MICROFINANCE PROFITABILITY

By

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DEDICATION

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ABSTRACT

The main objective of microfinance institutions (MFIs) is to provide financial services to the poor and non-bankable population. Microbanking in Africa however remains a difficult business. Although MFIs may be flourishing in commercial terms, few are profitable. Many MFIs in Africa face major constraints in their pursuit of effectively delivering microfinance services profitably. While MFIs in other regions have consistently reported positive profits, those operating in Africa continue to post negative profits. What explains this disparity?

This thesis seeks to contribute to the current state of knowledge and research on microfinance profitability by investigating the potential determinants of MFIs profitability with a focus on Africa. Further empirical work is carried out to examine: (i) profit persistence and the speed of convergence; (ii) impact of financing choice on microfinance profitability; and (iii) the impact of institutional environment of the host economy where MFI is located on profitability. This thesis is pioneering in using two-step System-Generalized Method of Moments (GMM) estimators in studies of determinants of microfinance profitability which enables us to control for possible endogeneity. The analytical framework uses an unbalanced panel dataset comprising of 210 MFIs across 32 countries operating from 1997 to 2008. We tested the robustness of our models with different specifications which confirmed the general result.

Our main estimations show that MFI profitability is non-negligibly driven by MFI specific factors and the institutional environment of the host country. Specifically, average profitability is higher in MFIs that are efficient, well-capitalized and with scale advantages. A key result is that macroeconomic environment is not significant in explaining microfinance profitability.

We find that a proportionally higher deposit as a percentage of total assets is associated with improved profitability. However, the magnitude of this effect is very sensitive to MFI age. Voluntary deposit mobilization may therefore help MFIs achieve independence from donors and investors, since it provides MFIs with inexpensive and sustainable source of funds for making loans. Consistent with the agency costs hypothesis, our results show that highly leveraged MFIs are more profitable. This may benefit MFIs if higher debt to equity ratio were to increase profitability by a greater margin than the cost of the debt. This calls for the development of

appropriate regulatory policies that enable MFIs to have access to long-term debt to improve their profitability.

Institutional environment of the host economy also plays a major role in MFIs profitability. The study reveals that young MFIs suffer more from political instability and weak enhancement of the rule of law, which is consistent with accumulation of information capital and relationship lending. The quality of contract enforcement and overall political stability in the country could therefore affect the extent of moral hazard that MFIs face when making loans. Results also indicate that corruption makes it harder for MFIs to realize profits, irrespective of MFI age. Corruption may therefore reduce the probability that MFI will invest in a country. This evidence may help guide the sequencing of institutional reforms to promote microfinance development.

Finally, we find evidence of a moderate persistence in profitability. Microfinance industry in Africa is therefore not competitive. This finding is consistent with literature that considers persistence of profitability as a signal of barriers to competition reflecting either impediments to market competition or informational asymmetry.

The evidence gathered in this thesis is important for forming credit market policy that may help deepen the quality and quantity of access to finance particularly by the poor. This research work therefore bridges some knowledge gaps in microfinance profitability by presenting important findings that confirm some theoretical postulations. Questions for further research are discussed in the conclusion.

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CHAPTER ONE

1. INTRODUCTION

1.1 Background

Lack of access to credit is a major obstacle to growth in Africa, where a large majority of households do not have adequate collateral to secure a loan[1]. These households rely on both informal-sector and moneylenders where they borrow at usurious interest rates, or are simply denied access to credit and therefore investment. Microfinance institutions (henceforth MFIs) expand the frontier of financial intermediation by providing credit to those who are excluded from formal financial markets.

Microfinance is high on the public policy agenda. It has achieved tremendous success in improving the livelihoods of the poor[2], through the provision of financial services. Such initiatives are widely sponsored by a variety of organizations including; the World Bank, United Nations, national governments and many charitable non-governmental organizations (NGOs). Their aim is to help the poor cope with risk and take advantage of small income generating opportunities, by employing profit-making banking practices amongst low income communities (Banerjee and Duflo, 2009; Ahlin and Jiang, 2008; Arun and Hulme, 2008; Swain and Varghese 2009; Imai et al. 2010). By alleviating financing constraints, microfinance is able to promote small scale investments from otherwise unrealized market activities while yielding a return on their investment (Hartarska and Nadolnyak 2008b; Hilson and Ackah-Baidoo 2010). Levels of success however vary across MFIs and depending on some factors, some fail and cease to exist while others grow to reach millions of borrowers.

1 Illustrations on this point abound (see, e.g., Demirgüc-Kunt, et al 2007; Beck, et al 2007).

2 According to the Micro credit Summit Campaign, the world's core poor are those who live in the bottom half or those living below their nation's poverty line or any of the 1 billion people living on less than US$ 1 a day.

Spurred by an accord reached at the Microcredit Summit in February 1997, to reach 100 million of the world's poorest households with credit by the end of 2005; there is arguably more widespread support for microfinance today than any other single tool for fighting global poverty (Daley-Harris, 2009; Armendáriz and Morduch, 2010). This heralded and much celebrated success has been reflected in outreach. For example, between December 1997 and December 2010 the number of MFIs reporting to the microcredit summit campaign rose from 618 to 3,652. The number of persons who received credit from these institutions rose from 13.5 million to 205 million during the same period (see Table 1.1). Assuming a family of five persons per household, the 137.5 million poorest clients reached by the end of 2010 affected some 687.7 million family members (Maes and Reed, 2012).

Table 1.1: Outreach figures as of December 31, 2010

Number of MFIs reporting (1997–2010)	3,652
Number of MFIs reporting in 2011 only (data from 12/31/10)	609
Percent poorest clients represented by MFIs reporting in 2011	56.5%
Total number of clients (as of 12/31/10)	205,314,502
Total number of women (as of 12/31/10)	153,306,542
Total number of poorest clients (as of 12/31/10)	137,547,441
Total number of poorest women (as of 12/31/10)	113,138,652

Source: (Maes and Reed, 2012).

Through innovative lending technology, MFIs are generating high loan repayment rates on non-collateralized loans in diverse environments that often exceed 95 percent (Cull, Demirgüc-Kunt and Morduch 2007). Translating high repayment rates into profits remains a challenge to most MFIs. Although micro-banking is dominated by NGOs and socially-oriented investors, experts believe only one percent of all NGO-sponsored MFIs are profitable and predict that no more than five percent would ever be (Armendáriz and Morduch, 2010). This argument is however anecdotal and largely based on general consensus than on supporting data and research.

In 1995, the donor community arrived at a consensus that all MFIs should in principle become profitable after seven to ten years of start-up support (Balkenhol, 2007). But given the

diversity of their objectives, ranging from very pronounced poverty focus to commercialization[3], the question is whether this is being realized. At the heart of the debate are important disagreements over the nature and scope of potential trade-offs between pursuits of profitability and outreach (Armendáriz and Morduch, 2010). This conflict cannot be resolved by lending technology as two pioneers of joint liability contract namely Grameen Bank and BancoSol have now switched to individual-based models (Cull, Demirgüc-Kunt and Morduch 2007).

Profitability of MFIs particularly across African economies is less understood partly due to inadequate data (Honohan 2004b). But why is it important for MFIs to be profitable? Profitability is an appropriate mechanism for achieving long term viability and sustainability of the microfinance industry. At the micro level, profitability is a prerequisite to a competitive microfinance industry and the cheapest source of capital, without which no firm would attract external capital (Gitman, 2007:65). MFIs profits are also an important source of equity, if profits are reinvested and this may promote financial stability. Moreover, market sources of funding are accessible only to MFIs that have demonstrated that they can turn a profit. By minimizing the probability of financial crisis, impressive profits are vital in reassuring MFI's stakeholders, including investors, borrowers, suppliers and regulators. At the macrolevel, a profitable microfinance industry is better placed to overcome negative shocks and contribute meaningfully to the stability of the overall financial system.

Our motivation for this piece of research emanates from the negative average profit levels amongst Africa[4] MFIs which are in sharp contrast with other regions (see Table 1.2). What explains this disparity? Are there constraints unique to Africa that hinders MFIs profitability?

3 Commercialization explicitly strives to provide the services intended by charging the real costs of providing microfinance services including margin to cover loan losses with a focus of narrowing the persistent demand-supply gap for sustainable microfinance products and services. Impliedly, MFIs will earn ample profits, and expand as rapidly as profits allow and therefore attract private investors. This is anchored on the premise that commercial businesses can be part of the solution to eliminating poverty.

4 Globally MFIs are classified into five main geographic regions: Africa, Asia, Eastern Europe and Central Asia (ECA), Latin America and the Caribbean (LAC) and Middle East and North Africa (MENA) http://www.themix.org/

Despite strong theoretical underpinnings, these questions highlight an important research gap, which deserves an empirical scrutiny. They therefore provide the intellectual framework for the empirical analysis reported in this thesis. This enables us to infer the extent to which both internal and external factors explain MFI profitability. Although Galema, Lensink and Spierdijk (2011), finds that investing in microfinance may be attractive to investors seeking a better risk–return profile, their analysis suggests that investing in MFIs from Africa to a portfolio of international assets is not beneficial for a mean-variance investor. It might also be the case that firms located in economies with less developed financial markets will not only take different quantities of investment, but will also take different kinds of investment that are perhaps safer, short-term and potentially less profitable (Almeida, et al. 2011)

Table 1.2: Overall financial performance (Real values percentage)

Region	**Return on Assets**				**Return on Equity**				**Profit Margin**			
	2005	2006	2007	2008	2005	2006	2007	2008	2005	2006	2007	2008
Africa	-1.2	-0.8	-0.6	-0.7	-4.9	-1.5	0.5	-2.3	-3.9	-2.0	-0.7	-3.7
Asia	0.9	1.2	0.6	1.3	4.4	6.8	5.0	9.6	5.2	7.4	7.1	8.0
ECA	1.4	1.7	1.1	0.3	4.4	6.3	6.2	2.8	8.9	11.7	10.0	4.0
LAC	1.5	2.3	2.1	1.8	5.9	8.9	9.3	7.3	7.8	10.3	10.8	6.9
MENA	2.6	2.4	2.0	2.4	5.8	4.9	7.9	3.5	8.9	9.6	8.1	6.8

Source: The Micro banking Bulletin http://www.themix.org/publications/microbanking-bulletin (various issues)
Africa=Sub-Saharan Africa; Asia=South and East Asia; ECA=Eastern Europe and Central Asia; LAC=Latin America and the Caribbean; MENA=Middle East and North Africa

We are also motivated by the increased investments from commercial players[5]. An important factor attributed to the rapid growth of MFIs in recent years has been the large investment flows. Historically, MFIs were largely funded through donations/grants and government subsidies. In recent years, new sources of funds have emerged that are often described as having a focus on profitability (Ghosh and Tassel, 2011). Between 2004 and 2006, foreign capital investment in both debt and equity tripled to $4 billion and by 2007, investment had reached $5.4 billion (Reillie and Forster 2008). Foreign capital investments in microfinance

5 A number of conventional banks have begun providing microfinance, since MFIs have demonstrated that it can be a successful and profitable venture. Comportamos in Mexico, Equity and KREP banks in Kenya are three examples of commercial banks that are involved in advancing loans to the poor.

passed the $10 billion mark in December 2008. At the end of 2009, total assets of the top 10 microfinance investment vehicles (MIVs) reached $3.6 billion (CGAP 2009a). Could this rapid growth in these investments be driving microfinance profitability?

While a large body of research on financial institutions profitability has been undertaken in the conventional banking industry (see for example Flamini, et al 2009; García-Herrero, et al 2009; Marcucci and Quagliariello 2008; Athanasoglou et al 2008), rigorous empirical evidence on microfinance remains limited, largely due to lack of reliable data. This has led to diverging opinions among scholars and microfinance practitioners. Well-known MFIs are therefore emulated, replicated and funded, even though rigorous evaluation on potential determinants of MFI profitability is rare. Recent developments in theoretical literature on transaction costs, asymmetric information, contracts and banking illustrate the challenges that MFIs must overcome to improve on performance (Becchetti and Conzo 2011; Behr et al 2011; Berger, et al 2011; Garmaise and Natividad, 2010; Gangopadhyay and Lensink 2009). We build on these insightful contributions to uncover factors that explain MFIs profitability across Africa.

1.2 Aims and objectives

Broadly, this thesis seeks to uncover the determinants of microfinance profitability. To achieve this objective, we used an unbalanced panel dataset of MFIs whose time dimension covered twelve years of operation across 32 African countries. We aim at disseminating the findings in order to enhance our understanding of the determinants of MFIs profitability, by contributing towards the existing literature and drawing policy prescriptions. Consistent with this goal, we specifically;

- Undertake and present a comprehensive theoretical and empirical literature survey that explores the current state of knowledge and research in the microfinance industry, with the aim of identifying emerging gaps and formulating questions that need further research.
- Conduct an empirical investigation to discern the potential determinants of microfinance profitability with a focus on Africa economies.
- Carry out an empirical scrutiny to uncover persistence of microfinance profits and the speed of convergence.
- Draw some policy implications and prescriptions on the basis of evidence adduced from both the survey of the literature and the subsequent four empirical chapters.
- Identify promising research ideas which ought to be addressed by future research

1.3 Contribution of the thesis

This thesis is the first study of its kind in the microfinance industry that has used comprehensive estimation techniques based on traditional and new performance indicators in uncovering determinants of microfinance profitability. Specifically;

- Any MFI evaluation that does not take into account factors beyond MFI management (firm specific), if found to robustly and non-negligibly predict MFI profitability is incomplete. Taking into account the context can make the evaluation of MFI profitability more accurate.
- At the policy level, examining factors that influence MFI profitability is important for forming credit market policy that may help deepen the quality and quantity of access to finance particularly by the poor.
- The existence of profit persistence if confirmed may imply that shocks to profitability persist indefinitely and that competitive pressures never erode differences in profitability. If this is

confirmed, it would imply some serious reconsideration of microfinance development policy in Africa.

- This thesis is pioneering in using dynamic system GMM two-step estimation techniques, in studies of determinants of microfinance profitability. This enables us to tackle endogeneity problem that has largely been ignored by the existing literature. It is an unexplored dimension in microfinance literature.
- We draw policy conclusions in every empirical chapter while paying close attention to identified contradictions or inconsistencies, as a result of making comparisons with previous empirical studies. The identified policy implications and prescriptions are further synthesized and summarized in the last chapter of this thesis.

1.4 Data and methodology

This thesis used a dataset that was assembled from four different sources the principal being the MIX Market database[6]. The rest of the data sources are World Development Indicators (WDI), World Governance Indicators, (WDI) and the Heritage Foundation. Detailed description and measurement of variables of interest are discussed in the relevant empirical chapters.

The MIX Market and Micro Banking Bulletin databases are produced by the Microfinance Information Exchange (MIX) covering approximately 2,000 MFIs around the world. This dataset which includes a number of standard financial performance indicators, alongside simplified financial statements is publicly available online at www.mixmarket.org. These data are provided by the MFIs themselves and is supported by audited financial statements or rating reports, which are established by a third party before publication. This is the source of our MFI-

6 The Mix Market is a global microfinance platform which provides information about microfinance in diverse ways to various stakeholders. Its aim is to promote investment and information flows within the world of microfinance and donors, as well as to improve reporting standards in the microfinance industry.

specific/institutional level data. Previous studies that have used Mix Market dataset include; Cull, Demirgüc-Kunt and Morduch (2011), Ahlin et al (2011), Arun and Annim (2010), Ayayi and Sene (2010) and Cull, Demirgüc-Kunt and Morduch (2007).

World Development Indicators consists of the primary World Bank collection of development indicators that includes data from 209 countries spanning from 1960 to 2010. WDI is the most accurate development data, with national, regional and global coverage. It is the source of our country level macroeconomic indicators and is publicly available at http://data.worldbank.org/data-catalog/world-development-indicators. Previous studies that have used this dataset include Ahlin et al (2011), Cull, Demirgüc-Kunt and Morduch (2011) and Cull, Demirgüc-Kunt and Morduch (2009b)

The World Bank Worldwide Governance Indicators (WGI) reports aggregate and individual governance indicators for 213 economies over the period 1996–2010 for six dimensions of governance that include; voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. The indicators are a combination of the views of a large number of expert surveys, enterprises, citizens in both industrial and developing countries. The underlying data sources for the aggregate indicators are drawn from a variety of think tanks, international organizations, non-governmental organizations and survey institutes. This is the source of our country level institutional environment proxies that is publicly available at;
http://info.worldbank.org/governance/wgi/index.asp. Previous studies that have used this data include Demetriades and Fielding (2011), Ahlin et al (2011), Cull et al (2011), Arun and Annim (2010), Lensink et al (2008).

Our complementary business environment measures are from Heritage Foundation which is publicly available at http://www.heritage.org/index/. The core component of Heritage Foundation

data is the Economic Freedom Index which covers 10 freedoms. This ranges from property rights to entrepreneurship and evaluate the economic success of 183 countries. From this index we draw three measures of business environment. Business Freedom (BF) measures the ability to start, operate and close a business and represents the overall burden of regulation as well as the efficiency of government in the regulatory process. Property rights (PR) is a composite Index ranging from 10 (Private property is rarely protected) to 100 (Private property is guaranteed by the government). Freedom from Corruption is a quantitative measure that is derived from Transparency International's Corruption Perceptions Index (CPI). It is the focal measure of corruption levels across 179 countries. Previous studies that have used this dataset include Mersland and Strøm (2009), Hartarska and Nadolnyak (2007).

Although participation to Mix Market is open to all MFIs and aim to boost the number of reporting MFIs, it is incumbent upon each MFI to decide whether to participate. MFIs may choose to report some indicators and conceal others and some years discretionary. Specific or individual MFIs data are confidential and can only be used with the permission of the respective MFIs.

Analyses based on MIX Market data are therefore vulnerable to self-selection bias. MFIs reporting to this source are likely to be different from those not reporting at all. This bias is likely to be large in magnitude, though it is difficult to measure and overcome. Take for instance, Microbanking Bulletin (2010) which shows that 57% percent of the MFIs surveyed by the bulletin were financially sustainable though with a financial revenue/assets ratio of 27% and 10.8 % return on equity. The sample surveyed is however not statistically meaningful since thousands of MFIs were not surveyed (Bauchet and Morduch 2010). To illustrate further on self-selection bias, Cull et al. (2009a) investigate the trade-offs between commercialization of microfinance and social outreach. They utilize MIX Market dataset comprising of 346 institutions. While the data

are of high quality and adjusted to comply with international accounting standards, they concede that the data are skewed towards MFIs that stress more on profitability.

Comparable MFI level data includes that used by for example Mersland, Randøy and Øystein (2011), Mersland and Strøm (2009; 2008). This dataset contains information from risk assessment reports constructed using rating reports made public at the www.ratingfund.org. The data also suffers from sample selection bias since only rated MFIs enter. Another set of data but which is less detailed is that provided by the microcredit summit campaign which covered 3,652 MFIs in its 2011 database, about twice as much as Mix Market.

Data for modelling determinants of MFIs profitability are considered proprietary and are hard to obtain. Our proxies are crude quantity-based indicators of profitability computed and standardised by the Mix Market team. We would have preferred to compute return on assets as net profit before tax as a percentage of total assets, or even net profit before tax as a percentage of total assets plus staff expenses as percentage of total assets to test the expense preference theory consistent with Molyneux and Thornton (1992). We were limited by data availability on this front. To the extent that tax regimes or rates differ across Africa, the indicators might be subject to measurement error. This is likely to bias the outcome of our analysis.

One of the estimation problems we had to contend with was poor quality of the data. For example, despite the breadth of data available through MIX datasets, some variables such as portfolio at risk among the MFIs reporting to MIX and the Heritage Foundation dataset shows little variability. We however acknowledge that cross-country data cannot be made perfectly homogeneous. Thus, given these data constraints, we cannot control for potential survivorship bias but nevertheless account for the implications of this bias in the discussion of the results. All the empirical findings should be viewed in that light and the reader will have to interpret our results with all the caveats in mind.

Despite these shortcomings, we view this data compilation effort and the subsequent empirical analysis as a useful and important first step towards developing more accurate indicators of determinants of microfinance profitability.

At the time of writing this thesis, available data were limited to 210 MFIs as some of the disclosures by MFIs were missing. As more comprehensive disclosures become available, similar research can be undertaken to find out if degrees of freedom affected our result. In addition, the hypotheses tested in the empirical chapters can be re-tested.

The methodology presented in this thesis is purely empirical. Microfinance industry is quite diverse in terms of the charter that established the organizations, with MFIs organized as banks, credit unions, non-governmental organizations (NGOs), or non-bank financial institutions. This diversity makes it difficult to choose appropriate conceptual framework thereby complicating any empirical analysis. The use of cross-country data provides a unique opportunity for this analysis.

Studies on firm performance employ various measures to test the predictions of different exogenous factors. Some of the measures of performance that have been used over the years include financial ratios (Mehran, 1995), stock market return and their volatility (Cole and Mehran, 1998) and also Tobin's q (Zhou, 2001). For the purpose of this study we use return on assets (ROA) and return on equity (ROE) as proxies of MFI performance. The Microfinance Financial Reporting Standards recommends the use of ROA and ROE as measures of profitability rather than financial self-sustenance (FSS) and operational self-sustenance (OSS). It is a financial metric that is well established and understood across the finance spectrum.

We acknowledge that ROA may be biased due to off balance-sheet items. It can however be argued that such activities may be negligible in Africa MFIs. ROE on the other hand disregards the risks associated with high leverage and financial leverage is often determined by

regulation. Thus ROA is more appropriate in Africa microfinance industry since MFI equity is abnormally low (Lafourcade, et al 2006).

We used unbalanced panel data econometrics methodology to shed light on certain important relationships that could help us to better understand the determinants of microfinance profitability. Our panel is unbalanced since not all MFIs have information for every year—some MFIs may have closed as others enter the market. In order to investigate on the determinants of profitability, we started from a basic linear econometric specification. Further empirical work was carried out to examine: (i) profit persistence and the speed of convergence; (ii) impact of financing choice on microfinance profitability; and (iii) impact of institutional environment on microfinance profitability is carried out. This was achieved by use of dynamic two-step System-Generalized Method of Moments (GMM) estimator which is an unexplored dimension in microfinance literature. We additionally test the robustness of our models with different specifications. Detailed methodology is contained in the respective empirical chapters.

1.5 Structure of the thesis

This thesis is structured into seven chapters. The rest of the thesis proceeds as follows. Chapter two reviews comprehensively microfinance literature with a view of identifying the main theoretical and empirical strands in order to isolate what has been done from what needs to be done. The literature is organized along a thematic structure covering different tenets in microfinance that touch on MFIs performance.

Chapter three presents empirical evidence on what explains the negative average profit margins of MFIs in Africa. Due to limited literature on what influences MFIs profitability, this chapter borrows heavily from determinants of profits in the conventional banking industry. A background to the Africa economies and in particular the microfinance landscape is documented in Appendix A. Using a unique dataset of unbalanced panel data of 210 MFIs across 31 Africa economies, we specify an empirical framework to investigate the effect of MFI-specific, country level institutions development and macroeconomic determinants on MFIs profitability. On the basis of empirical findings, we draw policy conclusions and PRIs.

Chapter four builds on the econometric framework developed in the previous chapter to investigate persistence of microfinance profits. Using the same dataset, we specify a dynamic econometric model to investigate persistence of MFIs profitability while controlling for MFI-specific, institutions development, macroeconomic context and industry-specific factors. We interpret the results while at the same time making comparisons and references to previous empirical studies. All our estimations are robust to alternative specifications and analytical methods.

Using the same econometric framework and estimation technique to the previous chapter, chapter five investigates the impact of financing choices on microfinance profitability. The motivation for this chapter stems from the recent trends towards commercialization where

microfinance has become attractive to foreign capital investment while at the same time mobilizing deposits from the public. We estimate a dynamic panel data model using system GMM estimator while controlling for profit persistence, other MFI specific and country level factors. This enables us to probe further the determinants of MFIs profitability arrived at in the previous chapters, while drawing policy conclusions and recommendations.

In chapter six, we use the empirical strategy developed in the previous chapter, to examine the role of host country institutional environment on influencing microfinance profitability. The motivation here emanates from the consistent negative profit margins across Africa as reported in the Microbanking Bulletin (2010), contrary to other regions. We therefore estimate a dynamic panel data model using system GMM estimator while controlling for profit persistence, MFI specific and other country level variables. This enables us to probe further on the determinants of MFIs profitability arrived at in all the previous chapters. We also draw policy conclusions and suggest ideas for further research.

The final chapter concludes this thesis by summarizing the main findings, policy implications and prescriptions while identifying ideas of extending this piece of research work.

CHAPTER TWO

COMPREHENSIVE AND CRITICAL SURVEY OF THE LITERATURE

2.1 Introduction

2.1.1 Background

Microfinance literature, like the institutions themselves, is still nascent. Most results are from theoretical models that rely on abstractions from reality but they nevertheless pose an important challenge. Why does reality look so different? In spite of the euphoric attitude among donors and policy-makers about the impact of microfinance, what explains MFIs profitability is a poorly understood phenomenon. While this may be explained by the relative youthfulness of the programs and the research agenda, taking a step towards a focused literature survey is the goal of this chapter. A vast literature already surveyed by Morduch (1999b), Hartarska and Holtmann (2006) and Hermes and Lensink (2007), are relevant as a departing point. We build on this insightful contribution by reviewing recent research in microfinance so as to isolate the leading theoretical and empirical issues.

2.1.2 Motivation of the review

A large theoretical literature has established conditions under which for instance symmetric group loans do better than individual loans (Vigenina and Kritikos 2004; Rai et al 2004; Gangopadhyay et al 2005; Karlan 2005; Chowdry 2005; Bond and Rai 2008; Carpena et al 2010; Giné et al 2010), which group characteristics lead to higher repayment (Cassar et al 2007; Ahlin and Townsend 2007b; Karlan 2007), or which contracts are optimal (Ahlin and Townsend 2007a; Daripa 2008; Madajewicz 2011). Through these innovative contracts MFIs are generating high

loan repayment rates in diverse environments but which have not translated into profits (Cull, Demirgüc-Kunt and Morduch 2007).

Although these studies do provide invaluable information on innovations in lending technology and organization design, empirical work on MFIs performance over time is scarce largely due to significant data limitations. For instance, evidence on what explains microfinance profitability remains scant and economic theory on lending technology which focuses almost exclusively on joint liability contracts; has largely ignored microfinance profitability. What explains this apparent paradox? Is the theory too stylized to capture the reality of microfinance performance particularly in the developing world where most MFIs conglomerate? Does the experience vary across countries? Why are some MFIs more profitable in some regions than others? What general lessons can we draw from the experience of the last three decades?

2.1.3 Objectives of the review

The purpose of this chapter is to synthesize and distil scholarly and policy lessons emerging from the reviewed studies, in a broader array of topics. This will aid in prompting new promising research ideas. Consistent with this goal, we explored the current state of knowledge and research in the microfinance industry both at theoretical and empirical fronts. To achieve this objective, we; (a) took stock of existing knowledge in microfinance, (b) examined both theoretical and analytical approaches used in microfinance with the aim of identifying the appropriateness of the chosen methodologies, (c) identified contradictions and inconsistencies, both within single articles and as a result of making comparisons between articles from different authors while simultaneously identifying conflicting interpretations of findings, (d) Identified the main strands of theoretical and empirical literature so as to distinguish what has been done from what needs to be done, (e) identified promising research ideas with the aim of laying ground for future research.

To this end we presented a large amount of both theoretical and empirical evidence in parallel from both developing and developed economies.

2.1.4 Methodology/approach

The review focused on gathering both theoretical and empirical evidence to support various themes in microfinance. We reviewed recent innovations on microfinance performance. We related the innovations to theoretical propositions, drawing links to new work in financial intermediation and to randomized control trials where necessary. To achieve the objective of the literature review, we proceeded as follows. We used a broad search strategy by conducting an initial search in 2006/07 and repeated the entire search in 2011 for an update and validation. The survey of peer-reviewed Journals was not restricted by date. For inclusion, articles must have clearly defined research methodology that culminated to objective evidence, as well as a focus on one or more MFIs offering some form of microfinance regardless of the lending technology.

We searched several electronic databases that included but not limited to; EBSCO, EconLit, ScienceDirect, Wiley InterScience, Emerald, Springer, Applied Social Sciences Index and Abstracts (ASSIA) among others. After searching for available literature on the internet, we were able to determine several key words and terms (Microfinance or microcredit or micro-finance or micro-credit or village bank, microbank) that helped define our initial search. Using these search criteria, we identified 600 articles in the electronic databases which included duplicates across databases. We examined the titles of all of the articles identified and selected 400 articles for further review. After removing duplicates, the survey narrowed down to 300 abstracts of peer reviewed articles with 200 of these articles selected for full-text review. We carefully reviewed these articles for information about the study design, outcomes and limitations. We developed a

summary table which helped in identifying the source/author, idea behind the article, methodology used as well as conclusions.

The criterion for selecting studies was based on their potential to provide information relevant to the study theme and the rigorousness of the methodology (that included accuracy and validity of the measurements) of the study design. This involved carefully reading the title and abstract, methodology and conclusion of each article and subsequently developing a review matrix based on the same format. This review has been organized around and related directly to the theme of the thesis contrasting similar ideas/agreements with competing views, clearly identifying areas of controversy/disagreements, inconsistencies, discriminating or synthesizing results into a summary of what is known and unknown/uncertain, point of departure and convergence, logical structure, emerging gaps and formulating questions that need further scrutiny.

From a methodological point, we do not discuss the well documented theories at length but rather summarized the main arguments within the literature. We also do not cover some topics, such as microfinance products which have substantial literature on their own (see for instance Brau and Woller 2004 for a comprehensive review). We concentrate on studies that involve direct description and analysis of the main tenets of microfinance performance especially regression studies geared towards understanding the temporal and the cross-sectional differences of MFIs operating in different countries. Additionally, we do not dwell much on research based on case studies. In reviewing the empirical evidence, we summarize the main results and seek to evaluate their policy implications for the industry.

2.1.5 Limitations of the review

Although we undertook to explore vast theoretical and empirical research on microfinance, this chapter is not devoid of any limitations. Three important limitations warrant our mention here. First, owing to time constraints we could not survey all issues under the auspices of microfinance but nevertheless covered most of them. We therefore do not provide an exhaustive account of everything published on microfinance but rather a focus on a particular theme and discuss all the significant scholarly work important to that end. Second, while the evidence that we discuss in this chapter is subject to several measurement problems, theory has moved ahead of evidence and therefore most of the articles reviewed are theoretical propositions with no direct empirical measure. Third, at the time of writing this thesis, the Journal articles available were limited up to and including November 2011 time period. More articles may have been made available after the completion of this thesis and therefore, the conclusion arrived at in this chapter can be re-evaluated.

2.1.6 Structure of the review

The main focus of this review is MFIs financial performance. We begin by a survey of studies touching on financial sustainability which is a tangible parameter that can be measured and monitored continually. In section three, we review and discuss various aspects of microfinance profitability. The final section of this chapter provides a summary and conclusion based on the entire literature survey.

2.2 Microfinance performance

2.2.1 The broader context

Microfinance performance has attracted significant interest in recent years, both from policy makers and in the academia. MFIs face unique challenges because they must achieve a double bottom line—that of providing financial services to the poor (outreach) and covering their costs (sustainability). MFIs are therefore a hybrid but some are also similar to banks because they are regulated or supervised and because they mobilize deposits. This organizational diversity makes any empirical analysis of their performance difficult (Cull, 2009a). In this chapter, we do not survey the extent to which MFIs contribute to social performance and neither we do we review studies on cost-benefit analysis of funds invested by donors or governments which has largely been addressed by Hermes and Lensink (2011). The main focus of this chapter is MFIs financial performance. Recent academic interest on microfinance performance has not been matched by a surge in empirical research. The subject thus remains under-studied.

2.2.2 Financial sustainability

A vast and growing literature posits that for MFIs to achieve full potential they must become financially sustainable (see e.g. Brau and Woller, 2004 for a comprehensive review). Financial sustainability also known as financial self sustenance (FSS) and operational self sustenance (OSS) in this context, is measured as the ability of MFIs to continue operations indefinitely using own resources without seeking donations, grants, or subsidized loans from outside individuals, NGOs, or governments. It should however be noted that sustainability does not imply profitability (Morduch 2005).

The importance of being financially self sufficient can best be illustrated by referring to pioneer institutions. Hollis and Sweetman (1998) for example compare six micro credit

organizations of 19th-century Europe, to identify institutional designs that were a prerequisite to financial sustainability. They established that organizations that relied on charitable funding were more fragile and tended to lose their focus more quickly than those that obtained funds from depositors. Hollis and Sweetman (2001) further show that these MFIs were financially sustainable for more than a century because they adapted to their economic and financial environment. Moreover, the literature survey by Hermes and Lensink (2007) in particular points to the need for further research on the mechanisms that explain MFIs financial outcomes. Most of the existing literature on MFIs performance has nevertheless been constrained by inadequate and unreliable data at the firm level and therefore has resorted to a number of indicators as proxies. It's for this reason that Morduch, (1999b) calls for more quantitative empirical research into MFI performance.

