estimation Results (Inflation Levels of Countries in SSA)

	ESTIMATION MODEL: FE WITH ROBUST SEs					
	Low Inflation Countries		**Medium Inflation Countries**		**High Inflation Countries**	
MFI-Specific Var.						
Age	-0.001	(0.002)	-0.003	(0.005)	-0.001	(0.002)
COF	0.764***	(0.148)	0.503*	(0.266)	0.842***	(0.200)
Deposits	-0.002	(0.002)	-0.006	(0.011)	-0.020***	(0.007)
LogLoan-Size	-0.003	(0.005)	-0.051***	(0.019)	-0.010	(0.007)
OPeEX	0.149***	(0.010)	0.077***	(0.030)	0.565***	(0.016)
Outreach	-0.003	(0.003)	-0.001***	(0.000)	-0.005	(0.005)
PAR	-0.098***	(0.029)	-0.032	(0.082)	-0.223***	(0.051)
LogSize	0.001	(0.004)	0.089***	(0.019)	0.007	(0.006)
Institutional Var.						
BuF	-0.000	(0.001)	-0.001	(0.002)	-0.000	(0.001)
CorrF	-0.001	(0.001)	-0.003	(0.002)	-0.001	(0.002)
InveF	-0.003	(0.003)	-0.001	(0.001)	-0.003***	(0.001)
$PPTY_{Right}$	-0.000	(0.001)	-0.001	(0.002)	-0.000	(0.001)
HHI	-0.001	(0.001)	-0.013***	(0.004)	-0.001	(0.001)
Macro Var.						
FinDev	-0.014	(0.054)	-0.074	(0.091)	-0.050	(0.054)
Growth	0.225	(0.169)	0.302	(0.361)	0.357*	(0.192)
Inflation	0.896***	(0.194)	0.928***	(0.299)	0.992***	(0.098)
Obs.	314		216		442	
R^2	0.603		0.779		0.631	
Adj. R^2	0.570		0.752		0.582	

NOTES: Table 6.11 presents estimation results of the main factors influencing microcredit interest rates in SSA, using sub-samples of inflation levels. The dependent variable is microcredit interest rates (IR). The robust Standard Errors (**SEs**) are reported in parenthesis. The abbreviation **FE** designates Fixed Effect estimation techniques specified in equation (6.3). The symbol * denotes statistical significance at the 10 percent level, ** at 5 percent level, and *** at the 1 percent level. As previously mentioned, the inflation groups are characterised as follows: (i) **Low Inflation Countries**, with inflation rates less than 5 percent on average between 2003 and 2011; (ii) **Medium Inflation Countries**, with inflation between 5 and10 percent on average between 2003 and 2011; and (iii) **High Inflation Countries**, with inflation greater than10 percent on average between 2003 and 2011. Year dummies are included in all specifications.

The coefficient of PAR is found to be negative and statistically significant at the one percent level, in the low and high inflation countries. An inverse relationship demonstrates that an increase in the proportion of badly performing loans raises microcredit interest rates.

Also, there is evidence of a negative and significant relationship between competition and outreach with microcredit interest rates in the medium inflation countries. Likewise, an inverse relationship is evident between microsavings and microcredit interest rates in the high inflation countries. This finding is rational because deposits are alternative cheap sources of finance in the SSA, whereas other sources of financing are prohibitively expensive (Roberts, 2013).

6.4.3 Analysis based on the Income Levels of the SSA Countries

There are large variations between countries in the SSA region, especially in terms of *per capita* income. For example, Malawi and Burundi reported GNI *per capita* of less than USD 1,000 in 2011, while South Africa and Gabon reported a considerably higher GNI *per capita*, greater than USD 8,000 in the same year. These large variations between the countries underlines the need to segregate the full sample into the three income groups reported in Table 6.5 of this chapter. Against this background, we now investigate how the various factors influence microcredit interest rates in the three income groups of the SSA region.

The results presented in Table 6.12 above are obtained after applying estimation equation (6.3); the OLS via fixed effects method. These results are generally consistent and robust for all three income groups with relatively few dissimilarities. One important, consistent and new finding was that competition in all three income groups is negative and significant. This demonstrates that increased levels of competition in the microfinance industry are negatively associated with microcredit interest rates in the SSA region. This finding is reasonable and is consistent with earlier findings reported in the microfinance industry (see for example: Assefa et al., 2013; Dorfleitner et al., 2013).

Table 6.12: Estimation Results (Income Levels of Countries in SSA)

	ESTIMATION MODEL: FE WITH ROBUST SEs					
	Lower income countries		**Lower-medium income countries**		**Upper-medium income countries**	
MFI-Specific Var.						
Age	-0.001	(0.005)	-0.005	(0.004)	-0.028	(0.024)
COF	0.890***	(0.358)	0.595***	(0.206)	0.147	(0.860)
Deposits	-0.004	(0.005)	-0.014***	(0.006)	-0.074	(0.050)
LogLoan-Size	-0.054***	(0.019)	-0.033***	(0.013)	0.085	(0.071)
OPeEX	0.037*	(0.022)	0.488***	(0.012)	0.685***	(0.278)
Outreach	-0.000	(0.000)	-0.001***	(0.000)	-0.002***	(0.000)
PAR	-0.214***	(0.076)	-0.071	(0.052)	-0.046	(0.437)
LogSize	0.013	(0.021)	0.034***	(0.013)	0.377***	(0.155)
Institutional Var.						
BuF	-0.002**	(0.001)	-0.000	(0.001)	-0.002	(0.016)
CorrF	-0.001	(0.002)	-0.001	(0.001)	-0.029***	(0.012)
InveF	-0.003***	(0.001)	-0.002**	(0.001)	-0.000	(0.004)
$PPTY_{Right}$	-0.003	(0.003)	-0.001	(0.001)	-0.002	(0.007)
HHI	-0.024***	(0.009)	-0.018***	(0.005)	-0.045*	(0.024)
Macro Var.						
FinDev	-0.037	(0.052)	-0.050	(0.059)	-0.012	(0.102)
Growth	0.501**	(0.236)	0.122	(0.196)	0.515	(0.664)
Inflation	0.871***	(0.097)	0.927***	(0.133)	0.650**	(0.321)
Obs.	322		605		44	
R^2	0.555		0.612		0.743	
Adj. R^2	0.444		0.504		0.686	

NOTES: Table 6.12 reports the estimation results of the factors (i.e. the MFI firm level, the country's institutional environment, and macroeconomic climate) influencing the microcredit interest rates in SSA over the period 2003 to 2011. The main sample was divided into sub-samples as shown in Table 6.5. The dependent variable is microcredit interest rates (IR). The robust Standard Errors (**SEs**) are reported in parenthesis. **FE** designates the Fixed Effect estimation technique. The symbol * denotes statistical significance at the 10 percent level, ** at 5 percent level, and *** at the 1 percent level. The income levels are classified as: (I) **Lower income countries** with GNI *per capita* less than USD 1,000; (II) **Lower-middle income countries** with GNI *per capita* between USD 1,020 and 4,000; (III) **Upper-middle income countries** with GNI *per capita* between USD 4,020 and 12,500. Year dummies are included in all specifications.

Specifically, a strong negative relationship was found between PAR and microcredit interest rates in the case of those MFIs based in the lower income countries. Interestingly, it was also found that an increase in loan size (LogLoan-Size) has a negative effect on the microcredit interest rates. This finding is logical because the provision of small loans elevates operating costs. As far as institutional development is concerned, there is evidence that an improved business and investment atmosphere is negatively and significantly associated with microcredit interest rates. Additionally, it was found that high rates of GDP growth exert positive and substantial effects on microcredit interest rates in the case of those MFIs operating in the lower income countries of the SSA region. This finding is similar to the baseline estimates reported in the previous section.

For MFIs operating in the lower-medium income countries, a significant inverse relationship was found between providing slightly bigger loans (LogLoan-Size) and microcredit interest rates. Interestingly, the results also revealed that serving more customers (Outreach) is negatively associated with microcredit interest. This confirms the economy of scale hypothesis. Also, as outlined in the main results reported in Table 6.9, it was observed that large MFIs in lower-medium income countries charge slightly higher microcredit interest rates than the small MFIs. Finally, an improved investment environment has a negative but significant effect on microcredit interest rates in the case of MFIs operating in the lower-medium income countries of the SSA region.

In the case of MFIs operating in the upper-medium income countries, there is significant evidence to show that serving more customers, indicating breadth of outreach, has a negative and significant effect on microcredit interest rates. Furthermore, smaller MFIs (LogSize) operating in the upper-medium income countries charge slightly lower interest rates than the large firms. As previously explained, this finding is plausible because small and newly established MFIs have to offer slightly lower interest rates in order to gain market share. Moreover, as also explained earlier, this finding can also indicate mission drift and possible diseconomies of scale. The endemic corruption in the SSA region has an inverse effect on microcredit interest rates, especially in the upper-medium income countries. This inverse relationship is evident because the low corruption scores signify rampant corruption. It will be recalled from Table 6.6 that a higher index score signifies lower levels of corruption. The results show that an increase in the corruption index score, signifying a lower prevalence of corruption, has a negative and significant impact on the microcredit interest rates, hence the inverse relationship. Notably, corruption aggravates uncertainty in the microfinance loan market, through increased moral hazard and collusion between loan officers and borrowers (Stiglitz & Weiss, 1981).[63]

To summarise: the results suggest that the main factors influencing microcredit interest rates in all the three income categories of the SSA region are as follows: the costs of funds, loan sizes, inflation, prevailing investment atmosphere, operating expenses and competition.

6.4.4 Analysis based on the Types of Established Legal Charter of MFIs in SSA

Microfinance institutions have diverse mission objectives, which are reflected in their established legal charters. As indicated in Figure 6.1 of this chapter, there are five types of legal charter as follows: Cooperatives and Credit Unions (**CCUs**), Micro-banks (**Banks**), Non-Banking Financial Institutions (**NBFIs**), Non-Governmental Organisations (**NGOs**), and Rural Banks (**RBs**). Because there are only a small number of RBs in the sample, these have been added to the CCUs sub-sample; this seems logical because CCUs and RBs have a similar objective of poverty alleviation. Moreover, they are often non-profit oriented. The

[63] The collapse of Zambia's largest Swedish-funded microfinance institution, Pride Zambia, in 2009 was largely due to corruption among its executives. This could be traced to poor corporate governance and accountability mechanisms (Siwale & Ritchie, 2011).

principal aim of employing this technique of analysis is to examine the possible variations among different established legal charters of MFIs.

The results reported in Table 6.13 below are obtained after applying estimation equation (6.3) using the fixed effects procedure on the four distinct types of MFI. The coefficients of costs of funds (COF), deposits, inflation and operating costs (OPeEX) are consistent for all four distinct types of MFI. However, the other results generally show a lack of such consistency. Moreover, if the results in Table 6.13 are matched with the baseline results reported in Table 6.9, then it becomes apparent that only the coefficients of operating costs (OPeEX) and inflation are consistent. Overall, and when interpreted, the estimates reported in Table 6.13 mostly agree with the baseline results shown in Table 6.9. This finding is discussed below.

Table 6.13: Estimation Results (MFIs Established Legal Charters)

	ESTIMATION MODEL: FIXED EFFECTS WITH ROBUST SEs							
	Micro-Banks		**CCU & RBs**		**NBFIs**		**NGOs**	
MFI-Specific Var.								
Age	-0.011*	(0.006)	-0.001	(0.003)	0.003	(0.002)	0.002	(0.003)
COF	2.294***	(0.523)	0.856***	(0.215)	1.398***	(0.163)	0.491**	(0.200)
Deposits	-0.034***	(0.008)	-0.019***	(0.005)	-0.052***	(0.012)	-0.049***	(0.007)
LogLoan-Size	-0.031***	(0.013)	-0.011**	(0.005)	-0.012**	(0.006)	-0.028***	(0.011)
OPeEX	0.393***	(0.060)	0.270***	(0.018)	0.388***	(0.016)	0.519***	(0.119)
Outreach	-0.002	(0.002)	-0.006	(0.006)	-0.000	(0.000)	-0.009***	(0.002)
PAR	-0.011	(0.116)	-0.095***	(0.040)	-0.062	(0.061)	-0.206***	(0.058)
LogSize	0.008	(0.010)	0.003	(0.003)	0.003	(0.007)	0.006**	(0.003)
Institutional Var.								
BuF	-0.001	(0.002)	-0.001	(0.001)	-0.001	(0.001)	-0.000	(0.001)
CorrF	-0.005*	(0.003)	-0.000	(0.001)	-0.001	(0.001)	-0.001	(0.001)
InveF	-0.002	(0.002)	-0.001***	(0.000)	-0.002**	(0.001)	-0.001	(0.001)
$PPTY_{Right}$	-0.004**	(0.002)	-0.000	(0.001)	-0.002***	(0.001)	-0.001	(0.001)
HHI	-0.002	(0.002)	-0.000	(0.001)	-0.005***	(0.001)	-0.002**	(0.001)
Macro Var.								
FinDev	-0.063	(0.100)	-0.196***	(0.050)	-0.245***	(0.061)	-0.122**	(0.058)
Growth	0.512	(0.349)	0.174	(0.175)	0.181	(0.187)	0.838***	(0.310)
Inflation	1.107***	(0.254)	0.544***	(0.115)	0.852***	(0.181)	0.498***	(0.159)
Nr of MFIs	74		52		83		80	
Obs.	107		263		318		283	
R^2	0.756		0.672		0.737		0.834	
Adj. R^2	0.684		0.639		0.684		0.818	

NOTES: Table 6.13 presents estimation results of the main factors (i.e. the MFI firm level, the country's institutional environment, and macroeconomic climate) influencing the microcredit interest rates in SSA over the period 2003 to 2011. The dependent variable is microcredit interest rates (IR). The robust Standard Errors (**SEs**) are reported in parenthesis. The symbol * denotes statistical significance at the 10 percent level, ** at 5 percent level, and *** at the 1 percent level. **Nr**. is short for Number. The different types of MFIs are abbreviated as follows: (I) **CCUs** and **RBs** denotes Cooperatives, Credit Unions and Rural Banks; (II) **NBFI** stands for Non-Banking Financial Institutions; (III) **NGOs** represent the Non-Governmental Organisations. Year dummies are included in all specifications.

In particular, it was found that an increase in the number of years that a given Micro-bank has existed is significantly and negatively associated with that Micro-bank's microcredit interest rates. This finding is rational because many Micro-banks, if not all, are profit oriented, and operational efficiency is a prerequisite for achieving sustainability and profitability. Moreover, it was found that fighting rampant corruption and promoting property rights have a significant inverse relationship with the microcredit interest rates of Microbanks in the SSA region. This finding is reasonable, as Micro-banks often target small businesses and salaried workers. The enforcement of repayments can be difficult in a corruption-infested community, which explains the inverse relationship between microcredit interest rates and institutional deficiencies. In the case of CCUs and RBs, the results reported in Table 6.13 demonstrate that credit risks (PAR) have a negative and statistically significant relationship with the microcredit interest rates that CCUs and RBs offer. This finding indicates that an increase in the amount of uncollected microcredits amplifies the microcredit interest rates offered by the CCUs and RBs operating in the SSA region. This finding is reasonable; after all, CCUs and RBs are member-based firms and their sustainability depends upon members honouring their debt obligations (Roberts, 2013).

Equally, a sound investment environment was found to have a negative and significant effect on the microcredit interest rates of CCUs, NBFI and RBs. One valid explanation for this finding is that most CCUs, NBFIs and RBs depend on external donor funding as the main source of initial capital. A favourable investment environment is likely to attract external microfinance funders. Moreover, an inverse relationship is evident between financial development and the microcredit interest rates prevailing at the CCUs, NBFIs, NGOs and RBs. One valid explanation for this finding is that developed financial systems allow for better efficiency that in turn promotes lower lending interest rates: the opposite is also true (Beck & Hesse, 2009). Likewise, the results provided in Table 6.13 show that property rights have a negative and statistically significant relationship with microcredit interest rates of NBFIs. Finally, the results also demonstrate that increased levels of competition between the NBFIs and NGOs are negatively and significantly related to microcredit interest rates.

6.4.5 Analysis Based on the Balanced Dataset

The robustness of the baseline results given in Table 6.9 are verified further by estimating equation (6.3) on the balanced dataset. In brief, an analysis was conducted only on those MFIs which provided data for the entire period of this study: 2003 to 2011. The application of this technique left nine MFIs operating in seven countries of SSA. The estimation results are shown in Table 6.14.

There are dissimilarities between the baseline results reported in Table 6.9 and the results from the balanced dataset shown in Table 6.14. However, the differences are minor, and most of the significant coefficients are the same as those reported in Table 6.9. For example, the coefficients of operating expenses (OPeEX), business freedom (BU), investment freedom (InveF), financial development (FinDev), and inflation are significant. This finding is fairly consistent if one matches the significant coefficients of the two-step system GMM estimator reported in Table 6.9, which are: operating expenses (OPeEX); Outreach, firm size (LogSize), investment freedom (InveF), property rights ($PPTY_{Right}$), Economic growth (Growth), and inflation (Inflation).