In the existing empirical literature, factors explaining MFI financial sustainability may be categorized into MFI-specific and those external to MFI management (Crabb, 2008). External factors are macroeconomic environment, industry specific such as regulatory conditions, concentration and charter that established the MFIs. Several studies have examined the determinants of MFIs financial sustainability. Using a dataset of 124 MFIs across 49 countries, Cull, Demirgüc-Kunt and Morduch (2007) examine financial performance and outreach in a large comparative study. They use pooled regression to estimate the model

$$FSS = \alpha + \beta_i Yield_i + \beta_2 Yield_i Xlendingtype_i + \beta_3 Labour\cos t_i + \beta_4 labour\cos t_i Xtype_i + \beta_5 capital\cos t_i + \beta_6 capital\cos t_i Xtype_i + \beta_7 lendingtype_i + \beta_8 MFIAgeSize_i + \beta_9 Busprac_i + \beta_{10} region_i + \varepsilon_i \quad \text{.....(2.1)}$$

Where FSS represents financial self-sufficiency ratio. They find that the impact of various MFI-specific factors on performance depends on an institution's lending methodology. Although they pioneered the use of cross-country, cross-MFI data in statistical tests and provide a new dimension to the existing literature on MFIs performance, their pooled regression model omits

fixed effects, and omitting fixed effects risks omitted variables bias. Rather than estimate different intercepts for each unit and/or time point, pooled regression estimates just a single intercept (Baltagi, 2008). The omitted country-specific intercepts may be correlated with the independent variables (Greene, 2008) and the disturbances may be correlated within groups. This study also fails to control for endogeneity. It is possible that previous levels of FSS may be explaining the current levels.

Using data on 217 MFIs across 101 countries distributed by region and type of MFIs over the period 1998-2006, Ayayi and Sene (2010) estimated a pooled regression model;

$$FSS = \beta_0 + \beta_1^{*} Par > 30 + \beta_2 * Finrevrat + \beta_3 * Per\cos rat + \beta_4 * AgeMFI + \beta_5 * Avloanbal + \beta_6 * percwomen + \beta_7 * loanstaff + \beta_8 + borlooff + \mu \quad \text{.....(2.2)}$$

Where FSS represents financial self-sufficiency. Their results show that the quality of the loan portfolio is the main determining factor of MFI financial sustainability. They further show that outreach, the age of MFIs and the percentage of women among the clientele do not significantly influence the MFIs' financial sustainability. Consistent with Cull, Demirgüc-Kunt and Morduch (2007) this study suffers from the same methodological weaknesses, thus their results may not be convincing.

Ahlin et al. (2011) also estimated a pooled regression model;

$$Y_{ijt} = \alpha + \beta_m M_{it} + \beta_X X_{jt} + \varepsilon_{ijt} \quad \text{.....(2.3)}$$

Where Y_{ijt} is a year-t operational self-sufficiency (OSS) of MFI *i* located in country *j*; M_{it} is a set of MFI-specific control variables at time *t*; and X_{jt} is a set of macroeconomic variables describing country *j* at time *t*. Their pooled regression model omits fixed effects, and omitting fixed effects risks omitted variables bias. They too fail to expunge endogeneity.

While Ahlin et al (2011) shows that macroeconomic-context matters for MFI operational sustainability, Cull, Demirgüc-Kunt and Morduch (2007) concludes that MFIs can still expand outreach without compromising financially sustainability. Both studies nevertheless fail to circumvent methodological weaknesses.

Bogan (2009) investigates the impact of existing sources of funding on the efficiency and OSS of MFIs. He finds causal evidence to the effect that an increased use of grants by MFIs decreases OSS. Crabb (2008) models OSS as a function of both firm level and environmental factors. Using MIX dataset from 2000 to 2004 to estimate a fixed-effects panel data model, Crabb finds that portfolio at risk and outreach breadth are significant, with the expected signs. Further evidence on OSS is presented by de Crombrugghe, et al (2008) who use regression analysis to study the determinants of self-sustainability of a sample of MFIs in India. They investigate three aspects of sustainability: cost coverage by revenue, repayment of loans and cost-control and conclude that MFIs can cover costs on small and partly uncollateralized loans without necessarily increasing loan size or raising monitoring cost. The use of OSS can however be misleading as it lumps together genuine operating net revenue with transfers.

Hartarska and Nadolnyak (2007) further examine the determinants of MFIs OSS and find positive significant impact from MFI size and capital ratios. Using OSS Makame and Murinde (2007) estimate a linear random effects model where average loan is treated as a proxy for outreach depth and regressed against sustainability exogenous variables proxied by operational efficiency and profitability (measured as return on assets and return on capital employed). We do not find both Crabb (2008) and Makame (2007) OLS empirical results as convincing, since their empirical specification includes return on asset and outreach as exogenous variables without controlling for endogeneity. To the extent that there is likely to be persistence in the MFI

financial outcome variables, endogeneity remains an issue as with previous empirical studies that have employed panel econometrics.

Using Sustainability Dependency Index (SDI), Sustainability Dependency Ratio (SDR) and Efficiency and Subsidy Intensity Index (ESII) techniques to investigate financial sustainability, of Bangladesh Unemployed Rehabilitation Organization (BURO), microfinance institution, Hasan, et al (2009) finds BURO achieved sustainability from 2001 to 2005, but then the trend was reversed between 2006 and 2007. Although computation based on SDI to determine financial sustainability is useful, it nevertheless has some drawbacks. First, the underlying assumption is that a rise in interest rates translates to higher profitability. This, however, need not be the case since higher interest rates could lead to a decline in profitability due to adverse selection and moral hazard effects (Morduch, 1999a; Cull, Demirgüc-Kunt and Morduch 2007).

While financial self-sufficiency (FSS) and operational self-sustenance (OSS) of microfinance institutions are increasingly well researched, little is known about MFIs profitability. MFI could in principle cover operating expenses and not post any profit. Given the increased investments from commercial players, research focused on MFI's profitability may help a growing number of investment funds that target their money towards MFI's, with the aim of earning returns from the investments. Studies whose main focal point is OSS and FSS do not fill this void. Indeed, Cull et al. (2009a) and Guérin, et al (2011), show that profit-maximizing investors would have limited interest in most of the institutions that are focusing on social mission.

2.2.3 Profitability

Although there is a vast literature evaluating MFI success and failure, studies on microfinance profitability are scant. Much of the applied economics literature in this area addresses the social worth of MFIs (see for instance Navajas et al., 2000; Navajas et al., 2003; Bruett, 2005), measuring the impact of village-level microfinance institutions (Kaboski and Townsend, 2005), the impact of microcredit on the poor (Mohindra, et al 2008; Mondal 2009; Brau, Hiatt and Woodworth 2009; Roodman and Morduch 2010), costs and benefits of subsidies (Morduch, 2009a; Armendáriz and Morduch, 2010), correlations for MFIs and commercial banks (Krauss and Ingo, 2009), microfinance and mission drift (Hishigsuren, 2007; Copestake 2007; Armendáriz and Szafarz 2011), impact analysis (Hartarska and Nadolnyak 2008b), efficiency of MFIs (Gutiérrez-Nieto et al, 2007), competition between MFIs and conventional banks (Cull et al 2009b), women and repayment in microfinance (D'Espallier et al 2011), microfinance commercialization (Galema and Lensink 2009), microfinance plus (Lensink, and Mersland, 2009), which microfinance institutions are becoming more cost-effective with time (Caudill, Gropper and Hartarska 2009), and social efficiency in microfinance institutions (Gutiérrez-Nieto et al, 2009).

There are also other closely related studies but whose main focus is on firm level specifics such as management techniques, organizational structure and contract design. These include Coleman and Osei (2008) on the role of governance on outreach and profitability of microfinance institutions; Mersland and Strøm (2009), Arun and Annim (2010) on MFI performance and governance; Hartarska (2009), on the impact of outside control in MFI performance; Hartarska (2005) on the relation between managers' experience and compensation schemes on MFI-performance; Mersland and Strøm (2008) on MFI ownership structure and performance; Cull, Demirgüc-Kunt and Morduch (2007), Mersland and Strøm, (2010), Makame and Murinde,

(2007) on micro-institutional determinants of MFI outreach-sustainability trade off; Cull, et al (2009c) on the performance, regulation-competition and financing trade off and D'Espallier et al (2010) on gender bias and microfinance performance.

There are also a few studies that focus on the determinants of MFI success which are external to the control of the MFI management. Ahlin et al. (2011), for example examine implications of the surrounding macroeconomic context on MFIs operational self-sufficiency and growth of loan portfolio. Similar studies on this front include Vanroose (2008); Gonzalez (2007); Honohan (2004), who have investigated the relationship between MFIs' performance and changes in the macro-environment. Mersland, Randøy and Strøm, (2011) examine the impact of internationalization on microfinance institutions' performance. Hartarska and Nadolnyak, (2008a) investigate the impact of credit rating in facilitating microfinance institutions raise funds. These studies address factors that may explain financial sustainability where the depedent variable is either FFS or OSS. What is clearly lacking from all these studies is a focus on MFI profitability.

2.2.3.1 Profitability and outreach of microfinance institutions

The pioneering theoretical work by Copestake (2007) and Ghosh and Tassel (2008), shows that wealthier clients cost less thus pursuit of outreach should decrease MFI profitability. Empirical evidence adduced so far shows mixed results (for a recent review see Hermes and Lensink 2011). Cull, Demirgüc-Kunt and Morduch (2007) empirically investigate whether there is a trade-off between the depth of outreach and profitability of MFIs. Their results show that MFIs that mainly provide individual loans perform better in terms of profitability, but the fraction of poor borrowers and female borrowers in the loan portfolio is lower than for institutions that mainly

provide group loans. They stress on the importance of institutional design in determining the existence and size of such a trade-off.

The most comprehensive study of sustainability-outreach trade-off is by Hermes, Lensink, and Meesters (2011). Using data for 435 MFIs for the period 1997-2007, they focus on the relationship between cost efficiency as a proxy for sustainability of MFIs and the depth of outreach measured by the average loan balance and percentage of women borrowers. They conclude that outreach is negatively related to sustainability of MFIs. The results remain robustly significant even after taking into account a long list of control variables. This is consistent with Cull et al (2009a) and Hoque, et al (2011), who shows evidence of such trade off from recent commercialization trend in microfinance. Although Olivares-Polanco (2005) use less rigorous techniques and/or smaller datasets, their study also confirms the existence of this trade-off. These findings are however inconsistent with Ayayi and Sene (2010) who after estimating a pooled regression model, show that outreach and the percentage of women among the clientele do not significantly influence the MFIs' financial sustainability. Their findings confirm Cull, Demirgüc-Kunt and Morduch (2007) who shows that MFIs can expand outreach without compromising financially sustainability. Though there is no convergence among these studies, we can deduce that varying outreach has implications on MFI financial outcomes. It is important however to point that the evidence adduced here mostly relate to MFIs sustainability and not profitability. Could outreach therefore explain MFIs profitability?

2.2.3.2 Profitability and microfinance mechanisms

Type of lending contract

MFIs employ a diversity of approaches, such as group lending and individual non-collateralized loans with gradual increase in loan size conditional on repayment (dynamic incentives). However, not all have the same impact on MFI profitable. Table 2.1 provides comparative data for 487 programs surveyed in the Micro-Banking Bulletin (2010). Relative to MFIs using group lending methodologies, those using standard loan contracts tend to (a) serve better off clients as reflected by the average loan size; (b) be more financially stable as proxied by the percentage of their financial costs covered (117 % relative to 105% for group lending MFIs); (c) serve a small percentage of female clients and (d) charge lower interest rates and fees as shown in the real portfolio yield. MFIs employing group lending and village bank models have considerably higher operating expenses relative to loan size. Whereas MFIs using standard loan contract devote 14% of each dollar lent to operational costs, solidarity group lenders devote 23% and village banks 24%. Therefore group lenders and village banks tend to serve poorer clients and face higher operating costs relative to loan size. Intuitively therefore one would expect individual type of lenders to be more profitable. Thus one question that warrants empirical scrutiny is whether the type of loan contract influences profitability of microfinance institutions.

Table 2.1: Comparison of financial indicators by lending methodology (2008 MFI Benchmarks Values)

	Individual	**Solidarity groups**	**Individual/Solidarity**	**Village banks**
	1 borrower	Groups of 3-9 borrowers	A hybrid of both individual and solidarity	10 or more borrowers per group
Observations	181	42	252	50
Scale				
Number of borrowers	10,600	20,695	14,693	33,357
Average loan size	1,633	152	449	223
Outreach				
Average loan size/GNI per capita (%)	49.9	12.8	26.7	12.3
Fraction female (%)	46	96.8	66.7	86
Financial performance				
Return on assets (%)	1.2	-6.2	0.5	0.5
Return on equity (%)	5.4	-14	2.8	2.4
Operational self sufficiency ratio (%)	117.3	110.5	114.6	114.5
Financial self sufficiency ratio (%)	107.6	85	104.6	102.3
Profit margin (%)	6.8	-17.7	4.4	2.3
Portfolio yield (real, %)	16.0	-17.8	18.9	21.9
Portfolio at risk>90 days	1.8	0.8	1.6	0.8
Efficiency				
Operating expenses/loan portfolio	14.2	27.2	22.5	22.7
Cost per borrower (US$)	229	40	114	92
Number of borrowers/total staff	89	150	114	140
Number of borrowers/loan officer	240	254	257	298

Source: Microbanking Bulletin 2010, Issue 20; http://www.mixmarket.org/

Theoretical literature advocates for collateral as a mechanism that mitigates adverse selection (Bergera, et al 2011). Although Berger, Frame and Ioannidou (2011), finds that observably riskier borrowers are more likely to pledge collateral, adverse selection occurs because while borrowers know whether their project is of high or low quality, the MFIs management do not. MFI is therefore unable to distinguish between risky and safe borrowers in its pool of loan applicants; if it could, it would charge a high interest rate to the risky borrower and a lower to the safe borrower. This adverse selection therefore is likely to influence MFIs performance.

Gangopadhyay and Lensink (2009), build on previous work on joint liability borrowing to show that unlike standard debt contract, group lending can mitigate this adverse selection. They conclude that by harnessing local information, joint liability lending can improve efficiency and microfinance performance compared to standard debt contracts in the presence of asymmetric information about borrower types. Along the same vein, Bhole and Ogden (2010) show why group lending is feasible for a greater range of opportunity cost of capital than any other form of lending technology. Madajewicz (2011) further demonstrates that borrowers are able to monitor each other when liability is joint, while MFIs monitors borrowers on standard debt contract. Joint liability therefore offers poorer borrowers larger loans with less monitoring effort than would have been exerted by the lender. Less monitoring on the part of the MFI and larger loan sizes is likely to enhance MFI performance. Along the same vein, Becchetti and Conzo (2011) and Jeon and Menicucci (2010) shows that group lending dominates individual lending either by providing more insurance or by saving audit costs. All these merits of group lending therefore have implications on MFIs profitability.

A rebuttal of joint liability is offered by Armendáriz and Morduch (2010) who is quick to point out that group lending technology may not be optimal. They argue that monitoring raises the effort cost for the types who would otherwise adopt low effort, reducing the underlying externality problem. Eijkel, Hermes and Lensink (2011) show that monitoring efforts differ between group members due to free-riding with implications on default rates. This may lead to lower MFIs profitability.

In spite of these theoretical underpinnings on the relative importance of the type of loan contract on enhancing repayment rates, the basic empirical question of whether it matters for MFI profitability has remained unanswered. The pioneering study by Cull, Demirgüc-Kunt and Morduch (2007) provides the first empirical evidence on this front. Using firm level data on 124

MFIs across 49 countries, they explore the patterns of profitability, loan repayment, and cost reduction. They find that institutional design matter substantially. Specifically, MFIs that do not use group-lending methodology to overcome incentive problems experience weaker portfolio quality and lower profitability rates when interest rates are raised substantially. They conclude that in order for the MFIs that employ the standard individual loan contract, to achieve profitability, they would have to invest more heavily in staff costs which is consistent with the economics of information but contrary to the conventional wisdom that profitability is largely a function of minimizing cost. Other studies that have used cross-country data and which corroborates Cull, Demirgüc-Kunt and Morduch (2007) includes Vigenina and Kritikos (2004). On the contrary, Mersland and Strøm, (2009) find that individual loan is never a significant variable in all their regressions which is an indication that financial performance may be achieved with the optimal mix of both individual and group lending. A limitation with these studies is that they fail to control for endogeneity.

Recent approach to overcome endogeneity problem has been the use of field experiments which allows for several lending contracts to be tested simultaneously. Feigenberg, et al (2010) provides the first experimental evidence in this context and finds that group lending is successful in achieving low rates of default without collateral not only because it harnesses existing social capital, but also because it builds new social capital among participants. This finding is consistent with Giné et al (2010), Berhane, et al (2009), Cassar et al (2007) and Abbink et al (2006). On the contrary, and using data from a World Bank survey carried out in Bangladesh during the period 1991-1992, Pellegrina (2011) compare the impact of microfinance programs and other types of credit contracts on household investment in productive activities. She shows that joint liability contract may be less conducive to building up fixed assets due to short regular repayment schedules. Group lending technology may therefore push borrowers more towards short-term

investments with subsequent low returns. Using field experiments, Hisaki (2006) established that joint liability contracts cause serious free-riding problems, inducing strategic default and lowering repayment rates. Joint liability may also induce the borrower's suicide ex post through the stigma associated with default as evidenced in Japan (Chen, Choi and Sawada 2010). The issue of whether type of lending contract is significant in explaining microfinance performance therefore remains contestable.

Repayments schedule

Theory suggests that a more flexible repayment schedule would potentially improve repayment capacity by allowing MFIs to make use of superior monitoring capability of the informal lender in constraining strategic behaviour by the borrower (Jain 1999; Armendáriz and Morduch 2010). Frequent repayment schedules may also help borrowers who have difficulty in holding on to income. On the contrary Jain and Mansuri (2003) shows that although group meetings help in eliciting information on problematic borrowers or projects from their group members, there are transactions costs of making the repayments at weekly meetings of the members at each collection point. These costs are likely to affect MFI performance. Moreover, an optimal lending contract must provide additional repayment incentives to counter borrower run (Bond and Rai 2009).

Does the use of regularly scheduled repayments have an impact of MFI performance through increased default rates? Here the evidence on repayment frequency remains mixed. Pellegrina (2011) shows that using loan contracts with regular repayments may discourage borrowers from investing in projects requiring longer gestation. The evidence adduced by Field and Pande (2008) finds no difference in repayment. One has however to be cautious with the interpretation of their results since they are preliminary, based on small-sized loans and on new

short-term borrowers. McIntosh (2008) extends the Field and Pande result with a study of a Ugandan MFI in which the bank offered its village banks a choice between weekly or bi-weekly repayment. He as well finds no drop in repayment. On the contrary Feigenberg, et al (2010), show that relative to clients who met on a monthly basis during their first loan, those who met weekly are three and a half times less likely to default on their subsequent loan. Empirical evidence therefore remains contestable.

Dynamic incentives

The seminal theoretical work on repayment incentives through refinancing in the context of microfinance was first attributed to Besley and Coate, (1995). In a departure from his earlier work, Chowdhury (2007) allows for endogenous group-formation by using an explicitly dynamic framework where sequential financing and contingent renewal are used concurrently. He posits that dynamic incentive is important critical since, in its absence, the borrowers may collude among themselves. This is not consistent with Chowdhury (2005) where he had postulated that sequential financing enhances the incentive for peer monitoring and may, even in the absence of joint liability, solve the moral hazard problem. Consistent theoretical predictions to Chowdhury (2007), had been advanced in previous studies by Aniket (2004), who extends the time horizon further to analyze sequential group loans and shows that, by temporally separating the decision on peer monitoring and investment, sequential financing makes collusion impossible. Tedeschi (2006) improves on contracts used by MFIs by endogenizing the default penalty, while constraining the MFI to maintain sustainable lending operations. In a similar vein, Jain and Mansuri, (2003) postulate that when a borrower has continual credit needs, access to future loans can provide a strong reason to avoid default on a current loan but who also contend that unless

there is a substantial uncertainty about end date or graduation from one program to the next, dynamic incentives have limited scope on repayments.

Non-contestable evidence on dynamic incentive components of the contract structure are more difficult to show, as most lenders only vary contract terms endogenously, for selected clients (Karlan and Zinman 2009). Relevant studies that have examined dynamic incentives include Giné et al (2010) and Fischer (2010). Both studies found evidence that dynamic incentives have large impact on reducing moral hazard problems with implications on higher MFI performance.

2.2.5.3 Profitability and microfinance regulation

The need for regulation of economic activities is justified in the economic literature as a policy instrument to minimize the effects of market failures (Majone, 1996). While developing a technical guide for microfinance investors, Forster et al (2009) concede that client protection is a key tenet of microfinance. There is therefore a need for sector-specific regulations along with prudential reforms which enables MFIs to mobilise deposits (Arun 2005). Prudential regulation and supervision of MFIs has become increasingly important since several of the largest MFIs now mobilize public deposits and particularly from the relatively poor households (Hartarska and Nadolnyak, 2007). Protection of these deposits is therefore a policy relevant issue. That notwithstanding MFIs regulation raise costs of lending for MFIs and the question is whether this affects profitability (Cull, et al 2009c). Although Seibel (2003) and Guinnane (2002) draw attention to how financial history justifies the need for appropriate legal frameworks in order to support the development of pro-poor financial systems, recent empirical evidence shows mixed results.

Using data from 245 of the world's largest MFIs, Cull et al (2011) test whether MFIs are able to maintain profitability in the face of the additional costs of complying with supervision. Using OLS estimations, they show that profitability declines with supervision. Upon controlling for the non-random assignment of supervision via treatment effects and instrumental variables regressions, they confirm that supervision is not significantly associated with profitability. Consistent with this finding, Tchakoute-Tchuigoua (2010) investigates whether there is a difference in performance by the legal status of MFIs and concludes that the performance of commercial MFIs is better than that of NGOs but only when portfolio quality is used as the proxy of measuring performance. Glass, McKillop and Rasaratnam (2010), shows that 68% of Irish credit unions do not incur an extra opportunity cost in meeting regulatory guidance on bad debt, which perhaps explains their good performance. Thus MFI supervision has no impact on performance. To the extent that other variables included in the regression may partially account for credit risk, this explains the failure of legal status to significantly affect MFI returns. This counter intuitive finding confirm Mersland and Strøm (2009), who establish that regulation does not have a significant impact on financial performance and similarly Hartarska and Nadolnyak (2007) who after controlling for the endogeneity of regulation, find that regulation has no impact on financial performance. This finding is inconsistent with Hartarska (2005). These studies underscore the importance of taking into account the trade-offs and for further empirical scrutiny.

2.2.3.4 Profitability and microfinance competition

Most of this work has focused on interactions between lenders and borrowers, or among the lenders themselves. Competition weakens long-term relationship between the financial intermediary and the client (Petersen and Rajan 1995). To reinforce this argument, Villas-Boas and Schmidt-Mohr (1999) and Navajas et al. (2003) predict that with intense competition most

MFIs would focus on the most profitable customers. Competition exacerbates asymmetric information problems over borrower indebtedness (McIntosh and Wydick 2005). With asymmetric information between competing MFIs, every loan contract therefore yields a lower profit margin to the borrower than under the full information benchmark. This has implications on MFIs profitability as well. With regard to repayment rates, Marquez (2002) observes that competition lowers the screening ability of the incumbent institution, thus increasing the share of low quality borrowers among clients. A rise in default rates leads to lower repayment and the resultant profitability.

Empirical literature on the link between microfinance competition and profitability is scant. Using financial data for socially-motivated MFIs between 2003 and 2006 in developing countries, Hisako (2009) examines the empirical relationship between competition and financial self-sufficiency (FSS). He concludes that competition has no impact on financial self-sufficiency. On the contrary Mersland and Strøm (2009), finds higher competition to lower portfolio yield among MFIs which lowers profitability. Cull et al (2009b) examine whether the presence of conventional banks affects the profitability and outreach of MFIs. Their results on profitability is however insignificant. One of the shortcomings of Cull et al (2009b) is that they use country-level indicators of competition, rather than measures that would reflect firm level competition amongst the MFIs. These findings therefore remain inconclusive.

Mcintosh, De Janvry and Sadoulet (2005) estimate a panel fixed-effects regression and linear probability model. They show that more intense competition leads to multiple borrowing and a decline in repayment rates. Although they do not explicitly examine the impact of competition on MFI performance, their study indirectly finds negative impact of increased competition on repayment performance which is consistent with McIntosh and Wydick (2005) theoretical underpinnings. This too has implications on profitability. Vogelgesang (2003)

examines how competition affects loan repayment performance of Caja Los Andes. Her estimation results indicate that competition is related to multiple loan taking and higher levels of borrower indebtedness. We argue that this level of default has negative implications on MFIs profitability. Again, the evidence here remains contestable

2.2.3.5 Profitability and governance of micro finance institutions

Both policy makers and practitioners of microfinance are increasingly stressing on the need for improved corporate governance to enhance MFIs' survival and growth. Indeed, CSFI (2008) report identifies corporate governance as a principal risk facing microfinance. This control mechanism is important because managers and funders are likely to have divergent priorities and missions. MFI managers may for instance focus on fulfilling the objectives of the MFI but they may additionally have preferences for non-pecuniary rewards which subsequently lead to the so called agency problem in the corporate governance literature.

MFIs board has several major stakeholders represented who include donors, equity investors, management and employees and creditors. Some MFIs have included clients on their boards (Mitchell et al., 1997; Campion, 1998). The board controls the managerial power thereby reducing organizational inefficiencies (Andrés-Alonso, et al 2009). Donors or their representatives in the board of directors and other governance bodies can lead to a better control of the opportunistic behaviour of the manager (Hartarska 2005). But the relative power balance or otherwise of these various stakeholders affects MFIs performance (Mersland 2009a). Hence, the traditional board governance may be less effective in not-for-profit MFIs. Donors on the other hand may prefer outreach to sustainability, while private investors prefer profitability. These two stakeholders may put their representatives on the board and influence the direction of manager's effort.

Empirical evidence on the impact of corporate governance on MFIs performance is scant and consistency in findings within and across studies is rare. Hartarska (2009) uses a database of 108 MFIs operating in over 30 countries and analyzes their performance by adopting an empirical approach usually employed in cross-country banking research on the impact of market forces and regulation on performance. MFI performance is measured by sustainability and modelled as a function of regulatory status, external audit and microfinance rating while at the same time controlling for MFI and country-specific characteristics. The author finds that some rating agencies may play a disciplining role which subsequently affects performance.

To explore the effect of traditional governance mechanisms such as board composition and size, managerial incentives, ownership type, and regulation, Mersland and Strøm (2009) use a global dataset including 278 rated MFIs from 60 countries examine the relationship between firm performance and corporate governance in microfinance institutions (MFI) using a self-constructed global dataset; Mersland and Strøm (2008) investigates whether the transformation of non-government organisations type of MFIs is superior to shareholder owned MFIs in performance; Coleman and Osei, (2008) utilizes a panel of 52 MFIs and examine how selected governance indicators impact on performance measures of outreach and profitability in microfinance institutions (MFIs); Hartarska (2005) uses different datasets spanning 46 to 144 observations from East European MFIs. Although these studies conclude that governance matters, they have difficulties in identifying significant governance influence. They call for better data and the study of alternative governance mechanisms in order to better understand the effect of corporate governance in the microfinance sector. Another drawback in these studies is that they do not in their analysis adequately take into account the fact that most MFIs do not intend to be shareholder owned, have multiple goals, and do not have an inherent profit motive. Additionally, MFIs differ from regular corporate entities in that they encounter horizontal agency

problems between themselves and their clients while at the same time donor-funded MFIs face agency costs in their relationships with donors (Adams and Mehran, 2003). Further research is therefore necessary to reconcile the reported evidence.

2.2.3.6 Profitability and financing choice

While there is a vast literature on the optimal capital structure of corporate firms, the application of the Modigliani and Miller (1958) theorem and other corporate finance theorems to microfinance institutions is not straight-forward. Modigliani and Miller theorem posits that financing decisions do not matter in a world without taxes, transaction costs, or other market imperfections. They argue that a firm cannot change the total value of its securities by splitting its cash flows into different streams and therefore value is determined by its real assets. Thus, capital structure does not matter as long as the firm's decisions are endogenously determined.

There have been no systematic empirical studies for a large group of MFIs that provide robust evidence of how variations in funding affect MFIs profitability. Much of the existing empirical work places the evolution of MFI funding sources within the realm of institutional life cycle theory[7] of MFI development (Helms, 2006). Using data on outreach and default rate as the dependent variables, Kyereboah-Coleman (2007) investigate the impact of capital structure on the performance of microfinance institutions by estimating a random and fixed effects linear model. Here no attempt has been made to control for reverse causality from performance to capital structure (endogeneity) or to employ a variant of other capital structure measures such as gearing, deposits and portfolio-asset ratio that may explain performance

7 According to this framework of analysis, most MFIs start out as NGOs with a social mission, funding operations with grants and concessional loans from donors and international financial institutions that effectively serve as the primary sources of risk capital for the microfinance sector. Thus, literature on microfinance devotes considerable attention to this process of "NGO transformation" as a life cycle model outlining the evolution of a microfinance institution with different stages of funding

MFIs have two broad funding options beyond debt which include deposits (if regulation allows) and equity (commercialization). Several key trends have emerged; the tendency towards increased leveraging of capital[8], the rise in mobilizing public deposits as more MFIs get regulated and a shift away from subsidized donor funds towards commercial funding[9] (Armendáriz and Morduch, 2010; Hartarska and Nadolnyak 2008a). These changes mark a general shift towards capital structures typical of traditional banks.

Commercially-funded MFIs respond to the profit incentive, working to increase revenues while minimizing expenses so that they can have revenues sufficient to cover all operating expenses including cost of capital (Cull et al, 2009a). MFIs with access to donor funds may not respond to these pressures to operate efficiently or may deliberately choose outreach over profitability by serving poorer or rural clients with higher delivery costs (Armendáriz and Morduch, 2010). A higher cost of external funds may force the MFI to raise the interest rate it charges its borrowers, with implications on profitability. Cheap external funding may however attract an inefficient MFI, which relies on the implicit subsidy to cover its high operating costs (Ghosh and Tassel 2011). Studies that would provide empirical evidence on this policy relevant issue are however lacking.

8 For example, non-profit foundations now have an average leverage of 4.5 times the value of their equity compared to about 1.3 times their equity (see Farrington and Abrams 2002)

9 Commercialized microfinance institutions have a profile distinct from others, earning higher profits by making larger loans at lower cost per dollar lent (Cull, et al, 2009b).

2.2.3.7 Profitability and country institutional context

This section aims at addressing microfinance profitability and institutional context by drawing on insights from institutional theory (e.g., North, 1990). Pande and Urdy (2005) contest the notion of "agency" embodied in North's definition of institutions by arguing that institutions are often not "designed" and even when they are, their operation may be different to what was originally intended. Along the same vein, Casson, Giusta and Kambhampati (2010) contends that North's "moral and ethical behavioural norms" are often embodied in informal institutions like religion and caste that determine the quality and sustainability of formal institutions like schools, labour markets, and the rules and regulations governing economic activity. Practices and rules as well as the public agencies and moral environment which sustain trust are determined at least in part, if not largely, by the cultural endowment of societies as they have developed over their particular histories (Platteau, 1994).

Existing literature on institutions is limited in two ways: first, institutions are seen in very broad terms as relating to certain political or economic rules of behaviour (e.g., protection against expropriation risk or government anti-diversion policies (Acemoglu et al., 2001) or country's openness (Hall and Jones, 1999) or bureaucratic efficiency (Mauro, 1995). Second, it's more aligned towards the effect of institutions on growth. Thus, most of the existing studies are concerned with the impact on GDP per capita (Acemoglu and Johnson, 2005; Acemoglu, Johnson, and Robinson, 2002; Acemoglu et al., 2001; Aghion et al., 2005) or output per worker (Clague, et al, 1999; Hall and Jones, 1999).

Evidence so far shows that the present and anticipated institutional context influences risks and returns associated with investment in a specific location (Xu, 2010). Thus, good governance is a prerequisite to secure property rights, enforcement of contracts and for the provision of

adequate public goods and the control of public "bads." Without this assurance, citizenry lose the incentive to save and invest (Dixit, 2009).

Although a well functioning government is known to influence the performance of the financial sector, there is little evidence linking well-functioning institutions to financial intermediaries' outcomes. Kauffman et al (2009) for example, show that if citizen' perceptions regarding the inefficiency of both the commercial and criminal justice system are corrupt; they are unlikely to seek their services.

Most of the existing empirical literature on institutions development focuses on the impact of economic growth by referring to three different environmental aspects: physical endowments, culture and institutions which are often interrelated and difficult to disentangle[10]. The empirical evidence is unequivocal that institutions matter for growth. Williamson, (2009) shows that formal institutions are only successful when embedded in informal constraints. Berggren, (2008) demonstrates that secure property rights, rule of law and light regulatory burden particularly that geared towards contracting appear to robustly promote growth and prosperity. Jerzmanowski (2006), evidence points towards favourable and sustained growth regimes emanating from sound economic institutions. Rodrik (2005; 2008), William (2008), Williamson, (2000), Hausmann et al (2005), Acemoglu, et al (2001), finds a positive and significant effect of institutions on growth accelerations. Acemoglu (2006), demonstrate that distortionary policies, economic crises, and slow economic growth are due to the weakness of political institutions. Gwartney et al (2006), shows that countries with high quality institutions are able to attract more private investment. Glaeser et al (2004), Rodrik, et al (2004), Durnev et al. (2003), find that property rights, shareholder rights, stock market transparency and capital account openness contribute to efficient

10 The impact of culture, religion and endowments has been extensively documented in literature. Examples include empirical studies of the relationship between endowments and economic development , between culture and a country's legal system (Acemoglu et al., 2001) and between culture and governance (La Porta et al., 1998)

capital allocation and economic growth. These studies show that good institutions matter in fostering economic growth and financial development. What is clearly lacking from the literature is the impact of country-specific institutions on microfinance profitability.

Hartarska and Nadolnyak (2007) examine the determinants of MFIs operational self sufficiency and find no significant impact from per capita income or any measures of economic freedom and property rights. Consistent findings are also documented by Hartarska (2009) who examine the effects of external governance mechanisms on MFIs' performance, and conclude that regulatory involvement and financial statement transparency do not impact on performance, while some but not all rating agencies may play a disciplining role. This evidence is also confirmed by Arun and Annim (2010) who investigate the effect of external governance structure and functioning on the outreach and financial objectives of MFIs. Contrary to corporate governance studies, external governance indicators fail to cause changes in the profitability of MFIs. On the contrary Ahlin et al (2011) do not find MFI operational self-sufficiency (OSS) to be significantly influenced by governance measures. Similar inconsistent findings were arrived at by Cull et al (2009b) who controls for the same governance indicators for the period 1996-2006. Additionally Crabb (2008) models OSS as a function of both firm level and environmental context and shows that MFIs operate primarily in countries with a relatively low degree of overall economic freedom and that government intervention in the economy can reduce their sustainability. These estimation results therefore remain inconclusive.

One major shortcoming with these previous studies is that they do not attempt to control for endogeneity. Moreover these studies focus on Operational Self Sufficiency but which can be misleading since it lumps together genuine operating net revenue with transfers. It is for this reason that Microfinance Financial Reporting Standards recommends the use of ROA and ROE as measures of profitability rather than financial self-sustenance (FSS) and operational self-

sustenance (OSS). Table 2.2 attempts to reconcile the seemingly inconclusive findings on MFI profitability by summarizing the main findings emerging from the reviewed section on microfinance performance.

Table 2.2: Summary of empirical studies and direction of impact.

Variable	Return on assets	Operational self sustainability	Financial self sustainability
Size	Arun and Annim (2010), Insignificant	Mersland and Strøm (2009). +	Cull, et al (2011). Insignificant
	Cull, et al (2011). Insignificant	Hartarska and Nadolnyak (2007). +	Cull, et al (2009b). Insignificant
	Cull, et al (2009b). +	Cull, Demirgüç-Kunt, Morduch (2007). +	Cull, Demirgüç-Kunt, Morduch (2007). +
	Mersland and Strøm (2009). +	Hartarska, (2005). Insignificant	
	Hartarska (2009) +		
	Coleman and Osei (2008) +		
	Cull, Demirgüç-Kunt, Morduch (2007). +		
	Hartarska, (2005). Insignificant		
Efficiency	Arun and Annim (2010), -	D'Espallier et al (2010) –	Cull, et al (2011). –
	Cull, et al (2011). –		Cull, et al (2011). –
	D'Espallier et al (2010) –		
	Cull, et al (2009b). –		
Age (yrs)	Arun and Annim (2010), +	Ahlin et al (2011) +	
	D'Espallier et al (2010) Insignificant	D'Espallier et al (2010) Insignificant	Cull, et al (2011). Insignificant
	Cull, et al (2009b). –	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, et al (2009b). Insignificant
	Cull, et al (2011). Insignificant	Hartarska and Nadolnyak (2007). +	
	Cull, Demirgüç-Kunt, Morduch (2007).	Hartarska, (2005). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007).

	+		+
	Hartarska, (2005). Insignificant	Mersland and Strøm (2009). -	
	Mersland and Strøm (2009). Insignificant		
	Hartarska (2009) +		
	Coleman and Osei (2008) -		
Competition	Mersland and Strøm (2009). Insignificant	Hartarska and Nadolnyak (2007). Insignificant	
		Mersland and Strøm (2009). Insignificant	
Capital	Hartarska (2009) Insignificant	Hartarska and Nadolnyak (2007). +	
Portfolio at risk	Arun and Annim (2010), -	Mersland and Strøm (2009). +	
	Mersland and Strøm (2009). Insignificant		
	Hartarska (2009) Insignificant		
Village banking lending contract	Cull, et al (2011). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, et al (2011). +
	Cull, et al (2009b). Insignificant		Cull, et al (2009b). +
	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant		Cull, Demirgüç-Kunt, Morduch (2007). Insignificant
Solidarity group lending	Cull, et al (2011). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, et al (2011). Insignificant
	Cull, et al (2009b). Insignificant		Cull, et al (2009b). Insignificant
	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant		Cull, Demirgüç-Kunt, Morduch (2007). Insignificant
Individual loan contracts	Mersland and Strøm (2009). Insignificant	Mersland and Strøm (2009). Insignificant	
Regulated	Arun and Annim (2010), +	Mersland and Strøm (2009). Insignificant	Cull, et al (2011). Insignificant
	Tchakoute-Tchuigoua (2010) Insignificant	Hartarska and Nadolnyak (2007). Insignificant	

	Mersland and Strøm (2009). Insignificant		
Outreach depth (Average loan size)[11]	Arun and Annim (2010), -	Ahlin et al (2011) +	
	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant
Portfolio to assets ratio	Cull, Demirgüç-Kunt, Morduch (2007). +	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). +
	Coleman and Osei (2008) +		
For-profit legal status	Tchakoute-Tchuigoua (2011) Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant
	Tchakoute-Tchuigoua (2010) +		
	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant		
Board size	Mersland and Strøm (2009). Insignificant	Mersland and Strøm (2009). Insignificant	
	Coleman and Osei (2008) +		
Board independence	Coleman and Osei (2008) +		
Property rights	Arun and Annim (2010), Insignificant	Hartarska and Nadolnyak (2007). Insignificant	
Voice and Accountability	Arun and Annim (2010) -		
Enforcement of Contract	Arun and Annim (2010) +		
Credit Information	Arun and Annim (2010) Insignificant		
Economic freedom		Hartarska and Nadolnyak (2007). Insignificant	
Informal sector size	Hartarska (2009) Insignificant	Hartarska and Nadolnyak (2007). +	
Private credit/GDP		Ahlin et al (2011) Insignificant	
Inflation	Cull, et al (2009b). Insignificant	Hartarska and Nadolnyak (2007). +	Cull, et al (2009b). Insignificant
	Hartarska, (2005). Insignificant	Hartarska, (2005). -	
GDP	Cull, et al (2009b). +	Ahlin et al (2011) Insignificant	Cull, et al (2009b). +

[11] Average Loan Balance per Borrower/GNI per Capita

		Hartarska and Nadolnyak (2007). Insignificant	
Rural population (%, 1990)	Cull, et al (2009b). Insignificant		Cull, et al (2009b). Insignificant
Rural population growth (%)	Cull, et al (2009b). Insignificant		Cull, et al (2009b). Insignificant
KKM[12] index	Cull, et al (2009b). Insignificant		Cull, et al (2009b). Insignificant
Eastern Europe and Central Asia region	Cull, et al (2009b). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). +	Cull, et al (2009b). Insignificant
	Cull, Demirgüç-Kunt, Morduch (2007). +		Cull, Demirgüç-Kunt, Morduch (2007). Insignificant
Africa	Cull, et al (2009b). Insignificant		Cull, et al (2009b). Insignificant
	Cull, Demirgüç-Kunt, Morduch (2007). +	Cull, Demirgüç-Kunt, Morduch (2007). +	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant
South Asia	Cull, et al (2009b). –	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, et al (2009c). –
	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant		Cull, Demirgüç-Kunt, Morduch (2007). Insignificant
East Asia and Pacific	Cull, et al (2009b). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, et al (2009b). Insignificant
	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant		Cull, Demirgüç-Kunt, Morduch (2007). Insignificant
Middle-East and North Africa	Cull, et al (2009b). Insignificant	Cull, Demirgüç-Kunt, Morduch (2007). Insignificant	Cull, et al (2009b). Insignificant
	Cull, Demirgüç-Kunt, Morduch (2007). +		Cull, Demirgüç-Kunt, Morduch (2007). Insignificant

12 KKM is the Kaufmann, Kraay, Mastruzzi index of institutional development

2.2.4 Conclusion

The main purpose of this chapter was to survey existing theoretical and empirical literature with a focus on microfinance performance. Microfinance literature has a strong focus on the peculiarities of microfinance which differ significantly with those of traditional banking (Armendáriz and Morduch 2010). These peculiarities include but are not limited to the type of lending technologies employed to overcome incentive problems in lending to informal business and poor households (e.g. Stiglitz 1990), and second microfinance has a social mission of alleviating poverty on borrowers (Banerjee et al 2009). It is against this backdrop that there has been a long debate on the question of whether MFIs can be financially sustainable (Morduch, 1999b; Hermes and Lensink 2007; Balkenhol, 2007).

Empirical studies have explored the determinants of MFIs sustainability, including the type of loan contracts used, the institutional ownership, institutions' age, loan size, gender of clients, governance, regulation and capital structure of institutions, as well as country level macroeconomic and institutional context (Cull, Demirgüç- Kunt and Morduch 2007; Bogan 2009; Mersland and Strom 2009; Ayayi and Sene 2010; Cull, et al 2011; Ahlin et al 2011). To some extent, MFIs can achieve sustainability while serving the poor (Hermes and Lensink 2011). However, and as elucidated in Hermes and Lensink, (2007), the question on the determinants of MFI profitability remain unanswered. MFIs could in principle be financially sustainable but not profitable. This question is therefore very relevant given the increased investments from commercial players that target their money towards MFIs, with the aim of earning returns from the investments. Profit-maximizing investors would have limited interest in most of the institutions that focus on social mission (Cull et al 2009a; Guérin, et al 2011). Moreover, measures of sustainability differ between studies and are sometimes rather *ad hoc*, making comparisons difficult.

Although literature on the impact of outreach on financial performance is not extensive and is largely anecdotal, there is a strong evidence of a trade-off. Empirical evidence adduced so far shows that outreach does compromise financial sustainability (Cull, Demirgüc-Kunt and Morduch 2007; Hermes, Lensink, and Meesters 2011). This evidence is relevant for policy makers, since putting emphasis on poverty reduction comes at a price, which may be a reduction on the scope for financial sustainability. This trade-off is relevant for commercial investors, especially those who aim for socially responsible investments. It is however important to note that the evidence adduced here mostly relate to financial sustainability and not MFI profitability. Thus the question on whether outreach explains MFIs profitability remains un-answered, which calls for further empirical research with theoretical and empirically sound underpinnings.

Our literature survey points to unresolved issues on the impact of regulation on microfinance profitability. Although Seibel (2003) and Guinnane (2002) draw attention to how financial history justifies the need for appropriate legal frameworks in order to support the development of pro-poor financial systems, recent empirical evidence shows mixed results. Contrary to the arguments offered by proponents of regulating MFIs (see for example Arun 2005), the innovation provided by (Cull et al., 2011; Tchakoute-Tchuigoua 2010; Mersland and Strøm (2009), shows that regulation is not significantly associated with MFI profitability. This finding is inconsistent with Hartarska (2005). The policy implication is that MFIs' transformation into regulated financial institutions may not lead to profitability. But to the extent that other variables included in the regression may partially account for credit risk, this explains the failure of legal status to significantly affect MFI returns. These studies underscore the importance of taking into account the trade-offs and for further empirical scrutiny.

Our literature survey shows that evidence on the link between microfinance competition and profitability is scant and mixed. The finding by Hisako (2009) is unequivocal that

competition does not worsen financial self-sufficiency which confirms Mcintosh, De Janvry and Sadoulet (2005). This is consistent with McIntosh and Wydick (2005) theoretical underpinnings. Mersland and Strøm (2009), on the contrary finds higher competition to lower portfolio yield among MFIs which lowers profitability. Although, Cull et al (2009b) findings on profitability are insignificant, their study focus on country-level indicators of competition, rather than measures that would reflect firm level competition amongst the MFIs. Though these findings remain inconclusive, their focus is also on OSS rather than profitability.

Turning to the impact of governance on MFI profitability; empirical evidence on MFIs performance is scant and consistency in findings within and across studies is rare. The innovation by Hartarska (2009) who adopt an empirical approach usually employed in cross-country banking research finds that some rating agencies may play a disciplining role which subsequently affects performance. Although Mersland and Strøm (2008; 2009), Coleman and Osei, (2008), Hartarska (2005) conclude that governance matters on MFIs performance, they have difficulties in identifying significant governance influence. Another drawback in these studies is that they do not in their analysis adequately take into account the fact that most MFIs do not intend to be shareholder owned, have multiple goals, and do not have an inherent profit motive. Additionally, MFIs differ from regular corporate entities in that they encounter horizontal agency problems between themselves and their clients while at the same time donor-funded MFIs face agency costs in their relationships with donors (Adams and Mehran, 2003). Further research is therefore necessary to reconcile the reported evidence and with a focus on profitability rather than sustainability.

While there is a vast literature on the optimal capital structure of corporate firms, the application of the Modigliani and Miller (1958) theorem and other corporate finance theorems to microfinance institutions is not straight-forward. There have been no systematic empirical studies

for a large group of MFIs that would provide robust evidence of how variations in funding affect MFIs profitability. MFIs with access to donor funds may not operate efficiently or may deliberately choose outreach over profitability (Armendáriz and Morduch, 2010). Cheap external funding may attract an inefficient MFI, which relies on the implicit subsidy to cover its high operating costs (Ghosh and Tassel 2011) and this has implications on profitability as well. Studies that would provide empirical evidence on this policy relevant issue are however lacking.

Theoretical contributions on contract design in combination with randomized control trials continue to be important tools to determine the ingredients of microfinance's performance. In spite of these theoretical underpinnings on the importance of the type of loan contract, the basic empirical question of whether it matters for MFI profitability has remained unanswered. The innovation provided by Cull, Demirgüc-Kunt and Morduch (2007) shows that institutional design matter substantially. Specifically, MFIs that do not use group-lending methodology to overcome incentive problems experience weaker portfolio quality and lower profitability rates. On the contrary, Mersland and Strøm, (2009) find that individual loan contract is never a significant variable in all their regressions. We do not find estimation results from these studies as convincing since they do not control for endogeneity. Studies that have used field experiments to circumvent endogeneity report mixed findings. Though Feigenberg, et al (2010), Giné et al (2010), Berhane, et al (2009), finds joint liability contract to improve on MFI performance, inconsistent findings are documented by Pellegrina (2011), Chen, Choi and Sawada (2010). These studies do not therefore provide answers to the policy relevant question of whether the type of debt contract influences profitability of microfinance institutions.

CHAPTER THREE

WHAT EXPLAINS THE LOW PROFITABILITY OF MICROFINANCE INSTITUTIONS IN AFRICA[13]?

3.1 Introduction

In spite of many MFIs realizing high loan repayment rates, few are profitable to date. In Table 1.2 (see chapter one), we reported that MFIs in Africa have on average consistently reported negative profits compared to other regions. For a poverty intervention as widespread as microfinance, with over five billion dollars invested each year (CGAP 2009a; Forster and Reillie, 2008) and an estimated 205 million clients worldwide (Maes and Reed, 2012), there is surprisingly little rigorous evidence of the determinants of microfinance profitability. This is due to inadequate and unreliable data (Honohan 2004b).

This study has two goals. One is to clearly identify, on the basis of empirical evidence and in a single static equation framework, significant determinants of MFIs' profitability. To achieve this objective, we used an unbalanced panel dataset of Africa MFIs over the period 1997-2007. This chapter draws from economic theory to assess the role of determinants of profitability and then evaluates a corpus of relevant evidence. We primarily use several exogenous variables to control for a wide array of MFI specific, institutional and country level differences that might confound the inferences which we draw upon.

The second goal is to investigate whether MFIs seek to maximize profits or whether they are pursuing additional objectives as well. Managerial objectives may vary systemically with for example MFI size. Of relevance also is the need for risk management in the microfinance sector

13 A previous version of this chapter was presented at the 8th Infiniti Conference on International Finance, June 14-15, 2010, Trinity College, Dublin; West Midlands Regional Doctoral Colloquium (Aston and Birmingham Business Schools) held on 17th June 2010; 6th Portuguese Finance Network to be held at the Azores, July 1-3, 2010, and EBES 2010 Conference-Athens, Greece October 28-30, 2010. I acknowledge the inputs of the conference participants.

which is inherent in the nature of their business. The standard profit analysis assumes explicitly or implicitly, that firms face market-priced risk which does not vary with production decisions. This simplification undermines the model's usefulness when applied to an industry such as microfinance where risk and risk-related phenomena including moral hazard plays an important role in the intermediation process.

Much of the applied economics literature in this area addresses the social worth of microfinance organizations (e.g., Bruett, 2005; Navajas et al., 2003; Navajas et al., 2000), measuring for example; the impact of village-level microfinance institutions (Menkhoff and Rungruxsirivorn 2011; Kaboski and Townsend, 2005), the impact of microcredit on the poor (Karlan and Zinman 2010; Brau, Roodman and Morduch 2010; Hiatt and Woodworth 2009; Kaboski and Townsend 2010; Dupas and Robinson 2009; Mohindra, et al 2008), costs and benefits of subsidies (Armendáriz and Morduch, 2010), correlations for MFIs and commercial banks (Krauss and Ingo, 2009), microfinance and mission drift (Armendáriz and Szafarz 2011; Hishigsuren, 2007; Copestake 2007), impact analysis (Hartarska and Nadolnyak 2008b), efficiency of MFIs (Gutiérrez-Nieto et al, 2010, 2009, 2007; Caudill, Gropper and Hartarska 2009), competition between MFIs and traditional banks (Cull et al 2009b, c), women and repayment in microfinance (D'Espallier et al 2011), microfinance commercialization (Montgomery and Weiss 2011; Galema and Lensink 2009), microfinance plus (Lensink, and Mersland, 2009), outreach-sustainability trade off (Hermes and Lensink 2011; Cull, Demirgüc-Kunt and Morduch (2007) and studies that examine the relationship between MFI performance and corporate governance (Mersland and Strøm, 2009). There has however, been limited up-to-date scholarly research detailing factors that explain microfinance profitability.

It is against this background that this study raises several key research questions: (1) Documented evidence shows that self sufficient MFIs have more clients, assets, mobilize

deposits and have diversified credit lines (Aschcroft, 2008; Balkenhol, 2007). Could it be that failure to become profitable is due to lack of scale economies? (2) MFIs are subject to significantly higher transaction costs than conventional retail banks both in absolute and relative terms. These expenses include cost of funds for on-lending, the loan loss, and administrative[14] costs (Cull et al 2009a). What evidence exists to the effect that efficient management of expenses affect MFI investment and hence profitability? (3) Theory suggests that increased exposure to credit risk is normally associated with decreased bank profitability (see e.g. Cooper et al., 2003). Does this also hold true for the microfinance industry? (4) Does age of the MFI or learning effects matter in explaining MFIs profitability? (5) Well-capitalized banks are regarded to be less risky. Is this also true for the MFIs? (6) Literature shows that funding constraints have hindered the expansion of microfinance activities. Does gearing ratio have an important implication on MFIs profitability? (7) To what extent are discrepancies in MFIs' profitability due to variations in macroeconomic environment which is not under the control of MFI management? (8) Do ingredients of growth such as better institutions make microfinance more profitable? The joint analysis of these eight issues is important if we want to provide answers to more articulated questions on microfinance performance.

This study makes four main contributions to policy and existing literature. (1) It is timely, in view of the current emphasis on the role of finance in economic growth. (2) Understanding determinants of MFI's profitability may help a growing number of investment funds that target their money towards MFI's, with the aim of earning returns from the investments. (3) Any microfinance evaluation that does not take into account external factors, if they are found to robustly and non-negligibly predict MFI profitability would be incomplete. (4) At the policy

14 This includes identifying and screening clients, processing loan applications, disbursing payments, collecting repayments, and following up on non-repayment

level, examining factors that impact on MFI profits is important for forming credit market policy that may help deepen the quantity and quality of access to finance by the poor.

Although vast similar studies on firm-specific and macroeconomic determinants of conventional banking performance have been conducted in; Japan (Liu and Wilson 2010), Italy (Marcucci and Quagliariello 2008), Greece (Athanasoglou et al., 2008; Kosmidou 2008; Spathis et al. 2002), China (Hsiu-Ling et al 2007), European Union (Pasiourasa and Kosmidou 2007; Carbo, 2007; Goddard, et al. 2004b; Molyneux and Thornton 1992), United Kingdom (Kosmidou et al., 2006), Cross country (Laeven and Majoni 2003; Bikker and Hu 2002; Demirgüc-Kunt and Huizingha 1999), South Eastern European Region (Athanasoglou et al., 2006), Nigeria (Beck et al., 2005), Malaysia (Guru, et al., 2002) and the United States of America (Angbazo, 1997; Neeley and Wheelock 1997; Berger, 1995; Boyd and Runkle 1993), their empirical results are difficult to generalize in microfinance. It is therefore far from a fore-drawn conclusion that what holds true for the traditional banking sector will also hold for MFI's. Thus, we lack sufficient empirical analyses in this field.

The remainder of this chapter is organized as follows. Section 2 provides a background of the existing literature, relating banking profitability to its determinants as well as distinguishing between single and cross-country studies while, drawing on both theoretical and empirical work. Section 3 describes conceptual framework and the model specification. In Section 4, we provide detailed description of data, which include measurements of our variable of interest. Section 5 discusses econometric methodology. Section 6 presents the empirical results and findings. Conclusions and some policy suggestions are offered in the final section by pointing out some unresolved issues, undiscovered territory and the future of microfinance in Africa.

3.2. Review of the background literature

Owing to limited literature on microfinance performance, this sub-section borrows heavily from the banking literature, since MFIs offer banking services to the poor. Existing literature defines profitability of a financial intermediary as the return on assets (ROA) or the return on equity (ROE). This is measured and/or expressed as a function of internal and external factors. Internal factors are those influenced by management decisions or within the control of firm management. Such factors include firm size, capital adequacy, credit risk provisioning, and efficiency in the management of operating expenses. The external determinants include macroeconomic and industry-specific factors which reflect the economic, legal and business orientation within the context where the financial institution operates. A number of explanatory variables have been proposed for both categories depending on the nature and purpose of each study.

There is no convergence on the empirical evidence on firm size. Significant predictions of theories are not supported, and interesting regularities in the data are not predicted, thus anecdotal explanations abound. Sufian and Habibullah (2009) examine the determinants of the profitability of the Chinese banking sector during the post-reform period of 2000-2005 and conclude that the impacts on bank profitability depend on the bank types. During the period under study, they find size to lower city commercial banks profitability. Along the same vein Hsiu-Ling et al (2007) investigate the main determinants of the bank profitability in China. They find that the more assets a bank has, the worse will be its return on assets (ROA). Both studies render support for the diseconomies of scale. Consistent with this finding, Pasiourasa and Kosmidou (2007), find diseconomies for larger banks which apply to both domestic and foreign banks. The negative coefficient indicates that in both cases, larger (smaller) banks tend to earn lower (higher) profits and gives credence to previous studies which include (Kosmidou et al., 2006; Bikker and Hu

2002; Demirgüc-Kunt and Huizingha 1999; Boyd and Runkle 1993) that found either economies of scale and scope for smaller banks or diseconomies for larger financial institutions.

Contrasting findings confirming economies of scale are evident. Using a self-constructed global dataset on MFIs collected from third-party rating agencies, Mersland and Strøm, (2009) examine the relationship between MFI performance and corporate governance while controlling for MFI size. Using random effects panel data estimations they find that financial performance improves with firm size. These findings are consistent with Cull, Demirgüc-Kunt, and Morduch (2007). In the banking industry Kosmidou (2008) use total assets of the bank to control for size and similarly find a positive impact on profitability which confirms Athanasoglou et al (2006), Beck et al. (2005), Naceur and Goaied (2001), Spathis et al. (2002), Altunbas et al. (2001), Berger and Humphrey, (1997), who similarly find large banks to be more profitable, consistent with the predictions of modern intermediation theory.

There has been an extensive literature on efficiency in the management of operating expenses and firm performance. Sufian and Habibullah (2009) investigate the determinants of the profitability of the Chinese banking sector and find inefficiency in operating expenses management to impact negatively on bank profits. This confirms Athanasoglou, et al (2008) who applies a GMM technique to a panel of Greek banks covering the period 1985-2001 and similarly finds operating expenses to significantly impact negatively on bank profitability. They are however quick to point out that the negative effect means that there is a lack of competence in expenses management since banks pass part of increased cost to customers. Consistent findings have been documented by Kosmidou (2008) who examine the determinants of performance of Greek banks during the period of EU financial integration (1990-2002), Pasiourasa and Kosmidou (2007), Athanasoglou et al (2006) and Kosmidou, et al (2005). Previous evidence on the same include Guru et al. (2002) Bourke (1989) and Molyneux and Thornton (1992). Similar

estimation results have been reported in microfinance literature. Cull, Demirgüc-Kunt, and Morduch (2007) conclude that the impact of costs on profitability of MFIs depends on an institution's lending methodology. Contrasting findings are evident. Hollis and Sweetman, (2007) investigate the impact of capital structure on non-interest operating costs using data on Irish loan funds[15]. They find that higher net income is associated with higher salaries and other non-interest costs. Indeed, higher capital-deposit ratios led to higher operational costs even after controlling for net income. These findings suggest that depositors could assist in controlling operational costs in MFIs.

The issue of whether firm's age matter has generated large amounts of empirical research. In the banking industry and contrary to theoretical predictions, Hsiu-Ling et al (2007) establish that the longer a bank has been in existence, the worse the return on assets (ROA). Similarly, Beck et al (2005) shows that older institutions perform worse which imply that the new entrants into the market are better able to pursue new profit opportunities. Moreover, newer institutions appear to enjoy more autonomy in their decision-making, and are more willing to innovate. Inconsistent findings in microfinance have been documented by Cull, Demirgüc-Kunt, and Morduch (2007) who concludes that an institution's age is significant and positively linked to financial performance. Clearly the evidence remains inconclusive and contestable.

Both theoretical and empirical studies show that capital adequacy is important in determining bank profitability. Sufian and Habibullah (2009), find capital to have a positive impact on bank profitability in China. This confirms Athanasoglou, et al. (2008, 2006) and Kosmidou (2008) who also finds a positive and significant effect of capital on bank profitability, reflecting the sound financial condition of banks. Boubakri, et al. (2005) examine the post-privatization performance of 81 banks from 22 developing countries and establish a similar

15 Rather than being financed by equity-holders these community based organizations were financed by deposits and capital which comprised of donations and accumulated profits and which created problems of managerial moral hazard.

result. Consistent previous findings include Goddard, et al. (2004b), Naceur and Goaied (2001), Molyneux and Thornton (1992), Berger, (1995) and Demirgüc-Kunt and Huizinga, (1999).

Empirical evidence on the impact of quality of loan portfolio on profitability is mixed. Mersland and Strøm (2009) do not find credit risk to be a significant determinant of performance. On the contrary, Athanasoglou, et al. (2008) finds credit risk to be negatively and significantly related to bank profitability which confirms previous findings by Athanasoglou et al (2006). Additionally, Kasimodio (2008) evidence a negative and statistically significant impact of loan loss reserves to loans on profitability, which implies that financial institutions can reduce the variability of reported income by making higher provisions than necessary when credit quality and net income are high, during favourable economic conditions. This finding lends support to Boubakri, et al (2005), who using the past due loans to total loans ratio, and a measure of interest rate risk that is equal to short term assets minus short term liabilities over total assets arrives at the same conclusion. Few studies evidence a positive relationship between credit risk and performance. Sufian and Habibullah (2009) findings suggest that credit risk has positive impacts on the state owned commercial banks and joint stock commercial profits which is consistent with Anghazo (1997). Evidence from microfinance is lacking.

Financial institutions performance is sensitive to prevailing macroeconomic conditions. Using a panel of Italian banks, Marcucci and Quagliariello (2008) finds that loan loss provisions and bad debts increase during economic growth slump. Laeven and Majoni (2003) provide similar evidence in a cross-country comparison. Athanasoglou, et al. (2008), similarly find a positive impact on bank profitability in the Greek banking industry which confirms Athanasoglou et al (2006) and Beck and Hesse (2006). Kasimodiou (2008) find growth of GDP to have a significant and positive impact on profitability, consistent with Kosmidou et al. (2005), while inflation has a significant negative impact. Athanasoglou, et al. (2008), find inflation and cyclical

output to affect the performance of the banking sector negatively, while Hsiu-Ling et al (2007) conclude that per capita GDP has a positive impact. Pasiourasa and Kosmidou (2007) find inflation to be positively related to domestic banks, implying that during the period of their study the levels of inflation were anticipated by domestic banks[16]. The results about the impact of per capita incomes on domestic banks profitability are consistent with those of Kosmidou et al. (2005), Kosmidou (2008). Other similar previous findings include Neeley and Wheelock (1997) who explore the profitability of a sample of commercial banks in the US over the 1980-1995 periods.

Empirical evidence suggests that better institutional environment will have a positive impact on net interest margins (see for example William and Levine, 2003). MFIs operating in countries with better protection of property rights are also able to reach more borrowers (Hartarska and Nadolnyak, 2007). Existing empirical studies on corruption shows a negative impact on performance. In Uganda, for instance, bribes increase companies' operating cost by about 8 per cent (Ng, 2006). Gelos and Wei (2006), show that endemic corruption is associated with lower investment from international funds. They also find that during financial crises, international funds flee corrupt economies by a greater amount than their transparent counterparts.

Even though these studies show that it's possible to conduct a meaningful analysis of MFI profitability, there is no single study that provides definitive proof for any claim in microfinance profitability. Moreover some issues are not dealt with sufficiently. First, a vast amount of the literature has examined determinants of profitability at the bank level. Second, in most of the literature, the econometric methodology is not adequately described. To conclude therefore, our

16 This gave the banks the opportunity to adjust the interest rates accordingly and consequently earn higher profits. With regard to foreign banks, inflation triggered a higher increase in costs than revenues as the negative relationship between inflation and foreign banks profits shows. These mixed results can be attributed to different levels of country-specific macroeconomic conditions and expectations concerning inflation rate between domestic and foreign banks.

review of banking literature shows that there is only limited empirical evidence on some of the issues under consideration and scant in microfinance. The few studies available within the realm of microfinance remain anecdotal and contestable.

Our study aims at going beyond the existing empirical analyses in two important ways. First, while focusing on Africa, we use a substantially larger dataset, containing information for a large number of MFIs over a longer period of time than any of the previous studies in this field. Secondly, we incorporate variables that capture issues that have not been examined before. In particular, we factor in credit risk and factors external to MFIs management. In order to do this, we formulate a profit function and apply static analysis to determine the impact of various exogenous variables on MFI profitability.

Table 3.1: Summary of empirical findings and direction of impact.