Table 6.14: Results of Balanced Dataset

	Fixed Effects with Robust SE	
MFI-Specific Variables		
Age	-0.004	(0.007)
COF	0.409	(0.476)
Deposits	-0.000	(0.000)
LogLoan-Size	-0.000	(0.000)
OPeEX	0.789***	(0.069)
Outreach	0.008	(0.006)
PAR	-0.158	(0.112)
LogSize	-0.013	(0.012)
Institutional Variables		
BuF	-0.002**	(0.001)
CorrF	-0.004	(0.003)
InveF	-0.002***	(0.001)
$PPTY_{Right}$	-0.000	(0.001)
HHI	-0.003	(0.002)
Macro Variables		
FinDev	-0.012**	(0.006)
Growth	-0.004	(0.004)
Inflation	0.328***	(0.083)
Number of Observations	81	
R^2 (Adj. R2)	0.523	(0.484)

NOTES: Table 6.14 reports the fixed effects estimation results of the main factors influencing microcredit interest rates in SSA over the period 2003 to 2011. The dependent variable is microcredit interest rates (IR). Robust Standard errors are reported in parenthesis. The symbol * denotes statistical significance at the 10 percent level, ** at 5 percent level, and *** at the 1 percent level. The estimation specifications controls for time and MFI fixed effects. The **7 countries** in the sample are: Benin, Kenya, Mali, Senegal, Tanzania, Togo and Uganda. The **9 MFIs** in the sample are: ACEP Senegal, Akiba, Centenary Bank, Equity Bank, FINCA- UGA, Kafo Jiginew, Opportunity Uganda, Vital Finance and Wages. Year dummies are included in the estimation framework.

6.4.6 Assessing the Effect of Multivariate Outliers

The discussion of the results presented in the previous two sections 6.3 and 6.4 did not consider the possible influence of outliers. In this context, outliers can be regarded as extreme values in the data. It is important to consider outliers in the data because these might cause bias in the estimates and predictions (Barnett & Lewis, 1994). Thus, two techniques were applied to assess the possible effect of outliers on the baseline results reported earlier in Table 6.9.

First, the regression model specified in equation (6.3) was fitted, leading to prediction of the standardised residuals shown in Figure 6.3 below. Next, any absolute values of two or more standard deviations away from the mean [in this case it is zero (0)] were removed. The total number of observations that were removed amounted to 42, which left 932 observations in the sample. Finally the estimation models detailed in equation (6.3) and (6.4) were re-run using those 932 observations, and the results were consistent with the baseline results previously reported in Table 6.9. The Cook's Distance method of identifying outliers in the data (Cook, 1977) was also used; this was done in order to assess the robustness [consistence] of the outliers identified and shown in Figure 6.3. The results of Cook's Distance method produced fewer outliers, although those outliers that were found also conformed with the standardised residuals shown in Figure 6.3. The equation form of Cook's Distance is given in Appendix 5.

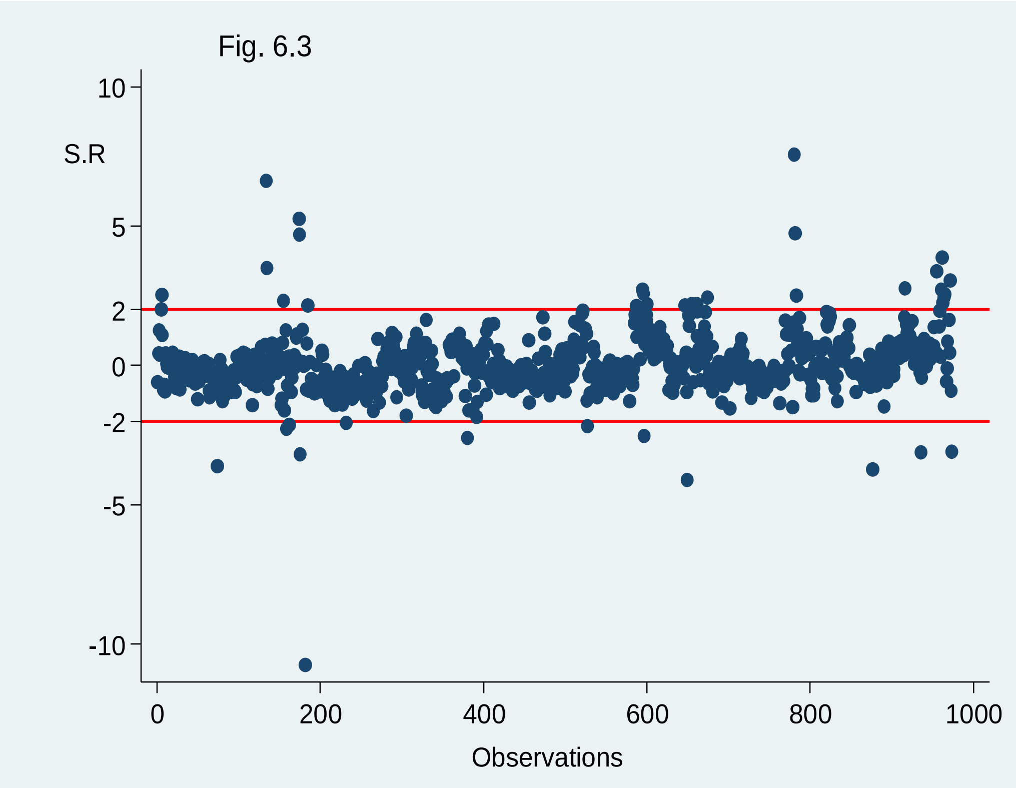


Fig. 6.3 scatters the distribution of standardised residuals (S.R) of the variables that entered the estimation model given in equation (6.3). On the y-axis, S.R denotes the Standardised Residuals. Observations outside the two horizontal red lines are classified as outliers (extreme values), which are defined as two or more standard deviations outside the mean, which is zero (0). The total number of observations in the sample was 974 of which 42 were outliers.

Second, rather than dropping the outliers from the sample, we statistically transformed the variables by using the winsorization approach (Hoaglin, 2003; Kennedy, Lakonishok & Shaw, 1992; Tukey, 1962, p.18). The variables were winsorized at the 5 percent level. The results of estimating equations (6.3) and (6.4) using the winsorized variables are presented in Table 6.15 below.

Table 6.15: Estimation Results (Winsorized Variables)

	(1)	(2)	(3)
	Fixed Effects with Robust SE	**GMM (One Step)**	**GMM (Two Step)**
MFI-Specific Var.			
IR_{t-1}	0.061*** (0.020)	0.066*** (0.021)	0.068*** (0.026)
Age	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)
COF	0.407 (0.312)	0.412 (0.428)	0.432 (0.453)
Deposits	-0.015*** (0.006)	-0.003 (0.004)	-0.004 (0.007)
LogLoan-Size	-0.021* (0.012)	-0.025 (0.017)	-0.027 (0.023)
OPeEX	0.233*** (0.063)	0.185**** (0.045)	0.238*** (0.053)
Outreach	0.008*** (0.003)	0.001 (0.001)	0.001 (0.001)
PAR	-0.070 (0.068)	-0.049 (0.055)	-0.069 (0.063)
LogSize	0.002** (0.001)	0.002 (0.003)	0.002 (0.004)
Institutional Var.			
BuF	-0.016*** (0.003)	-0.002** (0.001)	-0.002** (0.001)
CorrF	-0.003 (0.004)	-0.001 (0.001)	-0.002 (0.002)
InveF	-0.011 (0.012)	-0.000 (0.001)	-0.000 (0.001)
$PPTY_{Right}$	-0.006 (0.010)	-0.002 (0.002)	-0.003 (0.002)
HHI	-0.002 (0.002)	-0.003 (0.003)	-0.004 (0.005)
Macro Var.			
FinDev	-0.021 (0.038)	-0.044 (0.040)	-0.048 (0.059)
Growth	0.582*** (0.179)	0.555*** (0.150)	0.562* (0.168)
Inflation	1.112*** (0.228)	0.939*** (0.188)	1.010*** (0.211)
Obs.	641	301	301
R^2 (Adj. R^2)	0.621 (0.589)		
Number of Instruments		48	48
Wald Test		χ^2 (21) = 341.37	χ^2 (21) = 426.52
AB Test AR (1) *p*-value		0.012	0.011
AB Test AR (2) *p*-value		0.668	0.793
Hansen Test (*p*-value)		0.244	0.244

NOTES: Table 6.15 reports results of the factors that influence microcredit interest rates in SSA over the period 2003 to 2011. All variables were winsorized at 5 percent level. The dependent variable is the microcredit interest rates (IR). The symbol * expresses significance at the 10 percent level, ** at 5 percent and *** at the 1 percent level. The figures in parentheses represent standard errors (**SEs**). The GMM procedures follow Blundell and Bond (2000) and the Hansen tests are the test for over-identifying restrictions in GMM dynamic model estimation. The Arellano-Bond tests, AR (1) and AR (2), refer to the tests that average autocovariance in residuals of order 1 respectively of order 2 is 0 (HO: no autocorrelation). The regression model estimation controls for MFI and time fixed effects. The estimation results in column **(1)** used OLS via fixed effects with robust standard errors (SEs), and include a lagged coefficient of the dependent variables (IR-Real). Similarly, columns **(2)** and **(3)** apply the one-step and two-step system GMM estimators, respectively. Year dummies are included in all specifications.

Overall, the estimation results presented in Table 6.15 are consistent and robust in all three estimation models, although some slight variations are present. Moreover, there are minor differences between the estimation results presented in Table 6.15 and the baseline results initially shown in Table 6.9. However, the key variables are consistent and significant. These are: (i) the operating costs (OPeEX), the business freedom (BuF), economic growth (Growth), and inflation. It is important to note that, after using the winsorization approach, the number of observations dropped from 446 for untransformed variables to 301 for winsorized variables in the system GMM estimators. Likewise, the number of instruments in the GMM estimators dropped from 59 to 48 for untransformed and winsorized variables, respectively.

6.4.7 Endogeneity

During panel data estimation, an econometric problem of endogeneity is often an issue (Doko Tchatoka & Dufour, 2014). One possible concern with the estimation results reported in the previous sections is that microcredit interest rate (IR) is endogenous; that is, correlated with the error term. Although endogeneity cannot be eliminated completely, various approaches were used in this study to tackle the econometric problem of endogeneity. These are described below.

Firstly, this study used a dynamic system GMM estimation technique. The GMM estimator is a robust and convenient framework designed to control for heterogeneity and correct endogeneity (Arellano & Bover, 1995; Blundell & Bond, 1998, 2000). The, GMM estimator corrects for all three types of endogeneity: omitted variable bias, simultaneous endogeneity and dynamic endogeneity (Abdallah, Goergen, & O'Sullivan, 2015; Windmeijer, 2005; Wooldridge, 2010). Therefore, it is not suspected that the main results are biased by endogeneity.

Secondly, potential endogeneity was addressed using the sub-sample analysis of inflation and income levels. This approach was needed in the light of the economic argument that a low *per capita* income and weak institutional quality can explain, to some degree, the level of financial development (Assane & Grammy, 2003; Green, 2016; Scully, 1988). Thus, countries with a relatively high income *per capita* are likely to have better institutional qualities than countries with a lower income *per capita*; for example, in the sample Gabon and South Africa both have higher *per capita* incomes and better institutional qualities than Malawi and Burundi. Moreover, there is disagreement on the direction of causality between these two parameters (Acemoglu & Johnson, 2005). For example, a study conducted by Beck and Hesse (2009) on the Uganda banking system claimed that causality runs from institutional quality to financial development. Against this background, equation (6.3) was re-estimated on sub-samples, in order to ensure that homogeneous groups were present. This allowed the assessment of possible variations across these subgroups. The GNI *per capita* was used as: (i) a control variable, and (ii) as an identifying restriction on a vector of institutional development variables (Bender & Theodossiou, 2009; Collier & Goderis, 2012). The outcome of using this methodology further assesses the robustness of the results. Thus, the results were found to be consistent with the main results reported in Table 6.9. To conclude: this approach lessens concerns over endogeneity relating to those results.

Thirdly, the explanatory variables in the estimation model were carefully selected based on the underlying theoretical predictions defined in chapter 3. Additionally, close attention was paid to the potential causal effect of explanatory variables on the microcredit interest rates. Moreover, the approach took into account the considerations of endogeneity and multicollinearity among the explanatory variables (Abdallah, Goergen, & O'Sullivan, 2015; Doko Tchatoka & Dufour, 2014; Torabi & Rao, 2013). This approach was reinforced by an additional robustness check using the Bayesian Model averaging (BMA). The BMA methodology often helps empirical researchers to rule out, systematically, any model uncertainty and misspecification (Moral-Benito, 2015). The next section will discuss the BMA approach.

6.5 Bayesian Model Averaging (BMA) Approach

A common problem that arise in empirical research is associated with the choice of appropriate variables to include in the estimation model, even though there are already underlying theories for the study being conducted (Moral-Benito, 2015; Raftery, Madigan, & Hoeting, 1997). Since completely new variables are included in the model, the BMA approach is used to assess the potential model uncertainty and misspecification (Wasserman, 2000). The main reason for performing this econometric test is to check for model completeness: in other words, to check whether the three catageries of variables considered in this study are appropriate for explaining the persistently high levels of microcredit interest rates in SSA. See Appendix 6 for the derivation of the posterior probability in BMA.

The BMA results are reported in Table 6.16 below. The BMA produces the posterior inclusion probabilities (PIPs) and the sign certainty index (SIGN). In Table 6.16, the SIGN is only given whenever the PIPs exceed 0.2. The PIPs greater than 0.2 are considered to be robust in determining the association between the dependent and independent variables (Huang, 2011; Raftery, 1995).

Table 6.16: Estimation Results using BMA Approach

	PIPs	SIGN
MFI-Specific Variables		
Age	0.12	
COF	**1.00**	(+)
Deposits	**0.48**	(-)
LogLoan-Size	**0.97**	(-)
OPeEX	**1.00**	(+)
Outreach	**0.75**	(-)
PAR	**0.98**	(-)
LogSize	0.16	
Institutional Variables		
BuF	**0.75**	(-)
CorrF	0.05	
InveF	**0.46**	(-)
$PPTY_{Right}$	0.06	
HHI	0.04	
Macroeconomic Variables		
FinDev	**1.00**	(-)
Growth	0.07	
Inflation	**1.00**	(+)
Constant	**1.00**	(-)

NOTES: Table 6.16 presents the estimation results of using the BMA approach for the factors that influence the microcredit interest rates in SSA over the period 2003 to 2011. The BMA analysis produces the posterior inclusion probabilities (PIPs) and the SIGN certainty index of a relationship. If the SIGN is not given in the table, then this indicates that the estimated coefficient is not robustly related to microcredit interest rates (IR). PIPs greater than 0.2 are shown in bold text (Raftery, 1995).

To summarise: the results of the Bayesian Model Averaging (BMA) approach, reported in Table 6.16, imply that the microcredit interest rates in the SSA region are influenced by the MFIs-specific (firm level) factors, institutional factors, and macroeconomic factors. These BMA results confirm that it is appropriate to include those three categories of factors in the estimation models.

6.6 Concluding Remarks

The main aim of this chapter was to investigate factors that influence microcredit interest rates in the SSA region. An unbalanced panel dataset was used, comprising 292 MFIs drawn from 34 countries in the SSA region and covering period from 2003 to 2011. The results of the literature survey strongly suggest that there is no other single empirical study, with a sole focus on SSA, that has attempted to examine those factors influencing microcredit interest rates; this seems surprising if one considers how large and poor the continent is, and also the rapid expansion of the microfinance industry in the region.

Theoretical predictions indicate that lending interest rates of MFIs are likely to be influenced by the following three main factors: (i) MFIs firm level endogenous characteristics; (ii) the level of institutional development of the MFI's host country; and (iii) macroeconomic fundamentals. In the light of this finding, the main factors influencing the microcredit interest rates in sub-Saharan Africa were studied using these three sets of factors.

To summarise: the panel regression results were estimated using fixed effects and GMM and demonstrate the following. First, the higher inevitable costs of providing small uncollaterised loans, and also unexploited economies of scale, to a greater degree, augments the microcredit interest rates; also related to this, is the high cost of financing, which has positive and significant relationship with microcredit interest rate of MFIs operating in SSA. Second, an inverse relationship was observed between the microcredit interest rate and the expansion of outreach to the poor: serving more customers. Third, it was found that the larger MFIs charge slightly higher interest rates than the smaller firms. Although this finding seemed counter-intuitive, the possible explanations could be: (i) mission drift; and (ii) that newly established MFIs might have to offer lower interest rates to gain market share. Fourth, institutional deficiencies augment microcredit interest rates; these shortcomings include an unfavourable business environment, endemic corruption and weak property rights. Fifth, unstable macroeconomic fundamentals exert undesirable effects on microcredit interest rates. More specifically, the high inflation environment in many countries in the SSA region is a factor contributing to the persistently high microcredit interest rates. Finally, it was found that economic acceleration, to some degree, augments the microcredit interest rates in SSA. This relationship could possibly be explained by: the crowding out effect, the positive relationship between economic growth and inflation, and also by the Keynesian theory of demand and supply in an economy (Keynes, 1937).