	Banks (dependent variable ROA)								
Banks specific	Size	Flamini et al (2009) +	Sufian and Habibullah (2009) -	Athanasoglou, et al (2008)- Insignificant	Kosmidou (2008) +	Hsiu-Ling et al (2007) -	Pasiourasa and Kosmidou (2007) -	Kosmidou et al., (2006) -	Athanasoglou et al (2006) +
	Efficiency	Flamini et al (2009) -	Sufian and Habibullah (2009) -	Athanasoglou, et al (2008) -	Kosmidou (2008) -	Pasiourasa and Kosmidou (2007) -	Athanasoglou et al (2006) -	Kosmidou, et al (2005) -	Guru et al. (2002) -
	Age (yrs)	Hsiu-Ling et al (2007) -	Beck et al (2005) -						
	Labour Productivity	Athanasoglou, et al. (2008) +							
	Capital	Flamini et al (2009) +	Sufian and Habibullah (2009) +	Athanasoglou, et al (2008) +	Kosmidou (2008) +	Athanasoglou et al (2006) +	Boubakri, et al. (2005) +	Naceur and Goaied (2001) +	Demirgüc-Kunt and Huizinga, (1999) +
	Credit risk	Flamini et al (2009) +	Sufian and Habibullah (2009) -	Athanasoglou, et al (2008)- Insignificant	Kosmidou (2008) +	Athanasoglou et al (2006) +	Boubakri, et al (2005) -	Anghazo (1997) +	
	Activity mix[17]	Flamini et al (2009) +							
Industry specific	Concentration	Flamini et al (2009) Insignificant	Athanasoglou, et al. (2008) Insignificant						
	Charter /ownership	Athanasoglou, et al. (2008) Insignificant							
Macroeconomic environment	Inflation	Flamini et al (2009) +	Kasimodiou (2008) -	Athanasoglou, et al. (2008) -	Athanasoglou et al (2006) -	Pasiourasa and Kosmidou (2007) +			
	Per Capita Income	Flamini et al (2009) Insignificant	Sufian and Habibullah (2009) +	Marcucci and Quagliariello (2008) +	Kasimodiou (2008) +	Hsiu-Ling et al (2007) +	Pasiourasa and Kosmidou (2007) +	Kosmidou et al. (2005) +	Laeven and Majoni (2003). +

[17] The ratio of net interest revenues over other operating income.

	Business cycle	Flamini et al (2009) +	Athanasoglou, et al. (2008) +						
MFIs									
MFI specific	Size	Cull et al (2011) Insignificant	Mersland and Strøm, (2009) +	Cull et al (2007) +					
	Efficiency	Cull et al (2011) Negative	Cull et al. (2007) Negative						
	Age (yrs)	Cull et al (2011) Insignificant	Cull et al (2007) +	Mersland and Strøm, (2009), Insignificant					
	Credit risk	Mersland and Strøm, (2009), Insignificant							
	Lending methodology	Cull et al (2011) Insignificant	Mersland and Strøm, (2009), Insignificant	Cull et al (2007) Insignifiant					
	Regulated	Cull et al (2011) Negative	Mersland and Strøm, (2009), Insignificant						
	Outreach (Average loan size)[18]	Cull et al (2007) Insignifiant							

[18] Average Loan Balance per Borrower/GNI per Capita

3.3. Modelling profitability: an application to microfinance

3.3.1 Conceptual framework

Microfinance sector is very diverse in terms of industrial organizational, with MFIs organized as credit cooperatives/unions, non-governmental organizations (NGOs), banks and non-bank financial institutions. This diversity makes it difficult to choose appropriate conceptual framework thereby complicating the analysis. For example, the overall equation linking labour and capital inputs into profits still proves difficult to master (Cull, Demirgüç-Kunt and Morduch 2007).

3.3.1.1 Design of the model

Microfinance industry is characterized by a different production function to that of conventional profit seeking retail banks or any other corporate entity. MFI is a unique type of a financial institution with risk and return characteristics different from that of traditional banks. While retail profit seeking banks loans are characterized by large sizes, large markets, long maturities, microfinance receivables are uncollateralized and with a short term maturity. Moreover, MFIs also have a double bottom line mission of reducing poverty while at the same time maximizing firm value. It is therefore plausible that there are additional factors that impact on MFI profitability in addition to bank level specifics such as measures of outreach.

To empirically ascertain significant determinants of microfinance profitability in Africa, a multivariate linear regression model has been predicted. While we have not specified any test to support using the linear function, it is evident that the linear functional form is widely used in the literature and produces good results; see for example Mersland and Strøm, (2009), Marcucci and Quagliariello (2008), Athanasoglou et al (2006; 2008), Kasimodiou (2008), Kosmidou et al. (2005), Hsiu-Ling et al (2007), Pasiourasa and Kosmidou (2007), Goddard et al. (2004a) Demirgüc-Kunt and Huizinga (2000), Bourke (1989), and Molyneux and Thornton (1992), who

use linear models to estimate the impact of various factors that may impact on financial institution profitability.

3.3.1.2 Functional form of the equation

In an effort to develop an empirical model, we recognize that it is important to follow the principle of parsimony and try to find the simplest model that best fits our data. Inorder to design an appropriate regression model, it is imperative that we begin with a base specification which rely on theory and then add or drop variables based on adjusted R^2 and t-statistics. To frame our empirical analysis, the subsequent regression analysis starts from the following basic linear equation[19]:

$$\Pi_{ict} = \alpha + \sum_{j=1}^{J} \beta_j X_{ict}^{j} + \sum_{m=1}^{M} \beta_m X_{ct}^{m} + \sum_{n=1}^{N} \beta_n X_{ct}^{n} + \varepsilon_{itc} \quad \text{.....(3.1)}$$

Where Π_{ict} is the profitability of MFI *i* located in country *c*, at time *t*, with i=1, . . .,N, t=1, . . .,T; c=1,…,C,; α is the regression constant, X_{ict}^{j} is a vector of MFI-specific characteristics (*j*) of MFI *i* in country *c* during the period *t* which vary across time and MFIs; X_{ct}^{m} is a vector of macroeconomic variables (*m*) in country *c* during the period *t*; X_{ct}^{n} is a vector of institutional development indicators (*n*) in country *c* during the period *t* and $\varepsilon_{itc} = \upsilon_i + \mu_{itc}$ is the disturbance, with υ_i the unobserved MFI-specific effect/heterogeneity across MFIs, which could be very large given the differences in corporate governance and μ_{itc} the idiosyncratic error. This is a one-way error component regression model[20], where $\upsilon_i \sim IIN(0, \sigma_\upsilon^2)$ and independent of $\mu_{it} \sim IIN(0, \sigma_\mu^2)$.

19 This linearity assumption is however not binding. Bourke (1989), for instance suggests that any functional form of bank profitability is qualitatively analogous to the linear.

20 The work horse for unbalanced panel data applications is the one-way error component regression model (see Baltagi and Song 2006)

Due to the significant differences that exist across Africa microfinance industry, we test for potential cross-country effects. Additionally, it is possible that, within the eleven years time frame of our analysis, certain developments might have taken place and therefore time effects may be present in the error component of the model. We contend that failure to account for these two effects is likely to bias our estimates. We test for country and time effects by including time and country specific dummies, respectively, in equation (3.1). The econometric model is therefore expanded as follows,

$$\Pi_{ict} = \alpha + \sum_{j=1}^{J} \beta_j X_{ict}^{j} + \sum_{m=1}^{M} \beta_m X_{ct}^{m} + \sum_{n=1}^{N} \beta_n X_{ct}^{n} + D_{c-1} + \varepsilon_{itc} \quad \text{.....(3.2)}$$

Where D denotes the country-specific dummy variables and $\varepsilon_{ict} = \upsilon_i + \gamma_t + \mu_{ict}$ is the disturbance; γ_t is the unobservable time effects, υ_i is the unobserved complete set of individual MFI-specific effect and which controls for all cross-sectional (or 'between MFIs'), and μ_{ict} is the idiosyncratic error. We test for country and time hypotheses separately as well as jointly, by H0: $\gamma_2 = \gamma_3 = \ldots\ldots = \gamma_T = 0$ and present the results in Table 2 of Appendix B. The Lagrange Multiplier (LM) tests show that for Africa microfinance industry, both country and time specific dummy variables are insignificant. We experimented with many country dummies and it turned out that none was significant. We therefore neither included year-specific dummy variables nor country specific dummies. Hence, we proceeded with the estimation of the following specification,

$$\Pi_{ict} = \alpha + \sum_{j=1}^{J} \beta_j X_{ict}^{j} + \sum_{m=1}^{M} \beta_m X_{ct}^{m} + \sum_{n=1}^{N} \beta_n X_{ct}^{n} + \varepsilon_{itc} \quad \text{.....(3.3)}$$

In our analysis it is important to delineate various concepts both at MFI-specific, institutional and at macroeconomic levels. It is not easy to design a single model that completely

describes MFI performance. We therefore test different specifications of the baseline model in order to avoid the risk of mis-specifying the functional form of the relationship.

3.3.1.3 MFI-specific determinants

These can be classified into either intangible or tangible. Intangible MFI-specific factors are hard to account for. A good example is the quality of managerial decisions which is closely related to corporate governance. For the purpose of this chapter, we consider tangible factors.

We use the variable *size* to capture economies or diseconomies of scale in the market. Seminal work on modern intermediation theory focusing on the role of financial intermediaries when borrowers and lenders are asymmetrically informed include Diamond (1984), Ramakrishnan and Thakor (1984), Boyd and Prescott (1986), Williamson (1986) and subsequently Allen (1990). This body of theory predicts economies of scale in the financial intermediation process. If larger MFIs have a greater control of the domestic market, and operate in a non-competitive environment, lending rates may remain high while deposit rates for larger institutions remain lower because they are perceived to be safer. Thus larger MFIs may enjoy higher profits. This implies therefore that, large size may result in economies of scale that will reduce the cost of gathering and processing information. Put differently, a large financial institution can contract with a large number of borrowers which results in diversification which hitherto reduces the *ex ante* expected cost of overcoming information asymmetries[21]. This results in cost savings which are realized whether or not failure actually occurs[22]. Empirical evidence is

21 In many of these models it is assumed that borrowers, but not lenders, costlessly observe investment return realizations. Uncertainty about return realizations is undesirable and bad (failure) realizations trigger costly information production. However, if a large number of investments are made by a single financial intermediary, pooled risk is reduced or eliminated, and so is the frequency of costly failure states.

22 Modern intermediation theory therefore makes two related predictions about size of the financial intermediary-large financial institutions are less likely to fail and are more cost efficient than small firms. The counter argument is that size could have a negative impact when banks become extremely large-due to bureaucratic and other reasons exhibiting a non linear relationship between size and performance.

mixed (see Table 3.1). We therefore predict an indeterminate relationship between size and profitability of a microfinance institution.

Age is introduced in the model to capture learning effects. A vast amount of research considers older firms to be more experienced and can therefore enjoy higher performance (see for example Lumpkin, et al, 2001). Rebuttals suggests that older firms are prone to inertia, are more bureaucratic and are less receptive to entrepreneurial orientation; thus, they are unlikely to have the flexibility to make rapid adjustments to changing circumstances which cause poor performance and decline (Dunne and Hughes 1994; Boeker 1997; Szulanski 1996; Park, and Luo 2001).

An excessively high *capital-assets* ratio (CAP) could signify that MFI is operating over-cautiously and ignoring profitable investment opportunities. On the contrary, the cost of insurance against bankruptcy may be high for a MFI with a low capital-assets ratio, suggesting a positive relationship between the capital-assets ratio and performance (Berger, 1995). First, capital can be considered a cushion to raise the share of risky assets, such as loans. Even if regulatory capital represents a binding restriction on MFIs, and is perceived as a cost, we nevertheless expect a positive relationship since MFIs may pass some of the regulatory cost to their clients. Second, any firm with sufficient capital borrows less to support a given level of assets. Empirical evidence supporting this argument includes García-Herrero et al. (2009), Kosmidou (2008), Athanasoglou, et al. (2008), Athanasoglou et al (2006), Boubakri, et al. (2005). We therefore predict a positive association between level of capitalization and MFI profitability.

Closely related to capital is the *gearing ratio* which merely defines the source of business finance to boost financial performance. High proportion of fixed interest capital to equity would imply that MFIs are highly geared and therefore risks becoming insolvent. It may also imply that MFIs may be able to better deal with moral hazard and adverse selection, enhancing their ability

to deal with risk (Kyereboah-Coleman 2007). We therefore postulate a positive relationship between gearing ratio and profitability.

The arguments in the literature with respect to *credit risk* are well known. Poor asset quality should reduce profitability in as far as it limits the MFIs's pool of loanable resources. Changes in credit risk may also reflect changes in the health of MFI's loan portfolio which may affect the performance of the institution (see Derban, Binner and Mullineux 2005; Cooper et al., 2003; Demirgüc-Kunt and Huizinga 2000). Consistent with theory, Miller and Noulas (1997) postulate that the more the risk exposure or the higher the accumulation of outstanding loans and therefore lower the profitability. We thus expect a negative relationship between portfolio at risk and MFI profitability.

Efficiency in expenses management should ensure a more effective use of MFIs loanable resources, which may enhance profitability. Higher ratios of operating expenses to gross loan portfolio imply a less efficient management. Empirical evidence points to the fact that providing microfinance is a costly business perhaps due to high transaction and information costs (Hermes and Lensink, 2007; Gonzalez, 2007). Because the administrative costs per dollar lent are much higher for small loans than for large ones; to maintain the same level of profitability, the interest rates necessary to cover all costs including costs of funds and loan losses are much higher for MFI loans than for conventional bank loans (de Mel et. al., 2009b; Cull, McKenzie and Woodruff 2007). Efficiency may also be influenced by corporate governance as evidenced by Mersland and Strøm, (2009), Mersland (2009a) and Gutiérrez-Nieto, et al (2009). Thus, cost decisions of MFI management are instrumental in influencing the performance. We therefore predict a negative association between inefficiency and profitability.

3.3.1.4 Macroeconomic environment

A sound investment climate requires sufficient macroeconomic stability before microeconomic policies can gain much grip. Credit risk, for example, is influenced by economic growth, which affects the borrower's repayment ability and the value of collateral. Whether *inflation* affects financial institution's profitability will largely depend on whether inflation expectations are anticipated [23] or otherwise (Revell, 1979). An unanticipated inflation lowers real rates of return for an MFI, and may cause it to react by building conservatively large inflation premia into interest rates. Similarly, inflation may impact on MFI's cost of funds. Borrowers' incentives for delay and default can also be affected. Ahlin et al (2011) finds that MFIs cover costs better when macroeconomic growth is higher, partly due to lower default rates and operating costs. They find that MFIs appear to cope reasonably well with inflation, by raising rates. Krauss and Ingo (2009) find a significant exposure of MFI performance to changes in the Gross Domestic Product while Gonzalez (2007) concludes that macroeconomic developments do not influence MFIs in a significant manner. This evidence remains contestable.

3.3.1.5 Institutions development

Corruption, when endemic and deeply rooted, has significant adverse effects on an economy. Corruption destroys firms by promoting bad management, significantly raising the costs of doing business, increasing the risk and uncertainties of doing business; discouraging and reducing investment in general and in particular capital investment (Ng, 2006). Rent seeking distorts the allocation of talent away from entrepreneurship and innovation, thereby reducing growth (Aidt, 2003). Competing arguments for corruption has been advocated by Ehrlich and Lui (1999) who

23 Put differently, the impact depends on whether MFIs' wages and other operating expenses increase at a faster rate than inflation. When inflation rate is fully anticipated the financial intermediary can appropriately adjust interest rates in order to increase their revenues faster than the costs and realize higher profits. However when unanticipated the financial intermediary may be slow in adjusting the interest rates, which results in a faster increase in costs than revenues with consequences of a negative impact on profitability.

point out, that corruption by itself need not impose a net social cost since it involves transfer payments from bribe payers to bureaucrats. Moreover, bribes can ameliorate the deadweight cost of government intervention by directing scarce resources towards higher bidders (Lui, 1985). Seminal theoretical work suggests that corruption might enhance commerce, by reducing transaction cost and lowers the cost of capital (see Lui, 1985; Kaufmann and Wei, 1999). We therefore postulate a negative relationship between corruption and return on MFI investments.

The owner of a property right to an asset can decide upon its use, to receive the income from it and can transfer or exchange the asset, i.e. he has the control rights to the asset and has the right to the residual returns, as long as he obeys legal and social norms (Jansson 2008). The regulator may for example, put constraints on prices which can affect the strategy of the firm particularly if the prices were calculated as a sum of costs plus a fair rate of return (Kim, and Mahoney 2005). The more certain the legal protection of property, the better the investment climate. Similarly, the higher the probability of government expropriation of property, the worse the investment climate[24] (World Bank 2005). We therefore postulate a positive relationship between strong property rights and MFI performance.

24 In an environment in which property rights are insecure, opportunism is possible, and the identification of new business opportunities is costly. There is then no incentive to be cost efficient as the price covers costs.

3.4. Data set, description and measurement

Data description

Given the abundance of theories and predictions, it is natural to turn to data in an attempt to disentangle and assess predicted effects. We use unbalanced dataset in this chapter. Incomplete panels are more likely to be the norm in typical MFI performance empirical settings since some MFIs may have started recording data later than others, while others may have stopped recording data altogether. Additionally some MFIs may have dropped out of the market while new entrants may have emerged over the sample period observed (Baltagi and Song 2006).

This chapter examines the profitability of 210 MFIs across 31 developing economies in Sub-Sahara Africa for the period 1997-2007 based on their financial accounts. These spans across four different regions that include West (81), East (63), Central (23) and South Africa (43) totalling 2,310 observations (see Tables 9 and 10 in Appendix B for sample representation and country distribution). The dataset was assembled from three sources the principal being the MIX Market database, World Development Indicators (WDI) and the Heritage Foundation

It is a publicly available website that contains information on more than 1800 MFIs, more than 100 investors (e.g. Calvert Foundation), and nearly 200 partners (umbrella organizations that facilitate multiple MFIs' operations)[25]. MixMarket groups MFI's into five categories—one through five-stars, based on amount and reliability of information reported. We restricted our dataset to include only three-five star MFIs whose data is reasonably reliable. Rather than taking MFIs statement of performance at face value, these data have been adjusted to account for subsidies which render the data valuable.

Our initial sample comprised of 295 MFIs all of which had three diamond rating and above. 85 MFIs were eliminated notably due to substantial missing information on one or more of the key variables. With regard to MFI types, the breakdown is as follows: 9 "credit unions", 10

25 This information is taken from the mixmarket.org website during June/July 2010

"banks", 39 "non-bank financial institutions" and 52 "non-governmental organizations (NGO)"s. We exclude rural banks category because it does not have enough observations to provide significant within-category variation. Finally, we restrict the sample to MFI's whose fiscal year corresponds to the calendar year, for comparability with the annual country-level macroeconomic and institutional data. All results should be viewed in this light.

We merge the MFI level dataset with country-level data from the World Development Indicators (WDI) and institutional development indices from the Heritage Foundation. From WDI we obtain annual rate of inflation and real GNI per capita levels expressed in current U.S. dollars, for each of the countries and years corresponding to MFI's in the dataset. These are our focal measures of the macroeconomic environment, property rights and corruption indices.

Definition and Measurement of the variables

Given that the MFI data are collected from MIX Market, we use the MIX Market definitions of key variables. *Capital* (CAP) is the ratio of equity capital to total assets[26]. *Gearing ratio* (GR) defines the MFI capital structure which is measured by the ratio of debt and debt-like instruments to capitalization namely Short Term Debt + Long Term Debt divided by total shareholders' equity or simply the Debt/Equity ratio.

To capture the relationship between MFI *size* (S) and profitability while also accounting for potential nonlinearities-due to possible diseconomies of scale as MFIs become too big, we use the logarithm of real MFIs' total assets in period t for each MFI. The squared size (S^2) captures the possible non-linear relationship. If coefficient of the squared size variable turns out to be negative but statistically non-significant, this would provide evidence that MFIs in Africa enjoy enough market power to be able to pass costs on to clients. We observe that since the dependent variable

26 While Basel II addresses fewer concepts than the Standards in terms of direct application to MFI financial management, internal controls, and management reporting, it does outline three "pillars" that are relevant to microfinance

in the models (ROA) were deflated by total assets it would be appropriate to log total assets before including it in the models. We denote age (Ag*)* by the number of years MFI has been in operation in order to capture learning effect in MFI performance.

The credit risk exposure (CR) is measured by the sum of the level of loans past due 30 days or more and still accruing interest namely Portfolio at Risk (PAR-30). In robustness tests we include further measures of credit risk by estimating various econometric specifications for three additional different explanatory variables; the write-off ratio (WOR) which is the value of loans written off during the year as uncollectible, as a percentage of average gross loan portfolio over the year[27]. An additional measure of credit risk is the Risk Coverage Ratio (RC) which is measured as the Adjusted Impairment Loss Allowance/PAR>30 Days and finally Loan Loss Reserve Ratio (LLR). This is measured as the ratio of loan loss reserves to gross loans or simply put as Loan loss reserve/Value of loans outstanding. It is an indicator of how much of the gross loan portfolio has been provided for but not charged off. It is important to note that only WOR and LLR are measures of default, while PAR is a measure of risk of default.

Efficiency (EFF) in the management of operating expenses*:* The total MFI costs (net of interest payments) can be split into operating and other expenses (such as taxes, depreciation etc). We regard operating expenses as the only direct outcome of MFI management. We thus measure efficiency in expenses management by the ratio of Adjusted Operating Expense/Adjusted Average Gross Loan Portfolio and in robustness tests, we use Cost per Borrower (CB).

We use two proxies for the macroeconomic environment; inflation and real GNI per capita growth. We use growth of GNI per capita[28] at current US Dollars (GNI) to control for different levels of economic development in each country and year. Arguably, this is the most informative single indicator of progress in economic development, while inflation expectation is measured at

27 It's a form of serious default involving final non-repayment, measured as the value of loans written-off/Adjusted Average Gross Loan Portfolio.

28 Baltagi and Song 2006)a number of macroeconomic variables (such as GDP, the unemployment rate and interest rate differentials).

time *t-1* annual % change of the GDP deflator at market prices for each country where the MFI is located for each year.

This study has also factored in the impact on performance by institutions development. *Property rights* (PR) Index ranges from 10 where private property is rarely protected to 100 where private property is guaranteed. Put differently, it measures the extent to which a country's laws protect private property and the extent to which government enforces those laws. *Freedom from corruption* is a quantitative measure that is derived from Transparency International's Corruption Perceptions Index (CPI). This measures the level of corruption in 179 countries. It is based on a 10-point scale where a score of 10 indicates little corruption and a score of 0 indicates a corrupt government.

Dependent variables

MFI performance studies rely on accounting and profit or cost efficiency indicators based on the efficiency and productivity analysis. In the present study, we use accounting-based profitability indicators. The dependent variable is Return on Assets which is a measure of *ex-post* MFI profits. In order to test the robustness of our results we also use Return on Equity (ROE).

(a) Return on Assets (%) = adjusted net operating income-taxes/adjusted average total assets

(b) Return on Equity (%) =adjusted net operating income-taxes/adjusted average total equity

These two variables make it possible for us to compare data across countries and through time. ROA reflects the ability of MFIs' management to generate profits from MFIs assets, although it may be biased due to off balance-sheet activities. It can however be argued that such activities may be negligible in Africa MFIs, while the risk associated with leverage is likely to be substantial. This is despite the institutional innovations that MFIs embrace in order to compensate for informational asymmetries. ROE captures the return on shareholders equity. MFIs with lower leverage/higher equity reports higher ROA and lower ROE. Since an analysis of ROE disregards

the risks associated with high leverage and financial leverage is often determined by regulation, ROA emerges as our key ratio for the evaluation of MFI profitability. Moreover, ROA is more appropriate since MFI equity in Africa is abnormally low (Lafourcade, et al 2006) and ROA is a more comprehensive measure of profitability. It is also widely used in the literature, which allows comparison with previous studies. Debt/equity levels also differ considerably between MFIs. The variables of interest, source of data and the predicted coefficient signs are summarized in Table 3.2

Table 3.2: Summary of variables and measurement

Variable	Notation	Measure	Predicted effect	Source of data
Dependent variable				
Return on assets	ROA	Net profits after taxes/Assets		The MIX
Return on equity	ROE	Net profits after tax/Equity		
Determinants				
MFI-specific				
Capital	CAP	Equity/Assets	Positive	The MIX
Credit risk				
Portfolio at Risk	PAR-30	Outstanding balance, portfolio overdue> 30 Days + renegotiated portfolio/Adjusted Gross Loan Portfolio	Negative	The MIX
Write off Ratio	WOR	Value of loans written-off/Adjusted Average Gross Loan Portfolio		
Loan Loss Reserve Ratio	LLR	Loan loss reserve/Value of loans outstanding		
Risk Coverage Ratio	RC	Adjusted Impairment Loss Allowance/PAR > 30 Days		
Operational efficiency				
Efficiency	EFF	Adjusted Operating Expense/Adjusted Average Gross Loan Portfolio	Negative	The MIX
Cost per Borrower	CB	Adjusted Operating Expense/Adjusted Average Number of Active Borrowers.		
Other factors				
Loan size[29]	LS	Adjusted Average Loan Balance per Borrower/GNI per Capita	Positive	
Gearing	GR	Debt/equity ratio	Negative	
Log Age	Ag	Log of Age of the MFI in years	Indeterminate	
Log Age^2	Ag^2	Log of Age^2 of the MFI in years	Indeterminate	
Log Size	S	Log of total assets and (total assets)^2 in period *t*	Indeterminate	
Log Size^2	S^2	Log of total assets^2 in period *t*	Indeterminate	
Institutional development				

29 This is also a proxy for depth of outreach

Property rights	PR	Composite Index ranging from 10 (Private property is rarely protected) to 100 (Private property is guaranteed by the government)	Positive	Heritage Foundation
Freedom from corruption	COR	Composite Index 10-point scale Corruption Perceptions Index (CPI) in which a score of 100 indicates very little corruption and a score of 0 indicates a very corrupt government		
Macroeconomic environment				
Inflation Expectations	INF	Annual % change of the GDP deflator in period *t-1*	Indeterminate	World Bank (WDI)
Per capita Income	GNI	GNI per capita, Atlas method (current US$)	Positive	

3.5. Empirical methodology

3.5.1 Estimation and testing procedures

The parameters of model (3.3) are estimated using unbalanced panel data regression. This is because it contains MFIs entering or leaving the market during the sample period which is more likely to be the case in cross country's MFIs profitability studies. To avoid the possibility of obtaining spurious correlations, we have ensured that all the variables incorporated into the empirical model are clearly established in the literature, to impact on bank profitability. That notwithstanding, our dataset suffers from several problems that dictate the choice of estimation procedure. First, we cannot assume homoskedastic errors. Since most of the exogenous variables are time variant though constant across MFIs, the estimated model may be prone to heteroscedasticity where the residual variance differs across time periods.

In order to investigate whether there is evidence of heteroscedasticity in the residual variance, based on Breusch-Pagan test we calculate the Lagrange multiplier (LM) and compare the relevant statistic of the model with the critical chi-square value χ^2 0.005,10= 25.182. Values below this would reject the null hypothesis of heteroscedastic residual variance. We thus estimate

model (3.3) using White's transformation[30] to control cross-section heteroscedasticity of the variables. Second, outliers can also bias regression slopes (Baltagi 2008). To check for outliers, we exclude observations that have both extremely high residuals and high leverage[31] on the regression results. To the extent that these problems are present and not corrected, the analysis of panel data may actually produce incorrect analytic results thereby placing the validity of the inferences drawn from this particular study at stake (Baltagi 2008; Certo and Semadeni 2006).

Empirical work on determinants of MFI's profitability can also suffer from two sources of inconsistency: omitted variables and endogeneity problem. Combining cross-section and time-series data is useful for three main reasons. First, since MFIs profitability may vary over time, it is necessary to use panel methodology because the time-series dimension of our variables of interest provides a wealth of information ignored in cross-sectional studies. Second, the use of panel data increases the sample size and the degree of freedom, which is particularly important when a relatively large number of regressors are used. Third, panel data takes into consideration potential endogeneity of the regressors, while at the same time controlling for firm-specific effects which cross-section regressions fails to take into account (Baltagi, 2008). If it appears then that there is correlation between the MFI and/or time effects and the exogenous variables, then and in order to solve for the endogeneity problem, the MFI and time effects should be estimated as dummy variables.

Advantages of panel over time series data include the possibility that underlying microeconomic dynamics may be confounded by aggregation biases, while the scope that panel data offers to examine heterogenity in adjustment dynamics between different types of firms is immense. Although, these advantages can be realized with repeated cross-section, panel data

30 The use of a White heteroskedasticity consistent covariance estimator with ordinary least squares estimation in fixed effects models can yield standard errors robust to unequal variance along the predicted line (Greene, 2008; Wooldridge, 2002). Such standard errors are able to account for contemporaneous correlation, heteroskedasticity, and autocorrelation when the data set contains at least 15 time periods.

31 The leverage of an observation is a multivariate measure of the distance of its X values from the means in the sample.

allows more of the variation in the micro data to be used in construction of parameter estimates as well as allowing the use of relatively simple econometric techniques (Baltagi, 2008). Estimation bias is therefore lower with panel data estimation than would have been the case with either time-series or cross-sectional data, while multicollinearity is less of a problem. Moreover, panel data circumvents errors in model specification, with improved efficiency of estimation.

If we were to undertake regression analysis on the panel data using the ordinary least squares (OLS) method, we would have ignored the differences between MFIs, and this would have made it impossible to determine the direction of error, giving rise to heterogeneity bias. We therefore felt that the use of fixed effects and random effects model would be more appropriate. Previous studies that have used least squares methods of either FE or RE models include Bourke (1989), Naceur and Goaied (2001), Molyneux and Thornton (1992), Demirgüc-Kunt and Huizinga (1999), Hsiu-Ling et al (2007), Pasiourasa and Kosmidou (2007) and Flamini et al (2009).

For the purpose of estimation and testing we proceeded as follows. First, we test for non-stationarity using the Fisher test which is based on combining the *p-values* of the test-statistic for a unit root in each MFI[32]. Based on the *p-values* of individual unit root tests, Fisher's test assumes that all series are non-stationary under the null hypothesis against the alternative (Greene 2008). Maddala and Wu (1999) contend that not only does this test perform better than other tests for unit roots in panel data, but it also has the advantage that it does not require a balanced panel, as most tests do. Depending on the outcome of the panel unit root test, we estimate the model excluding the non-stationary variables, especially if the excluded variables do not affect the model's performance.

32 The most disseminated results were developed by Levin and Lin (1993) and Im, Pesaran and Shin (2003) while surveys on the topic appear in Banerjee (1999) and Maddala and Wu (1999).

The second issue we have to contend with is the choice between a Fixed Effect (FE) and a Random Effect model (RE). Under a FE model the *vi'*s are considered fixed parameters to be estimated. Here we transform the dependent and explanatory variables and then apply OLS to the transformed data to obtain the within estimator. FE model transforms the estimating equation so as to get rid of the fixed effects (Baltagi, 2008). Under a RE model the *vi'*s are assumed to be random and the estimation method is generalized least squares (GLS). GLS uses cross-section weights for every observed MFI *i* at time *t*, and the true variance components, in order to produce a matrix-weighted average of the within and the between which is obtained by regressing the cross section averages across time estimators (Baltagi, 2008; Greene, 2008). We perform the traditional Hausman test (Hausman, 1978) which is identical asymptotically to the Wooldridge (2002) test where we first estimate the fixed effects model, save the coefficients and compare them with the results of the random affects model. In the event that we obtain Hausman test value which is larger than the critical chi-square, then the FE estimator is the appropriate choice (Hausman, 1978).

There is strong evidence that our specification follows a FE model as the Hausman test indicates. The relevant F-statistic is significant at the 1% level (F (181, 486) =4.47). Fixed effects approach is further reinforced by the absence of significant heteroscedasticity in the residuals from our estimated model. Therefore, under the null hypothesis, the two estimates differ systematically as indicated by the *p*-values in Table 3.3. This means that the coefficients of interest are statistically different in the two estimations; hence we reject the random effects solution both on substantive and statistical grounds.

Table 3.3: Hausman fixed random specification test

ROA	Notation	Coefficients		
		Fixed Effects (b)	Random Effects (B)	Difference (b-B)
Log age	Ag	-0.0127	-0.0042	-0.0086
Log size	S	0.0243	0.0111	0.0132
Capital	CAP	0.0614	0.0472	0.0142
Gearing ratio	GR	0.0137	0.0167	-0.0030
Portfolio at risk	PAR	-0.0106	-0.0112	0.0006
Efficiency	EFF	-0.1372	-0.0969	-0.0403
Loan size	LS	0.0021	0.0031	-0.0009
GNI per capita	GNI	-0.0127	0.0003	0.0011
Inflation expectations	INF	0.0243	0.0002	0.0017
Property rights	PR	0.0014	-0.0042	-0.0086
Freedom from corruption	COR	0.0019	0.0111	0.0132

Test: Ho: difference in coefficients not systematic Chi2 (10) = (b-B)'[S^ (-1)] (b-B), S = (S_fe-S_re) =71.90
Prob>chi2 = 0.0000

Finally, we performed sensitivity tests in order to develop robust empirical results for the empirical model. Accordingly, if the coefficients are not sensitive to the inclusion of different variables, then the variables of interest can robustly affect the dependent variable. We estimate the same linear specification both with and without the macroeconomic control variables and institutional factors. The joint impact of these additional variables is assessed by the improvement in the overall explanatory power of the model. Only the robust results of the empirical model are presented in this chapter.

3.5.2 Univariate analysis

Table 3.4 presents descriptive statistics. There is a wide variation in performance across MFIs. The means and standard deviation for ROA and ROE are all within the expected range but the minimum and maximum values suggest a wide range for each variable. It is evident from the summary statistics that there is a clear difference among MFIs. The standard deviations of most variables are quite large. Consistent with Balkenhol (2007), most MFIs in Africa post negative average returns on assets. ROA varies from 32% to negative 86%. Similarly, ROE varies from over 100% to negative 86%, prompting the use of robust regression methods as a check on

robustness to outliers. For the whole region the average period ROA stands at -0.1 per cent, while the average ROE is 0.1 per cent which perhaps is an indication that MFIs in Africa earn lower average financial revenues, which is consistent with low profitability as reported in Table 1.2 (see also Figure 2 and Table 9 in Appendix A for a global comparison). The operational inefficiency is also quite high at 43%. Indeed relative to other regions, the average cost per borrower among Africa MFIs is $ 72, which is higher than MFIs in other global regions (Lafourcade, et al 2006).

Table 3.4: Descriptive and summary statistics

Variable	Notation	Obs	Mean	Median	Standard Deviation	Minimum	Maximum
Return on assets	ROA	1058	-0.0128	0.000	0.0950	-0.8660	0.3240
Return on equity	ROE	899	0.0140	0.000	0.2202	-0.8630	1.0760
Age	AG	1143	9.2	8	6.2	0	40
Capital	CAP	1145	0.3800	0.3258	0.3428	-1.366	1.000
Gearing	GR	953	0.6906	1.182	1.5811	0	9.09
Efficiency	EFF	899	0.4395	0.305	0.5739	0	12.25
Log of cost per borrower	CB	884	4.2749	4.299	1.1758	0.6931	8.9569
Portfolio at Risk	PAR	1145	0.0655	0.028	0.1103	0	1.05
Write off Ratio	WOR	1129	1.2343	0.00	2.7280	-1.32	20.59
Loan Loss Reserve ratio	LLR	906	0.9618	0.025	1.6369	0	16.49 |
Risk Coverage Ratio	RC	1111	0.5962	0.385	0.8356	0	9.64
Loan size	LS	1143	0.9617	0.468	1.6369	0	16.49
Log Size	S	1140	14.485	14.36	1.9620	7.102	20.54
Lagged Inflation rate	INF	2066	0.0346	0.000	0.0628	-0.1390	0.3820
Per capita income	GNI	906	0.0854	0.087	0.0938	-0.1880	0.2930
Property rights	PR	2211	39.47	30.00	12.78	10	70
Freedom from corruption	COR	2211	25.66	26.0	11.42	7	57

This Table presents the summary statistics. A detailed description of the definition and sources of the variables is given in Table 3.2.

We anticipate that our regression may give us the coefficients that best describe the dataset, but the independent variables may not have a good *p-value* if multicollinearity is present. We therefore perform correlation test to investigate whether there is perfect linear combination among variables. Table 3.5 shows that most of the correlations among variables of interest are significant although the level of correlation is very low. Our primary concern though is whether multicollinearity is strong enough to invalidate the simultaneous inclusion of the explanatory variables in regressions. We contend that multicollinearity could only be a problem if the correlation coefficient is above 0.70 (Baltagi 2008; Kennedy 2008), which is not the case with our variables. Moreover, since panel data estimation gives more degrees of freedom, the multicollinearity problem is further reduced (Hsiao, 2003).

With the exception of operating efficiency which is significantly correlated with cost per borrower (0.59) all other pair wise correlations between the regressors are less than 0.50. Most notably, profitability measures (ROA, ROE) are significantly positively correlated, but not perfect (at 0.65). Interestingly, age, MFI size, gearing ratio, operating efficiency, and credit risk are significantly correlated with performance which is an indication that profitable MFIs tend to be large and older, rely more on debt financing and are more efficient. Age in particular may have nothing to do with learning effect but rather survivorship bias which is exemplified by retaining successful borrowers instead of graduating them into mainstream banks. This would in essence release capital that could be borrowed by other households. Dropouts or survivorship bias may also imply that borrowers leave because they are doing so well or they are in trouble (Armendáriz and Morduch, 2010). It is likely that those who remain behind have the positive attributes of survivors, while the new borrowers have yet to be tested. Variables that proxies the quality of the institutions are not significantly correlated with return on assets. We do not detect any significant bivariate correlations relating the macroeconomic environment and MFI performance.

The significant correlation between performance and gearing ratio is an indication that perhaps more debt relative to equity is used to finance microfinance activities and that long term borrowings impact positively on profitability by accelerating MFIs growth than it would have been without debt financing. Whereas these summary statistics presented in both Tables 3.4 and 3.5 give us a clue of what might influence profitability of MFIs, a more precise investigation of the determinants of MFI profitability and the relative contribution of each factor can only be uncovered by using multivariate panel regression techniques. Panel regression analysis allows us to investigate the strength of these correlations after controlling for other relevant covariates.

Table 3.5: Correlation matrix

	ROA	ROE	AG	S	CAP	GR	EFF	CB	PAR	LLR	RC	WOR	LS	INF	GNI	PR	COR
ROA	1.000 1058																
ROE	.653** 992	1.000 995															
AG	.095** 1055	.120** 992	1.000 1143														
S	.121** 1056	.171** 993	.360** 1141	1.000** 1144													
CAP	-.016 1058	-.155** 995	-.166** 1142	-.112** 1143	1.000 1145												
GR	.130** 876	.200** 849	.163** 950	.153** 952	-.461** 952	1.000 953											
EFF	-.312** 865	-.134** 804	-.065* 897	.008 899	.062 899	-.211** 754	1.000 899										
CB	-.066* 853	.070* 792	.075* 889	.127** 891	-.178** 891	.043 744	.589** 871	1.000 891									
PAR	-.075** 1057	-.059 994	.060* 1141	.005 1142	-.081** 1143	-.004 951	.032 898	-.008 890	1.000 1145								
LLR	-.073* 1057	-.070* 994	.064* 1142	.022 1143	-.019 1144	-.021 952	.230** 899	.209** 891	.362** 1144	1.000 1146							
RC	-.048 1027	-.031 965	-.008 1108	-.005 1109	.023 1110	-.015 921	.097** 873	-.007 865	-.059* 1110	.039 1110	1.000 1111						
WOR	-.129** 1044	-.093** 982	.101** 1125	.015 1126	-.097** 1127	.013 940	.152** 886	.031 875	.147** 1128	.002 1128	.008 1094	1.000 1129					
LS	0.108** 1091	0.119** 1086	0.106** 1144	0.003 1145	-0.117** 1146	0.097** 954	-0.098 898	0.227** 890	-0.026 1146	-0.043 1146	-0.075* 1112	0.014 1130	1.000 1147				
INF	.044 1033	.073* 973	.075** 1109	-.033 1110	.067* 1111	.005 923	.102** 876	-.027 869	.114** 1111	.062* 1111	.093** 1078	.090** 1096	-0.040 1147	1.000 2066			
GNI	.042 865	.053 807	.092** 904	.045 904	-.044 906	.078* 756	-.054 858	.024 847	.078* 905	.035 906	.018 881	.069* 892	-0.025 938	.240** 897	1.000 906		
PR	-.013 1021	.013 961	.036 1104	.064* 1105	.028 1106	-.011 922	.053 880	.059 865	-.026 1106	.043 1107	-.020 1073	-.037 1093	0.038 1106	-.046* 1978	-.127** 880	1.000 2211	
COR	-.025 1021	.044 961	-.046 1104	.079** 1105	.057 1106	-.115** 922	.041 880	.065 865	.034 1106	.011 1107	-.009 1073	.027 1093	0.043 1106	.017 1978	-.090** 880	.391** 2211	1.000 2211

** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed). Figures beneath are the observations (N)

Where ROA=Return on Assets; ROE=Return on Equity; AG= Age of the MFI; S= Size; CAP= Capital; GR= Gearing ratio; EFF= Operating efficiency; CB= Cost per borrower; PAR=Portfolio at Risk; LLR= Loan loss reserve; RC= Risk cover; WOR= Write off ratio; INF= Lagged Inflation; GNI= Growth of per capita income; PR=Property rights index; COR= Freedom from corruption index

3.5.3 Multivariate regression analysis

Having summarised the correlates of profitability, the next set of regressions explores the relationship between exogenous factors and MFI profitability. We make further considerations regarding the approach to estimations. Using a dataset with potential measurement error due to poor accounting standards that is common among developing countries and multiple observations from the same MFI, error terms may not be identically and independently distributed (IID). In particular, MFI-specific errors may be correlated and measurement error which is likely to be higher for some of the MFIs could be driving our regression results. Another problem with our analysis is that we have assumed that ROA values were completely independent from one MFI to the other. This is unlikely to be true since ROA within MFI are likely to be similar to one another. To find out how the extent of the variability within MFI versus the extent between MFIs, we compute an intra-class correlation which is One-way Analysis of Variance that works only with first and second moments of the data and thus will not bias estimate between and within variance components, regardless of the distribution of the data. Table 3.6 shows an intra-class correlation of 0.33 which is minimal. We proceed with our estimation allowing for differences in the variance and standard errors due to intra-group correlation[33].

33 Although the coefficient estimates and standard errors are the same for the xtreg, fe and .areg approach in stata, we use the latter for our estimation. The advantage with .areg approach is that it allows for differences in the average level of across MFIs in addition to adjusting the standard errors taking into account the specific intra-group correlation. Areg procedure, involves estimating coefficients for each of the covariates plus each dummy variable for MFI groups while in the xtreg, fe procedure the R2 reported is obtained by only fitting a mean deviated model where the effects of the groups are assumed to be fixed. So, all of the effects for the groups are simply subtracted out of the model and no attempt is made to quantify their overall effect on the fit of the model leading to low R squared and standard errors due to larger degrees of freedom for errors. It is for this reason that the calculation of the R2 is different.

Table 3.6: One-way Analysis of Variance for roa: ROA

Number of obs=1058
R-squared=0.46

Source	SS	df	MS	F	Prob > F
Between idfirm	4.3905	209	0.0210	3.46	0.0000
Within idfirm	5.1433	848	0.0061		
Total	9.5338047	1057	0.0090		

Intra-class Correlation	Asy. S.E.	[95% Conf.	Interval]
0.3286	0.0351	0.2599	0.39728

Estimated SD of idfirm effect 0.0545
Estimated SD within idfirm 0.0779
Est. reliability of idfirm mean 0.7113
(Evaluated at n=5.03)

We introduce a quadratic term for the MFI size and age in the profitability equations, to capture non-linear effects of diseconomies of scale as firms become large and learning effect. The quadratic form can generate inverted U-shaped patterns consistent with the prediction that when non linear effects become severe, then overall profitability eventually falls as both size and age rise.

3.6. Empirical results and discussion

The estimated equations appear to fit the panel reasonably well as indicated by the R-squared values which have fairly stable coefficients among the alternative models. Table 3.7 reports results from our basic specification using ROA as the profitability measure. The estimations based on ROE produce inferior results (see Table 5 in Appendix B) as suggested by the coefficients estimates and hence they are not reported or discussed here. The performance based on the ROE specification may be related to the explanation given in Section *3.4.2*. The third specification of Table 3.7 gives our preferred model. A comparison of the first and second model specification allows us to distinguish between non-linear effects and the robustness of the MFI-specific factors to the inclusion of macroeconomic and institutional quality variables (see the discussion in Section 3). Although model 1 shows both age and size

and their corresponding non-linear effects, they were nevertheless estimated separately due to multicollinearity.

Interesting results appear in both significant and non-significant findings. The overall Wald statistic shows rejection of the hypothesis that all coefficients are equal to zero in all specifications. We comment on all regressions together. The overall explanatory power (measured by adjusted R^2) for both models is relatively high, and is not associated with high correlation among some of the trended variables (e.g. INF and GNI). Dropping either of these variables does not make much difference to the overall results or the explanatory power. On the other hand, reasonably high explanatory power has also been reported on banks profitability studies e.g. by Kosmidou (2008), Hsiu-Ling et al (2007), Pasiourasa and Kosmidou (2007). One would have expected much higher values for the adjusted R^2. One potential explanation for the not so high values is the use of accounting data. Performance proxied by accounting earnings, are backward-looking and tend to be smoothed relative to the underlying value of the firm. Accountants spread cost and revenue over multiple periods and this minimizes the sensitivity to market movements or regression coefficients and market-risk (R^2) for our profitability indicators. This is because market impacts are not directly reflected in yearly accounting results. In addition to the missing variables, the poor quality of the accounting data creates variation that cannot be explained by the model, which subsequently slightly lowers the R^2 values in our results.

A casual inspection of the dependent variable using a simple run-sequence plot shows that it is stationary having removed the outliers. We also removed outliers on the explanatory variables. Independent cross section data on the panel adds information and this leads to a stronger overall signal than that of the pure time series, depending on whether there exists or not a serial correlation in the time series component. Since both N and T are least squares estimator consistent, the asymptotic bias of the within estimator vanishes to zero as $T \to \infty$ (Phillips and Moon 1999).

Table 3.7: Estimation Results Using Fixed Effects-within (dependent variable: ROA)

Variant model specifications with robust standard errors				
Variable	Notation	1	2	3
Intercept		-0.4113*** (-3.92)	-0.4588*** (-4.11)	-0.5912*** (-4.64)
Log Size	S	0.0169* (1.85)	0.0237*** (2.53)	0.0243*** (2.57)
Log Size^2	S^2	0.0084 (0.065)		
Log Age	AG	0.0091 (0.41)	-0.0209 (-0.90)	-0.0127 (-0.53)
Log Age^2	AG^2	0.0046 (0.41)		
Capital	CAP	0.0619*** (2.66)	0.0645*** (3.13)	0.0614*** (2.95)
Gearing	GR	0.0104 (0.95)	0.0144 (1.53)	0.0137 (1.45)
Efficiency	EFF	-0.1314*** (-12.24)	-0.1350*** (-10.03)	-0.1372*** (-10.57)
Portfolio at risk	PAR	-0.0105*** (-2.46)	-0.0112** (-2.40)	-0.0106*** (-2.35)
Loan size	LS	0.0021 (0.46)	0.0013 (0.29)	0.0013 (0.29)
Inflation expectations	INF		0.0660 (1.07)	0.0582 (0.93)
Per capita incomes	GNI		-0.0123 (-0.31)	-0.0087 (-0.21)
Property rights	PR			0.0014*** (2.27)
Freedom from corruption	COR			0.0019*** (3.33)
R^2		0.80	0.82	0.83
No of obs.		508	485	476

This Table presents regression with robust standard errors results conducted to determine the determinants of profitability for Africa MFIs. Estimations were performed using fixed effects estimation. T-Statistics are in parentheses and significance at the 10%, 5%, and 1% level is denoted by *, ** and *** respectively. A detailed description of the definition and sources of the variables is given in Table 3.2

Based on a panel data set of 210 microfinance institutions, what inferences can we draw from the regression coefficients? We find that capital adequacy has robust and significant positive association with MFI profitability. This is depicted by the relatively high coefficient of the equity to assets ratio across the specifications. This effect remains so even after the inclusion of the external factors. Intuitively, this is an indication that well capitalized MFIs are more flexible in dealing with problems arising from unexpected losses and are confronted with a reduced cost of funding or lower external funding. It may also suggest that MFIs may be capital constrained. Weak capitalisation has hampered MFI performance in Africa where loan portfolios has been increasing by over a billion dollars a year while provision of enough funding to the institutions remains a major challenge (Lafourcade, et al 2006). Compared with

the banks' average capital adequacy ratio of approximately 0.13, MFIs are much less capitalized, since it's more difficult to leverage the risky microfinance loan portfolios (Conning, 1999). This result is consistent with the banking literature as evidenced by Sufian and Habibullah (2009), Kosmidou et al (2008), Athanasoglou, et al. (2008), Boubakri, et al. (2005), Naceur and Goaied (2001), Demirgüc-Kunt and Huizinga, (1999), and comprehensively discussed in Berger (1995). This evidence is however inconsistent with Goddard et al (2010) who in the traditional banking industry, finds lower profitability for banks that are highly capitalised.

As predicted by Miller and Noulas (1997) and subsequently by Cooper et al., (2003), credit risk measured by the sum of the level of loans past due 30 days or more (PAR>30) and still accruing interest is negatively and significantly related to MFI profitability. This study therefore finds evidence to support the conjecture that increased exposure to credit risk is normally associated with lower MFI profitability. This finding is consistent with CSFI (2009) which identified credit risk as the biggest risk faced by the MFIs globally. It also confirms Athanasoglou, et al. (2008), Kosmidou et al (2008), and Boubakri, et al. (2005) in the banking literature but contrary to Sufian and Habibullah (2009) who evidence a positive link between credit risk and profitability in China. As a robustness check, we carried out additional regressions using alternative specifications. Specifically, we re-run the regressions using three other measures of credit risk that include write-off ratio (WOR), risk cover (RC) and loan loss reserve ratio (LLR) which all turned out to be insignificant[34]. Intuitively, under some circumstances, self-financing could be used to mitigate adverse selection related problems (Amitrajeet and Beladi, 2010).

34 It is however worth noting that whereas portfolio at risk (PAR) is a measure of risk of default, write-off ratio (WOR) and loan loss reserve ratio (LLR) are measures of actual default. Given dynamic incentives that MFIs clients have to repay their loans in order to secure additional loans and the effectiveness of loans collections by the MFIs staff, it is conceivable that most late loans will be paid at some point. This perhaps explains why whereas PAR coefficient is significant, WOR and LLR are insignificant.

The significant result for MFI size across all regressions where the relationship is linear[35] confirms the economies of scale hypothesis in the microfinance intermediation process. This basic result does not change even with the inclusion of external factors. In microfinance literature, these findings confirm Cull, Demirgüc-Kunt, and Morduch (2007). It is also consistent with Mersland and Strøm, (2009), Kosmidou (2008), Athanasoglou et al (2006) and Beck et al (2005) but is inconsistent with Sufian and Habibullah (2009), Hsiu-Ling et al (2007), Pasiourasa and Kosmidou (2007), Kosmidou et al (2006), Bikker and Hu (2002), Demerguç-Kunt and Huizingha (1999) in the banking industry. It can therefore be argued that failure to become profitable in microfinance is partly due to lack of scale economies. Our finding suggests that MFIs may have to institute a dual objective of profit maximization while presumably pursuing a managerial goal of firm size maximisation. It could also imply that profitable MFIs in Africa have a greater control of the domestic market, and therefore lending rates may remain high while deposit rates remain lower since larger MFIs may be perceived to be safer. This high interest rate spread translates to and sustains higher profits margins.

We cannot confirm Cull, Demirgüc-Kunt, and Morduch (2007) and the general literature that performance of MFI improves with age. We find insignificant results in all cases, suggesting that the length of time a MFI has been in operation doesn't count towards profitability. The theoretical foundation that new entrants into the market are better able to pursue new profit opportunities which translate to higher profits is not supported here. Our findings do not confirm Hsiu-Ling et al (2007) and Beck et al (2005) who found a negative and significant relationship between age and performance in the banking literature. We also do not detect significant non-linear effect of age on MFI outcomes, or any reflection of a learning curve on performance.

We find inefficiency in the management of operating expenses to significantly decrease MFI profitability. As a robustness check, we carried out additional regressions using Cost per

35 We do not find support for non-linear effects as the square of MFI assets is similarly positive and significant

Borrower (CB), which yields similar results. This finding is consistent with Cull, Demirgüc-Kunt, and Morduch (2007) amongst a sample of MFIs and Sufian and Habibullah (2009), Kosmidou (2008), Athanasoglou, et al (2008), Pasiourasa and Kosmidou (2007), Athanasoglou et al (2006), Kosmidou, et al (2005), Guru et al. (2002) in traditional banking. This perhaps reflects problems in corporate governance[36] as evidenced by Mersland and Strøm (2009) who concludes that better corporate governance is a key factor for enhancing the viability of the microfinance industry. This is consistent with Chhaochharia and Laeven (2009) who concludes that improvements in corporate governance impacts positively on firm value.

Guided by stakeholder and agency theories, Mersland (2009a) similarly draws a historical parallel found in savings banks to present corporate governance lessons for MFIs. His findings show that the survival of savings banks was largely due to monitoring by bank associations, depositors, donors, and local communities. In addition, cross-subsidization by the wealthier customers helped the banks to become financially stable. Further evidence by Bourke (1989), and Molyneux and Thornton (1992) point to a positive relationship between quality management and profitability of European banks. This inefficiency in cost management could also signal lack of competitive market.

The insignificant gearing ratio suggests that most profitable MFIs neither finance their operations with debt instruments nor equity. They may therefore be relying on deposit mobilization. Indeed and to draw the link or otherwise, existing evidence shows that whereas globally most MFIs rely heavily on donations and retained earnings to fund their activities, Africa MFIs fund only 25 percent of their assets with equity. 72 percent of the source of their liabilities is deposits which is significantly higher than MFIs in other regions (Lafourcade, et al 2006). Although the impact of gearing ratio warrants further research, it is important to

36 To explore the effect of traditional governance mechanisms such as board composition and size, managerial incentives, ownership type, and regulation, Mersland and Strøm (2009) use a global dataset including 278 rated MFIs from 60 countries while Hartarska (2005) uses different datasets spanning 46 to 144 observations from East European MFIs. Both studies have difficulties in identifying significant governance influence though both conclude that governance matters, but the traditional governance mechanisms seem to matter less in MFIs.

point out that when attempting to identify variations in profitability arising from gearing ratio, it is important not to do so in a vacuum. If, for instance, long term borrowings negatively affected profitability but enable MFIs to expand their outreach such that they can loan to more poor people, then that effect should be considered when developing normative implications from the analysis. This conjecture, however, cannot be the entire explanation, because MFIs differ with respect to mission/objectives.

Contrary to Cull, Demirgüc-Kunt, and Morduch (2007), our results show that the average loan size variable is not significantly linked to MFIs profitability. Even after controlling for other covariates, MFIs that make smaller loans are not less profitable on average. The hypothesis that expanding loan sizes thereby making relatively large loans to fewer customers is likely to be more efficient than making large numbers of small loans to improve profitability by lowering average costs is not supported here.

After controlling for MFI specific characteristics, we find no evidence suggesting a statistically significant relationship between changes in macroeconomic variables (GNI per capita growth and inflation) and profitability of MFIs which is contrary to Ahlin and Lin (2011) and Liu and Wilson (2010) in the banking sector. Indeed, Zaidi, et al (2009) show that inflation has not had a damaging effect on microfinance clients in the first nine months of 2008 when it rose to 25 percent in Pakistan and predicts that it is not likely to have an effect in the subsequent months. This is may be an indication of the high resilience of MFI on local macroeconomic conditions. Intuitively, it could also imply that microfinance relies on a poor macro economy to thrive. To draw the link, Hartarska and Nadolnyak (2007) use index of the size of the informal market developed by the Heritage Foundation and conclude that the size of the informal market has a positive effect on microfinance performance. Specifically, an MFI operating in a country with an index of 3, such as South Africa, would have 8% lower operational sustainability than MFI in a country with an index of 4 such as Mozambique. We however caution that this conjecture needs to be corroborated by further research.

Proxies for quality of institutions are both positive and significant as predicted by theory. This suggests that freedom from corruption would enhance greater profitability since corruption may distort the allocation of talent away from entrepreneurship and innovation, thereby significantly increasing costs of doing business. This eventually stifles MFI growth by increasing the risk and uncertainties which is consistent with (Aidt 2003; Ng 2006). The positive and significant coefficient of property rights is consistent with Kim, and Mahoney (2005). This suggests that the more certain the legal protection of property, the better the investment climate or the higher the probability of government expropriation of property, the worse the investment climate. To conclude therefore the quality of institutions are prerequisites if MFIs are to achieve profitability.

3.6.1 Robustness checks

To confirm the main results, a robustness check was performed by running the same set of regressions for a smaller data set of 1,260 observations over a reduced period of six years (2002-2007). As shown in Table 6 (Appendix B), using a significantly reduced unbalanced sample does not fundamentally change the picture. The significance and the relative magnitude of influence of the MFI- specific and macroeconomic variables used in previous regressions are preserved**.**

3.7. Conclusions, policy implications and prescription

This chapter is a first attempt to study profitability of the microfinance industry in Africa. We specified an empirical framework to investigate the effect of MFI-specific, quality of institutions and macroeconomic determinants of profitability of MFIs in Africa. An unbalanced panel dataset of 210 MFIs operating across 31 countries during 1997-2007 periods provided the basis for the econometric analysis.

The impact of MFI-specific variables is in line with theoretical expectations, with notable exception of MFI age and gearing ratio which are insignificant. Our empirical findings are robust to alternative specifications. Although some of the findings are well known in the banking literature, they are nevertheless new in microfinance industry. Interesting estimation results are obtained, which shows that successful MFIs are most often larger, well-capitalized and that increased exposure to credit risk lowers profitability. While the usual caveat about drawing strong policy conclusions from cross-country analysis applies, the findings in this study do have a clear set of policy implications for policymakers in the microfinance industry. We suggest the following five points.

First, efficiency in delivering microfinance is an important determinant of profitability and therefore MFIs have much to gain if they improve on their managerial practices. Efficient cost management is a prerequisite to profitability since this sector may not have reached the maturity level required to link quality effects emanating from increased spending to higher MFI profits. One potential solution to reducing transactional costs is through the use of mobile phone micro-banking. Safaricom's *M-Pesa* service in Kenya currently transfers an average of KSh150 million (US$2m) a day mostly in small amounts averaging KSh3, 800 (US$50) per transaction.[37] A major drawback would however be technological innovations in Africa which pose particular challenges because mobile phone usage has lower penetration than in the developing countries. The new technologies such as mobile banking and

37 See Microfinance Insights Vol. 9, Nov/Dec 2008 at https://www.microfinanceinsights.com/index.asp. accessed on Jan 2009

branchless micro-banking may also pose a major threat to the data privacy of MFI consumers (CGAP, 2009b).

Guided by stakeholder and agency theories on corporate governance, our findings suggests that MFIs may be able to effectively use local depositors as in the case of Irish loan funds (see Hollis, and Sweetman, 2007) not just for funding, but also because of the important financial discipline that depositors can impose on the management. Our findings suggest that MFIs may improve on performance by switching to lower frequency repayment schedules and save dramatically on the transaction costs of instalment collection. This policy implication may only hold if the risk composition of borrowers is not made worse by a more flexible repayment schedule. There are also issues of borrower runs to contend with (Bond and Rai 2009), though evidence to date points on the contrary (Field and Pande 2008; McIntosh 2010). This study could be extended by exploring the role of "managerial capital", on MFI management which is distinct from human capital in line with Bruhn, Karlan, and Schoar (2010).

Second, the positive and highly significant capital variable coefficient is a clear indication that microfinance industry may be capital constrained. Therefore, at the MFI level, profitability can be realized by reinforcement of MFIs capitalization through national regulation programs and by reducing the proportion of non-interest bearing assets to the benefit of MFI loans.

Third, the evidence of positive and significant MFI size is an indication that MFIs may have to institute a dual objective of profit maximization while presumably pursuing a managerial goal of firm size maximisation. It could be the case that MFI with lower repayment and a larger client base is more profitable. One of the most important questions underlying MFI policy is which size optimizes MFI profitability. Smaller MFIs in particular are at a disadvantage, struggling to cover the industry's high operational costs and diversify their products in order to compete with larger microfinance providers. That notwithstanding,

governments and funders/donors face a challenge; although scale economies are important for profitability, local markets in Africa do not always allow such scale economies.

Fourth, evidence on credit risk is consistent with our hypothesis. This calls for improvements in information capital. Better screening processes may enable MFIs to mitigate adverse selection problems. Most countries in Africa however lack credit reference bureaus or unique identification that would help minimise loan defaults (Janvry, McIntosh and Sadoulet 2010). While some of the developing countries such as El Salvador have established reasonably well-functioning centralized risk-management structures, where nearly instantaneous credit checks are possible (McIntosh and Wydick 2005), the same lacks in Africa. But even with credit reference bureaus, lenders must still have to make a decision on whether to approve loans and on what terms (Karlan and Zinman 2009).

These findings have therefore responded to the primary aims and objectives of our study and made a contribution to the existing literature. Overall, these empirical results provide evidence that the MFIs profitability is shaped by MFI-specific factors and quality of institutions that are not the direct result of MFIs's managerial decisions.

CHAPTER FOUR

DO MICROFINANCE PROFITS CONVERGE? EVIDENCE FROM A DYNAMIC PANEL ANALYSIS[38]

4.1 Introduction

Microfinance competition has been transformed over the past two decades by forces such as regulation, increased commercialization of microfinance, technological changes and competition from the formal financial sector (Cull et al 2009c). MFIs operate in product and geographical markets that significantly differ from those that existed two decades ago. These developments have implications on MFIs profitability. Theoretical literature has established that intense competition leads to the poorest borrowers dropping out of the microfinance market (see e.g. McIntosh and Wydick 2005). Additionally, competition undermines the dynamic incentives at the root of microfinance loan contracts (Guttman 2008; Chowdhury 2007). To a large extent, competition has gone under-studied in microfinance due to lack of data, regarding the performance of microfinance institutions. Recent improvements in the data enabled us to undertake this analysis.

Our primary goal in this chapter is to test for the persistence of profits by combining a new dataset on the performance of microfinance providers with industry specific, macroeconomic indicators and location specific factors. This will enable us to offer evidence on whether microfinance industry in Africa is competitive by employing alternative method in the empirical analysis. Pertinent questions concern whether one observes convergence to the mean, moderate/high persistence or explosive paths.

To achieve this objective, we use a system GMM dynamic model to test the hypothesis that entry and exit are sufficiently free to eliminate any supernormal profits quickly, so that MFI profit rates converge rapidly towards their long-run equilibrium values. The alternative

38 A previous version of this chapter was presented at the 1st World Finance Conference, in Viana do Castelo (Portugal). I acknowledge the inputs of the conference participants.

hypothesis is that the structural characteristics of microfinance industry in particular countries, specialist knowledge or regulatory advantages enjoyed by incumbent MFIs, renders entry into these regions sufficiently costly. We argue that the slower is the speed of adjustment, the longer is the period over which supernormal profits may persist, and the greater is the extent of the potential departure from the competitive ideal.

To date, academic research on microfinance competition is limited to; whether the presence of conventional banks affects the profitability and outreach of microfinance institutions (Cull, et al 2009b), whether microfinance competition worsens outreach and financial self-sufficiency (Hisako 2009), whether microfinance competition lowers interest rates (Porteous 2006), whether competition affects the incumbent village bank's ability to attract new clients (De Janvry and Sadoulet, 2005), whether competition affects the effort and lending decisions of the incumbent, the effects of competition on deposit growth, loan portfolio composition, repayment rates, and other effort (Park, Brandt, and Giles 2003). These studies do not answer the research question "are microfinance profits persistent?" because; (i) their focus is not MFI profitability and (ii) they employ static analytical framework which are only relevant when identifying causal relationships between variables when markets are in equilibrium (Geroski, 1990). Cross-sectional data usually does not contain sufficient information on which to base reliable policy decisions to promote competitive outcomes. Moreover, any abnormal profit realized in one period may disappear in the subsequent period which renders intervention by government unnecessary.

This chapter is similar to the previous in two ways. First, although the study employs a different estimation technique, the two studies nevertheless have employed the analysis of panel data methodology. Second, we use the same unbalanced dataset ranging from 1997 to 2007. That notwithstanding, this study differs from the previous chapter in that although the main focus is persistence of MFI profits, it offers more robust estimates as we introduce a new set of control variables; location/regional variable as a measure of the diverse environments in

which MFIs operate and regulatory policy variable. In particular, we seek to establish whether the conclusions and policy recommendations arrived at in the previous chapter differ significantly when we consider more control variables. This enables us to probe further evidence on the determinants of MFI profitability. Variations in regional or location factors may contribute to the growth in loan portfolios differently. Additionally, costs associated with regulation are likely to be higher for MFIs because of their small scale (Cull, et al 2011). Regulation may also lead to a mission drift if the regulatory requirements such as capital adequacy divert resources away from serving the core poor to better-off borrowers in order to improve on capital requirements. Regulation may also curtail innovation in lending mechanisms that has been the driving force behind MFIs' performance (Hartarska and Nadolnyak, 2007).

We thus seek to answer two principal research questions (i) Are microfinance profits persistent in Africa? (ii) Does the level of persistence converge to the mean, or do we observe explosive paths? While the competitive environment hypothesis predicts that profit differentials across firms should disappear in the long run, the empirical evidence tends to give little support to this theory. Answers to these questions are important empirically as well as from a policy perspective for the evolving microfinance sector in Africa. To date, there has been relatively little discussion, at least within academic circles, and almost no empirical analysis of persistence of MFIs profits. To address these issues, we combine high-quality data for 210 leading MFIs from Africa.