The study's empirical results present evidence consistent with the underlying theoretical predictions laid out in chapter 3. Firstly, the small firm endogenous characteristics of MFIs go far towards explaining the persistently high microcredit interest rates in the SSA region. Secondly, institutional deficiencies in the SSA region also contribute to relatively high microcredit interest rates when compared to elsewhere in the world. Thirdly, a volatile macroeconomic environment, which includes high inflation rates, is commonly seen in the countries of SSA; this exerts undesirable effects on microcredit interest rates in that region.

The results of this study raise important operational challenges for microfinance institutions. Thus, they must strive to emulate traditional banking practices by adopting digital technology to drive operational efficiency; if successful, this could lower the microcredit interest rates. Also, any reduction in the volatility of the macroeconomic climate, and strengthening of the institutional environment, will undoubtedly contribute to the rapid growth of the microfinance industry in the SSA region. Above all, the findings of this study provide important foundations upon which future empirical studies could be based.

CHAPTER SEVEN

DOES THE PURSUIT OF OUTREACH CONSISTENTLY STIFLE OR AUGMENT THE FINANCIAL PERFORMANCE OF MICROFINANCE INSTITUTIONS IN THE SSA REGION?

Discussion of Empirical Results[64]

7.1 Introduction

In view of the importance of outreach to the poor in the microfinance industry, and building on the findings described in chapter 6, it is important to perform a methodical analysis of the nexus between outreach to the poor and the financial performance of microfinance institutions (MFIs) in the SSA region. This analysis will examine the trade-off between financial performance and outreach of MFIs operating in SSA. One will recall that chapter 6 presented evidence of a robust but negative relationship between outreach to the poor and microcredit interest rates in SSA. Also, chapter 6 provided evidence that an increase in loan size is accompanied by a decrease in the interest rates charged by MFIs operating in SSA.

In light of the evidence described in sections 1.8.2 and 3.6, the main objective for the statistical analysis presented in this chapter is to investigate two theoretical predictions. The first of these is the prediction that unexploited economies of scale could, in part, explain the persistently high microcredit interest rates and sluggish profitability growth of MFIs in SSA (for related evidence on the economies of scale, see Gilligan et al., 1984). Secondly, small uncollaterised loans are inherently costly, and risky because of imperfect financial markets; this exacerbates moral hazard in credit markets and elevates the microcredit interest rates (De

[64] We acknowledge the suggestions and comments offered by Professor Malcolm Harper of Cranfield University, United Kingdom.

Gregorio & Sturzenegger, 1997; Pringle, 1974; Stiglitz & Weiss, 1981). These theoretical predictions, combined with the main aim of this chapter, link this chapter to the previous one (chapter 6).

Many studies have examined the relationship between outreach and the financial performance of microfinance institutions, although the findings of these studies are inconclusive because they use different methodologies (Hermes et al., 2011). This study, unlike many previous ones, adopts the approach of segregating the outreach variables into different segments, with the aim of determining the optimal outreach thresholds for the MFIs operating in the SSA region. Consequently, this methodology distinguishes this study from previous ones that analysed the systematic relationship between outreach and financial performance of MFIs. In this study, outreach to the poor is captured in two dimensions: (i) breadth representing the number of clients served; and (ii) depth signifying the number of poor clients served.

The analysis was based on the methodical approach and produced the following findings. First, microcredits smaller than USD 500 are inevitably less profitable than larger ones. In contrast, microcredits larger than USD 500 yield better financial returns to MFIs operating in SSA. Second, MFIs serving more than 30,000 clients reported stronger financial returns than those serving between 10,000 and 30,000 clients; moreover, MFIs serving fewer than 10,000 clients reported the worst financial returns during the period under review.

The remainder of this chapter is structured as follows. The next section 7.2 briefly re-visits the literature focussing on the relationship between outreach and the financial performance of MFIs. Section 7.3 outlines the dataset and methodology. In section 7.4, the results are presented and discussed. Section 7.5 presents examples of non-profit oriented MFIs with strong financial performances that are operating in Ethiopia and Nigeria. Finally section 7.6 offers concluding remarks for this chapter.

7.2 Brief Review of Empirical Literature

Studies conducted by Hermes and Lensink (2011) and Reichert (2018) provided a review of empirical studies that focussed on the two dimensions of outreach and profitability trade-off in the microfinance industry. The earliest association between breadth of outreach and the financial performance of MFIs was suggested by Copestake (2007), who argued that the pursuit of outreach decreases profitability of MFIs.[65] In a related study, Cull et al. (2007) claimed that it is possible to earn a profit while serving the poor, but a trade-off emerges between profitability and serving the poorest. Similarly, Hermes et al. (2011) argued that providing relatively small loans, while denoting depth of outreach, is negatively related to cost efficiency. Comparable findings have been reported by Morduch et al. (2009) and Hoque et al. (2011).

Ayayi and Sene (2010) showed that an increase in client outreach does not have a significant influence on the financial sustainability of MFIs. Also, Cull et al. (2007) argued that MFIs can expand depth of outreach without compromising performance. In contrast, Quayes (2011) found a positive and significant relationship between the financial sustainability of MFIs and their depth of outreach. A study by Nakamura (1993) concluded that in smaller loan markets, banks have a fuller picture about the borrower’s ability to repay;

[65] Outreach in this context represents the degree of poverty of the clients being served; it is captured by dividing the active number of borrowers by the gross loan portfolio. This is a commonly accepted measure in the microfinance industry. Additionally, it is a widely held view in microfinance literature that small loan sizes are predominantly offered to poor customers (Cull et al., 2007; Mersland & Strøm, 2010).

as such they are subject to fewer agency problems which allows them to set lower loan rates. In marked contrast, Gonzalez (2008) argued that an increase in loan size from 10 percent of Gross National Income (GNI) *per capita* to 20 percent, can be expected to reduce operating expenses as a percentage of gross loan portfolio by about 7 percentage points.

Conning (1999) claimed that a trade-off exists between targeting poor borrowers and sustainability. This situation arises because of the higher operating costs that naturally arise from providing small microcredits to poor borrowers. A similar study by Vanroose and D'Espallier (2013) documented evidence indicating that serving more poor clients is profitable, especially in countries with low rates of financial inclusion. Moreover, Quayes (2015) drew a similar conclusion regarding the relationship between depth of outreach and financial performance of MFIs. Kar (2011) argued that MFIs can be sustainable without necessarily increasing average loan sizes. Likewise, Chikalipah, (2017b) found that an increase in client outreach is positively associated with financial sustainability of MFIs operating in SSA.

A study by Abate et al. (2014) was conducted in Ethiopia and found evidence of a trade-off between outreach to the poor clients and cost-efficiency of the MFIs in that country. Their results suggested that it is difficult to achieve these two goals simultaneously. A study by Adhikary and Papachristou (2014) showed that both the breadth and depth of outreach are positively and significantly associated with profitability and efficiency in south Asian MFIs.

A thorough search of the literature on outreach and profitability of the microfinance industry yielded the studies mentioned above; all these performed regression analysis on the relationship between outreach to the poor and the financial performance of MFIs. There is reason to believe that the empirical analysis described in this chapter is the first attempt to provide evidence on the effect of segmented levels of client outreach and loan sizes on the financial performance of MFIs in the SSA region. Furthermore, it should be noted that there is only a meagre amount of literature on the microfinance industry with a sole focus on the SSA region. Thus, this study will attempt to contribute to that specific body of knowledge.

7.3 Data and Methodology

This study has made use of the initial unbalanced panel data used in chapter 6. The dataset contained 292 microfinance institutions drawn from 34 countries of the SSA region and covering the period 2003 to 2011. However, in order to achieve the purposes of this chapter, we selected only those specific institutions with at least five years of annual financial statements reported to the MIX market over the period considered in this study. This approach preserves consistency and ensures that only MFIs operating for at least five years are analysed. This process also reduces the risk of outliers, such as newly established MFIs with limited experience of the industry. Thus, the final sample for this analysis consists of 107 microfinance institutions taken from 20 sub-Saharan African countries, over the period 2003 to 2011. Table 7.1, below, lists those 20 sub-Saharan African countries in this final sample, and Appendix 7 lists the 107 MFIs institutions included in the analysis.

Table 7.1: SSA Countries in the Sample

1. Benin	6. Ghana	11. Mozambique	16. South Africa
2. Burkina Faso	7. Kenya	12. Niger	17. Tanzania
3. Cameroon	8. Madagascar	13. Nigeria	18. Togo
4. Congo, D.R	9. Malawi	14. Rwanda	19. Uganda
5. Ethiopia	10. Mali	15. Senegal	20. Zambia

NOTE: Table 7.1 lists the countries of the sub-Saharan African (SSA) region included in the analysis for this chapter. The letter **D.R** denotes Democratic Republic. These 20 countries hosted the 107 MFIs in the sample over the period 2003 to 2011.

The variables used to search for a methodical relationship between outreach and the financial performance of MFIs are all annual data and dollarised (USD) using the official exchange rate at the time of the financial year-end. The accounting-based measure of financial performance of Return on Assets (ROA) was used. This is a commonly used measure of financial performance in the traditional banking and microfinance literature (Barry & Tacneng, 2014; Cull et al., 2007; Dietrich & Wanzenried, 2011; Kyereboah-Coleman & Osei, 2008; Vanroose & D'Espallier, 2013). As per the MIX market, ROA is calculated as:

$$ROA_{i,t} = \frac{\sum_{i}(\pi - \alpha)_{i,t}}{\sum_{i=1} SIZE_{i,t}} \qquad (7.1)$$

Where $ROA_{i,t}$ is return on assets of MFI i in year t, $(\pi - \alpha)_{i,t}$ is the net operating income less taxes of MFI i in year t, and $SIZE_{i,t}$ is the total average assets of MFI i in year t. ROA is expressed in percentage form.

Outreach is captured in two dimensions: firstly, the breadth of outreach indicates the number of clients served by the MFI and secondly, the depth of outreach, measured by the average loan size, which gives a fair indication of the level of poverty of the clients served by that MFI (Cull et al., 2007; Mersland & Strøm, 2010). The depth of outreach is calculated as being the gross loan portfolio divided by the total number of active borrowers.

This study differs from previous microfinance studies insofar as it adopts a technique of disaggregating the outreach variables in different sets. Specifically, for the breadth of outreach, MFIs are analysed based on the number of customers served. To do this the following three MIX market classifications are applied: firstly, SMALL breadth of outreach for MFIs with fewer than 10,000 clients; secondly, MEDIUM breadth of outreach for MFIs serving between 10,000 and 30,000 clients, and thirdly, LARGE breadth of outreach for MFIs serving more than 30,000 clients. In the case of depth of outreach, loan sizes are analysed as follows: firstly, loan sizes less than USD 150; secondly, loan sizes between USD 150 and 300; thirdly, loan sizes between USD 300 and 500; fourth, loan sizes between USD 500 and 1000; and lastly, loan sizes greater than USD 1000.

As indicated previously, the analysis approach in this chapter is empirical and applies the methodical analysis technique recently adopted by Rogoff and Reinhart (2010) in their study. Their study has been widely discredited, and much of the criticism focuses on data mining and not on the analysis approach adopted in their study. Indeed, their analysis approach has never being questioned, and can be used in empirical studies. This approach will involve a methodical matching of different loan sizes with the return on assets (ROA) of each MFI for the period 2003 to 2011. This study does the same for the different segments of clients served by each MFI. The results of each MFI are then aggregated and reported per country. Against this background, a discussion of the descriptive statistics of the variables of interest follows below.

Table 7.2: Descriptive Statistics

Variables	*N*	Mean	S.D	MIN	Q1	Median	Q3	MAX
Breadth of Outreach **('000)**	762	40.5	87.7	0.10	6.40	15.3	39.1	775.4
Depth of Outreach **(USD)**	762	468.4	504.77	23.0	128	264.5	646	2990
Return on Asset **(ROA)**	762	-0.02	0.12	-0.85	-0.04	0.01	0.04	0.20

NOTES: Table 7.2 presents the summary statistics {number of observations (***N***), Mean, Standard Deviation (**S.D**), Minimum (**MIN**), first quartile (**Q1**), Median, third quartile (**Q3**), and Maximum (**MAX**)} for the dependent and explanatory variables. The data covers the period 2003 to 2011 and incorporates 107 MFIs drawn from 20 countries of SSA. The **Breadth** of outreach signifies the number of clients served by the MFIs, while **Depth** of outreach represents the poorness of poor clients served, often reflected by and hence captured by average loan size. The letters **USD** signifies the United States Dollars.

Table 7.2 indicates that the average number of clients served by the MFIs is in the region of 40,500, with the smallest firms serving as few as 100 clients while the largest MFIs serve in the region of 775,000 clients. The average loan size in our sample is USD 468, with the smallest loan amounts being USD 23 and the largest loan amounts in the region of USD 2,990. The average ROA of the 107 MFIs sampled is about -2 percent, with the best-performing MFIs reporting ROA of 20 percent; however, the under-performing MFIs reported a negative return on assets of 85 percent. The correlation matrix of the three variables is presented in Table 7.3.

Table 7.3: Correlation Matrix

	Breadth of Outreach	Depth of Outreach	Return on Asset
Breadth of Outreach	1.000		
Depth of Outreach	-0.042	1.000	
Return on Asset	0.020***	0.084***	1.000

NOTES: Table 7.3 presents the Bravais-Pearson correlation coefficients between independent variables. The three asterisks (***) express significance at the 1 percent level. The Breadth of outreach signifies the number of clients served by the MFIs, while Depth of outreach represents the poorness of poor clients served, often captured by average loan sizes.

7.4 Empirical Results

The following Table 7.4 provides details of the methodical relationship between the segments of loan sizes and the financial performance of the 107 selected MFIs based in 20 countries of the SSA region during the period 2003 to 2011. The 762 annual observations were segregated into five loan sizes as described in the preceding section of this chapter. The average loan sizes (Depth) of each MFI were then matched with the Return on Assets (ROA) for the period 2003 to 2011. The same approach was applied for the various levels of outreach to the poor (Breadth). The results for the MFIs were then aggregated per country. The objective was to determine the optimal breadth and depth of outreach thresholds for MFIs operating in each country of the SSA region.

Table 7.4 shows a significant relationship between the loan sizes and the financial performance of MFIs in the SSA region. The results indicate that an increase in loan size improves the financial performance of MFIs operating in the SSA region. Of course, there are minor variations in the results, which are noticeable in the following countries: Benin, Democratic Republic of Congo, Ethiopia, Malawi, Niger, Tanzania and Zambia. Note, however, that the variations in these seven countries do not distort the overall conclusion.

Table 7.4: The effect of Depth of Outreach on the Financial Performance of MFIs

		DIFFERENT LOAN SIZES				
Country	**Obs.**	**Below USD 150**	**150 to 300 USD**	**300 to 500 USD**	**500 to 1,000 USD**	**USD 1,000 and Above**
Benin	49	-21	-4.9	-5.7	0.7	-3.5
Burkina Faso	18	-1.8	*	*	1.2	2.7
Cameroon	20	*	*	-2	0.7	6.6
Congo, DR	23	-6.7	2.6	-4.4	*	*
Ethiopia	67	2.2	6.4	2.2	*	*
Ghana	65	-7	2	2.9	2.3	3.5
Kenya	63	-2.6	-3.6	-0.5	-2.5	1.9
Madagascar	53	-9.7	-2	0.9	0.5	6.5
Malawi	28	-23.9	3.3	-8.4	-4.9	*
Mali	47	-3	1.6	-2	0.2	-4.2
Mozambique	47	-42	-3.2	1.3	1.3	0.5
Niger	15	-13.5	1.2	5.2	4.1	3
Nigeria	24	8.7	9.3	*	*	*
Rwanda	24	-11.8	-7.3	1.7	0.9	13.9
Senegal	56	-6.2	-1.4	1.6	1.6	5.6
South Africa	9	-3	-3.5	*	*	*
Tanzania	46	-6	-13.5	2	1.5	1.4
Togo	35	-19.8	-1.7	-2.9	-1.6	-0.6
Uganda	53	-3.5	-10.5	-2	2.4	4.6
Zambia	20	17.5	-1.2	-6.5	6.5	*
Observations	**762**	235	168	126	136	97
Mean ROA		**-8.1**	**-1.5**	**-1.0**	**0.9**	**3.0**
Median ROA		**-6.2**	**-1.6**	**-0.5**	**1.1**	**2.9**

NOTES: Table 7.4 presents the methodical relationship between Return on Assets (ROA) and different loan sizes for 107 MFIs operating in SSA during the period 2003 to 2011. An asterisk (*) indicates no observations were available for that particular segment. The study period was from 2003 to 2011. The **USD** abbreviates United States dollars and **Obs**. refers to number of observations.

Overall, the results reported in Table 7.4 reveal that targeting the poor with loan sizes averaging less than USD 150 is typically associated with a poor financial performance. One plausible explanation is that the inherently high administrative costs of providing uncollateralised microcredits are greater than the financial returns on those loans (Agier & Szafarz, 2013). Thus, loan sizes averaging less than USD 150 are correlated with a mean ROA of -8.1 percent; this compares with -1.5 percent for loan sizes between USD 150 and

300, and with a ROA of -1 percent with loan sizes between USD 300 and 500. However, loan sizes between USD 500 and 1,000 yield a ROA of 0.9 percent and loan sizes greater than USD 1,000 yield a ROA of 3 percent.

Table 7.5: The effect of Breadth of Outreach on the Financial Performance of MFIs

		BREADTH OF OUTREACH		
Country	**Obs.**	**Small**	**Medium**	**Large**
Benin	49	-9.6	-3.0	0.1
Burkina Faso	18	-1.6	-1.9	1.4
Cameroon	20	4.4	0.6	-3.3
Congo, DR	23	-8.0	-0.5	5.9
Ethiopia	67	0.6	2.3	5.3
Ghana	65	-6.3	-0.6	3.4
Kenya	63	-8.3	-5.2	2.4
Madagascar	53	0.8	-0.7	5.5
Malawi	28	-31.0	-18.0	-1.5
Mali	47	-0.5	-2.9	0.8
Mozambique	47	-7.6	0.7	6.2
Niger	15	3.5	*	-4.3
Nigeria	24	8.0	4.9	10.5
Rwanda	24	-1.4	-7.4	-6.1
Senegal	56	-0.8	3.8	1.9
South Africa	9	*	-4.2	-3.1
Tanzania	46	-18.0	-4.3	-1.6
Togo	35	-5.5	1.1	1.6
Uganda	53	-36.0	0.2	1.6
Zambia	20	-14.2	-6.2	*
Observations	**762**	285	243	234
Mean ROA		**-6.9**	**-2.2**	**1.4**
Median ROA		**-5.5**	**0.7**	**1.6**

NOTES: Table 7.5 presents the methodical relationship between Return on Assets (ROA) and different breadth of outreach of 107 MFIs operating in SSA over the period 2003 to 2011. An asterisk (*) indicates no observations were available for that particular segment, and **Obs**. refers to number of observations. The breadth of outreach is characterised as: (I) **Small Outreach** = MFIs with fewer than 10,000 clients; (II) **Medium Outreach** = MFIs with between 10,000 and 30,000 clients; and (III) **Large Outreach** = MFIs with more than 30,000 clients.

We now review the relationship between the breadth of outreach and the financial performance of the 107 selected microfinance institutions operating in 20 countries of the SSA region. Refer to Table 7.5 above.

The results shown in Table 7.5 demonstrate that an increase in the number of clients served by an MFI promotes its financial performance significantly: Cameroon is a notable exception in those countries considered in this analysis. Taken together, the LARGE MFIs have been characteristically associated with a mean ROA of 1.4 percent, which compares with -2.2 percent for MEDIUM MFIs and -6.9 percent for MFIs in the SMALL category. This leads to the conclusion that large MFIs benefit from economies of scale, as illustrated by their relatively strong financial performance between 2003 and 2011.

To summarise: it is fair to conclude that the persistently high microcredit interest rates are partly attributable to unexploited economies of scale and the high inherent costs of providing small uncollaterised loans. This claim is consistent with the findings of Armendariz and Morduch (2005) as well as Hermes and Lensink (2011). In that respect, an increase in client outreach accompanied by loan sizes of not less than USD 500, could undoubtedly contribute to an improved financial performance of MFIs. This scenario could contribute towards lowering microcredit interest rates in the SSA region.

7.5 Examples from Ethiopia and Nigeria

This section provides examples of non-profit seeking MFIs in Ethiopia and Nigeria, which consistently reported a strong financial performance during the period covered in this study (2003 to 2011). The reason for this analysis is to re-inforce the conclusion that there is profit to be earned from serving the poorest in the communities of SSA. It is important to note that non-profit oriented MFIs were selected because these firms habitually target the poorest people by providing small loan amounts, with the mission of poverty alleviation (Chikalipah, 2017b).

- **ETHIOPIA:** the Ethiopian MFIs in the sample include four non-profit oriented MFIs that consistently reported favourable returns on assets (ROA) between 2003 and 2011. These MFIs are ACSI, ESHET, GASHA and PEACE. They targeted mostly poor people with average loan sizes not exceeding USD 500 over the study period. Unsurprising, the MFIs' most profitable loan amounts were those in the range USD 150 and 300. This evidently demonstrates that outreach to the poor people in society is profitable with reasonably modest loan amounts.

- **NIGERIA:** the Nigerian MFIs dominated the sample of the most profitable firms in the period 2003 to 2011. The three non-profit seeking MFIs were DEC, LAPO-NGR and SEAP and they reported an average ROA of not less than 5 percent between 2003 and 2011. The mission of these three MFIs is poverty alleviation and they targeted the poor with average loan amounts of USD 300 between 2003 and 2011. All three MFIs are strongly profitable despite their market orientation and mission objective. These three examples firmly support the conclusion that MFIs can expand outreach to the poor and remain profitable at the same time.

One possible objection to the Ethiopian and Nigerian examples, above, is that there are many non-profit oriented MFIs in SSA that are recording poor financial results. That viewpoint is correct, yet results have consistently shown that profit can be earned while serving poor people in the communities of the SSA region. Here, the key factors to strong financial performance of MFIs include adopting digital technology to drive operational efficiency accompanied by sound portfolio management strategies. It seems reasonable to believe that the Ethiopian and Nigerian MFIs outlined in this section have done exactly that.

7.6 Conclusion

Outreach is important to the microfinance industry in terms of both breadth and depth. The findings of previous empirical studies have been inconclusive and sometimes contradictory and this situation prompted further investigation into this research area. To do this, use was made of the dataset modified for this study. The final sample comprised 107 microfinance institutions based in 20 countries of the sub-Saharan African region for the period 2003 to 2011.

In order to study the methodical relationship between outreach and the financial performance of those 107 MFIs operating in 20 countries of the SSA region, an innovative approach was used; this entailed segregating the outreach variables into different segments. Thus, the different average loan sizes (Depth) of each MFI were matched with the Return on Assets (ROA) for the period 2003 to 2011. The same approach was followed for the different levels of outreach to the poor (Breadth). The results for each MFI were then aggregated for each country in the survey. The aim was to establish the optimal thresholds of breadth and depth of outreach for MFIs in each country.

The main findings from the analysis of the relationship between outreach and financial performance of MFIs in the SSA region are as follows. First, microcredits smaller than USD 500 are strongly associated with lower profitability than larger loans. Thus, microcredits larger than USD 500 yield better financial returns. This finding is plausible since managing small loans is often cost prohibitive. Second, it was found that MFIs with more than 30,000 clients reported stronger financial returns than those serving between 10,000 and 30,000 clients. Those MFIs serving fewer than 10,000 clients reported the worst financial performance.

Of course, other factors can also influence the financial performance of MFIs and these include the number of years that the MFI has been in operation as well as its operational efficiency, and the economic outlook. However, there is a close link between outreach and financial performance as the results illustrate. Overall, the results provide a broad support for the viewpoint that MFIs benefit immensely from economy of scale. Moreover, profit can be earned whilst serving the poor, as long as loan sizes are at least USD 500.

CHAPTER EIGHT

WHAT DETERMINES FINANCIAL INCLUSION IN SUB-SAHARAN AFRICA?

Discussion of Empirical Results[66]

8.1 Introduction

The aim of this chapter is to investigate factors that influence financial inclusion in the sub-Saharan African (SSA) region. Our problem statement in section 1.2 of chapter 1 - Introduction - is poverty with financial inclusion as one of the possible solutions.[67] It is not unreasonable to believe that if microcredit interest rates in SSA were lower, then more people would access the MFI services, which could lead to less poverty. However, these persistently high microcredit interest rates are not the only factors influencing financial inclusion, and therefore some other factors are considered in this chapter. Here, use is made of a dataset which differs from the ones used in chapters 6 and 7. Instead, reference is made to the most recent financial inclusion surveys, conducted by the World Bank in 2014. This approach possibly allows for data triangulation.

As earlier mentioned in chapter 1 in section 1.8.2, the main motivation for undertaking this empirical investigation is that microfinance institutions predominantly target the financially excluded part of the population. In light of that, a better understanding of the

[66] This chapter was configured into a journal article. It was accepted for publication in April 2016, and published in March 2017 in the *African Journal of Economic and Management Studies*, 8(1), 8–18. Therefore, we acknowledge comments and suggestions from the Journal Reviewers and the Editor.

[67] Financial inclusion is one of the United Nations' sustainable development goals. It is believed that financial inclusion is a key driver of economic growth and a possible instrument for alleviating endemic poverty in developing countries (for related evidence, see: Levine et al., 2000).

main factors that influence financial inclusion in SSA could, to some degree, contribute to the development of the microfinance industry. Additionally, the findings of the investigation will contribute to the general body of literature, by shedding light on the main factors that determine financial inclusion in SSA.

It is worth noting that there is a lack of empirical studies which investigate the determinants of financial inclusion in SSA. Consequently, available studies in the public domain are country specific. For example, Johnson and Nino-Zarazua (2011) examined factors influencing financial inclusion in Kenya and Uganda, while Johnson and Arnold (2012) investigated financial inclusion in Kenya only. Akudugu (2013) studied determinants of financial inclusion in Ghana.

The empirical results given in this chapter provide evidence demonstrating that illiteracy has a negative effect on financial inclusion in the 20 countries considered in this study. Reducing the extent of illiteracy could improve the degree of financial inclusion, which can contribute towards poverty alleviation. It is also important to pilot the use of local languages as an additional medium of communication in the banking industry, especially in the rural areas of SSA. It is believed that using local languages as an additional medium of communication could make inroads into the banking apathy that prevails among the poor in the region, where French and English are the predominant languages of banking.

The remainder of this chapter is structured as follows. Thus, section 8.2 outlines the main factors that impact negatively on financial inclusion in SSA. Section 8.3 reviews the relevant literature while section 8.4 describes the dataset and methodology used. Empirical results are discussed in section 8.5 while section 8.6 presents a robustness check and endogeneity. Finally, section 8.6 offers concluding remarks.

8.2 Factors Associated with Financial Exclusion in SSA[68]

Financial inclusion has an immense multiplier effect on the economy as a whole; this is achieved by a higher level of savings mobilised from those at the bottom of the social pyramid (Chibba, 2009). The extension of financial services to the financially excluded segment in society leads to an improvement in their financial conditions and living standards, enabling them to create a financial safety net and facilitating their consumption of goods and services (Allen et al., 2014). According to anecdotal evidence many factors affect financial inclusion in sub-Saharan Africa, some positively and some negatively (Akudugu, 2013). Some of the most common and important factors that have a negative influence on financial inclusion in the SSA region are described in the following paragraphs.

1. **High Transaction Costs**: it has been proved empirically that small financial products are inherently costly (Bag, 2013; Moore, 2003; Natamba et al., 2013). Because of this, the banking network in SSA is largely concentrated in commercial towns and bank services are aimed at serving wealthy customers (Beck & Maimbo, 2012). The high cost of financial intermediation in the region is aggravated by macro-prudential policies[69] as well as by the costs of managing branch networks, especially in rural areas (Beck, 2012; Brown et al., 2005).

2. **Poor Infrastructure**: the SSA region occupies the lowest ranking among the developing countries in terms of access to infrastructure; it is far behind Latin America and East Asia. The necessary infrastructure, such as security services, telecommunications facilities and proper road networks is still embryonic. The

[68] It is important to note that some of the studies considered in this section were published in low-ranked scientific journals: these studies include Akudugu, (2013); Natamba et al., (2013); and Tchouassi (2012).

[69] For example: the statutory reserve requirement, minimum capital adequacy and interest rates controls.

situation is even worse in the rural parts of the SSA region (World Bank, 2014). For example, Batuo (2015) noted that telephone lines are mostly provided in urban areas, with the average teledensity of 1 across the region (Wilson, David, Beatrice & Mary, 2014). There is a consensus in empirical studies indicating that providing adequate infrastructure is an important step towards alleviating poverty and accelerating economic growth.[70] Finally, the under-developed infrastructure in SSA has been cited as a factor contributing to slow economic development during the past decades (Kessides, 2012).

3. High Poverty Levels and Banking Charges: poverty is often defined as "lacking sufficient means" and is one of the main reasons why poor people fail to maintain even a basic bank account. As reported by Allen et al. (2016), the common barriers to accessing formal financial services include the following: lack of funds; the traditional bank practice of requiring account holders to maintain a minimum balance in their accounts; and difficulties encountered by prospective customers in obtaining the documentation needed to open a bank account.[71] Similar observations were reported by Akudugu (2013) and by Hendricks and Chidiac (2011). Moreover, excessive bank charges, such as withdrawal fees and bank monthly maintenance fees, exacerbate the financial exclusion situation in the region (Tchouassi, 2012). Notably, average annual bank charges account for about 20 percent of the country's GNI *per capita*. In addition, bank service charges account for about a quarter of commercial banks' total annual revenue in the SSA (Beck & Maimbo, 2012; Fosu, 2013).

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[70] For a thorough review refer *inter alia* to: Perkins, Fedderke, and Luiz (2005), Munnell (1992), Duffy-Deno and Eberts (1991), Calderón and Servén (2004) and Demurger (2001).

[71] These would include documents such as a utility bill for proof of address and passport or ID card for proof of identity.

4. Sparse Population: the SSA region is the least-populated region of the world with an average of 40 people per square kilometre overall, and 14 in rural areas (Collins, 2014; WorldBank, 2014). Consequently, extending financial services to people in remote areas often costs more than the yield on capital employed (Dupas & Robinson, 2013). Furthermore, the high operating costs associated with running branches in sparsely populated areas often exacerbate the situation of financial exclusion in those areas. As indicated previously, this is the reason why the bank branch network in SSA is highly concentrated in the densely populated and economically viable towns (Allen et al., 2016; WorldBank, 2014).

5. Functional Illiteracy: Africa is the only continent in the world where 40 percent of the adult population are illiterate.[72] About half of the parents are unable to assist their children with school homework because they are illiterate (UNESCO, 2014). Regrettably the rate of illiteracy is on the rise because of the exponential growth in the overall population, inadequate schooling, humanitarian crises, low levels of schooling enrolment and general poverty (UNESCO, 2014). Proponents of literacy programmes argue that reading and writing skills improve individuals' chances of increasing their earnings (Norton, 2014). Some studies suggest that literacy increases the productivity and earning potential of a population (Hendricks & Chidiac, 2011; Robinson, 2014). It is claimed, also, that illiteracy is closely tied to financial illiteracy.[73] One example supporting this view is that approximately two-thirds of the financially excluded adults, surveyed by the World Bank, had no wish to open a formal bank account,

[72] 40 percent represents about 160 million illiterate adults of whom approximately two-thirds are women (based on the 2014 data from UNESCO).

[73] Financial literacy is regarded as the ability to apply an effective knowledge and understanding of financial resources. Knowledge helps someone to earn money and make investment planning for the future (Calcagno & Monticone, 2015).

mainly because of lack of knowledge (Allen et al., 2016; WorldBank, 2014). Finally, studies have shown that people with financial knowledge and skills are more likely to have more savings and are more able to borrow money; they are also more likely to start a new business (Acemoglu et al., 2014; Hanushek, 2013; Norton, 2014).

8.3 Review of Empirical Literature

As previously mentioned, there is a lack of studies that investigate the determinants of financial inclusion in SSA. Nevertheless, there is an increasing body of literature focusing on gaining a better understanding of what influences access to finance in the region; these include studies by: Morduch and Armendáriz (2010); Akpalu, Alnaa, and Aglobitse (2012); Aterido, Beck, and Iacovone (2013); Ngalawa and Viegi (2013); and Allen et al. (2014). Findings on the determinants of financial inclusion are discussed in the following paragraphs.

Akudugu (2013) investigated the determinants of financial inclusion for the adult population in Ghana and found strong evidence indicating that inadequate levels of literacy, lack of money, lack of documentation and long distances to financial institutions are the significant determinants of financial inclusion in Ghana. A related study by Sarma and Pais (2011), examined the relationship between financial inclusion and development in 49 developing countries across the world, and concluded that the level of *per capita* income and human development and that of financial inclusion were strongly and positively related. They also argued that adult literacy and better infrastructure play a positive role in enhancing financial inclusion.

Kumar (2013) analysed the determinants of financial inclusion in 29 major states in India for the period 1995 to 2008; it was shown that the branch network is the significant determinant of financial inclusion in India. That study used variables on the supply side of financial inclusion, as follows: population density, average population per bank branch, GNI *per capita*, net deposit-credit utilisation, industrialisation and sociological modernisation. Likewise, Dev (2006) evaluated the challenges of providing bank services to poor farmers, rural non-farm enterprises and other vulnerable groups in India. It was found that microfinance self-help groups, simplified regulatory procedures and depoliticisation of the financial system have important roles to play in promoting financial inclusion.