This study makes four contributions both to policy and literature as follows; (i) So far there is no empirical evidence on whether MFI predicted to earn a high long-run profit rate would in fact earn a high profit rate in subsequent periods. Previous studies examine the convergence of profitability to a long-run mean value, either for industries or for the economy as a whole; but the evidence for the microfinance sector is clearly lacking. We are convinced that the issue under investigation is highly relevant because if profits persistence is only a

short-term phenomenon among the MFIs, then its anti-competitive implication would be limited. (ii) This study is pioneering in using dynamic GMM estimators, two-step estimation method, in studies of determinants of microfinance profitability. (iii) Profits are also an important source for equity. If reinvested, this should lead to more stable MFIs which could promote financial stability in the microfinance sector. (iv) At the policy level, the existence of profit persistence may imply that shocks to profitability persist indefinitely and that competitive pressures never erode differences in profitability.

The rest of this chapter is organized as follows. Section 2 provides a brief literature review on persistence of firm profits. Section 3 describes the model specification. In Section 4, we provide description of data, which include measurements of our variable of interest. Section 5 discusses econometric methodology. Section 6 presents the empirical results and findings. Finally, a seventh section spells out some concluding remarks and policy suggestions.

4.2. Previous literature

Theoretical underpinnings

In a perfectly competitive market, no firm would be able to earn a profit rate above the competitive return[39]. Thus the hypothesis tested in the profit persistence literature is that entry and exit is sufficiently free to eliminate any supernormal profits whatever their cause, and that all firms' economic profit tends to converge to the same long-run average rate (Berger et al., 2000; Singh 2003; Cuaresma and Gschwandtner, 2008). The puzzling question however is why do some firms consistently report supernormal profits? Theoretical literature shows that some firms may be more innovative or endowed with advantages that give them an edge over the others, which prevent imitation or block entry. These unique endowments include firm characteristics such as size, market share, advertising and research and development

39 The basic premise of microeconomic theory is that a firm's economic profits should converge to zero in competitive markets or to a level that is just sufficient to provide a normal risk-adjusted return on capital.

expenditures. Thus, along this line of argument, it is innovation competition that leads to persistence in profits rather than price competition, Consequently, abnormal profit may tend to persist from year to year, and differences in average profit rates may be sustained indefinitely[40] (Galbreath and Galvin 2008). Indeed, financial institutions profits show a tendency to persist over time, reflecting either impediments to market competition or informational asymmetry (Berger et al., 2000).

Another competing argument considers persistence in levels of profitability to be a reflection of sensitivity to regional or macroeconomic shocks (see Berger et al., 2000). To the extent that regional shocks are serially correlated *ex post*, firms in a region subjected to positive shocks will tend to remain in the high end of profitability, provided that entry into these regions is sufficiently costly. Similarly, firms in a region subjected to negative shocks would tend to remain in the low end of profitability levels, provided that regional exit is sufficiently costly. Arguably, if it is sufficiently costly for firms to adjust their risk-return profiles in response to changing macroeconomic conditions, firms with high risk or pro-cyclical returns may perform consistently in the high end of the profitability levels during protracted economic expansions and perform consistently in the low end during protracted downturns (Singh 2003).

Cubbin and Geroski (1987) observe that considerable heterogeneities exist within most industries. They also find that firms in highly concentrated industries adjust much more slowly toward long-run equilibrium profit rates. Other studies that have examined differences between firms persistence of profit and the speed of convergence include Geroski and Jacquemin, (1988) and McGahan and Porter, (1999).

40 Theoretical literature also suggests that profit persistence among firms involve interesting questions such as; what are their sources; why don't competitive forces make them vanish; and what their consequences are for industrial growth and dynamics. The distribution of profits in the future depends on the impact of the forces of competition over time on the present state, which is itself the outcome of similar previous forces. Since profit persistence reflects existence of impediments to competition that generates market power in output market and informational opacity which generates market power in the input markets, the argument that firms in concentrated markets might have some degree of market power and use it to manipulate prices in their favour both in the short and long run is intuitively plausible. Such firms could act to accelerate or retard the rate at which prices adjust to supply and demand shocks, affecting the speed of adjustment when equilibrium shifts (Gonzalo and Hachiya 2008).

MFIs differ in many respects, such as lending methodology. Cultural factors which are time invariant may also influence the direction of one lending type over another in a country or region, and it could be these social factors that are ultimately driving profitability rather than lending methodology. Having reviewed different strands in theoretical literature, it is clear that an appropriate empirical framework of the persistence of profits that controls for determinants of MFI profitability should capture several potential linkages.

A review of empirical evidence

Since the seminal work of Mueller (1977, 1986), there is a growing empirical literature focused on the persistence of firm profits. Mueller (1977), points that the average firm's profit comprises both permanent and short-run components, which converge over time. However, the direction of such effect is unclear; thus so far it is not possible to determine profit persistence in the microfinance sector *a priori*.

Most of the existing empirical literature on persistence of profit is based on manufacturing data, with only a handful of studies investigating persistence of profit in banking. The pioneering contribution by Mueller (1977), and subsequent Mueller (1986) used a stochastic approach, modelling profitability as a first order autoregressive (AR (1)) process[41]. Glen and Singh (2003) test profitability persistence in seven leading developing countries and conclude that both short and long-term persistence of firm profit rates for the developing economies are lower than those for advanced economies which he attributes to lower sunk cost to enter markets, faster growth rates of firms, weaker role of governmental regulations, and the existence of many large business groups. This is however inconsistent with theoretical predictions since it implies there is a higher level of competition in emerging

41 He concluded that there is significant variability in the speed with which profits adjust to their firm-specific permanent value across different sectors and countries. Moreover, difference in convergence patterns might be associated with steady flow of resources through the persistence of both higher market power and profits above or below average levels over time. The potential influence of initial profit rates (See e.g. Mueller, 1990; Goddard and Wilson, 1999) has also been the subject of research

markets, but the findings confirm Waring (1996) and Geroski and Jacquemin (1988) on a sample of industrial firms in three European countries.

Consistent with theoretical postulation that innovations play the outmost key role in profit persistence, (Cefis, 2003) finds that firms that are persistent innovators and earn above-average profits have a high propensity to continue doing both while earning above normal profits which corroborates previous findings by (Mueller 1990). However, extra profit due to innovations can only be temporary, vanishing when competitors start to imitate the products or processes of the innovative leading firm.

What does the evidence in the financial sector show? A recent wave of studies in the banking sector has emerged consistently showing that the sector is not perfectly competitive. Using a dynamic panel model, Goddard, et al (2010) investigates the convergence of bank profitability in eight European Union member countries, between 1992 and 2007. Their results show evidence of persistence of excess profit from one year to the next, which was lower in 1999-2007 than it was in 1992-98 in all the eight countries. Their findings are consistent with Flamini et al (2009) who in a cross-country study for Sub-Saharan Africa, finds modest persistence. Athanasoglou, et al. (2008) applies a dynamic panel data model to study the performance of Greek banks over the period 1985-2001 and find profit persistence. This result confirms those reported in Carbo and Fernandez (2007) who document persistence in bank spreads in Europe. Goddard, et al. (2004a) shows persistence of profit to be higher for savings and co-operative banks than for commercial banks whose profit levels tend to adjust fairly fast to their average level which corroborates Yurtoglu (2004) among Turkish banks. On the contrary Goddard, et al. (2004b) finds in both sets of their estimations that there are quite large differences between countries in the magnitudes of the persistence coefficients. On a similar vein Berger et al. (2000) conclude that profit converges to its long-run average value more slowly in U.S. banking than in manufacturing, and market power plays a significant role in enabling abnormal profit to persist. On the contrary, Bektas, (2007) uses the panel data

method to test for unit roots of profitability for 28 surviving banks in Turkey between 1989 and 2003 and their persistence. He concludes that persistence of profits does not exist in the long run. One of the central conclusions in the literature is that rivalry alone does not therefore erase persistent asymmetries among firms.

Turning to regulatory policies as a control variable, Cull, et al[42] (2011) finds supervision to be negatively associated with profitability which confirms previous findings by Hartarska (2005). This is however inconsistent with Mersland and Strøm (2009), who using an endogenous equations approach establish that regulation does not have a significant impact on financial performance. Hartarska and Nadolnyak (2007) similarly find that regulation does no matter on financial performance, after controlling for the endogeneity of regulation. Barth et al, (2008; 2004) similary finds cross-country evidence that regulation has no impact on the performance of conventional banks. Clearly this issue remains contestable.

Table 4.1: Summary of profit persistence studies

Author	Country	Sample period	Observation per firm	Speed of adjustment
Muller (1990)	US	1950-1972	23	0.183
Cubbin and Geroski (1987)	UK	1948-1977	30	0.482
Geroski and Jacquemin, (1988)	UK	1947-1977	29	0.488
	France	1965-1982	18	0.412
	Germany	1961-1981	21	0.410
Waring (1996)	US	1970-1989	20	0.540
Goddard and Wilson, (1999)	UK	1972-1991	20	0.590
Berger et al (2000)	US banks	1969-1997	29	0.900
Maruyama and Odagiri (2002)	Japan	1964-1982	19	0.639
		1983-1997	15	0.597
Glen and Sign (2003)	Emerging countries	1980-1994	10	0.01-0.42
Ces (2003)	UK-with patent	1978-1991	14	0.187
	UK-no patent	1978-1991	14	0.813
Goddard, et al. (2004a)	EU-Savings banks	1992-1998	7	0.299
	EU-Commercial banks	1992-1998	7	-0.149*
Goddard, et al. (2004b)	EU-Banks	1992-1998	7	0.260
Yurtoglu (2004)	Turkish banks	1985-1998	14	0.430
Bektas, E (2007).	Turkish banks	1989-2003	15	0.030
Galbreath and Galvin	Japan	1991-2001	11	0.560

42 Investigates implications and trade-offs of regulation for the world's largest MFIs, by examining impact on profitability and outreach to small-scale borrowers and women, drawing on a financial data of 245 MFIs from the MIX database that allows for within-country variation regarding MFI regulation and supervision.

(2008).				
Athanasoglou, et al. (2008)	European banks	1995-2001	7	0.350
Flamini et al (2009)	Sub-Sahara Africa	1998-2006	Cross country	0.210
Goddard, et al. (2010)	European banks	1992-2007	Cross country	0.333

*Insignificant

Table 4.1 shows that the empirical evidence to date focuses on a relatively small number of countries, and identifies positive autocorrelation in firm profit rates observed over time. The persistence of firm profit is driven by firm-specific, industry-specific and macroeconomic context. Moreover, literature lacks formal verification of the persistence on microfinance profitability, which might be relevant for the constantly evolving microfinance industry. The main objective of this chapter is therefore to fill this gap in the existing literature. This study therefore formulates a dynamic model of the determinants of MFI profitability, while controlling for other factors that are expected to influence profitability.

4.3. Design of the model

The persistence of profit approach is based on empirical investigation of the dynamics of firm level profit. Much of the existing literature is based on the structure conduct performance paradigm which is based on the static, cross-sectional methodology. An alternative to conduct-based measure of competition uses *H-statistic* and reports evidence of monopolistic competition (Carbo et al. 2009; Goddard and Wilson, 2009). There is no certainty that conduct or performance measures observed at any point in time represent equilibrium values. For example, an empirical association between high concentration and high profitability that is the standard in structure conduct performance models may simply appear by chance, from observations taken during a period when the relevant market is in a state of disequilibrium (Goddard and Wilson, 2009).

Rather than the standard linear regression model adopted in the previous chapter, and to infer the speed at which abnormal profits above or below the normal tend to dissipate, we develop a dynamic model which enables us to derive the rate of adjustment that is most

consistent with the observed panel data[43]. We therefore augment model (3.3) in the previous chapter to a dynamic specification (4.1).

We also control for other factors that may explain MFI profitability. Due to country specific differences that exist in the Africa microfinance sector, we test for potential location effects. We contend that even within the same continent, location specific variations may have an impact on MFI profitability[44]. Additionally, we note that, given the large time frame of our dataset and the developments that might have taken place in the Africa microfinance sector during the sample period, it is possible that time effects are present in the error component of the model. Failure to account for these two effects might bias the estimates in unknown magnitudes and directions. We test for these effects by augmenting model (4.1) to include regional dummies for West, East, South and Central Africa. We further augment the model with industry-specific factors such as the type of the charter that has established the MFIs and regulatory environment. From an economics point of view, the main difference between for-profit and not-for-profit status is the ability to distribute profits (Glaeser and Shleifer 2001). If not-for-profits earn revenues greater than costs, they reinvest it back into the firm to further social missions. On the contrary, for-profit institutions have a leeway on what they can do with after-tax profits.

In order to avoid over-identification problems, and to control for the overall institutional development on MFI profitability, we replicate the two time-variant exogenous variables from Heritage Foundation in the empirical specifications that were used in the previous chapter. We also include all the variables described in the previous chapter to control for important influences on MFI profitability. Thus, to examine profit persistence, while

43 One may however be tempted to ask the question why we have to undertake cross-country study rather than country specific. We argue that including several countries in this study is important as it enable us understand the impact of the different location advantages, regulatory restrictions on MFI growth, institutions development and macroeconomic environments on MFI profitability which we control for before we draw any conclusions. By undertaking a cross-country analysis, it is possible to narrow the range of factors. In view of the findings, we are able to draw some policy implications that may be useful to MFI management, policy makers and shareholders in the Africa economies.

44 Undocumented regional differences, such as prices, infrastructure, or cultural attributes, may influence the demand for and use of credit.

controlling for other covariates in a rather simplified way, the econometric model is expanded as follows:

$$\Pi_{ict} = \alpha + \eta\Pi_{ict-1} + \sum_{j=1}^{J}\beta_j X_{ict}^{j} + \sum_{m=1}^{M}\beta_m X_{ct}^{m} + \sum_{n=1}^{N}\beta_n X_{ct}^{n} + \sum_{l=1}^{L}\beta_l X_{ct}^{l} + \delta D_r + \varepsilon_{ict} \text{.....(4.1)}$$

More formally, Π_{ict} is the profitability of MFI *i* located in country *c*, at time *t*, with i=1, . . .,N, t=1, . . ., T; α is the regression constant, X_{ict}^{j} is a vector of MFI-specific characteristics (*j*) of MFI *i* in country *c* during the period *t*; X_{ct}^{m} is a vector of macroeconomic country-specific variables (*m*) in country *c* during the period *t;* X_{ct}^{n} is a vector of institutional development indicators (*n*) in country *c* during the period *t*; X_{ct}^{l} refers to industry-specific factors (*l*) and $\varepsilon_{ict} = \upsilon_i + \gamma_t + \mu_{ict}$ is the disturbance; γ_t is the unobservable time effects, υ_i is the unobserved complete set of individual MFI-specific effect which controls for all cross-sectional (or 'between MFIs'), and μ_{ict} is the idiosyncratic error. Augmenting the model with unobservable time effects modifies the specification into an unbalanced two-way error component model. *D* is a binary for the location-specific dummy variables. η, β, δ are the coefficients to be estimated.

Π_{ict-1} is the one-period lagged profitability and η is the speed of adjustment to equilibrium which gives us some information about the structure of the market. A value of η between 0 and 1 implies that any shock to profits will persist but will nevertheless return to their normal level. In competitive firms, we expect this to occur quickly, while in less competitive industries we might anticipate high persistence and a value of η, closer to 1. If η lies between 0 and -1, then profits revert to normal in an oscillating manner. This might occur in periods of rapid change in the structure of the microfinance sector which can cause MFI profitability to become highly volatile.

4.4 Data and measurement

Data description

This study analyses profit persistence of the microfinance industry in Africa economies, using the same data set and measurements as the previous chapter. This comprises 210 MFIs across 31 developing economies in Africa for the period 1997-2007 with 2,310 observations. Persistence of profits is evaluated by using the net income after tax to total assets (ROA) as a profit measure. In order to avoid duplication we shall not dwell into a detailed discussion about the same. Reference should be made to previous chapter on a formal discussion of the conceptual framework, data and measurement of the variables.

Industry specific factors are characteristics that are unique to the microfinance sector. In order to control for the differences in profitability arising from the charter that establishes the MFIs, we use (i) *Prof* as a dummy variable indicating MFIs formal profit status[45] (equal to one if the organization is for-profit). Again, the markers are drawn from MIX data set. MFIs with not-for-profit charters tend to have objectives and funding arrangements that are different from those of more commercially-oriented MFIs (such as banks or credit unions). Not-for-profit MFIs place more emphasis on outreach while at the same time relying relatively more on donated funds to subsidize those efforts (Cull, et al, 2009a). (ii) *Region* is a dummy variable for each of the four regions in Africa to capture location impacts. The nature and composition of microfinance business may be such that certain locations are favoured while others are avoided. (iii) *REG* is a binary variable indicating regulation status equal to one if regulated and zero otherwise[46]. Table 4.2 lists the variables used to proxy profitability and its determinants (including notation and the predicted effect of the determinants according to the literature).

45 More of the objectives of commercial microfinance is discussed by Robinson (2001).

46 To the extent that reserve requirements are not remunerated or remunerated at less-than market rates, MFI regulation may impose a burden on these institutions. Moreover, regulation of MFIs may lead to a mission drift if the regulatory requirements such as capital adequacy divert resources away from serving the poor to serving better off borrowers in order to improve capital adequacy ratios with implications on profitability.

Table 4.2: Summary of variables and measurement

Variable	Notation	Measure	Predicted effect	Source of data
Dependent variable				
Profitability	ROA	Net profits after taxes/Assets		The MIX
Control variables				
MFI-specific				
Capital	CAP	Equity/Assets	Positive	The MIX
Credit risk				
Portfolio at Risk	PAR-30	Outstanding balance, portfolio overdue>30 Days + renegotiated portfolio/Adjusted Gross Loan Portfolio	Negative	The MIX
Write off Ratio	WOR	Value of loans written-off/Adjusted Average Gross Loan Portfolio		
Loan Loss Reserve Ratio	LLR	Loan loss reserve/Value of loans outstanding		
Risk Coverage Ratio	RC	Adjusted Impairment Loss Allowance/PAR > 30 Days		
Other factors				
Efficiency	Eff	Adjusted Operating Expense/Adjusted Average Gross Loan Portfolio	Negative	The MIX
Gearing	GR	Debt/equity ratio	Negative	The MIX
Age	Ag	Age of the MFI in years	Indeterminate	
Size	S	Log of total assets	Indeterminate	
Loan size	LS	Adjusted Average Loan Balance per Borrower/GNI per Capita	Positive	
Industry-specific				
For-profit dummy	Prof	Dummy variable equal to one for profit and zero otherwise	Indeterminate	The MIX
Regulated	REG	Dummy variable equal to one for regulated and zero otherwise	Indeterminate	
Region	WA	Dummy variable equal to 1 for West Africa and 0 otherwise	Indeterminate	The MIX
	CA	Dummy variable equal to 1 for Central Africa and 0 otherwise		
	SA	Dummy variable equal to 1 for South Africa and 0 otherwise		
	EA	Dummy variable equal to 1 for East Africa and 0 otherwise		
Institutional development				
Property rights	PR	Composite Index ranging from 10 (Private property is rarely protected) to 100 (Private property is guaranteed by the government)	Positive	Heritage Foundation
Freedom from corruption	COR	Composite Index 10-point scale Corruption Perceptions Index (CPI) in which a score of 100 indicates very little corruption and a score of 0 indicates a very corrupt government		
Macroeconomic environment				
Inflation expectations	INF	Previous annual % change of the GDP deflator	Indeterminate	World Bank (WDI)
Per capita Income	GNI	GNI per capita, Atlas method (current US$)	Positive	

4.5. Empirical methodology

4.5.1 Estimation and testing

We begin this section by first estimating and testing for the time effects. Consistent with the previous chapter, we tested the joint significance of the unobservable time effects by the $H0:\gamma 2=\gamma 3=.....\gamma T=0$ at the 95% confidence level. We experimented with many year dummies and it turns out that none of the time dummies is significant. The fact that the year dummy variables are insignificant suggests that there may be no additional aggregate macroeconomic effects influencing MFI returns in Africa other that those we have explicitly controlled for in the estimation model. Since Lagrange Multiplier (LM) tests show that time effect is not significant, we proceed with the estimation of the following model;

$$\Pi_{ict}=\alpha+\eta\Pi_{ict-1}+\sum_{j=1}^{J}\beta_j X_{ict}^{j}+\sum_{m=1}^{M}\beta_m X_{ct}^{m}+\sum_{n=1}^{N}\beta_n X_{ct}^{n}+\sum_{l=1}^{L}\beta_l X_{ct}^{l}+\delta D_r+\varepsilon_{ict}.....(4.2)$$

$$\varepsilon_{ict}=\upsilon i+\mu_{ict}$$

Static panel estimates, as do the OLS models, omit dynamics causing the problem of dynamic panel bias and as such do not allow us to study the dynamics of adjustment (Baltagi, 2008). Omitted dynamics means that such models are misspecified, because they omit the entire history of the right-hand-side variables (Greene, 2008).

When estimating equation (4.2), several econometric problems may arise. First is endogeneity: more profitable MFIs may be able to increase their equity more easily by retaining profits. They could also pay more for marketing their products and increase their size, which in turn may affect profitability. However, the causality could also run in the opposite direction, as more profitable MFIs may hire more personnel (as per the expense preference theorem), reducing their operational efficiency.

The dynamic structure of our model makes the OLS estimator biased upwards [47] and inconsistent, since the lagged level of profitability is correlated with the error term. The

47 The estimation methods based on the OLS principle are vulnerable to the omitted variable bias if some important determinants of MFI profitability are not included among the regressors.

within transformation does not solve the problem, because of a downward bias (Nickel, 1981) and inconsistency. We tackle these problems by moving beyond the methodology currently in use in the empirical literature of bank profitability of mainly fixed or random effects[48].

A possible solution on the endogeneity problem is represented by the Generalized Method of Moments (GMM) technique. GMM developed by Hansen (1982), and the first-differenced GMM estimators for the AR (1) panel data that was later developed by Arellano and Bond (1991) provides a convenient framework for obtaining asymptotically efficient estimators in this context. GMM estimators are designed for datasets that has many panels and few periods and gives consistent estimates under the assumption that there is no autocorrelation in the idiosyncratic errors and the explanatory variables are weakly exogenous. The identifying assumption that there is no serial correlation in the idiosyncratic errors ε_{it} can also be validated by testing for no second order serial correlation in the first-differenced residuals. Negative first order serial correlation is expected in the first-differenced residuals if the idiosyncratic errors ε_{it} are serially uncorrelated while positive serial correlation is expected in the levels residuals (Bond and Windmeijer, 2002).

With a fixed number of years panel and a substantial number of observations, Arellano and Bond (1991) suggests estimating equation (4.2) with GMM in first-differences, by first differencing the initial equation, which removes the time invariant υ_i. This renders the equation estimable by instrumental variables as;

$$\pi_{it} - \pi_{it-1} = \alpha_i(\pi_{it-1} - \pi_{it-2}) + \beta(x_{it} - x_{it-1}) + \upsilon(\upsilon_i - \upsilon_i) + (\mu_{it} - \mu_{it-1}) \quad \text{.....(4.3)}$$

Arellano and Bond estimator has however been criticized when applied to panels with very small *T*, on the premise that under such conditions this estimator is inefficient if the instruments used are weak (Arellano and Bover 1995; Blundell and Bover 1998; Phillipsa and Donggyu 2007). Blundell and Bond (1998) for example shows that when η approaches 1, so

48 Recent studies in the banking literature that use fixed or random effects include for example Flamini et al (2009); Sufian and Habibullah (2009), Kosmidou (2008), Hsiu-Ling et al (2007)

that the dependent variable follows a path close to a random walk, the differenced-GMM (Arellano and Bond, 1991) has poor finite sample properties, and it's downwards biased, especially when *T* is small. Therefore, Blundell and Bond (1998) proposed the System-GMM which is derived from the estimation of a system of two simultaneous equations, one in levels (with lagged first differences as instruments) and the other in first differences (with lagged levels as instruments). In multivariate dynamic panel models like ours, System-GMM estimator is shown to perform better than the differenced-GMM when series are persistent (η close to unity) and there is a dramatic reduction in the finite sample bias due to the exploitation of additional moment conditions (Blundell and Bond 2000).

We thus resort to the system GMM[49] since there is a gain in efficiency, and the instrument set is valid. The system GMM estimator also controls for unobserved heterogeneity. Moreover, it's more suited to estimate MFI profitability equations in our empirical framework, than the first-differenced GMM estimator used by some previous authors (see for example Flamini et al, 2009). MFIs profitability outcomes may be highly persistent so their lagged levels might be very weak instruments for the first differenced equations. We instrument for all regressors except for those which are clearly exogenous.

We are also confronted with the choice of using one-step or two-step estimation. The one-step estimator assumes homoscedastic errors while the two-step estimator uses the first-step errors to construct heteroscedasticity-consistent standard errors which imply that the one-step estimators are less efficient than the two-step estimators even in the presence of homoscedastic error terms (Arellano and Hahn, 2007). Although two-step estimators are asymptotically more efficient, they present standard errors estimates that are severely downward biased. However, it is possible to solve this problem using the finite-sample

49 There are two types of GMM estimators that have been frequently used. The first one is the first-difference GMM estimator, developed by Arellano and Bond (1991), which uses first-differenced equations with suitable lagged levels as instruments. The second one is the system GMM estimator, developed by Arellano and Bover (1995) and Blundell and Bond (1998), which augments the former by addition of equations in levels with lagged first-differences as instruments. The system GMM estimator uses the levels equation (e.g. equation 4.1) to obtain a system of two equations: one differenced and one in levels. By adding the second equation, additional instruments can be obtained. Thus the variables in levels in the second equation are instrumented with their own first differences.

correction to the two-step covariance matrix derived by Bond and Windmeijer (2002), which can make two-step robust GMM estimates more efficient than one-step robust ones, especially for system GMM (Roodman, 2009).

The last challenge is the risk of omitted variables. To that end, we follow a general to specific strategy by estimating an equation with all possible regressors according to the existing literature and Africa specific characteristics (see Appendix A). We, then, test through a Wald test the joint hypothesis that the coefficients of the variables that are not significant individually are equal to zero. If not rejected, we re-estimate the model only with the controls which were significant in the general regression. Otherwise, we test a less restrictive hypothesis but still trying to reduce the number of non-significant regressors to the maximum extent possible. We stop reducing the number of regressors when we can reject that the remaining set of coefficients of the control variables is equal to zero. The coefficients obtained in this way are even more efficient as the number of regressors is reduced to the minimum.

Finally, to confirm the validity of the instruments, we perform Hansen's or Sargan test of over-identifying restrictions, which is asymptotically distributed as $\chi^2(k)$ where k denotes the number of over-identifying restrictions and a test of serial correlation among the residuals. We test whether Arellano-Bond orthogonality conditions are fulfilled. If there is no autocorrelation in the levels equation, then the error term in the first-difference equation has negative first-order autocorrelation and zero second order autocorrelation (Baltagi 2008). If we reject the hypothesis that there is zero second order autocorrelation in the residuals of the first-difference equation, then we also reject the hypothesis that the error term in the levels equation is not autocorrelated which indicates that the Arellano-Bond orthogonality conditions are not valid no matter the number of lags used as instruments.

In order to design a suitable model, one key issue remains to be dealt with. We should confirm whether capital is better modelled as an endogenous variable or as a predetermined

variable. It may be the case that the profits earned are fully or partially reinvested which may lead to higher capital. In this case, we would predict a positive causation from profits to capital and based on these considerations, model capital as a predetermined variable rather than strictly exogenous variable. Although Athanasoglou, et al (2008) finds a positive and significant effect of capital on bank profitability, Berger (2005) finds positive causation in both direction between capital and profitability. Based on this argument, we test this hypothesis by re-running model (*4.2*) and treating capital as a predetermined variable. The Sargan test for over-identifying restrictions shows that our specification is well modelled, with a significantly higher *p–value* based on the hypothesis that capital is predetermined[50] (see Table 4 in Appendix B).

To probe further on the capital-profits association, we conduct Granger causality tests. This enables us to examine how each variable affects future changes in the other variable. We are aware that Granger-causation cannot establish causality in a theoretical sense; it is not a test for strict exogeneity and may be misleading if, for example, the processes determining the variables of interest involve expectations and that it only reflects historical correlations which does not necessarily imply economic causation. We nevertheless believe that this enables us to infer the link between capital and profits. We report our simple Granger causality test in Table 5 (Appendix B).

One limitation of using GMM estimator is that the differencing removes any time invariant explanatory variable along with the panel level effect, which does not allow us to introduce the main policy control variables of interest for regulatory status, diversity in regional distribution and for profit status into our main estimation. We would encounter the same effect by estimating a linear model with fixed effects (FE), since this doesn't allows us to control for factors which differ across MFIs but are constant through time and which we

50 When capital is assumed to be endogenous variable, the p-value for this hypothesis is 0.00. In contrast, when capital is assumed to be exogenous, the p-value is 0.18, implying that the instruments used are acceptable.

cannot measure directly known as unobserved MFI heterogeneity[51]. A random effect model seems to be the natural choice. We therefore re-estimate model *4.2* in a linear fashion by assuming random effects (RE).

4.5.2 Univariate analysis

Tables 4.3 and 4.4 present summary statistics. When descriptive statistics are broken down by region, we observe some interesting regional differences. All the regions report an average negative profitability. Although West Africa has the oldest MFIs on average, the region has the highest number of MFIs reporting average loan default rate and the most inefficient on the management of operational expenses. This may partly be explained by the fact that MFIs in some West Africa economies face interest rate ceilings, such as the West African Monetary Union usury law that caps MFI interest rates at 27 percent and bank interest rates at 18 percent (Lafourcade, et al 2006). Although South Africa region has the highest capital adequacy ratio, it also reports the lowest return on assets (at an average of -2.5%) while Central Africa has the most mature MFIs based on age. East Africa has the largest MFIs in terms of average assets. It also offers the smallest loan size. Perhaps this explains why the region has a higher depth of outreach than other regions. The region dominates in terms of outreach with 52 percent of all savers and 45 percent of all borrowers in Africa (Lafourcade, et al 2006). With respect to gearing ratio, MFIs from Central Africa region use more of debt relative to equity in terms of choice of financing compared to other regions. There seems to be no regional patterns with respect to macroeconomic variables in the raw data.

51 In micro-econometrics the unobserved firm heterogeneity means unobserved firm characteristics such as corporate governance and firm structure. Time variant explanatory variables, however, may be correlated with this unobserved firm heterogeneity. Managers may for instance opt to work for unregulated MFIs depending on their preferences for autonomy in decision making, desire and ability to implement microfinance innovations and therefore MFI regulation may limit the manager's ability to innovate. The significant heterogeneity of MFIs suggests that corporate governance may be correlated with MFI characteristics including regulatory status.

Table 4.3 Regional/location descriptive and summary statistics

		South Africa						Central Africa					
Variable	Notation	Obs	Mean	Median	Std Dev	Min	Max	Obs	Mean	Median	Std Dev	Min	Max
Return on assets	ROA	194	-0.025	0.00	0.103	-0.458	0.226	113	-0.007	0.00	0.082	-0.342	0.195
Age	AG	223	7.543	7	4.104	3	28	121	9.612	8	8.186	3.00	40
Capital	CAP	222	0.465	0.51	0.495	-1.366	1.000	121	0.313	0.235	0.244	-0.024	1.000
Gearing	GR	196	1.231	0.63	1.486	0.000	9.090	91	2.325	2.382	1.595	0.000	5.650
Efficiency	EFF	163	0.776	0.59	0.643	0.080	4.150	87	0.293	0.235	0.315	0.000	2.580
Portfolio at Risk	PAR	223	0.103	0.04	0.156	0.000	1.050	121	0.081	0.03	0.109	0.000	0.500
Log Size	S	223	14.488	14.46	1.549	9.720	19.756	121	13.862	13.81	2.156	7.268	18.802
Loan size	LS	224	1.1085	0.541	1.604	0.000	9.038	89	1.267	0.632	2.403	0.00	16.48
Lagged Inflation rate	INF	404	0.045	0.00	0.063	-0.006	0.340	252	0.026	0.000	0.056	-0.139	0.299
Per capita income	GNI	165	0.073	0.06	0.106	-0.188	0.289	92	0.076	0.083	0.079	-0.167	0.242

This Table presents the summary statistics. A detailed description of the definition and sources of the variables is given in Table 4.2.