Donovan (2012) showed that mobile money has the potential to contribute to financial inclusion in developing countries, and recommended proper prudential regulations for the industry to realise its potential. Equally, Johnson and Arnold (2012) investigated the main causes of financial exclusion in Kenya between 2006 and 2009. They documented evidence indicating that a person's age and level of education are the main factors determining that person's propensity to access the M-Pesa mobile money service in Kenya. On a related note, Carbó, Gardener, and Molyneux (2005) concluded that financial exclusion is a serious concern for both developed and developing countries.

A study by Honohan (2008) showed that access to financial services is negatively correlated with income inequality as measured by the Gini coefficient. Also, Kempson, Atkinson and Pilley (2004) drew a similar conclusion after finding a strong relationship between financial inclusion and high levels of income inequality. In addition, Johnson and Nino-Zarazua (2011) argued that access to formal financial services is strongly influenced by employment, income and education in Kenya and Uganda. They also claimed that "rurality is not a factor associated" with access to formal banking services. For a review of studies that indicate that living in a rural area hinders financial inclusion see: Claessens (2006) and World Bank (2014).

8.4 Data and Methodology

8.4.1 Description of Data

This study of financial inclusion uses the cross sectional, country-level data, derived from the World Bank for 2014 and covers 20 countries in the sub-Saharan African region. The supplementary data for the global infrastructure ranking index was sourced from Statista. The World Bank recently launched the financial inclusion dataset (Global Findex), but financial inclusion data is only available for 2011 and 2014. However the number of observations for the 2011 survey were relatively few and in view of this, this study uses the most recent Global Findex dataset for the year 2014. Also, many countries in SSA lacked data on key variables such as financial inclusion and literacy. Indeed, only 20 countries had all the required data, and so this financial inclusion study was limited to those 20 countries. Table 8.1 lists those countries.

Table 8.1 List of Countries included in the Analysis

1. Angola	6. Congo**, D.R**$^{\phi}$	11. Mauritius	16. South Africa
2. Botswana	7. Ghana	12. Mozambique	17. Tanzania
3. Burkina Faso	8. Kenya	13. Nigeria	18. Togo
4. Cameroon	9. Malawi	14. Rwanda	19. Uganda
5. Chad	10. Mali	15. Senegal	20. Zambia

NOTE: Table 8.1 presents a list of countries included in the analysis of this chapter. The abbreviation **D.R**$^{\phi}$ denotes Democratic Republic.

Dependent Variable: financial inclusion (**FI**) is the dependent variable. According to the World Bank, financial inclusion is captured as the total adult population with a bank account at a formal financial institution divided by the total adult population of a particular country, expressed as a percentage.

Explanatory Variables: adult literacy rate (**Literacy**) is captured as the percentage of the population aged 15 and above who can read and write. Literacy is measured using the United Nations Educational, Scientific and Cultural Organisation (UNESCO) methodology; this entails dividing the number of literates aged 15 years and more, by the corresponding age group population and expressing this ratio in percentage form (UNESCO, 2014). The Gross Domestic Product (**Growth**) *per capita* growth is the annual percentage change in a country in a given year. The cost of maintaining a bank account (**Bankfees/GNIPC**) is captured using the average monthly bank fees of a specific country as a percentage of gross national income *per capita*.

Population density (**Population Density**) is the number of people per square kilometre measured using the World Bank methodology, which entails dividing the mid-year population of a given area, by the size of that area in square kilometres.[74] The global infrastructure index (**Infrastructure Index**) is the ranking of countries based on the quantity and quality of their infrastructure. The index methodology is based on four components: transport, information and communication technology (ICT), energy and finance (Donaubauer, Meyer, & Nunnenkamp, 2015). Gross National Income *per capita* (**GNI per capita**) is derived from the World Bank data using the Atlas method and is measured as the gross national income of a country divided by the mid-year population.

As indicated in Table 8.2, the overall level of financial inclusion was 35 percent in 2014 for the 20 countries sampled in this study; however, Table 8.2 also shows wide variations between countries. Thus, Mauritius had the highest financial inclusion rate in the region at 80 percent while Chad had the lowest at 12 percent. In terms of literacy the regional

[74] One would have preferred to use the yardstick of the average distance of individuals who are financially excluded from their nearest financial institution. Unfortunately, this kind of data is not readily available.

average was 64 percent, with Kenya having the highest literacy rate of 85 percent and Burkina Faso the lowest of 33 percent. The bank fees in those countries studied averaged 6 percent of GNI *per capita* in 2014. The mean population density was 116.6, with the highest being 672 people per square kilometre in Mauritius and lowest being 4 people per square kilometre in Botswana. The growth rate of real GDP *per capita* (Growth) averaged 1 percent in 2014. In terms of GNI *per capita* there were wide variations in the sample, with an average of USD 2,120: Mauritius reported the highest GNI *per capita* of USD 9,710 with Malawi the lowest at USD 360. The quality of infrastructure average score is 3.39 and there was little variation between the 20 SSA countries considered in this analysis. According to Statista methodology, the highest score for the infrastructure index is 7.

Table 8.2: Descriptive Statistics

Variable	***N***	**MEAN**	**S.D**	**MIN**	**Q1**	**MEDIAN**	**Q3**	**MAX**
Financial Inclusion	20	0.35	0.19	0.12	0.18	0.39	0.43	0.80
Bankfees/GNIPC	20	0.06	0.04	0.01	0.02	0.05	0.09	0.14
Literacy	20	0.64	0.15	0.33	0.56	0.67	0.75	0.85
Population Density	20	116.60	165.92	4.00	23.00	55	141.50	672.00
GNI (*per capita*)	20	2120.00	2690.45	360.00	545.00	965	1955.00	9710.00
Growth	20	0.01	0.08	-0.27	0.00	0.03	0.06	0.09
Infrastructure Index	20	3.39	0.79	2.00	2.90	3.4	3.85	4.70

NOTES: Table 8.2 presents the summary statistics {number of observations (***N***), Mean, Standard Deviation (**S.D**), Minimum (**MIN**), first quartile (**Q1**), Median, third quartile **(Q3**), and Maximum (**MAX**)} for our dependent and explanatory variables that enter the estimation model specified in equation (8.1). The sample comprised 20 countries and data is for the year 2014. The abbreviations are as follows: (i) **GNICP** signifies the Gross National Income *per capita*; (ii) **GNI** is Gross National Income in in monetary terms using United States dollars; (iii) **Growth** is GDP *per capita* growth, expressed as annual percentage growth.

In order to examine the linear correlation between the independent variables, the pair-wise correlation test was performed and the results are shown in Table 8.3. The linear correlations between the explanatory variables are deemed statistically problematic if the correlation coefficients are greater than 0.70 (Baltagi, 2008; Hsiao, 2014). From Table 8.3, one can reasonably conclude that the linear relationship between the explanatory variables is not a concern.

Table 8.3: Correlation Matrix

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
(1) Literacy	1					
(2) Growth	0.149	1				
(3) Population Density	0.295	0.070	1			
(4) Infrastructure Index	0.411*	0.220	0.425*	1		
(5) GNI (*per capita*)	0.553*	-0.151	0.382*	0.498**	1	
(6) Bankfees/GNIPC	-0.385*	0.066	0.006	-0.098	-0.602***	1

NOTES: Table 8.3 reports the Bravais-Pearson correlation coefficient between independent variables. The symbol * expresses significance at the 10 percent level, ** at 5 percent and *** at the 1 percent level.

8.4.2 Econometric Specification

In the following equation (8.1), the dependent variable is financial inclusion and the explanatory variables are: literacy, annual economic growth rate, bank fees as percentage of GNI per *capita*, population density, infrastructure index, and GNI *per capita*. The general form of the Ordinary Least Squares (OLS) equation is:

$$Y_{i,t} = X'_{i,t}\beta + +\varepsilon_{i,t} \qquad (8.1)$$

With the assumption that:

$$i = 1, \dots \dots .., n, \qquad t = 1, \dots \dots \dots, T_i,$$
$$E[\varepsilon_{i,t}|\mathrm{X}_{\mathrm{i,t}}] = 0 \qquad \text{and} \qquad E(Var)\{\varepsilon_{i,t}|\mathrm{X}_{\mathrm{i,t}}\} = \sigma^2$$

Where: i indexes country, t indexes a year and $Y_{i,t}$ represents financial inclusion of country i in year t. $X'_{i,t}$ represents a matrix of explanatory variables in year t of a country i and $\varepsilon_{i,t}$ is the idiosyncratic error. The next section presents the results of estimating equation (8.1).

8.5 Discussion of Empirical Results

Table 8.4 provides the regression output results of factors that influence financial inclusion in SSA. These regression results were estimated using pooled OLS and also with the robust regression (Petersen, 2009).

Table 8.4: Estimation Results of Financial Inclusion

	DEPENDENT VARIABLE: Financial Inclusion	
	Pooled OLS	**Robust Regression**
Literacy	0.450*** (0.178)	0.471** (0.210)
Growth	1.547** (0.787)	1.471* (0.933)
Population Density	0.000 (0.000)	0.000 (0.000)
Infrastructure Index	0.016 (0.037)	0.014 (0.044)
GNI (*per capita*)	0.000** (0.000)	0.000* (0.000)
Bankfees/GNIPC	-0.399 (0.894)	-0.443 (1.060)
Durbin-Watson	2.27	
Prob. > *F*	0.000	0.001
Prob. Hatsq	0.989	0.972
R^2	0.828	0.771
Adj R^2	0.749	0.665
Countries	20	20

NOTES: Table 8.4 reports on the determinants of financial inclusion in SSA. The symbol * denotes statistically significance at the 10 percent level, ** at the 5 percent level and *** at the 1 percent level. Financial inclusion is the dependent variable and the data is for the year 2014.

The starting point of the discussion is the coefficient of literacy rates (Literacy), which is positive and robustly significant. The impact of literacy on financial inclusion is statistically strong and indicates that a 1 percentage increase in the level of literacy is associated with a 0.5 percent increase in financial inclusion. This finding of a strong relationship between literacy and financial inclusion is highly rational as the ability to read and write is a prerequisite for opening and maintaining a bank account.

A most interesting finding that emerged from the estimates shown in Table 8.4 is the coefficient of population density. The results indicate that population density has no effect on financial inclusion in SSA. This is strange, yet plausible, because financial exclusion is prevalent not only in countries with a low population density but also in densely populated countries of SSA (Robinson, 2014). For example, Botswana has high financial inclusion despite a low average population density, while the exact opposite is true for Malawi (World Bank, 2014). One could argue that Botswana is urbanised relative to Malawi (UN-Habitat, 2010). However, this argument does not provide the answer, as Angola and Cameroon are urbanised too, almost at the same level as Botswana, yet these two countries have disappointingly low levels of financial inclusion. Moreover, in Lesotho, almost three-quarters of the population live in rural areas, but 60 percent of that population have access to formal financial services (Allen et al., 2014; Demirgüç-Kunt et al., 2015).

Similarly, the economic growth coefficient is positive and statistically significant. The empirical results indicate that an increase in real economic growth would increase financial inclusion. This result could be justified on the basis that economic expansion entails a high budgetary allocation to the education sector and to fighting financial exclusion.[75] The results of a study by Claessens and Perotti (2007) were consistent with this finding; thus, they observed a positive relationship between financial inclusion and economic growth.

Finally, the coefficient of Gross National Income (GNI) *per capita* is positive and statistically significant, although the impact is rather small. This result indicates that an increase in individual income would increase financial inclusion. This finding is rational and in line with what one might reasonably expect. Besides, empirical studies confirm a strong correlation between the high level of poverty in a country and high financial exclusion (for further details, see: Akudugu, 2013; Kagochi, Al Nasser, & Kebede, 2013).

8.6 Robustness Check and Endogeneity

In order to verify the robustness of the estimation results, various estimation techniques have been applied, and the main findings are reported in Table 8.5. Overall, the results are robust and consistent with the initial ones reported in Table 8.4.

[75] Empirical studies have analysed the education and economic growth nexus and found evidence of bi-directional causality. For a review of recent literature see: Boccanfuso, Savard, and Savy (2013) and Uneze (2013). However, an influential work by Pritchett (2001) finds no significant contribution of educational expansion to economic growth, owing to the lack of a satisfactory institutional environment.

Table 8.5: Estimation Results of Financial Inclusion (Robustness Check)

	Model (1)	Model (2)	Model (3)
	Robust Regression	**Robust Regression**	**Robust Regression**
Literacy	0.463** (0.213)	0.547*** (0.195)	0.425** (0.216)
Growth	1.381* (0.814)	1.547** (0.787)	1.354** (0.678)
Population Density	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Infrastructure Index	0.012 (0.048)	0.055 (0.037)	0.020 (0.043)
Bankfees/GNIPC		-0.848 (0.676)	-0.578 (1.071)
GNI (*per capita*)	0.000** (0.000)		
Literacy*GNI (*per capita*)			0.000** (0.000)
Prob. > F	0.001	0.000	0.000
Prob. Hatsq	0.852	0.711	0.818
R^2	0.743	0.763	0.787
Adj R^2	0.651	0.678	0.705
Countries	20	20	20

NOTES: Table 8.5 presents additional estimation results of financial inclusion SSA, for robustness check. The dependent variable is financial inclusion and data is for the year 2014. The symbol * denotes statistical significance at the 10 percent level, ** at the 5 percent level and *** at the 1 percent level. In Model 1, we estimated equation (8.1) without Bankfees/GNIPC. In Model 2, we re-run equation (8.1) without GNI *per capita*. In Model 3, we included an interacting parameter of GNI *per capita* with literacy.

The results reported in Table 8.5 under the Model 1 column were estimated without the Bankfees/GNIPC variable. This approach was followed as the GNI *per capita* variable is used to construct the Bankfees/GNIPC variable and both these variables entered the estimation model. Thus, it is important to check if the regression results are fragile if one of the two variables is excluded. The use of this estimation technique was found to yield robust and consistent results, which accord with the baseline estimates as reported in Table 8.4.

The results reported in Table 8.5 under the Model 2 column were obtained after re-estimating equation (8.1) without the GNI *per capita* variable. This approach also helped to overcome concerns about potential endogeneity between financial inclusion and GNI *per capita*. One could expect a causal effect running from financial inclusion to GNI *per capita* (Beck & Hesse 2009; Collier & Goderis, 2012). After all, countries with significant levels of financial inclusion are likely to have higher *per capita* income, and the opposite applies (Honohan, 2008). In order to eliminate this potential concern, equation (8.1) was re-run without the GNI *per capita* variable, and the results were found to be robust and consistent with the baseline results reported in Table 8.4.

Finally, consideration was given to constructing a parameter of interacting GNI *per capita* with literacy. The results are reported in Table 8.5 under the Model 3 column. This approach was considered because high literacy rates could be correlated with high GNI *per capita*, and the direct opposite could apply (Honohan, 2008; Johnson & Nino-Zarazua, 2011; Kempson et al. (2004). Moreover, countries with higher incomes are more likely to spend on education and projects aimed at overcoming financial exclusion (Johnson & Nino-Zarazua, 2011). That being said, the coefficient of the interaction parameter was found to be significant, although the impact is small. This means that financial exclusion is not only influenced by illiteracy, but also depends on the general level of GNI *per capita*. The overall results of using this approach are found to be consistent and robust.

To summarise: concerns relating to endogeneity were addressed by performing robustness checks. The estimation results were found not to be biased and were robust and consistent. In addition, the model specification was found not to be fragile to various estimation techniques.

8.7 Conclusion

This chapter described an empirical investigation of the factors that influence financial inclusion in SSA. That region is the ideal candidate for such an investigation, in view of the lack of research there (Tijssen, 2007). More specifically, there are only a few studies that examined the determinants of financial inclusion in SSA. Also, the findings of the studies on this issue are inconclusive because of varying methodologies. In order to meet the objective of this chapter, use was made of the recent Findex survey from the World Bank. The final cross-section dataset comprised 20 countries of the sub-Saharan African region for the year 2014.

The main findings indicate consistently that illiteracy is negatively associated with financial inclusion in the SSA region. This supports the view that improving the literacy levels in a country can contribute towards building financially inclusive societies (Desai, 2012). Furthermore, governments in SSA should continue to support literacy initiatives, and those countries that have signed up for the "Maya Declaration" must strive to meet their committed national targets.[76]

The significance of this study finding underscores the main factor behind the success of the microfinance industry in the SSA region which is the use of local languages by loan officers. This breaches the significant barrier to accessing banking services, in a region where French and English are the main languages of banking (Helms & Reille, 2004). It is, therefore, prudent to explore the possibility of adding local languages to the main languages of banking especially in the rural areas of the region (Allen et al., 2014). The use of local

[76] The Maya declaration is a national commitment to encourage financial inclusion (for further information visit http://www.afi-global.org/maya-declaration).

languages as a medium of communication could make inroads into the banking apathy and language barriers that currently prevails, especially in the case of rural residents (Demirgüç-Kunt et al., 2015, p.388). According to Allen et al., 2014, the Equity Bank of Kenya piloted the use of local language as the language of banking and the outcome has been favourable to the bank.

This chapter makes the two following main contributions. Firstly, this study has attempted to offer an initial understanding of factors that influence financial inclusion in SSA using the country level data. Secondly, this study contributes to the meagre body of knowledge on that subject and complements work conducted by various scholars, notably: Akudugu (2013); Johnson and Arnold (2012); and Johnson and Nino-Zarazua (2011).

Finally, when more data points become available through the World Bank surveys, further research in this area should investigate the dynamic causal effects between literacy and financial inclusion in the countries of SSA. There are reasons to suspect that the causal effect could also run from financial inclusion to literacy (Chibba, 2009). However, this can only be confirmed by further empirical investigation into these two variables, preferably using time series data.

CHAPTER NINE

CONCLUDING REMARKS

9.1 Introduction

There were three main objectives of this thesis. The first was to investigate the extent to which firm-level endogenous factors of an MFI, the level of a country's institutional development, and macroeconomic factors, influence the microcredit interest rates in the SSA region. The second was to investigate the methodical relationship between the pursuit of outreach and the financial performance of MFIs operating in the sub-Saharan African region. The third was to examine the main factors that influence financial inclusion in sub-Saharan Africa. These three main objectives were addressed in nine chapters, of which three were dedicated to empirical analysis.

The **First chapter** introduced this study and provided a summary of the contents of the other eight chapters of this thesis. Chapter one outlined the following: the statement of the research problem for this thesis, research questions, research objectives, justifications for conducting this research, the main contributions of this research to the general body of knowledge, the overall research approach, and the delineations and limitations of this research.

Chapter two provided an overview of the sub-Saharan African region, the microfinance industry in that region and the general level of bank penetration. The mobile money industry in the region was examined briefly. The main factors that could potentially pose risks to the region's stability were also outlined. The principal objective of chapter two was to provide background on research involving this study area.

Chapter three discussed the theories and concepts related to this research, and focussed on interest rates, banking and microfinance. In this chapter, the focus was on theories relevant to investigating the main factors that influence microcredit interest rates in the microfinance industry. This was essential, because the research approach was post-positivistic. Finally, this chapter presented the theoretical predictions which underpinned the empirical analysis, particularly for chapters 6 and 7.

Chapter four reviewed empirical microfinance studies, and also gave an overview of traditional banking literature with particular focus on the SSA region. From this chapter, it became apparent that no single study has investigated, exclusively, the factors that influence microcredit interest rates in the context of the sub-Saharan Africa region. This region is distinctive because of its diverse income levels, disparities in institutional qualities, and wide differences in the level of financial development. Moreover, no single study has investigated the effect of countries' institutional environment on microcredit interest rates. Finally, this chapter documented the current gap in research and drew attention to the inconclusive findings of the microfinance literature currently available in the public domain.

Chapter five described the study methodology and highlighted the study's research philosophy and approach. To summarise: this study was conducted with a post-positivism philosophical view, was deductive in nature, and adopted a predominantly quantitative research approach in the three analysis chapters. This chapter also described the data sources and the ethical considerations pertaining to this research. Furthermore, some statistical tests were described mathematically using the relevant equations. Finally, the chapter touched upon the study limitations and the software used for data analysis.

Chapters six, seven and **eight** provided the empirical analysis of this research. Specifically, chapter 6 focussed on identifying factors that influence microcredit interest rates in SSA. Chapter 7 investigated the relationship between outreach and the financial performance of MFIs in SSA. Chapter 8 investigated the determinants of financial inclusion in SSA. The main findings of these three analysis chapters are discussed in section 9.3 of this chapter.

The remainder of this chapter is structured in the following manner. The next section, 9.2, briefly discusses the data used in the three analysis chapters 6, 7 and 8. Section 9.3 presents a concise overview of the main findings of this study and an evaluation of the thesis statement. Sections 9.4 outlines the contributions of this study to the current body of knowledge while 9.5 makes policy recommendations. Finally, section 9.6 outlines prospective future research areas in the microfinance industry, particularly in the SSA region.

9.2 Brief Description of Data

In order to conduct this research, two main datasets were used in the three analysis chapters. In **chapter 6,** use was made of a dataset consisting of 292 MFIs based in 34 countries of the SSA region during the period 2003 to 2011. The full sample was obtained from three international organisations as follows: firstly, the Heritage Foundation (HF) provided data on institutional development at country level; second, the Microfinance Information eXchange (MIX) was a source of microfinance data at firm level; and third, the World Bank (WB) provided macroeconomic data at country level. In **chapter 7,** use was made of the same dataset assembled for chapter 6, but subject to some minor adjustments. Thus, a decision was taken to select only MFIs with at least five years of annual financial statements reported to MIX market during the period 2003 to 2011. This decision reduced the risk of outliers in the sample; these could have been newly-established MFIs with limited experience of the industry. After this selection process, the final sample consisted of 107 microfinance institutions drawn from 20 countries of the SSA region during the period 2003 to 2011. **Chapter 8** made use of a country-level dataset obtained from the World Bank for the year 2014 only; that data was collected during the Global Findex survey conducted in 2014 and pertaining to financial inclusion around the world. The auxiliary data on the global infrastructure ranking index was sourced from Statista. Therefore, the final sample incorporated 20 countries of the SSA region.

The overall study approach was quantitative, and the following empirical techniques were applied: (i) Bayesian Model Averaging (BMA), (ii) fixed effects (FE), (iii) Generalised Method of Moments (GMM), and (iv) Ordinary Least Squares (OLS). These econometric techniques were developed based on the properties of our datasets in each of the three analysis chapters: 6, 7 and 8.

9.3 The Study Main Findings and Evaluation of the Thesis Statement

The initial stage of this study was to perform a thorough overview of the study area and then document a review of theoretical and empirical literature relevent to the subject of this study. An empirical analysis was conducted on the data to meet the objectives of this study. The main findings of the three analysis chapters are summarised below.

9.3.1 Main Findings from Chapter 6

The Blundell & Bond System GMM estimator and the fixed effects were used as panel estimation methods to arrive at the main empirical findings. Those provide evidence that the high operating costs of providing small uncollateralised microcredit loans augment the microcredit interest rates in the SSA region. Also, potential economies of scale are not exploited. Likewise, the cost of funds had a substantial effect on the microcredit interest rates of MFIs operating in the SSA region. The most striking findings include the statistically significant inverse relationships between microsavings and microcredit interest rates. This is plausible because microsavings are a cheap source of finance for many deposit-taking MFIs in SSA. Another finding was that expanding outreach to poor customers has a negative and upward effect on microcredit interest rates, as far as the MFIs operating in the SSA region are concerned. Importantly, limited evidence was found in support of the notion that credit risk influences the microcredit interest rates in SSA.

The empirical results also showed that institutional deficiencies augment the microcredit interest rates in the SSA region: these include an unfavourable business environment, endemic corruption and weak property rights. This finding underlines the need to promote a strong institutional environment, as a basis for sustained economic prosperity in the region. Also, there was evidence showing that the volatile macroeconomic environment, which prevails in the SSA region, exerts undesirable effects on microcredit interest rates. More specifically, an environment characterised by higher inflation rates such as in the SSA region, contributes, to a large extent, to the persistently high level of microcredit interest rates in the region.

9.3.2 Main Findings from Chapter 7

This study searched for evidence of any methodical relationship between MFI outreach[77] and the financial performance of MFIs in the SSA region. With this in mind an analysis was performed on MFIs with at least five years of financial statements reported to the MIX Market between 2003 and 2011. The final dataset for that analysis comprised 107 MFIs drawn from 20 countries of the SSA region. In contrast to many previous microfinance studies, the outreach variables were segregated in different segments and matched to Return on the Assets (ROA) of each MFI. The findings are as follows: first, small microcredits for amounts less than USD 500 are less profitable than larger loans. In sharp contrast, microcredits for amounts greater than USD 500 yield strong financial returns to MFIs in SSA. This finding is plausible because the cost of managing small uncollateralised loans might be prohibitive.

Secondly, it was found that MFIs serving more than 30,000 clients reported better financial returns than those serving between 10,000 and 30,000 clients. Furthermore, MFIs serving fewer than 10,000 clients reported the worst financial performance. These findings provide broad support for the viewpoint that MFIs benefit greatly from economies of scale. The significance of this finding is that MFIs can expand their client outreach with loan sizes of at least USD 500, without comproimising their profitability,

The findings presented in chapters 6 and 7 provide evidence consistent with the underlying theoretical predictions laid out in chapter 3. Firstly, the small firm endogenous characteristics of MFIs go far towards explaining the relatively high lending interest rates

[77] As earlier indicated, outreach is captured in two dimensions: **breadth** (the number of clients served) and **depth** (the degree of poverty of poor clients served).

across the SSA region. Secondly, as shown in chapter 6, institutional deficiencies in the SSA region are also an underlying factor for those microcredit interest rates which remain persistently high relative to other regions of the world. Thirdly, as shown in chapter 6, there is evidence showing that a volatile macroeconomic environment, which prevails in many SSA countries, exerts an undesired upward effect on microcredit interest rates in the region.

9.3.3 Main Findings from Chapter 8

As microfinance institutions predominantly target the financially excluded segment of the population in the SSA region, this study examined the main factors that influence financial inclusion in that region. The results suggested that illiteracy has a negative effect on financial inclusion in sub-Saharan Africa. The policy implication as far as this finding is concerned is that fighting illiteracy is essential if financial inclusion in the region is to improve. Also, the results confirm that there is a need to introduce the use of local languages as an additional medium of communication in banking industry, especially in the rural areas of the region. There is evidence to suggest that the use of local languages in banking, especially in rural areas, can overcome the banking apathy that prevails among the poor in the region, where English and French are the predominant languages of banking.

9.3.4 Evaluating the Thesis Statement

Having discussed the main findings of this study, we refer to the thesis statement presented in section 1.7:

> *"Price gouging does not explain the persistently high microcredit interest rates in sub-Saharan Africa."*

In chapters 6 and 7 it was established that microcredit interest rates in the SSA region are mainly driven by underlying fundamental factors. Therefore, price gouging does not explain the persistently high lending interest rates in the microfinance industry in the region. The main driving factors are as follows. First, there are inherently high operating costs involved in providing small loans and there are unexploited economies of scale; these factors contribute, to a large extent, to persistently high microcredit interest rates in SSA. A second contributory factor is weak institutional qualities which include an unfavourable business environment, political uncertainty, endemic corruption and weak protection of property rights; all these shortcomings create market risks which have an upward effect on microcredit interest rates. Thirdly, volatile macroeconomic regimes prevail in the region; for example, unstable and high inflation. These factors exert undesirable upward pressure on the microcredit interest rates in the SSA region. In light of these findings, section 9.5 of this chapter will provide policy recommendations.

9.4 Main Contributions of this Study

As indicated in the first chapter of this thesis, this study makes five main contributions to the general body of knowledge concerning the microfinance industry in sub-Saharan Africa.

Firstly, the results provide insights into the main factors that influence microcredit interest rates in sub-Saharan Africa. It has shown that microcredit interest rates in SSA are mainly influenced by fundamental factors, which include the following: MFI (firm level) endogenous factors, institutional factors, and macroeconomic factors. Also, this study has provided some insight into the relationship between outreach to the poor and the financial performance of MFIs in SSA. The findings of the study show that MFIs in SSA can expand outreach to the poor without compromising profitability, and it is possible to earn a profit when serving the poorest in society; this is subject to the proviso that loan sizes must be for at least USD 500. Moreover, the findings of this study lay the foundations upon which future studies could be based. They also contribute to the meagre body of knowledge on microfinance, particularly in the SSA region. Finally, this research shows that illiteracy negatively affects financial inclusion in the SSA region.

Secondly, the study focuses solely on sub-Saharan Africa and takes into account the region’s distinctiveness. By doing so, it has provided new evidence that was not documented in studies by Dorfleitner et al. (2013) and Cotler and Almazan (2013). For example, this study indicates that endemic institutional deficiencies and unstable macroeconomic factors have a significant influence on microcredit interest rates in SSA. Therefore, this study has attempted to bridge a gap in the existing literature, specifically on the SSA region.

Thirdly, and from policy perspective, this study argues that interest rates ceilings are not the best approach for fostering low microcredit interest rates in the SSA region. As discussed above, these ceilings stifle growth of the microfinance industry and force MFIs to add clandestine fees to their loan products to circumvent interest rates caps. Various view on this issue exist. Firstly, microfinance institutions must be encouraged to expand outreach and to adopt digital technology to drive operational efficiency. Secondly, countries in SSA must strengthen the prevailing weak institutional environment in the region. Thirdly, macroeconomic policy regimes must be moderated, particularly by maintaining low and stable inflation.

Fourth, this study adds to the body of literature on the rigid dichotomy between the welfarist and Institutionalist [capitalist] views on microcredit interest rates (Brau & Woller, 2004). Welfarists claim that these rates are usurious and must be capped while the latter argue that the rates are influenced by market fundamental factors. This study contributes to this debate by providing evidence that microcredit interest rates in SSA are mainly influenced by market forces.

Finally, this study has contributed to the general body of knowledge by performing research in the field of microfinance. The dataset assembled for this study has been used elsewhere and some of those other studies are summarised below.

- Chikalipah, S. (2017), Institutional environment and microfinance performance in sub-Saharan Africa. *African Development Review*, 29(1), 6–27.

- Chikalipah, S. (2017). Financial sustainability of microfinance institutions in sub-Saharan Africa: Evidence from GMM estimates. *Enterprise Development and Microfinance*, 28(3), 182 – 199.

- Chikalipah, S. (2017). The nexus between microcredit nominal interest rates and inflation in sub-Saharan Africa: evidence from panel vector autoregression analysis. *Enterprise Development and Microfinance*, 28(4), 355 – 370.

- Chikalipah, S. (*forthcoming* - 2018). Do microsavings stimulate financial performance of microfinance institutions? Panel data evidence from sub-

Saharan Africa – accepted for publication in the *Journal of Economic Studies*, 45(5).

- Chikalipah, S. (2018). Credit risk in microfinance industry: Evidence from sub-Saharan Africa. *Review of Development Finance*, 8(1), 38 – 48.

- Chikalipah, S. (*forthcoming*). Optimal Sources of Financing for Microfinance Institutions in sub-Saharan Africa – accepted for publication in the *Journal of Development in Practice*.

To summarise: the results of this study lead to the reasonable conclusion that this work has attempted to contribute to the general body of knowledge. Moreover, this study can be a starting reference point for future research, which will focus on understanding the dynamics of microfinance lending interest rates, especially in the sub-Saharan African region.

9.5 Policy Recommendations

As noted previously, the findings of this study indicate that operating expenses account to a large extent for the persistently high microcredit interest rates in the sub-Saharan African region. It has been argued that improved efficiency can contribute towards lowering those rates in SSA; for example, the microfinance industry can embrace information technology to reduce operating costs. This can be done by exploring innovative banking practices, such as mobile money banking services, and by using efficient banking information management software. Embracing information technology comes with its own challenges such as investment costs and staff training expenses; nevertheless, given enough time, the benefits certainly can outweigh the costs. Therefore, implementing efficiency processes could not only stimulate profitability, but could also help microcredit providers to offer affordable and low interest rates.

An important finding is that imposing interest rates ceilings is not the correct approach towards dealing with the persistently higher microcredit interest rates in the region. As mentioned previously, interest rates ceilings suppress the growth of the industry and force MFIs to attach clandestine fees to their loan products, in order to circumvent interest rates limits.[78] An equally important finding was evidence that strengthening the institutional regime of countries could help to reduce financial market uncertainties that currently prevail in the SSA region. Therefore, fighting endemic corruption, improving the business environment, protecting property rights and upholding the rule of law will definitely enhance the performance of the microfinance industry. Moreover, strong institutions will boost investors' confidence and contribute to sustained economic growth (Chikalipah, 2017a; North, 1990; Shirley, 2008; Shirley 2010).

Finally, the results of this study have established that a favourable macroeconomic environment exerts positive effects on the banking industry in the SSA region, while the opposite applies. More specifically, stable and low inflation is a key for achieving low microfinance lending interest rates, and also for sound financial performance of the industry (Ahlin et al., 2011). Furthermore, price stability is needed for creating business confidence and promoting economic growth (Barro, 2013). Maintaining sound macroeconomic fundamentals in the SSA region could significantly contribute to the growth of the microfinance industry, and could also help microfinance institutions to provide microcredit at lower interest rates.

[78] Refer to section 2.4.4 for a detailed discussion of interest rates ceilings.

9.6 Prospective Future Research Areas (PFRAs)

This study concludes by presenting some prospective future research areas in the microfinance industry, especially for MFIs operating in the sub-Saharan African region. Thus, future work could explore the following three research areas, which merit further attention:

Firstly, future studies should attempt to examine the impact of flourishing mobile money services on the microfinance industry. These could emphasise the impact of those services on microcredit interest rates in the SSA region.

Secondly, a brief discussion of the literature on subsidies in the microfinance industry revealed a lack of empirical studies focusing on this topic. Thus, future work should attempt to investigate the effect of subsidies on microcredit interest rates, especially in SSA.