Table 4.4 Regional/location descriptive and summary statistics

		East Africa						West Africa					
Variable	Notation	Obs	Mean	Median	Std Dev	Min	Max	Obs	Mean	Median	Std Dev	Min	Max
Return on assets	ROA	353	-0.015	0.00	0.099	-0.866	0.324	442	-0.0064	0.00	0.0886	-0.409	0.100
Age	AG	382	9.199	7	6.807	3	33	437	9.78	9	5.78	3	31
Capital	CAP	382	0.410	0.37	0.292	-1.140	0.994	431	0.318	0.27	0.303	-0.983	1.000
Gearing	GR	328	1.603	1.151	1.479	0.000	6.100	353	2.082	1.597	1.921	0.000	11.000
Efficiency	EFF	307	0.434	0.34	0.736	0.000	12.250	379	2.211	0.230	11.149	0.000	121.000
Portfolio at Risk	PAR	381	0.050	0.022	0.077	0.000	0.790	452	0.719	0.027	0.585	0.000	0.748
Log Size	S	377	14.793	14.51	1.929	8.412	20.541	421	14.299	14.36	2.433	7.102	19.063
Loan size	LS	429	1.007	0.523	1.88	0.000	15.05	450	1.025	0.318	1.864	0.00	15.05
Lagged Inflation rate	INF	627	0.032	0.000	0.049	-0.058	0.219	795	0.041	0.000	0.118	-0.139	2.3
Per capita income	GNI	310	0.077	0.10	0.092	-0.106	0.273	351	0.138	0.096	0.231	-0.125	0.434

This Table presents the summary statistics. A detailed description of the definition and sources of the variables is given in Table 4.2.

We present a correlation test matrix in Table 4.5. Although most correlation coefficients among variables of interest are low, they are nevertheless significant but not perfectly linear. Most notably, regulation status, credit risk measure, efficiency, age, size, gearing ratio are all significantly correlated with profitability measure which is perhaps an indication that MFIs with higher ROA are those that are regulated, larger in size, older, efficient and with lower loan default rates. Age may reflect survivor bias but it is also positively and significantly correlated with size, gearing and regulation, an indication that as MFIs matures, they also become larger, use more of debt in their financing options and become regulated over time. The significant correlation between ROA and gearing ratio implies that higher debt relative to equity mat be driving profitability. Interestingly none of the quality of institutions indices or regional dummy variables are significantly correlated with profitability. Both security of property rights and freedom from corruption are nevertheless significantly and positively related with Central and South Africa dummies but not collinear. To uncover the impact that these summary statistics may have on MFIs profitability requires rigorous econometric analysis which we pursue in the next section.

Table 4.5 Correlations Matrix

	ROA	AG	S	CAP	GR	EFF	PAR	LS	INF	GNI	PROF	WA	SA	EA	CA	REG	PR	COR
ROA	1.000 1058																	
AG	.095** 1055	1.000 1143																
S	.121** 1056	.360** 1141	1.000 1144															
CAP	-.016 1058	-.166** 1142	-.112** 1143	1.000 1145														
GR	.130** 876	.163** 950	.153** 952	-.461** 952	1.000 953													
EFF	-.312** 865	-.065* 897	.008 899	.062 899	-.211** 754	1.000 899												
PAR	-.075** 1057	.060* 1141	.005 1142	-.081** 1143	-.004 951	.032 898	1.000 1145											
LS	.123** 1055	.108** 1139	.003 1140	-.116** 1141	.096** 949	-.098** 897	-.026 1142	1.000 1143										
INF	.044 1033	.075** 1109	-.033 1110	.067* 1111	.005 923	.102** 876	.114** 1111	-.062* 1109	1.000 2066									
GNI	.042 865	.092** 904	.045 904	-.044 906	.078* 756	-.054 858	.078* 905	-.006 904	.240** 897	1.000 906								
PROF	-.061 1058	.022 1143	.045 1144	.045 1145	-.147 953	.080 899	.045 1145	-.168 1143	.081 2066	.013 906	1.000 2310							
WA	.054 1058	.077** 1143	-.041 1144	-.117** 1145	.097** 953	-.178** 899	-.067* 1145	.031 1143	-.003 2066	.096* 906	.123** 2310	1.000 2310						
SA	-.057 1058	-.128** 1143	-.018 1144	.121** 1145	-.145** 953	.276** 899	.166** 1145	.044 1143	.083** 2066	-.064* 906	.030 2310	-.402** 2310	1.000 2310					
EA	-.019 1058	.004 1143	.079** 1144	.062* 1145	-.040 953	-.007 899	-.102** 1145	-.096** 1143	-.025 2066	-.063 906	-.079** 2310	-.519** 2310	-.332** 2310	1.000 2310				
CA	.018 1058	.041 1143	-.038 1144	-.071* 1145	.118** 953	-.059 899	.052 1145	.043 1143	-.060** 2066	.031 906	-.115** 2310	-.279** 2310	-.175** 2310	-.230** 2310	1.000 2310			
REG	.134** 1051	.131** 1135	.116** 1136	-.202** 1137	.144** 945	-.166** 892	-.026 1137	.142** 1135	-.040 2056	.006 899	-.219** 2299	.109** 2299	-.072** 2299	-.104** 2299	.077** 2299	1.000 2299		
PR	.202 58	.514** 66	-.101 66	.113 65	-491** 52	.159 56	-.129 66	0.038 66	.002 113	-.168 54	-.038 132	0.80 132	.453** 132	-290** 132	-301** 132	-.179* 132	1.000 132	
COR	-.148 58	.235 66	-.031 66	-.156 65	-438** 52	.365** 56	.045 66	-0.043 65	-0.92 113	-2.04 54	.098 132	.119 132	.344** 132	-.114 132	-499** 132	-284** 132	.562** 132	1.000 132

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed). Figures beneath are the observations (N)

4.5.3 Multivariate regression analysis

Having examined the correlations which present an insight into how variables are related, we proceed to estimate a dynamic panel regression analysis which overcomes the multicolinearity between return on assets (ROA) and the previous return and which allows us to investigate the strength of these correlations. The estimation models encompass explanatory variables defined in Table 4.2.

4.6. Empirical results and discussions

Table 4.6 reports the results from our basic specification (4.2). The estimated model fits the panel data reasonably well, having fairly stable coefficients, while the Wald-test indicates fine goodness of fit since the overall test statistic shows rejection of the hypothesis that all coefficients are equal to zero (rejects the null hypothesis of joint insignificance of parameters). Although the estimated equation indicates the presence of negative first-order autocorrelation, this does not imply that the estimates are inconsistent. Inconsistency would only hold if the second order autocorrelation was present but this is rejected by the test for AR (2) errors (Arellano and Bond, 1991). The value test for the second order autocorrelation implies that the moment conditions of the model are valid.

4.6.1 Persistence of profit and speed of convergence

The final column of Table 4.6 gives the preferred model. In all the regressions, the speed of adjustment coefficient η (the lagged profitability measure) is positive and significant. The coefficient on the lagged dependent variable is about 0.3 and significantly greater than zero. The departure from perfect competition is however marginal—profits tend to adjust fairly fast to their average level. This implies that there is some moderate persistence in microfinance profitability in Africa. It is plausible that if there is a shock to profitability level in the current

year, about 30% of the effect will persist into the following year. Intuitively, microfinance industry in Africa is not competitive.

The theoretical proposition tested in the profit persistence literature that entry and exit is sufficiently free to eliminate any supernormal profits whatever their cause, and that all firms' economic profit tends to converge to the same long-run average rate (see Berger et al., 2000; Singh 2003; Cuaresma and Gschwandtner, 2008) is not supported here. Our findings signal barriers to competition reflecting either impediments to market competition or informational asymmetry (Berger et al., 2000). It may also indicate the existence of market power in the industry (Goddard and Wilson, 2009). All these factors may encourage and intensify competition or slow/accelerate the convergence process. Because microfinance industry in Africa is not competitive, the application of dynamic incentives at the root of microfinance loan contracts as postulated by Guttman (2008) and Chowdhury (2007) may not be undermined. The role of the state should thus be to foster competition in the microfinance industry. Government policies that prioritise MFIs stability over competition may have a tendency to introduce new barriers to competition by insulating incumbent MFIs from rivalry.

Comparable evidence amongst the MFIs is scant. Cull, et al (2009b) for example examines competition between conventional banks and MFIs and how this impacts on MFIs profitability and outreach of MFIs. They find that the effect of competition on MFI profitability appears weak. Hisako (2009) investigates whether microfinance competition worsens outreach and financial self-sufficiency. He finds that competition does not worsen financial self-sufficiency (FSS) and therefore does not raise subsidy dependence. Porteous (2006) examines whether microfinance competition lowers interest rates. Mcintosh, De Janvry and Sadoulet (2005) examine whether competition affects the incumbent village bank's ability to attract new clients while Park, Brandt, and Giles (2003), investigates whether competition affects the effort and lending decisions of the incumbent. These studies do not answer the research question as to whether microfinance profits are persistent ostensibly

because; (i) their focus is not on MFI profitability and (ii) their empirical framework does not control for endogeneity on performance using a dynamic panel econometrics; they employ static analytical framework which is nevertheless useful only in identifying causal relationships between key variables when markets are in equilibrium (Geroski, 1990).

In the conventional banking industry, a similar weak evidence of profit persistence was found for the conventional European banks by Goddard, et al (2010; 2004), amongst retail banks in Africa by Flamini et al (2009) and for the Greek banks by Athanasoglou, et al. (2008). It is however far from a foredawn conclusion that what holds true for large, traditional banks as a whole will also hold true for MFI's.

4.6.2 Control variables-further analysis

Table 4.6 shows that the significance and the relative magnitude of influence of the MFI-specific, macroeconomic and quality of institutions measures, evidenced in the previous chapter are preserved with notable exception of security of property rights, which is positive but insignificant. Property rights finding is counter-intuitive and should be investigated further. Macroeconomic context is similarly insignificant. However, as financial systems develop and the ongoing reform process in Africa ends, both the current and future rates of economic growth are likely to have an enhanced impact on MFI profitability. Consistent with the previous chapter, MFI age is not significantly associated with MFI profitability. Contrary to the previous chapter, we find evidence that gives credence to the hypothesis that firms which use more of debt financing are more profitable. The difference in results with this chapter is due to a major methodological update, including retroactive revisions and updating of the MIX market database. Our findings imply that MFIs that are more leveraged are also more profitable.

Results show that efficient MFIs are more profitable. Consistent with previous chapter and with much of the previous banking literature (see e.g. Goddard et al 2010, Athanasoglou,

et al 2008), efficiency appears to be a more important determinant of MFI profitability. Similarly size and credit risk are significant in explaining microfinance profitability which reinforces our findings in the previous chapter. Freedom from corruption is also significant suggesting a higher implicit cost of doing business.

Table 4.6: Two-step system GMM estimation results (dependent variable: ROA)

Variable	Notation	Variant of model specifications	
		1	2
Lagged ROA	Π_{t-1}	0.2499*** (9.22)	0.3169*** (10.63)
Log size	S	0.0090*** (3.35)	0.0060*** (3.54)
Log age	AG	-0.0001 (-0.14)	-0.0117 (-0.80)
Capital	CAP	0.0507** (2.22)	0.0750*** (2.79)
Gearing	GR	0.0716*** (2.98)	0.1163*** (3.60)
Efficiency	EFF	-0.1863*** (-6.17)	-0.2234*** (-9.70)
Portfolio at risk	PAR	-0.0327* (-1.79)	-0.0096** (-1.94)
Loan size	LS	0.0008 (0.94)	
Inflation expectations	INF		0.0457 (1.32)
Per capita incomes	GNI		-0.0067 (0.70)
Property rights	PR		0.0405 (1.51)
Freedom from corruption	COR		0.0019*** (2.77)
Wald-test		$\chi2(7) = 169.97$ Prob>chi2=0.96	$\chi2(11)= 173.06$ Prob>chi2=0.96
Sargan-test[a]		$\chi2(44) = 28.39$ Prob>chi2=0.97	$\chi2(44) = 21.62$ Prob>chi2=0.99
AR(1)[b]		z = -2.98 p-value = 0.00	z =-2.79 p-value = 0.00
AR(2)[c]		z = 1.58 *P-value* = 0.85	z =-1.77 *P-value* = 0.97

This table presents the results from regressions conducted to determine the determinants of MFI profitability in Africa. For the definition of the variables see Table 4.2

Estimations were performed using GMM estimation. T-Statistics are in parentheses and significance at the 10%, 5%, and 1% level is noted by *, ** and *** respectively.

The Wald test is a test of the null hypothesis that the coefficients in the given equation are all zero (Greene, 2008). A low value indicates null hypothesis rejection.

[a] Test for over-identifying restrictions in GMM dynamic model estimation.

[b] Arellano-Bond test that average autocovariance in residuals of order 1 is 0. (H0: no autocorrelation).

[c] Arellano-Bond test that average autocovariance in residuals of order 2 is 0. (H0: no autocorrelation).

To gain a deeper insight into the processes affecting MFI profitability while controlling for time invariant factors, we run a random effects (RE) model with complete set of controls, including dummies for location, regulation and charter status. We are aware that FE model is

inappropriate since it would remove the time-invariant variables of interest. It is therefore not surprising that the Hausman (1978) specification test rejects the null hypothesis that the coefficients between RE and FE are not systematic and the Breusch and Pagan Lagrangian Multiplier (LM) test similarly confirms the presence of individual effects which provides evidence in favour of the FE model. We take cognizance of the fact that while the presence of unobserved panel effects correlated with the explanatory variables in the regression may bias the result; we try to overcome this bias by including a full set of location dummies.

On the basis of evidence adduced in Table 4.7, we do not find empirical support for the hypothesis that institutions formally constituted as NGO's are less profitable. As elucidated in the data section (see previous chapter), to be attractive investment opportunities, most MFIs reporting to MIXmarket strive to run their operations very efficiently and pay close attention, among other variables, to profitability of their operations. This finding is consistent with Cull, Demirgüc-Kunt and Morduch (2007) who finds the for-profit dummy insignificant in all their regressions. It also confirms Hartarska and Nadolnyak (2007) who shows that the variable NGO is not significant in their profitability regression. This however does not support the theoretical proposition by Besley and Ghatak (2005) who predict that non-profit status alone can positively affect performance as donors would be more willing to support MFIs that are NGOs because the non-profit status guarantees permanency of the MFI social mission. Consistent with our findings is Tchakoute-Tchuigoua (2011) who while investigating the existence of a difference in performance amongst MFIs in Sub-Saharan Africa according to their legal status, does not find significant difference in profitability between for profit and NGOs.

We find no evidence to confirm the hypothesis of a positive link between regulation and MFI profitability, contrary to the arguments offered by proponents of regulating MFIs (see for example McGuire and Conroy, 2000; Steel and Andah, 2003). This counter intuitive finding confirms Mersland and Strøm (2009), who establish that regulation does not have a

significant impact on financial performance and Hartarska and Nadolnyak (2007) who after controlling for the endogeneity of regulation, find that regulation has no impact on financial performance. Previous findings consistent with these results include Barth et al, (2004) who find cross-country evidence that regulation has no impact on the performance of conventional banks but inconsistent with Cull, et al (2011) and Hartarska (2005) who find supervision to be negatively associated with profitability. Clearly this issue deserves further empirical scrutiny.

We also find that location or regional factor is also not significant in explaining MFI profitability, suggesting that MFIs' profitability is mainly driven by local conditions. This is contrary to Cull, Demirgüc-Kunt and Morduch (2007) who found MFIs from Eastern Europe and Central Asia and those from Sub-Saharan Africa outperformed those from other regions in terms of return on assets. As the microfinance industry aims at greater geographic diversification, our results indicate that profitability is not sensitive to location or regional distributional factors which reinforces the correlations in Table 4.5

Table 4.7: Random-effects GLS regression results (dependent variable: ROA)

Variable	Notation	Model specification
Intercept	α_{it}	
Log Size	S	0.0100*** (2.49)
Log Age	AG	-0.0056 (-0.49)
Capital	CAP	0.0453** (2.22)
Gearing	GR	0.0168* (1.76)
Efficiency	EFF	-0.1001*** (-12.42)
Portfolio at risk	PAR	-0.0107*** (-2.88)
Inflation expectations	INF	0.1329** (2.35)
Loan size	LS	0.0035 (0.92)
Per capita incomes	GNI	-0.0005 (-0.01)
Property rights	PR	0.0002 (0.37)
Freedom from corruption	COR	0.0002 (0.29)
For profit	PROF	0.0038 (0.23)
Regulated	REG	0.0056 (0.30)
West Africa	WA	0.0521

		(0.78)
South Africa	SA	0.0732 (1.07)
East Africa	EA	0.0505 (0.75)
Central Africa	CA	0.0390 (0.66)
R^2		0.40
No of obs.		471
Wald test		chi2(16= 247.97 Prob>chi2= 0.0000
Breusch and Pagan Lagrangian multiplier test		chi2(1)= 71.63 Prob>chi2=0.0000 H0:Var(u_i)=0
Hausman specification test		chi2(11) = 73.06 Prob>chi2 = 0.0000 Ho: difference in coefficients not systematic

This Table presents the results from regressions conducted to determine the determinants of profitability for Africa MFIs. Estimations were performed using GLS estimation. T-Statistics are in parentheses and significance at the 10%, 5%, and 1% level is noted by *, ** and *** respectively. For the definition of the variables see Table 4.2

Further region/location analysis

Studies of the location of services by commercial banks find that they generally favour economically well-endowed areas/regions to boost their profit margins. Is this the case with MFIs as well? To probe further on the location impacts on MFIs profitability, we split the sample of MFIs into four sub-samples, based on the regional distribution and estimate a fixed effect model for each sub-sample. This will allow us to compare the results with the summary statistics on Tables 4.3 and 4.4. The results show that economies of scale do not matter with respect to MFI profitability in South Africa region. It appears MFIs in this region are more constrained by capital. Although loan size is not significant in explaining profitability in other regions, it is crucial in West Africa. Cost inefficiency is more of a problem in East Africa than other regions perhaps because of the higher outreach as shown in Table 4.4.

Table 4.8: Estimation Results Using Fixed Effects-within (location effects)

Variant model specifications with robust standard errors					
Variable	Notation	WA	SA	CA	EA
Intercept		-0.1221 (-2.13)	0.2550 (0.75)	-0.5312 (-1.90)	-0.4128 (-2.10)
Log Size	S	0.0099 (2.52)	0.0145 (0.60)	0.0386 (1.97)	0.0353 (2.41)
Log Age	AG	-0.0004 (-0.25)	-0.0065 (-0.89)	-0.0036 (-0.42)	-0.0123 (-0.39)
Capital	CAP	0.0026 (0.10)	0.0509 (2.45)	0.4182 (2.70)	0.1893 (5.36)
Gearing	GR	0.0058 (2.40)	0.0188 (1.12)	0.0032 (0.21)	0.0148 (2.64)
Efficiency	EFF	-0.1828 (-7.43)	-0.1410 (-5.43)	-0.4722 (-4.81)	-0.3245 (-11.32)
Portfolio at risk	PAR	-0.0157 (-0.34)	-0.0158 (-0.21)	-0.1215 (-1.91)	-0.1520 (1.97)
Loan size	LS	0.0095 (2.50)	-0.0035 (-0.69)	0.0026 (0.23)	-0.0046 (-0.38)
Inflation expectations	INF	-0.0011 (-0.01)	0.2949 (1.47)	0.0544 (0.33)	0.0330 (0.27)
Per capita incomes	GNI	-0.0500 (-1.00)	-0.0206 (-0.28)	0.1340 (1.42)	0.1252 (1.56)
R^2		0.28	0.44	0.79	0.61
No of obs.		269	105	40	229

This Table presents regression with robust standard errors results conducted to determine the determinants of profitability for Africa MFIs. Estimations were performed using fixed effects estimation. T-Statistics are in parentheses and significance at the 10%, 5%, and 1% level is denoted by *, ** and *** respectively. A detailed description of the definition and sources of the variables is given in Table 4.2

4.6.3 Robustness checks

To confirm the main results, a robustness check is performed by running the same set of regressions for a smaller data set of 1,260 observations over a reduced period of six years (2002-2007). Using a significantly reduced unbalanced sample does not fundamentally alter the results. Table 4.9 shows that the significance and the relative magnitude of influence of all variables of interest are preserved. Therefore, while controlling operating expenditure remains the most important task for MFIs, credit risk, capital adequacy and scale economies play a significant role in determining MFI profitability.

Table 4.9: Random-effects GLS regression results (dependent variable: ROA)

Variable	Notation	Model specification
Log Size	S	0.0113*** (2.84)
Log Age	AG	-0.0104 (-0.89)
Capital	CAP	0.0508*** (2.46)
Gearing	GR	0.0198** (2.10)
Efficiency	EFF	-0.0951*** (-11.87)
Portfolio at risk	PAR	-0.0102*** (-2.56)
Loan size	LS	0.0031 (0.92)
Inflation expectations	INF	0.1668*** (2.89)
For profit	PROF	0.0105 (0.66)
Regulated	REG	-0.0005 (-0.02)
West Africa	WA	0.0487 (0.74)
South Africa	SA	0.0717 (1.08)
East Africa	EA	0.0494 (0.75)
Central Africa	CA	0.0449 (0.75)
R^2		0.39
No of obs.		444
Wald test		chi2(14)= 229.25 Prob>chi2= 0.0000
Breusch and Pagan Lagrangian multiplier test		chi2(1)=58.64 Prob>chi2= 0.0000 H0:Var(u_i)=0
Hausman specification test		chi2(9) = 35.97 Prob>chi2 = 0.0000 Ho: difference in coefficients not systematic

This Table presents the results from regressions conducted to determine the determinants of profitability for Africa MFIs. Estimations were performed using GLS estimation. T-Statistics are in parentheses and significance at the 10%, 5%, and 1% level is noted by *, ** and *** respectively. For the definition of the variables see Table 4.2

4.7. Conclusions, policy implications and prescriptions

In this chapter, we specified a dynamic empirical framework to investigate persistence of microfinance profits in Africa. Novel features of this chapter are the analysis of the effect of previous levels of MFI profits and additional time invariant control variables on profitability by use of an appropriate econometric methodology. All the estimated models are robust across various specifications while the results obtained in the previous chapter on the control variables are confirmed. This makes our findings more reliable and credible. The study identifies a series of new findings and policy implications.

First, although competition is effective in eliminating excess profit, our results suggest that this is not happening within microfinance industry in Africa. Therefore successful MFIs with advantages which enable them to earn supernormal profits can be expected to take measures to try and maintain those advantages in the future. This calls for some serious reconsideration of microfinance policy in Africa. Government regulations faced by MFIs are often ambiguous and opaque in most of the Africa countries which makes it difficult as well as labour intensive to create financial stable MFIs (see Lafourcade, et al 2006). Policymakers should therefore strive to remove MFI entry barriers as well as other obstacles to competition and similarly lower regulatory costs. Competition may support profitability of MFIs if the benefits of agglomeration effects and a stronger regulatory environment outweigh negative spillovers.

In order to maintain a competitive environment, policy makers will need to concentrate not only on capital adequacy, but also on competition in product markets. That notwithstanding, few issues remain unresolved. For example, competition for deposits imposes a cost that has to be borne under increased microfinance competition, and its role should be analyzed in a dynamic framework that allows for the development of customer relationships. Also, MFI's ability to raise funds may be correlated with depositors' or

investors' expectations concerning profitability, so that MFIs that are perceived as being profitable should find it easier to raise funds as well as entering new markets.

Second, although this chapter upholds the findings from the previous chapter on the control variables, there are interesting new findings. Efficient MFIs in the management of operating expenses are more profitable. Further research should therefore be undertaken to uncover how technology can optimally be used to enhance operational efficiency, and what partnerships are required to scale up technological solutions. Since one of the primary obstacles to an MFI's ability to adopt mobile banking is the lack of adequate back office systems, any scaling up of mobile and cell phone banking will need to take into account the management information systems and operational challenges that MFIs face in Africa and how best to address these issues. There is however need for more understanding on corporate governance in MFIs which may be a contributory factor on cost inefficiency.

Third, we find that regional distribution of MFIs or location effects matters. The nature of microfinance products and technology, and the constellation of incentives within MFIs may be such that certain locations are systematically favoured while others are avoided. Clearly more comprehensive data collection and more research are needed to better understand what factors drive the differences and the impact on profits.

Fourth, we find that capital is important in explaining MFI profitability which gives credence to an appropriate policy of imposing higher capital requirement to strengthen and stabilize microfinance sector in Africa. Our findings regarding equity therefore calls for a policy that advocates for better access to capital sources including savings mobilization.

Fifth, successful MFIs appear to be larger and therefore one can conclude that failure to become profitable is partly due to the lack of scale economies. Consequences of failure to achieve scale of economies may be manifested in reduced financial intermediation.

Sixth, while freedom from corruption is a significant factor in explaining MFI profits, we do not obtain conclusive results as to whether security of property rights influences MFI

profitability. We find that regulation of MFIs is not significant in explaining MFI profitability. Though these results are intuitive from an economic perspective, it remains an open question whether the benefits of supervision in terms of better protection of depositors' funds improves MFI profitability. Perhaps studies of past pro-poor banking systems such as the Irish loan funds, savings banks and cooperatives, which once operated in uncompetitive and unregulated markets similar to MFIs can yield new empirical knowledge for today.

Given the important role that the microfinance sector plays in the expansion of the private sector, future research on the persistence of MFI profits should focus on country-specific studies that will provide country-level policy conclusions. The model put forward in this study can easily be expanded to include a persistence parameter that account for asymmetric profits and profit persistence dynamics or regime shifts in the autoregressive parameter governing the autocorrelation in profit rates. Put differently, future research should seek to answer research questions such as; to what extent is the estimated speed of adjustment for MFIs reporting negative profits different from that of positive profits and the impact of lending technology and the type of contract on profit persistence. Another possible extension could be the examination of differences in the determinants of profitability between small and large or high-profits and low-profits MFIs. These are important considerations for microfinance development in Africa.

CHAPTER FIVE

MICROFINANCE PROFITABILITY: DOES THE FINANCING CHOICE MATTER?[52]

5.1 Introduction

A profitable microfinance industry is vital in maintaining the stability of the micro-banking system[53]. Low profitability weakens the capacity of MFIs to absorb negative shocks, which subsequently affect solvency. Profitability reflects how MFIs are run given the environment in which they operate, which should epitomize their efficiency, risk management capabilities, competitive strategies, quality of management and levels of capitalization.

Why is financing choice important for MFIs profitability? Financing choice raises particularly important research and policy questions regarding the microfinance industry. Microfinance industry promotes small scale investments that generates sufficient revenues from otherwise unrealized market activities while yielding a return on the investment. Agency costs may be particularly large in this industry because MFIs hold private information on their loan clients. In addition, MFIs access to grant funding and other safety net protections may increase incentives for risk shifting or lax risk management, potentially increasing the agency costs of outside debt.

Financing choice involves a trade off between risk and return to maximize shareholder wealth (Berger and Bonaccorsi di Patti, 2006). The objective of an optimal financing choice for any firm is therefore to have a mix of debt, preferred stock, and common equity that will maximize shareholders wealth. A higher leverage can boost the rate of return on equity during prosperity. On the contrary, a higher leverage may raise the risk on the part of the firm's

52 A previous version of this chapter was presented at the Annual Canadian Economics Association Conference held at University of Ottawa 2nd-5th June, 2011. I acknowledge the inputs of the conference participants.

53 Measured by return on assets (ROA), MFIs are on average more profitable than conventional banks in their respective countries. This does not imply that MFIs are more profitable than conventional banks. Rather, it is a pointer that microfinance industry has not yet matured in most countries where providers' profits have not yet been squeezed down. Measured by return on the equity (ROE), MFIs are on average less profitable than banks, perhaps because MFIs are not yet as fully leveraged as banks. Contrary to conventional banks, MFIs fund their assets with more of their own capital and less of deposits.

earnings stream. Moreover, the presence of debt may exert pressure on MFI management to ensure profitability in order to honour such debt obligations. Although debt as a homogeneous source of MFI funds is a powerful theoretical construct, this chapter goes beyond the leverage decision and investigates other dimensions of MFIs funding choice. Even with respect to debt, the nature of debt and its incentive properties can differ according to, for instance, maturity and to the providers.

Table 5.1 shows that MFIs have two broad funding options beyond debt which include deposits (if regulation allows), and equity. Deposits may be a cheaper option than debt or equity if volume and terms leverage potential market demand. It is also evident from Table 5.1 that MFIs in Africa rely more on savings to finance their activities. Indeed existing evidence shows that whereas globally most MFIs rely heavily on donations and retained earnings to fund their activities, 72 percent of Africa MFIs fund their activities with deposits which are significantly higher relative to other regions (Lafourcade, et al 2006).

Table 5.1: Financing Structure

		Debt to equity			Deposits to loans			Deposits to total assets			Portfolio to assets		
	Units	(%)			(%)			(%)			(%)		
	Year	2006	2007	2008	2006	2007	2008	2006	2007	2008	2006	2007	2008
Age[54]	New (1-4 yrs)	2.5	3.4	2.9	4.0	6.2	0.0	2.7	3.7	0.0	76.4	71.2	77.9
	Young (5-8 yrs)	1.8	2.7	3.1	0.0	1.1	4.8	0.0	1.0	2.1	81.7	80.6	74.4
	Mature (over 8 yrs)	2.9	3.2	3.4	10.1	6.2	1.4	4.9	4.6	3.3	78.1	79.4	79.3
Charter Type	Bank	1.2	1.7	1.9	69.3	64.0	66.3	41.6	41.4	51.0	67.3	68.0	71.6
	Credit Union	3.9	4.6	4.4	79.8	80.8	71.9	61.7	62.1	61.0	80.6	78.6	78.8
	NBFI	2.7	3.3	3.5	0.0	0.0	0.0	0.0	0.0	0.0	80.4	81.0	81.4
	NGO	1.3	1.7	2.0	0.0	0.0	0.0	0.0	0.0	0.0	80.6	80.9	80.7
Methodology	Individual	3.7	4.2	4.0	20.4	16.9	31.0	9.5	9.7	20.8	80.5	82.2	83.0
	Individual / Solidarity	1.9	2.5	2.9	0.6	0.7	0.4	0.1	0.4	0.3	79.9	79.1	77.5
	Solidarity	1.7	2.4	2.8	19.8	19.0	20.4	11.3	13.9	13.9	67.6	70.4	72.7
	Village Banking	2.0	2.2	2.6	0.0	0.0	0.0	0.0	0.0	0.0	77.2	79.1	79.7

54 Microbanking Bulletin classify MFIs into three categories (new, young, and mature) based on the maturity of their microfinance operations. This is calculated as the difference between the year they started their microfinance operations and the year of data submitted by the institutions.

Profit Status	Profit	4.1	4.3	4.3	21.1	26.8	21.5	16.1	11.9	17.2	73.0	71.9	71.5
	Not for Profit	1.7	2.1	2.5	0.0	0.0	0.0	0.0	0.0	0.0	80.8	80.9	81.0
Region	Africa	2.3	2.5	2.7	54.4	51.2	49.1	31.2	34.0	34.9	66.7	66.5	67.3
	Asia	4.5	1.4	4.9	23.3	23.5	24.2	11.2	14.8	11.7	74.0	71.0	73.5
	ECA	1.8	2.7	2.9	0.0	0.0	0.0	0.0	0.0	0.0	87.2	86.7	89.1
	LAC	2.5	2.6	3.2	0.0	0.0	0.0	0.0	0.0	0.0	80.5	81.2	82.2
	MENA	0.6	0.8	0.9	0.0	0.0	0.0	0.0	0.0	0.0	82.1	81.0	82.0

Source: MicroBanking Bulletin, September 2010 (Issue No. 20).

Mature MFIs are more likely to have been licensed to mobilize deposits and therefore may have a higher deposit to assets, deposit to loans, and loans-assets ratio, *ceteris paribus* (see Table 5.1). It is also evident that mature MFIs have higher debt-equity composition perhaps because as firms mature they become known to the market, which enables them to expand their access to capital. Put differently, as MFIs get older, the weight of external financial sources steadily decreases while the equity steadily becomes a more important source of finance. Additionally, mature MFIs may have lower debt ratios as they accumulate deposits and/or plough back into lending the retained profits. It also appears that NGO type of MFIs rely more on debt financing relative to other type of MFIs, perhaps because many are not regulated (see Table 10, Appendix B) to mobilize deposits. Table 5.2 provides details of the characteristics of both international and domestic MFI funding instruments.

Voluntary deposits[55] are a source of inexpensive and sustainable source of funds for MFI lending but, deposits may require widespread branching and other expenses with implications on MFI profitability. MFIs with access to donor funds may not respond to funding pressures to operate efficiently or may deliberately choose outreach over profitability by serving poorer or rural clients with higher delivery costs (Armendáriz and Morduch, 2010). The shift from donor dependence to sourcing funding from capital markets also raises fundamental questions regarding the role of funding instruments with obvious implications on MFIs profitability.

55 In this study the term deposits is applicable to any type of instrument used by MFIs to mobilize deposits and is not restricted to any particular type of instrument, such as time deposits or savings accounts.