Thirdly, there are more than 20 countries in the SSA region which have imposed interest rates ceilings. Therefore, future research should strive to provide evidence on the effect of those ceilings on the performance and growth of the microfinance industry. Those studies could provide insights into anecdotal evidence suggesting that MFIs introduce clandestine fees to their loan products in order to cope with interest rates ceilings. Furthermore, the interest rates ceilings are a possible exogenous shock to exploit to combat endogeneity in future microfinance studies.

Fourthly and lastly, the results presented in chapter 6 indicate a negative yet significant relationship between deposits and microcredit interest rates, and also indicate the increasing importance of deposits in the microfinance industry. It would be useful if future research were to investigate the optimal sources of financing for MFIs in the SSA region. Indeed, a study focussing on this area could provide an important foundation for studies of the effect of various sources of financing on the financial performance of MFIs operating in the SSA region.

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APPENDICES

APPENDIX 1: List of All MFIs in the Sample

AP 1.1: LIST OF MFIs

MFI	COUNTRY	MFI	COUNTRY
ABF	Burkina Faso	CCA	Cameroon
ACB sa	Rwanda	CDS	Cameroon
ACEP Cameroon	Cameroon	CECA	Togo
ACEP Senegal	Senegal	CECAM	Madagascar
ACFB	Benin	CECAW	Cameroon
ACSI	Ethiopia	CECIC S.A.	Cameroon
Adansi RB	Ghana	CECM	Burundi
ADEFI	Madagascar	CEC-PROM Mature	Cameroon
Advans Banque Congo	Congo, DR	CEDA Sierra Leone	Sierra Leone
Advans Cameroun	Cameroon	CEDEF	Ghana
Advans Ghana	Ghana	CEFA	Cote d'Ivoire
AE&I	Cote d'Ivoire	Centenary Bank	Uganda
AFRICA FINANCES	Benin	CETZAM	Zambia
AfricaWorks	Mozambique	CFCC	Cote d'Ivoire
AGFS	Ghana	CFE	Rwanda
Agora - ZMB	Zambia	CFF	Ghana
Ahantaman RB	Ghana	Chikum MFB	Nigeria
Akiba	Tanzania	CICE	Cote d'Ivoire
Akuapem RB	Ghana	CMCA	CAR[ϕ]
ALIDÃ©	Benin	CMMB	Benin
Alliance MFB	Nigeria	CMS	Senegal
AMfB	Nigeria	COOPEC Hinfani Dosso	Niger
APED	Ghana	COOPEDU-Kigali	Rwanda
ARD	Sierra Leone	COSPEC	Burundi
Asa Initiative	Ghana	CPECG Yete Mali	Guinea
ASUSU CIIGABA	Niger	CPFCI	Cote d'Ivoire
Atwima Kwanwoma	Ghana	CRAN	Ghana
AVFS	Ethiopia	CRG	Guinea
Bessfa RB	Ghana	CUMO	Malawi
BIMAS	Kenya	CVECA BM	Burkina Faso
BOM	Mozambique	CVECA Kita	Mali
Bosumtwi RB	Ghana	Daasgift Quality F	Ghana
BRAC - LBR	Liberia	DEC	Nigeria
BRAC - SLE	Sierra Leone	DECSI	Ethiopia
BRAC - TZA	Tanzania	DJOMEC	Senegal
BRAC - UGA	Uganda	Duterimbere	Rwanda
Buusaa Gonofaa	Ethiopia	Dwetire	Ghana
CAECE- Jigiseme	Mali	EB-ACCION	Ghana
CAFODEC	Guinea	Eb-F	Kenya
CamCCUL	Cameroon	ECLOF - KEN	Kenya
CAMEC	Mali	E-MFI	Zambia
Capitec Bank	South Africa	Equity Bank	Kenya
CAPPED	Congo, Republic	Equity Uganda	Uganda
CARD Ghana	Ghana	Eshet	Ethiopia
CAURIE Micro Finance	Senegal	Express Finance	Cote d'Ivoire

NOTE: [ϕ]CAR = Central Africa Republic

AP 1.2: LIST OF MFIs

MFI	COUNTRY
Faulu - KEN	Kenya
FCC	Mozambique
FDM	Mozambique
FECECAM	Benin
FECECAV	Togo
FIDEVIE	Benin
FINADEV	Benin
Finance Trust	Uganda
FINCA - DRC	Congo, DR
FINCA - MWI	Malawi
FINCA - TZA	Tanzania
FINCA - UGA	Uganda
FINCA - ZMB	Zambia
FINCORP	Swaziland
First Allied S& L	Ghana
FUCEC Togo	Togo
Gambaga RB	Ghana
GAMIFI SA	Gabon
Gasha	Ethiopia
GAWFA	Gambia, The
GES-CI	Cote d'Ivoire
GGEM Microfinance Serv	Sierra Leone
GRAINE sarl	Burkina Faso
Grameen Ghana	Ghana
Greenland MFB	Nigeria
Grooming Centre	Nigeria
Harbu	Ethiopia
Hasal MFB	Nigeria
Hekima	Congo, DR
Hluvuku	Mozambique
Hofokam	Uganda
ID Ghana	Ghana
IDYDC	Tanzania
Ikoyi-Ile MFB	Nigeria
IMFB	Nigeria
Iperu MFB	Nigeria
Jemeni	Mali
Jigiyaso Ba	Mali
Juaben RB	Ghana
Juhudi Kilimo	Kenya
Kaaseman RB	Ghana
KADET	Kenya
Kafo Jiginew	Mali
Kakum RB	Ghana
KixiCredito	Angola

MFI	COUNTRY
Kokari	Niger
Kondo Jigima	Mali
Koshi Yomuti	Namibia
K-Rep	Kenya
KSF	Ghana
Kuyasa	South Africa
KWFT	Kenya
La Community Bank	Ghana
La FinanciÃ¨re	Cote d'Ivoire
LAPO-NGR	Nigeria
LAPO-SLE	Sierra Leone
LEAP	Liberia
Letta	Ethiopia
LSK	Burkina Faso
Luma	Sierra Leone
Maata-N-Tudu	Ghana
Madfa SACCO	Uganda
MAMIDECOT	Uganda
Marang	South Africa
Mbinga CB	Tanzania
MBT	Zambia
MCÂ²	Cameroon
MCF Zambia	Zambia
MCL	Kenya
MDB	Benin
MEC AFER	Senegal
MEC Delta	Senegal
MEC FEPRODES	Senegal
MEC PROPAS	Senegal
MECBAS	Senegal
MECREF	Niger
MED-Net	Uganda
Meklit	Ethiopia
Mepe RB	Ghana
Metemamen	Ethiopia
MGPCC DEKAWOWO	Togo
Micro Kenya	Kenya
Micro Start	Burkina Faso
MicroCred - CIV	Cote d'Ivoire
MicroCred - MDG	Madagascar
MicroCred - SEN	Senegal
Miselini	Mali
MLF MWI	Malawi
MODEC	Benin
MSFP	Benin

AP 1.3: LIST OF MFIs

MFI	COUNTRY	MFI	COUNTRY
MUCODEC	Congo, Rep	PRIDE - ZMB	Zambia
MUCREFAB	Cote d'Ivoire	Pride Finance	Guinea
MUFEDE	Burkina Faso	ProCredit - GHA	Ghana
MUL	Uganda	ProCredit Bank - SLE	Sierra Leone
MultiCredit S&L	Ghana	ProCredit Bank- DRC	Congo, DR
MUSCCO	Malawi	PTF	Tanzania
MUTAS-RCEMAF	Cote d'Ivoire	RAFODE	Kenya
Mutuelle Akwaba	Togo	RCMEC	Cote d'Ivoire
Naara RB	Ghana	RCPB	Burkina Faso
Nandom RB	Ghana	RECECA - INKINGI	Burundi
Nasarawa MFB	Nigeria	Reliance	Gambia, The
NovoBanco - ANG	Angola	RENACA	Benin
NovoBanco - MOZ	Mozambique	RENAPROV Finance SA	Cameroon
Nwabiagya RB	Ghana	RMCR	Mali
Nyesigiso	Mali	RML	Rwanda
Oasis Microfinance	Cameroon	SAILD	Cameroon
OIBM	Malawi	SEAP	Nigeria
OISL	Ghana	SEDA	Tanzania
Okigwe Industrial MFB	Nigeria	SEF-TZ	Tanzania
Ologbon MFB	Nigeria	SEF-ZAF	South Africa
OMO	Ethiopia	SELFINA	Tanzania
Onibu-Ore MFB	Nigeria	SEM Fund	Senegal
Opportunity Finance	South Africa	SEYAMFI	Ethiopia
Opportunity Kenya	Kenya	SFPI	Ethiopia
Opportunity Tanzania	Tanzania	SIAN'SON	Benin
Opportunity Uganda	Uganda	Sidama	Ethiopia
Otiv Alaotra	Madagascar	Silver Upholders	Uganda
Otiv Diana	Madagascar	Sinapi Aba Trust	Ghana
Otiv SAVA	Madagascar	SIPEM	Madagascar
Otiv Tana	Madagascar	SISDO	Kenya
Otuasekan RB	Ghana	SMEP	Kenya
PADME	Benin	SOCREMO	Mozambique
PAIDEK	Congo, DR	SOFINA	Cameroon
PAMECAS	Senegal	SOFIPE SARL	Burkina Faso
PAMF-BFA	Burkina Faso	Sonzele RB	Ghana
PAMF-MDG	Madagascar	Soro Yiriwaso	Mali
PAPME	Benin	South Akim RB	Ghana
PASECA - Kayes	Mali	Taanadi	Niger
PAWDEP	Kenya	Tchuma	Mozambique
PEACE	Ethiopia	TIAVO	Madagascar
PEBCO	Benin	TIMPAC	Togo
Piyeli	Mali	Toende RB	Ghana
PRIDE - MWI	Malawi	Turame Comm. Finance	Burundi
PRIDE - TZA	Tanzania	UBK	Kenya
PRIDE - UGA	Uganda	UCCEC GY	Mali

AP 1.4: LIST OF MFIs

MFI	COUNTRY	MFI	COUNTRY
UCEC Sahel	Burkina Faso	Upper Manya RB	Ghana
UCEC/MK	Chad	URSA	Comoros
UCECTO	Togo	Vital Finance	Benin
UCMECF-TO	Togo	WAGES	Togo
UGAFODE	Uganda	Wasasa	Ethiopia
U-IMCEC	Senegal	Wisdom	Ethiopia
UMECTO	Togo	WMCB	Ghana
UNACOOPEC-CI	Cote d'Ivoire	WODASS	Nigeria
UNION DES COOPECs	Rwanda	WWB Ghana	Ghana
Union RB	Ghana	Yehu	Kenya
UOB	Rwanda	Y-SEF	Ghana

SUMMARY: of Country and MFI Distribution (DATA from Appendix 1)

Country	Number of MFIs	Country	Number of MFIs
Angola	2	Liberia	2
Benin	16	Madagascar	10
Burkina Faso	10	Malawi	6
Burundi	4	Mali	14
Cameroon	13	Mozambique	8
Central African Republic	1	Namibia	1
Chad	1	Niger	5
Comoros	1	Nigeria	17
Congo, Democratic Republic	5	Rwanda	7
Congo, Republic of the	2	Senegal	13
Cote d'Ivoire (Ivory Coast)	13	Sierra Leone	7
Ethiopia	17	South Africa	5
Gabon	1	Swaziland	1
Gambia, The	2	Tanzania	11
Ghana	44	Togo	10
Guinea	4	Uganda	14
Kenya	18	Zambia	7

APPENDIX 2: Average Microcredit Interest Rates in SSA (2003 – 2011)

Table AP2: Average Microcredit Interest Rates (2003 - 2011)

Country	MIR$^{\Phi}$	Country	MIR$^{\Phi}$
Togo	14%	Chad	26%
Burundi	15%	Madagascar	26%
Swaziland	15%	Rwanda	27%
Comoros	16%	Ghana	29%
Central African Rep.	17%	Nigeria	36%
Burkina Faso	18%	Cote d’Ivoire	38%
Congo, Republic	18%	Tanzania	39%
Kenya	18%	Sierra Leone	40%
Mali	18%	Uganda	40%
Niger	18%	Namibia	41%
Senegal	18%	Liberia	45%
Benin	19%	Gabon	49%
Guinea	19%	Mozambique	49%
Congo, DR	20%	Angola	50%
Ethiopia	23%	Malawi	53%
Gambia, The	23%	South Africa	62%
Cameroon	25%	Zambia	66%

NOTE: $^{\Phi}$**MIR** denotes Microcredit interest rates

APPENDIX 3: Data Diagnostic Tests

Ap. 3.1. Wald test for Heteroskedasticity

In order to investigate the presence of heteroskedasticity in the sample, the Wald statistical test is used to estimate the parameters of the data examined in this study. Heteroskedasticity is said to occur when the variance of the error terms differs across observations. In the equation (A3.1), the variance of the error term (u_i) is constant.

$$y_i = \beta_0 + \beta x_i + u_i \qquad (A3.1)$$

$$i = 1 \ldots \ldots, N \quad \text{and} \quad E(Var)\langle u_i | x_i \rangle = 0$$

If heteroskedasticity occurs in the data, the variance of the error term (u_i) is no longer assumed to be constant. Hence

$$E(Var)\,\langle u_i | x_i \rangle = \sigma_i{}^2 \qquad (A3.2)$$

Therefore, the Wald statistical test takes the form

$$W = \frac{\left[\,\hat{\theta} - \theta_0\right]^2}{1/I_n\ (\hat{\theta}\,)} = 1/I_n\ \left(\hat{\theta}\,\right)\left[\,\hat{\theta} + \theta_0\right]^2 \qquad (A3.3)$$

Where: $\hat{\theta}$ is the Maximum Likelihood Estimate (MLE), of a parameter of θ compared to the proposed value of θ_0 and $I_n\left(\hat{\theta}\right)$ is the expected Fisher information evaluated at the MLE. The homoscedasticity hypotheses for the parameters can be expressed as follows:

$$Hypotheses \begin{cases} H_0 : \delta = 0 \\ H_1 : \delta \neq 0 \end{cases}$$

Where: $W \rightarrow {\chi^2}_{df=n}$ is expected when the null hypothesis is true. The Wald statistical test was performed and the critical chi-square value χ^2= 6.0e+06 (N=293, $p < 0.01$). Since the *p*-value is significant, the null hypothesis of homoscedasticity is rejected and conclude that there is the presence of heteroskedasticity in the data (Baltagi, 2008).

Ap. 3.2. Durbin–Wu–Hausman test

The Durbin–Wu–Hausman test[79] is the standard procedure used in panel data analysis in order to discriminate between fixed effects and random effects models. Thus, the test was run to assistance in making a statistical decision between using either fixed effects or random effects model. The Hausman test basically estimates whether the unique errors (u_i) are correlated with the regressors, and the null hypothesis is that the error terms are not (Hausman, 1978). In order to derive the Durbin–Wu–Hausman model let us first consider the following simple linear model:

$$y_i = \beta x_i + u_i, \qquad i = 1 \ldots \ldots, N \qquad (A3.4)$$

$$E(u_i) = 0 \quad and \quad cov(x_i, u_i) = 0$$

[79] Also termed the 'Hausman specification test'

Where: y_i is the dependent variable, x_i is the regressor and u_i is the error term. Therefore, we have two estimators for β, which are $\beta_{0(FE)}$ and $\beta_{1(RE)}$. $\beta_{0(FE)}$ represents the estimation under fixed effects and $\beta_{1(RE)}$ is estimation under the random effects. The Hausman test states that "Random effects (RE) is the preferred [approach] under the null hypothesis due to higher efficiency, while the alternative, the fixed effects, is at least consistent and thus preferred" (Greene, 2008 chapter 9). Therefore, the Hausman test statistic is:

$$H = (\beta_{1RE} - \beta_{0FE})' \, [\boldsymbol{var}(\beta_{0FE}) - var\,(\beta_{1RE})]^{\dagger} \, \left(\beta_{1(RE)} - \beta_{0(FE)}\right) \overset{a}{\sim} {\chi_K}^2 \qquad (A3.5)$$

Where: † represents the Moore-Penrose pseudo inverse and K is the dimension of the estimated parameters β_0 and β_1 . According to Hausman (1978),under the null hypothesis the statistics in equation (10) above has asymptotically the chi-squared distribution with the number of degrees of freedom equal to the rank of matrix

$$[\boldsymbol{var}(\beta_{0FE}) - var\,(\beta_{1RE})] \qquad (A3.6)$$

Thus, after estimating equation (A3.4) above, the Hausman test results reveal a *p*-value, which is statistically significant at the 99 percent confidence level. Therefore, one must reject the null hypothesis that random effects is the preferred model and must conclude that fixed effect is the suitable model of estimation for this data.

Ap. 3.3. Time fixed effect test

The Wald statistical test is used to evaluate whether time fixed effects are needed when running the fixed effect model. It is a joint significance test to determine whether if the dummies for all the years are equal to zero (0): if they are, then no time effects are needed. The Wald test statistic for time fixed effects carries the form:

$$W = (Rb - r)' \, (RVR')^{-1} \, (Rb - r) \; \sim \chi^2{}_k \qquad (A3.7)$$

Where: the estimated coefficient vector is $\boldsymbol{b}$ and the estimated variance-covariance matrix is $\boldsymbol{V}$. $Rb = r$ and represents the set of $\boldsymbol{q}$ linear hypotheses to be tested jointly and $\boldsymbol{k}$ represents the degrees of freedom. If the output estimation reports significant results using the ***t*** statistics with ***k*** degrees of freedom, an ***F*** statistics is computed and carries the form

$$F = {}^{1}/_{q} \, W \qquad (A3.8)$$

The time fixed effects test, which is estimated using the Wald statistical methodology reveals an F (7,650) = 2.15 and *p*-value of 0.037, which is significant. As a result, we must reject the null hypothesis that all years' coefficients are jointly equal to zero and instead conclude that time fixed effects are needed when running our estimation models (Allison, 2009).

Ap. 3.4. Wald Test for Heteroskedasticity

In order to investigate the presence of heteroskedasticity in the sample, the Wald statistical test is used to estimate the parameters of the data examined in this study. Heteroskedasticity is said to occur when the variance of the error terms differs across observations. In the equation (5.1), the variance of the error term (u_i) is constant.

$$y_i = \beta_0 + \beta x_i + u_i \qquad (A3.9)$$

With the assumption that

$$E(Var)\langle u_i|x_i\rangle = 0 \qquad i = 1 \ldots \ldots ., N$$

If heteroskedasticity occurs in the data, then the variance of the error term (u_i) is assumed to be constant. Hence

$$E(Var)\ \langle u_i|x_i\rangle = \ {\sigma_i}^2 \qquad (A3.10)$$

Therefore, the Wald statistic test takes the form

$$W = \frac{\left[\,\hat{\theta} - \theta_0\right]^2}{1/I_n\ (\hat{\theta}\ )} = \ 1/I_n\ \left(\hat{\theta}\ \right)\left[\,\hat{\theta} + \ \theta_0\right]^2 \qquad (A3.11)$$

Where: $\hat{\theta}$ is the Maximum Likelihood Estimate (MLE) of a parameter of θ compared against the proposed value of θ_0 while $I_n\left(\hat{\theta}\right)$ is the expected Fisher information evaluated at the MLE (Hsiao, 2014). The homoscedasticity hypotheses for the parameters can be expressed:

$$\text{Hypotheses}\begin{cases} H_0 : \delta = 0 \\ H_1 : \delta \neq 0 \end{cases} \qquad (A3.12)$$

Where: $W \rightarrow {\chi^2}_{df=n}$ is expected when the null hypothesis is true. If the Wald test reveals statistical significant *p*-value, then the null hypothesis of homoscedasticity would be rejected and it may be concluded that heteroskedasticity is present in the data (Baltagi, 2008).

Ap. 3.5. Durbin–Wu–Hausman Test

The Durbin–Wu–Hausman test[80] is the standard technique applied during the panel data analysis in order to discriminate between fixed effects and random effects models (Wooldridge, 2010). This test was not run to assist in making a statistical decision between using either the fixed effects or random effects estimation methods; instead the aim was to check the consistency of the model selection. The Hausman test basically estimates whether the unique errors (u_i) are correlated with the regressors: the null hypothesis is that the error terms are not (Hausman, 1978).

In order to derive the Durbin–Wu–Hausman model, first consider the following simple linear model:

[80] Also sometimes termed 'Hausman specification test'

$$y_i = \beta x_i + u_i \qquad (A3.13)$$

With the assumption that:

$$i = 1 \dots \dots ., N$$
$$E(u_i) = 0$$
$$cov(x_i, u_i) = 0$$

Where: y_i is dependent variable, x_i is the regressor and u_i is the error term. Therefore, we have two estimators for β, which are $\beta_{0(FE)}$ and $\beta_{1(RE)}$. Where: $\beta_{0(FE)}$ represents the estimation under fixed effects and $\beta_{1(RE)}$ represents estimation under the random effects. The Hausman test states that Random effects (RE) is the preferred under the null hypothesis due to higher efficiency, while the alternative the fixed effects is at least consistent and thus preferred (Greene, 2008 chapter 9). Therefore, the Hausman test statistic is:

$$H = (\beta_{1RE} - \beta_{0FE})' \, [\boldsymbol{v}ar(\beta_{0FE}) - var\,(\beta_{1RE})]^{\dagger} \left(\beta_{1(RE)} - \beta_{0(FE)}\right) \overset{a}{\sim} {\chi_K}^2 \qquad (A3.14)$$

Where: † represents the Moore-Penrose pseudo inverse and K is the dimension of the estimated parameters β_0 and β_1 . According to Hausman (1978), under the null hypothesis the statistics in equation (A3.14) above have, asymptotically, a chi-squared distribution with the number of degrees of freedom equal to the rank of matrix

$$[\boldsymbol{v}ar(\beta_{0FE}) - var(\beta_{1RE})] \qquad (A3.15)$$

Thus, after estimating equation (*A*3.14) above, if the Hausman test results reveal a *p*-value which is statistically significant, then the null hypothesis can be rejected.

It is worth noting, however, that the results of the Hausman test are not the basis for nominating the fixed effect model for the final data analysis. On the contrary, the fixed effect estimation method is preferred because of other diagnostic tests, such as the presence of heteroskedasticity, and also taking into consideration the fundamental properties of our sample.

Ap. 3.6. Test for Linear Correlation Between Variables

In order to examine the degree of any linear relationship between explanatory variables, the correlation matrix test is normally performed. The equation form of the Pearson Correlation Coefficient (PCC) is as follows:

$$r_{(x,y)} = \frac{n[\sum xy] - [\sum x]\,[\sum y]}{\sqrt{[n\sum x^2]\,[n\sum y^2 - (\sum y)^2]}} \qquad (A3.16)$$

Equation (*A*3.16) can be re-written in short form as

$$r_{(x,y)} = \frac{COV[x,y]}{s_x\, s_y} \qquad (A3.17)$$

Where, $r_{(x,y)}$ is the correlation value of variables y and x, n denotes the number of pairs of scores, $COV[x, y]$ is the covariance of the variables y and x, s_x is the sample standard deviation of the random variable x and s_y is the sample standard deviation of the random variable y. The coefficient value $r_{(x,y)}$ can range from negative one (-1) to positive one (1). The two variables are negatively correlated if the coefficient value is in the negative range. On the other hand, a positive coefficient value means that the two variables are positively correlated (Pearson, 1931).

If there is a strong linear correlation between variables, then the statistical implication is that the *p*-values of the independent variables might be imprecise. Theoretically, the linear correlation between explanatory variables is viewed as problematic if the correlation coefficient is greater than 0.70 (Baltagi, 2008; Hsiao, 2014). Since panel data estimation techniques such as GMM and Fixed Effects account for multicollinearity, the problem could be reduced further (Greene, 2008; Hsiao, 2014).

APPENDIX 4: Test for Country-Specific Effects

It was found that time dummies are needed when running the estimation equations specified in equations (6.3) and (6.4) of chapter 6; for the results, see section AP 3.3 in Appendix 3. In view of this, there is a need to investigate whether country-specific dummies are needed when running the estimation frameworks described in chapter 6. To do this, we included country-specific dummies in the equation below:

$$IR_{i,j,t} = \beta' X_{i,j,t} + \gamma' IV_{j,t} + \lambda' MV_{j,t} + \delta_{i,j,t} + C_d + \varepsilon_{i,j,t} \qquad (A4.1)$$

Where: i indexes MFIs, j indexes country, and t indexes year and $IR_{i,j,t}$ is the interest rate of MFI i in year t. Moreover, $X_{i,j,t}$ represents a vector of MFI-specific (firm level) independent variables in year t of an active MFI i; $IV_{j,t}$ is the vector of institutional explanatory variables of a country j in year t. Also, $MV_{j,t}$ represents a vector of independent macroeconomic variables of country j in year t; $\delta_{i,j,t}$ controls for unobserved MFIs, country, and time fixed effects. Finally, $\varepsilon_{i,j,t}$ is the idiosyncratic error and C_d signifies country-specific dummies.

The results of the Lagrange Multiplier test shows χ^2 (22) = 124.83 and a *p*-value of 0.282, implying that the country-specific dummies are insignificant. This could suggest that there are no more country level effects that influence the microcredit interest rates in SSA, apart from those that have been captured in the estimation framework.

APPENDIX 5: The Cook's Distance Method

The Cook's distance estimation technique is also known as Cook's D and was founded by Cook (1977). The method is commonly performed after running an ordinary least squares (OLS) regression analysis. The equation form of Cook's distance is expressed as:

$$D_i = \frac{\sum_{j=1}^{n} (\hat{Y}_i - \hat{Y}_j(i))^2}{pMSE} \qquad (A5.1)$$

The subsequent equation is expressed as:

$$D_i \quad = \frac{e_i^2}{pMSE} \left[\frac{h_{ii}}{(1 - h_{ii})^2} \right] \qquad (A5.2)$$

$$D_i = \frac{\left(\hat{\beta} - \hat{\beta}^{-i}\right)^T (X^T X) \left(\hat{\beta} - \hat{\beta}^{-i}\right)}{(1 + p)s^2} \qquad (A5.3)$$

Where: $\hat{\beta}$ is the least squares (LS) estimate of β, while $\hat{\beta}^{-i}$ is the LS estimate of β on the dataset without case i. Moreover, $\hat{Y}_j$ is the prediction from the full regression model for observation j; $\hat{Y}_{j\,(i)}$ is the prediction for observation j from a refitted regression model in which observation i has been omitted. Then h_{ii} is the i^{th} diagonal element of the "hat" matrix $X\,(X^2\,X)^{-1}\,X^T$. The letters MSE represents the Mean Square Errors and p is the number of fitted variables.

APPENDIX 6: The Bayesian Model Averaging (BMA)[81]

The derivation of the posterior model probability in Bayesian Model Averaging (Raftery, Madigan, & Hoeting, 1997) is given below. It may be assumed that there are many models, $\{M_1, \ldots M_K\}$ applicable to the data D. Every model is specified by a vector of d while unknown parameters are given by $\theta_i = (\theta_{i1}, \theta_{i2} \ldots \theta_{id}), i = 1, 2 \ldots K$. These models might be nested or not. Specifically, Bayesians treat the unknown parameters as random variables (Huang, 2011; Moral-Benito, 2015).

Therefore, assume that Δ represent a quantity of interest such as a parameter. The posterior distribution of Δ given data D is derived according to:

$$P(\Delta \backslash D) = \sum_{i=1}^{K} P\,(\Delta \backslash D, M_K)\; P(M_K \backslash D) \qquad (A6.1)$$

Where $\mathrm{P}(\mathrm{M_K}/\mathrm{D})$ represents the posterior model probabilities, and $\mathrm{P}(\Delta \backslash \mathrm{D}, \mathrm{M_K})$ is the posterior distribution of Δ given data D and model M_K.

The equation incorporates all the information needed to reach a conclusion about Δ, signifying that the posterior distribution of Δ, given data D, is a weighted average of its posterior distributions given data D and specific model(Huang, 2011). The weights are the posterior model probabilities, $P(M_K \backslash D)$, which can be acquired by Bayes' theorem as follows:

[81] The outline in this section relies on Huang (2011), Moral- Benito (2015) and Raftery et al., (1997).

$$P\ (M_K \backslash D) = \frac{P(D \backslash M_K)\ P(M_K)}{\sum_{i=1}^{K} P(D \backslash M_i)\ P(M_i)} \qquad (A6.2)$$

Where $P(M_K)$ is the prior probability of model $i\ (i = 1, 2 \ldots K)$, and $P(D \backslash M_i)$ is the probability of the data given M_i, also termed the integrated (marginal) likelihood for model M_i or marginal (predictive) probability of the data given M_i.

In order to denote no prior preference for any model, each will start on an equal footing: that is, $P(M_1) = P(M_2) = \ldots\ P(M_K) = \frac{1}{K}$. Thus, the posterior model probabilities $\mathrm{P(M_K/D)}$ can be modified as:

$$P(M_K \backslash D) = \frac{P(D \backslash M_K)}{\sum_{i=1}^{K} P(D \backslash M_i)} \qquad (A6.3)$$

To detect the value of $P(D \backslash M_K)$, it is advantageous to compare model M_K with a baseline model. A null model (M_0) in which no explanatory variables are included is typically used as a baseline model (Huang, 2011).

If B_{K0} is the Bayes factor for M_K against model M_0, that is

$$B_{K0} = \frac{P(D \backslash M_K)}{P(D \backslash M_0)} \qquad (A6.4)$$

From equation (A4.4) then

$$2 \log B_{K0} = 2 \log P(D \backslash M_K) - 2 \log P(D \backslash M_0) \qquad (A6.5)$$

Exploiting an econometric approach developed by Raftery (1995), twice the log of the Bayesian factor, the "$2 \log B_{K0}$", can be regarded as the approximation of the difference between BIC_0 and BIC_K, the value of BIC for the null model, M_0, and model, M_K, respectively.

$$2 \log B_{K0} \approx BIC_0 - BIC_K \qquad (A6.6)$$

$BIC_0 = 0$ yields the approximation for the posterior probability $P\ (D \backslash M_K)$, which is

$$P(D \backslash M_K) \propto \exp\left(-\frac{1}{2}\ BIC_K\right) \qquad (A6.7)$$

The posterior model probabilities $P(M_K \backslash D)$ can be precisely expressed as

$$P(M_K \backslash D) \approx \frac{\exp\left(-\frac{1}{1} BIC_K\right)}{\sum_{i=1}^{K} \exp\left(-\frac{1}{2}\ BIC_i\right)} \qquad (A6.8)$$

APPENDIX 7: List of All MFIs in the Dataset for Chapter 7

AP 7.1: LIST OF MFIs

MFI	COUNTRY	MFI	COUNTRY
ACEP Cameroon	Cameroon	Equity Uganda	Uganda
ACEP Senegal	Senegal	Eshet	Ethiopia
ACSI	Ethiopia	Faulu - KEN	Kenya
ADEFI	Madagascar	FCC	Mozambique
Akiba	Tanzania	FDM	Mozambique
ALIDÃ©	Benin	FECECAM	Benin
APED	Ghana	Finance Trust	Uganda
ASUSU CIIGABA	Niger	FINCA - DRC	Congo, DR
AVFS	Ethiopia	FINCA - MWI	Malawi
BIMAS	Kenya	FINCA - TZA	Tanzania
BOM	Mozambique	FINCA - UGA	Uganda
BRAC - TZA	Tanzania	FINCA - ZMB	Zambia
BRAC - UGA	Uganda	First Allied	Ghana
Buusaa Gonofaa	Ethiopia	FUCEC Togo	Togo
CAURIE Micro Finance	Senegal	Gasha	Ethiopia
CCA	Cameroon	GRAINE sarl	Burkina Faso
CDS	Cameroon	Hekima	Congo, DR
CECAM	Madagascar	Hluvuku	Mozambique
Centenary Bank	Uganda	ID Ghana	Ghana
CETZAM	Zambia	KADET	Kenya
CFF	Ghana	Kafo Jiginew	Mali
CMS	Senegal	Kondo Jigima	Mali
COOPEC CAMEC MN	Congo, DR	K-Rep	Kenya
CRAN	Ghana	KSF	Ghana
CUMO	Malawi	KWFT	Kenya
CVECA Kita/BafoulabÃ©	Mali	LAPO-NGR	Nigeria
DEC	Nigeria	Maata-N-Tudu	Ghana
DECSI	Ethiopia	MBT	Zambia
Duterimbere	Rwanda	MEC FEPRODES	Senegal
Equity Bank	Kenya	MECBAS	Senegal

AP 7.2: LIST OF MFIs

MFI	COUNTRY	MFI	COUNTRY
MECREF	Niger	RCPB	Burkina Faso
MED-Net	Uganda	RENACA	Benin
MGPCC DEKAWOWO	Togo	RML	Rwanda
MicroCred - MDG	Madagascar	SEAP	Nigeria
MICROFUND	Togo	SEDA	Tanzania
Miselini	Mali	SEF-TZ	Tanzania
MLF MWI	Malawi	SEF-ZAF	South Africa
NovoBanco - MOZ	Mozambique	SFPI	Ethiopia
Nyesigiso	Mali	Sinapi Aba Trust	Ghana
OIBM	Malawi	SIPEM	Madagascar
OISL	Ghana	SMEP	Kenya
Opportunity Kenya	Kenya	SOCREMO	Mozambique
Opportunity Tanzania	Tanzania	Soro Yiriwaso	Mali
Opportunity Uganda	Uganda	Tchuma	Mozambique
Otiv Diana	Madagascar	TIAVO	Madagascar
Otiv SAVA	Madagascar	TIMPAC	Togo
Otiv Tana	Madagascar	U-IMCEC	Senegal
PADME	Benin	UNION DES CU	Rwanda
PAIDEK	Congo, DR	UOB	Rwanda
PAMECAS	Senegal	Vital Finance	Benin
PAPME	Benin	WAGES	Togo
PEACE	Ethiopia	Wasasa	Ethiopia
PRIDE - TZA	Tanzania	Wisdom	Ethiopia
ProCredit - GHA	Ghana		