Table 5.2. Alternative sources of funding instruments

Instrument	Investor	Strengths	When/How to Use
International			
Policy Support	Donors	Helps government make sound decisions and take a constructive role.	When specialized expertise is needed
Technical Assistance	Donors	Builds much-needed human capacity.	Needs to be market-based and client-responsive. Best for donors that can work directly with private sector.
Grants	Donors	Helps build equity that can later be leveraged.	When commercial sources unavailable, avoid distorting markets with money perceived as "too easy".
Loans			
Concessional	Donors	Source of cheap funds.	Its important to avoid foreign exchange risk when in hard currency. If commercial alternatives exist, avoid distorting domestic markets and reducing incentives to mobilize deposits.
Commercial	Donors, IFIs[56], Private Funds	Source of funds for cash-strapped financial institutions. Focus on efficient microfinance operations.	For mature institutions. If commercial alternatives exist, avoid distorting domestic markets and reducing incentives to mobilize deposits.
Quasi-equity[57]	Donors, IFIs	Source of funds for financial institution.	Same as concessional debt but only relevant to mature MFIs
Equity Investment	Private Funds, IFIs	Contributes equity that can be leveraged on domestic	Applicable to mature, formal institutions that sell shares. Avoid crowding out local investors.
Domestic			
Savings	Individual Savers	Independence from external funding low cost over time.	This only applies to regulated MFIs as some MFIs may need support to develop products and systems to lower costs and manage growth of deposits.
Loans			
Concessional	Apexes[58], Govt. Credit Schemes	Apexes, if well-designed and administered, can help develop retail MFIs.	If commercial alternatives exist, avoid distorting develop retail MFIs.
Commercial	Commercial Banks	Integrates MFIs into mainstream (although it may not include longer-term financing required for some activities, for example agriculture).	For mature institutions. Initial incentives or partnerships might be needed to jump-start funding between commercial banks and specialized MFIs.
Bonds	Local Investors	Allows financial institutions to tap into domestic capital markets.	Requires sufficiently developed secondary market; markets; dependent on local shocks. May require initial incentives to get started in some markets.

56 Subordinated debt at a subsidized interest rate that can be converted to equity. Usually medium- to long-term loans designed to be repaid from profits.

57 Publicly-owned international finance institutions that are involved in microfinance. Includes bilateral institutions such as the U.S. Overseas Private Investment Corporation and its counterparts.

58 Government sponsored agencies that function as wholesale market institutions, channelling funds to smaller MFIs

Equity			
Direct Investments	Local Investors	Builds an equity base that can be leveraged on domestic market.	This only applies to licensed MFIs. Avoid mission drift because of stockholder demands by balancing socially and profit-oriented owners.
Stock Market	Local Investors	Allows financial institutions to tap into domestic capital markets.	Only licensed financial institutions are eligible to sell shares on the market. Avoid mission drift because of diluted ownership and stockholder demands.

Source: Helms (2006)

Most of the existing literature on the impact of capital structure on firm performance has dealt on large and listed firms within developed economies. Although several research questions remain unresolved in the banking industry, due to banks being informational opaque, (Berger and Bonaccorsi di Patti, 2006), it similarly remains so for the microfinance industry where information asymmetry is also severe. Bogan (2009) investigates the impact of existing sources of funding on the efficiency and financial sustainability of MFIs. He finds causal evidence to the effect that more use of grants by MFIs decreases OSS. What is missing in the literature is a focus on profitability while controlling for endogeinity and other country and firm level covariates.

Since the seminal contribution by Modigliani and Miller (1958), several subsequent studies[59] show that a firm with high leverage tends to have a capital structure that translates into a better performance. The basic MM principles are applicable to financial intermediaries, but only after taking into consideration the fundamental differences in how financial institutions and other type of corporations operate (Cebenoyan and Strahan 2004). This has motivated researchers to examine the impact of capital structure on performance; though the main focus has been on the non-financial firms.

Empirical evidence on the agency costs hypothesis in the banking and finance literature is mixed and remains contestable (see Titman, 2000 and Myers, 2001 for reviews). In some cases negative relationships are found, but opposite results have similarly been documented. The lack of non-contestable evidence may partly be explained by the difficulty in defining a measure of performance that is close to the theoretical definition of agency costs. The mixed results in the previous research may also be due to the possibility of reverse causation from performance to capital structure. If for instance MFI profitability affects the choice of financing, then failure to take this reverse causality into account may result in simultaneous-equations bias (Berger and Bonaccorsi di Patti, 2006).

59 There is a vast amount of literature with respect to the optimal capital structure of corporate firms (See for example, Faulkender and Petersen 2006; Harris and Raviv 1991)

Using a sample of French manufacturing companies, Margaritis and Psillaki (2010) investigate the linkage among capital structure, ownership structure, and corporate performance. They find evidence supporting the theoretical predictions of the Jensen and Meckling (1976) hypothesis; that higher leverage is associated with improved efficiency over the entire range of observed data. An analysis from listed firms in Tehran Stock Exchange, by Arbabiyan and Safari (2009) found short-term and total debts to be positively related to profitability (ROE) and a negative relation between long-term debts and profitability. While focusing on the link between capital structure and profitability on small and medium enterprises (SMEs) in Ghana, Abor (2005) shows that short-term debt ratio is positively correlated with return on equity. This confirms Hadlock and James (2002) who find that banks with high leverage report high level of profitability and Michaelas et al. (1999) who similarly found a positive impact on performance.

On the contrary, several studies reveal a negative relation between capital structure and performance. Using the ratio of profit before interest, tax and depreciation to total assets and ratio of cash flows to total assets as profitability proxies, and two leverage measures, including ratio of total borrowing to asset and ratio of total liability to sum total of liability and equity, Chakraborty (2010) finds a negative relation. This confirms Huang and Song (2006) among Chinese firms. The negative influence of profitability on leverage should however become stronger as firm size increases. This is consistent with Caesar and Holmes (2003), Chiang et al. (2002), who document a negative relationship between profitability and both long-term and short-term debt. Other studies that find high levels of debt in the capital structure to decrease firm's profitability include Gleason et al (2000), Hirota (1999), Krishnan and Moyer (1997), Rajan and Zingales (1995). With mixed evidence in the literature, it is clear that financing choice and profitability is an important research agenda.

The main goal of this study therefore is to investigate the role that individual funding instruments play in influencing MFI profitability. To achieve this objective, we employ

dynamic panel data analysis to a broad sample of 167 MFIs across 32 Africa economies, for the period 1997-2008. Rather than delve into whether profitability is directly related to particular stages of a life cycle pattern of funding (see Helms, 2006), this study uncovers the role individual funding instruments play in determining MFI profitability. In spite of a possible association between funding sources and microfinance profitability, there have been no systematic studies for a large group of MFIs with a focus on Africa that provide robust evidence of how variations in funding affect MFI profitability.

We explore this issue by addressing the research questions; does source of funding matter on microfinance profitability? What is the optimal mix of debt, equity and deposits which ensures profitability? It is in light of these research questions, that this study seeks to broaden and deepen our understanding on the impacts of choice of financing structure on MFI profitability.

This study makes contributions to the existing knowledge four fold. First, since capital constraints have hindered the expansion of MFIs activities in Africa (Lafourcade, et al 2006), the question of how best to finance MFIs is crucial. Understanding the role played by various instruments of funding MFIs is important both to the shareholders and MFIs management—who are interested in making effective decisions that will help boost the profitability of their respective MFIs.

Second, the huge interest in MFI investment vehicles makes this study unique. There has been a rapid growth in foreign investment by various funds that tend to be more commercially oriented, such as the Dexia Microcredit Fund and MicroVest (Abrams and Ivatury, 2005). In 2003, for example, foreign investors in microfinance invested USD 62 million in debt, equity, and guarantees in 104 MFIs in Africa. This accounted for 21 percent of recipients of foreign investment (104 of 505 global MFIs). Understanding the role played by financing structure in enhancing MFI's profitability may therefore help these investment

funds that target their money towards MFI's, with the aim of earning returns from the investments.

Third, at the policy level the outcome of this study is important to the MFI managers and regulators when making choices on alternative funding instruments. MFIs managers who are able to identify an optimal financing choice may be rewarded for minimising MFIs cost of capital which has implications on profitability. From a creditor's perspective, it is possible that the debt to equity ratio aids in understanding MFIs' risk management strategies and how MFIs determine the likelihood of default associated with financially distressed firms.

Finally, at the macro level, capital structure issues raise particularly policy relevant questions regarding the microfinance industry. This is because of the crucial roles played by MFIs in channelling credit to non-financial firms and in transmitting the effects of monetary policy. This is vital in providing stability to the economy as a whole.

The remainder of this chapter proceeds as follows: In the next section we review the related literature. Section 3 describes conceptual framework and empirical specifications. Section 4 describes data and measurements of our variables of interest. Section 5 outlines econometric methodology. Following good practice guidelines suggested by a number of authors, (see e.g. Roodman, 2009), we report the main econometric specification choices that we faced and explain why the dynamic system-GMM panel model is our preferred model over the OLS and static panel estimation. In section 6 we present the empirical results and explore a number of robustness checks. Conclusions and policy suggestions are offered in the final section by pointing out some unresolved issues.

5.2 Theoretical underpinnings: firm performance and capital structure

In this section we review trade off, agency, and pecking order theories of capital structure and relate the same to microfinance. The seminal paper dealing with irrelevance of debt in capital structure for determining firm value by Modigliani-Miller (1958) included a number of assumptions—one of which was absence of corporate tax. Subsequently when Modigliani-Miller (1963) controlled for corporate tax, it was found that theoretically the value of a firm should increase with debt because of higher interest tax shield. But monotonic increase of debt for higher tax shield increases bankruptcy cost especially when profitability of the firm is low and fluctuating. This leads to 'trade off' theory of capital structure that considers an optimum debt level or target level, where the marginal increase of present value of tax saving is just offset by the same amount of bankruptcy cost.

Although we may not be able to determine the exact debt target level objectively in microfinance, because of MFIs industrial organization, trade off theory explains that that there is a limit to debt financing and the target debt may vary from MFI to MFI depending on profitability, among a host of other factors. Consistently profitable MFIs with a lot of tangible asset that can be offered as collateral for debt may have a higher target debt ratio. Simply put high proportion of fixed interest capital to equity would imply that the MFI is highly indebted and risks becoming insolvent. On the other hand highly leveraged MFIs may perform better by enjoying scale economies and enhancing their capability to boost profitability.

The second theory relevant to financing choice is known as 'pecking order' developed by Myers (1984). It is based on the premise that in reality successful firms with high and consistent profitability rarely use debt financing. The origin of pecking order theory is asymmetric information where managers know more about a firm's prospect than the outside investors. The theory suggests that if the firm issues equity shares to finance a project, it has to issue shares at less than the prevailing market price. This signals that the shares are overvalued and the management is not confident to service the debt if the project is financed

by debt. On the contrary if external borrowing is used to finance the project, it sends a signal that the management is confident of the future prospect of servicing debt. Hence debt is preferred over shares in financing decision. If debt is issued, pricing of debt instrument remains a problem. To avoid controversy the management may wish to finance project by internal fund generation, i.e. by retained earning. Thus, financing follows an order, first-retained earning, then-debt and finally equity when debt capacity gets exhausted. This explains why the profitable firm uses less debt. These preferences exhibit transitivity in the choice of financing. MFIs in Africa may represent an interesting scenario since on average retained earnings are zero and perhaps following the pecking order may opt for debt since quite a number are not regulated and therefore have no access to capital market. Should we find evidence that is consistent with the pecking order theory then our results may highlight a negative relation between debt and MFI profitability.

The theoretical foundation on agency cost hypothesis is that the managers' interests and that of the shareholders are not perfectly aligned. This workhorse is due to Jensen and Meckling (1976). They also contend that agency costs could also arise from conflicts between equity and debt holders. These conflicts arise when there is a risk of default. The risk of any default may lead to debt-overhang or underinvestment (Myers 1977). In this case, debt will have a negative effect on the value of the firm and therefore profitability. It could also be a scenario where managers have for instance incentives to take excessive risks as part of risk shifting investment strategies (Jensen and Meckling, 1976; Williams 1987). This is where higher leverage becomes useful as a governance mechanism to reduce wasteful cash flow by a threat of liquidation (Grossman and Hart, 1982; Williams 1987). This may also lead to higher pressure on the part of the management to generate cash flow to pay interest expenses on the part of the debt (Jensen, 1986). We therefore expect higher leverage to impact positively on firm performance.

There is however a threshold beyond which a rise in the proportion of debt in the capital structure; the benefits of leverage may not be realized (Altman, 1984; Titman, 1984). When leverage becomes relatively high, further increases may generate significant agency costs, ostensibly because of increase of bankruptcy costs (Titman 1984), managers may reduce their effort to control risk which result in higher expected costs of financial distress, bankruptcy, or liquidation (Berger and Bonaccorsi di Patti, 2006) and inefficient use of excessive cash used by managers for empire building (Jensen, 1986). But firm performance may also affect the capital structure choice (Berger and Bonaccorsi di Patti, 2006).

The literature survey presented in this section underscores the importance of financing choice on firm performance. Agency theory is very relevant in the microfinance industry since the interests of MFIs management and those of social investors may not be aligned. Some MFIs have continuously received grants and subsidized loans from development agencies to finance the transition into deposit mobilization. Grant financing may for example create moral hazard or incentive issues with respect to MFI operations and subsequently profitability. Donors and social investors have vested goals all aimed at boosting outreach while MFI management may be profit motivated. Agency costs may be particularly large in microfinance industry because MFIs are by their very nature informational opaque—where they hold private information on the borrowers. Moreover, regulators in the case of MFIs that are formally constituted may set minimums for equity capital in order to deter excessive risk taking which may affect agency costs directly and alter MFIs' financing choice with consequences on profitability. In addition, MFIs access to grant funding and other safety net protections may increase incentives for risk shifting or lax risk management.

5.3 Empirical Specifications

5.3.1 Design of the model

Microfinance literature devotes considerable attention to the life cycle model which is basically a process of "NGO transformation". The basis of the argument is that sources of MFIs financing are intertwined with the stages of MFI development (Helms, 2006). However, it does not seem to tell the entire story with respect to financing choice. We abstract from this line of argument since our primary focus is on the impact different sources of funding have on the outcome—profitability. We therefore estimate the following basic regression:

$$\Pi_{ict} = \alpha + \eta\Pi_{ict-1} + \sum_{n-1}^{N} \beta_n \mathrm{X}_{ict}^{n} + \sum_{j=1}^{J} \beta_j \mathrm{X}_{ict}^{j} + \sum_{m=1}^{M} \beta_m \mathrm{X}_{ct}^{m} + \varepsilon_{ict} \quad \text{.....(5.1)}$$

$$\varepsilon_{ict} = \upsilon_i + \gamma_t + \mu_{ict}$$

Where the outcome is a measure of the profitability Π_{ict} of microfinance institution *i* in year *t* located in country *c*, with i=1. . .N, t=1, . . ., T; α is the regression constant, X_{ict}^{n} represents capital structure variables, X_{ict}^{j} represents other MFI or firm-level characteristic, and X_{ct}^{m} represents country-level characteristics. $\varepsilon_{ict} = \upsilon_i + \gamma_t + \mu_{ict}$ is the disturbance; γ_t is the unobservable time effects, υ_i is the unobserved complete set of MFI-specific effect and μ_{ict} is the idiosyncratic error. η, β, δ are the coefficients to be estimated. Π_{ict-1} is the one-period lagged profitability and η is the speed of adjustment to equilibrium. This is a one-way error component regression model, where $\upsilon_i \sim IIN(0, \sigma_\upsilon^2)$ and independent of $\mu_{it} \sim IIN(0, \sigma_\mu^2)$.

We acknowledge the possibility of an alternative model, where funding may be assumed to shift or to evolve in tandem with changing market share. Although this is well grounded in the finance literature, it nevertheless appears less relevant in microfinance. Conceptually, market share fails to capture MFIs characteristics that graduate from informal arrangements and pre-existing MFIs. Additionally, the market share approach does not allow for changes in MFI profitability that may be associated with economies of scale, even if the growth in market share outpaces the growth of MFI size.

5.4 Data and hypotheses

Hypothesis testing and predictions

Some MFIs use more of borrowed funds than equity or vice versa. The impact of more debt is on the various risks perceived by the providers of equity capital which is construed to have a significant impact on the cost of capital. High proportion of fixed interest capital to equity especially in times of rising interest rates would imply that the MFI is highly leveraged and risks becoming insolvent. This is particularly so due to the additional interest that has to be paid out for the debt.

On the contrary, highly leveraged MFIs may perform better by enjoying scale economies. Additionally, debt instrument may acts as a governance mechanism by reducing management discretionary power on cash flow (Harris and Raviv, 1990). This in turn may boost profitability. We therefore hypothesize an indeterminate relationship between debt and MFI profitability.

Deposit to assets ratio is only relevant to MFIs that mobilize deposits. The lower the ratio, the greater is the MFI's capability to fund its assets from deposits. As long as the deposits program is efficient, we expect a proportionally larger deposit-total asset ratio to translate to a lower cost of funds. External funding is often a costly source of funding than deposits but which is the case when the deposit-total asset ratio is higher. MFIs may also effectively use local depositors as in the case of Irish loan funds (Hollis, and Sweetman, 2007) not just for funding, but also because of the important discipline that depositors can impose on expenses management—which has an impact on profitability. We therefore postulate a positive relationship between deposits mobilization and profitability.

Portfolio to asset ratio may also affect profitability. In the empirical banking literature, portfolio to asset ratio is often used both as a measure of credit risk and lending specialisation. Loans are less liquid but more risky than other assets in MFIs' portfolio. The risk of default, and the additional costs incurred in managing credit risk, requires MFIs to apply a risk

premium to the interest rate charged for the loan. MFIs with a relatively high portfolio to asset ratio may be at greater risk of failure. However, if portfolio to asset ratio is interpreted as measure of lending specialisation, a high portfolio to asset ratio might indicate that MFI specialises in lending because it benefits from informational advantages, which may reduce intermediation costs and enhance profitability (Freixas, 2005). Larger share of loans to total assets may therefore translate to more interest revenue because of the higher risk. However, MFI loans are subject to significantly higher transaction costs than retail profit seeking banks, which include cost of funds for on-lending, the loan loss, and administrative costs (Cull et al 2009a). MFI clients may often live in inaccessible locations. Since MFIs operations are heavily dependent on personal contact for their execution which is very time-consuming, this translates to a higher absolute transaction cost per loan. That notwithstanding, profitability should increase with a larger share of loans to assets as long as interest rates on loans are liberalized and the MFI applies mark-up pricing. We therefore predict a positive relationship between portfolio to asset ratio and MFI profitability.

Other MFI specific variables

Most of the control variables in equation (5.1) are the same as those used in the other studies of MFI performance (Ahlin et al, 2011; Cull, et al 2009b, 2011; Cull, Demirgüc-Kunt and Morduch 2007). Additional MFI-specific characteristics are captured by controls for share of lending to women. Existing literature with respect to share of lending to women remains contestable. Several studies shows that MFIs with a higher share of lending to women report better repayments, which lowers risk and increases profitability (D'Espallier et al 2011, Pham and Lensink 2007; Pitt, Khandker and Cartwright 2006; Khandker 2005; Kevane and Wydick 2001; Pitt and Khadker 1998). Indeed Armendáriz and Morduch (2010), points that Grameen Bank originally had a majority of male clients but decided to concentrate almost entirely on

women due to repayment problems related to male clients[60] and perhaps because female entrepreneurs face tighter credit availability compared to men (Fletschner 2009); even though they do not pay higher interest rates (Bellucci, et al 2010). On the contrary, MFIs that focus on women usually advance smaller loans, which increase their operational costs (D'Espallier et al 2010; Balkenhol, 2007). We therefore predict an indeterminate effect on profitability *a priori*.

Consistent with the previous chapter, the regressions also include a number of country-level controls. We use two proxies for the *macroeconomic environment*; inflation and GDP per capita growth. We use GDP per capita[61] growth which is arguably the most informative single indicator of economic progress. It can be considered an approximate summary statistic for the various institutional, technological, and factor-accumulation related ingredients of development. Inflation expectation is measured at time t-1 annual % change of the GDP deflator at market prices for each country where the MFI is located for each year.

Further country-level controls include rural population share (in 1990). Microfinance is heavily dependent on personal contact for its execution which is very time-consuming and resource intensive. MFI clients may however often live in inaccessible locations. Group lending may be more difficult in sparsely populated areas and contact between borrowers and individual lenders that are not located nearby is likely to be problematic. We also include rural population growth (since 1990). McIntosh, de Janvry and Sadoulet (2005) found that most of the microfinance entry in Uganda in the 1990s occurred in rural areas. On the contrary, Arun and Hulme, (2008) shows that the provision of MFIs mainly focuses on the cities, towns and major rural trading centres. We therefore control for the possibility that

60 The proportion of female clients of the Grameen Bank steadily increased from 44 per cent in October 1983 to 95 per cent in 2001 (Armendáriz and Morduch, 2010).

61 Ahlin et al (2011) use a similar measure. Demirgüc-Kunt and Huizinga (2000) used the annual growth rate of GDP and GNP per capita to identify such a relationship, while Bikker and Hu (2002) used a number of macroeconomic variables such as GDP, the unemployment rate and interest rate differentials.

rapidly growing rural areas may attract MFIs with a different profitability profile. We also control for persistence of MFI profitability.

Data and measurement

In order to capture the dynamics of relationship between financing choice and microfinance profitability in the backdrop of the theoretical underpinnings detailed in section *5.2* and *5.4.1*, this study uses a data sample that contains 2,004 observations. This corresponds to 167 MFIs for the period 1997-2008 that varies from a minimum of 10 in 1997 to a maximum of 167 in 2005 based on their financial accounts. This spans across four different regions namely West (67), East (53), Central (17) and South Africa (30). Our panel is unbalanced[62] since not all MFIs have information for every year—some MFIs may have closed as others enter the market. In order to avoid duplication we shall not dwell into a detailed discussion about the same. Reference should be made to chapter three for a formal discussion of the conceptual framework, data and measurement of the variables.

We analyze the impact of different sources of funding on MFI profitability which include (i) accepts deposits dummy (ii) deposits relative to assets ratio, (iii) loans relative to assets ratio (iv) and debt to equity ratio (gearing). Given that capital structure data is MFI specific and collected from MixMarket, we use the MixMarket definitions of key variables.

Deposits to assets ratio measures the relative portion of the MFI's total assets that is funded by deposits and gives an informed analysis of the role of deposits as a source of funding. Accepts deposits dummy is a binary variable which indicates whether or not the MFI mobilize deposits. This variable is given a value of 1 if the MFI accepts deposits. The variable is set to 0 otherwise. Portfolio to assets ratio is measured as the ratio of adjusted Gross Loan Portfolio/Adjusted Total Assets. Gearing ratio (GR) or debt to equity ratio is measured by the ratio of debt and debt-like instruments to capitalization namely short term debt + long term

62 We opt for an unbalanced panel not to lose degrees of freedom.

debt divided by total shareholders' equity or simply the Debt/Equity ratio. It captures the ratio of capital employed that is funded by debt and long term finance.

Studies on firm performance employ various measures to test the predictions of different capital structure hypothesis. Some of the measures of performance that have been used over the years include financial ratios (Mehran, 1995), stock market return and their volatility (Cole and Mehran, 1998; Saunders et al., 1990) and also, Tobin's q (Himmelberg et al., 1999; Zhou, 2001). For the purpose of this study we employ return on assets as our profitability proxy. ROA remains a valuable measure of MFI's profitability.

Due to data limitations, the empirical analysis does not address (i) grants (ii) retained earnings, (iii) share capital, (iv) debt relative to assets and (v) commercial funding liabilities ratio. We leave this for future research. All the empirical findings should be viewed in that light. Table 5.3 shows all variables definitions, source and measurements.

Table 5.3: Summary of variables and measurement

Variable	Notation	Measure	Predicted effect	Source of data
Dependent variable				
Return on assets	ROA	Net profits after taxes/Assets		The MIX
Exogenous variables				
Financing choice				
Accepts Deposits	DEP	Value of 1 if the MFI accepts deposits and 0 otherwise.	Positive	The MIX
Portfolio to Assets	PAsset	Adjusted Gross Loan Portfolio/Adjusted Total Assets	Positive	
Deposits to assets	DepAsse	Voluntary Deposits/Total assets	Positive	
Debt to equity ratio (gearing)	GR	Debt/equity ratio	Indeterminate	
Capital	CAP	Equity/Assets	Positive	
Other firm-specific controls				
Portfolio at Risk	PAR-30	Outstanding balance, portfolio overdue> 30 Days + renegotiated portfolio/Adjusted Gross Loan Portfolio	Negative	The MIX
Efficiency	EFF	Adjusted Operating Expense/Adjusted Average Gross Loan Portfolio	Negative	
Age	Ag	Age of the MFI in years	Indeterminate	
Size	S	Log of total assets in period *t*	Indeterminate	
Loan size	LS	Average Loan Balance per Borrower/GNI per Capita	Positive	
Share of lending to women	Wom	Share of MFI borrowers that are women	Indeterminate	
Country level controls				World Bank (WDI)
Inflation Expectations	INF	Inflation, consumer prices (annual %) in period *t-1*	Indeterminate	
Per capita	GDP	Gross Domestic Product (at current	Positive	

Income growth		US$) divided by midyear population in period *t-1*		
Rural population (%)	RPOP	Rural population share (in 1990)	Negative	
Population growth	POPG	Rural population growth (since 1990).	Negative	

5.5 Estimation and testing

When estimating equation (5.1), we are likely to encounter endogeneity problem: Berger and Bonaccorsi di Patti, (2006) observes that the mixed results in the previous empirical studies may be due to the possibility of reverse causation from performance to capital structure. If for instance MFI profitability affects the financing choice, these regressors may be correlated with the error term. Failure to control for this endogeneity may result in simultaneous-equations bias. Further estimation challenges are similar to those noted in the previous chapter. In order to avoid duplication we shall not dwell into a detailed discussion about the same. Reference should be made to chapter four for a formal discussion of the same.

In order to allow for comparison with previous studies, we conduct robustness tests with fixed effects and OLS. The use of OLS and fixed effect regressions can also be considered as a robustness test for the results with the GMM system method, at least for the sign of the coefficients. Moreover, by comparing the results of fixed effect model with those of the GMM system, we can identify the source of endogeneity in the data. Such simple models also help account for the fact that a large sample is needed for the properties of the GMM estimator to hold asymptotically.

5.5.1 Univariate analysis

Descriptive statistics of all variables are reported in Table 5.4. There is a wide variation in performance across MFIs. The means and standard deviation for ROA are all within the expected range but the minimum and maximum values suggest a wide range for each variable. Profitability is widely dispersed suggesting that the overall mean profitability may be driven by a few MFIs. It remains to be seen which MFI characteristics explain the wide dispersion of

profitability measure. The distributions of AGE and of SIZE variables indicate considerable heterogeneity in these characteristics.

Table 5.4 shows that on average a majority of the MFIs lend about 66% of their assets. It also shows that most of the MFIs are not highly leveraged as shown by the mean gearing ratio of 0.26, suggesting a considerable dependence on other sources of funding (e.g. voluntary savings) for their operations. This is further corroborated by the ratio of debt to equity which is negatively skewed, suggesting that more MFIs may be employing less of debt in their capital structure. The standard deviation, the minimum and maximum values of gearing ratio is an indication of an industry which is highly unevenly distributed with regards to leverage levels. This is consistent with Lafourcade, et al (2006) who shows that 72 percent of MFIs in Africa fund their activities with deposits. We uncover the magnitude and direction of this variability in the next section.

Table 5.4: Descriptive and summary statistics

Variable	Notation	Obs	Mean	Median	Standard Deviation	Minimum	Maximum
Return on assets	ROA	946	-0.016	0.007	0.121	-0.851	0.830
Debt to equity ratio	GR	844	0.257	1.602	1.348	-6.215	3.218
Deposits to assets ratio	DEPASE	382	0.386	0.329	0.255	0.000	0.960
Portfolio to Assets	PAsset	805	0.659	0.673	0.173	0.057	0.990
Capital	CAP	945	0.369	0.307	0.279	-0.983	1.000
Log Age	AG	945	2.180	2.197	0.607	0	3.7
Log Size	S	947	15.02	14.79	1.821	7.86	20.71
Efficiency	EFF	914	0.379	0.294	0.285	0.025	1.92
Portfolio at Risk	PAR30	937	0.066	0.037	0.093	0	0.737
Share of lending to women	WOM	764	0.604	0.615	0.260	0.000	1.000
Loan size	LS	847	0.790	0.569	0.709	0	3.541
Rural population share	RURALPOP	950	0.687	0.684	0.132	0.390	0.910
Growth of rural population	POPGROW	955	1.950	2.240	0.821	-0.880	3.820
GDP Per capita	GDP	784	0.998	2.837	0.845	-2.43	2.37
Lagged Inflation rate	INF	951	0.672	0.062	0.063	-0.09	0.431

This Table presents the summary statistics. A detailed description of the definition and sources of the variables is given in Table 5.3. Data has been winsorized at 10%

Mean values of ROA across institution types reported in Table 5.5 suggest several important regularities. Figures suggest that profitability varies across MFIs having different organizational structure, with credit unions being generally more profitable, relative to others, which necessitates controlling for organisational structure when analyzing MFI profitability. This observation is consistent with Tchakoute-Tchuigoua (2011) who finds that the performance of for-profit MFIs is better than that of NGOs. This is perhaps because non-profit MFIs make smaller loans on average and serve more women than do commercialized MFIs, and therefore their costs per dollar lent are also much higher (Cull et al 2009a, c). Are variations in Table 5.5 significant? We uncover the magnitude and direction of this variability in the next section.

Table 5.5. Mean MFIs profitability across MFI types

	Obs	Mean	Std. Dev.	Min	Max
Non-governmental Organizations	254	-0.050	0.176	-0.851	0.830
Credit unions	305	0.005	0.067	-0.254	0.204
Bank	87	-0.005	0.087	-0.421	0.124
Non-bank financial institutions	301	-0.010	0.107	-0.820	0.600

This Table presents averages of individual MFI returns on assets. Data has been winsorized at 10%

The Correlations

The bi-variate relationships shown in Table 5.6 are consistent with the argument that MFIs that mobilize deposits are more profitable perhaps because deposits constitute cheaper funding compared to borrowed funds. An interesting observation is the positive and significant debt to equity correlations with profitability. This may be an indication that more debt relative to equity is used to finance increased microfinance activities and that long term borrowings positively impact on profitability.

The negative rural population share (in 1990) correlation with profitability may reflect on the difficulties encountered by MFIs in employing group lending mechanism in sparsely populated areas. Contact between borrowers and MFIs that are not located nearby is likely to

be costly and time consuming. Of particular concern however is the high and significant bivariate correlation between population share and growth of rural population—which calls for separate inclusion of the two variables in the estimation model. The rural population growth variable is significantly correlated with greater lending to women, suggesting the importance of rural controls. Other bi-variate relationships follow expectations based on the existing literature that uses this database. Although most correlation coefficients among variables of interest are low, they are nevertheless significant though not perfect linear. Regression analysis allows us to investigate the strength of these correlations after controlling for other relevant covariates.

Table 5.6: Correlations

	ROA	ACDEP	DEPASE	PAsset	GR	CAP	RURALPOP	POPGROW	AG	S	EFF	PAR	LS	WOM	GDP	INF
ROA	1.000 948															
ACDEP	.068* 943	1.000 944														
DEPASE	.019 377	.068 378	1.000 383													
PAsset	.065 805	-.019 804	.084 381	1.000 385												
GR	.172** 870	.057 868	.166** 364	.001 759	1.000 888											
CAP	-.101** 943	-.109** 938	-.123** 374	-.021 803	-.367** 869	1.000 945										
RURALPOP	-.072* 948	.012 944	.012 383	.028 860	-.101** 888	.102** 945	1.000 2004									
POPGROW	-.016 948	-.047 944	.052 383	.022 860	-.127** 888	.028 945	.605** 2004	1.000 2004								
AG	.142** 942	.181** 937	-.033 372	-.002 801	.110** 867	-.204** 941	-.094** 945	-.039 945	1.000 945							
S	.111** 946	.146** 941	-.030 376	-.030 805	.124** 871	-.142** 945	-.010 948	-.030 948	.351** 944	1.000 948						
EFF	-.524** 912	-.074* 908	-.045 371	-.075* 786	-.130** 844	.217** 912	.046 914	-.108** 914	-.190** 910	-.086** 914	1.000 914					
PAR	-.046 935	.025 930	-.024 372	-.004 797	.101** 863	-.067* 936	-.083** 937	-.066* 937	.056 933	.008 937	.017 905	1.000 937				
LS	.178** 846	.094** 843	.060 345	.102** 725	.058 788	-.240** 846	.065 848	.132** 848	.052 844	.133** 848	-.197** 819	-.004 841	1.000 848			
WOM	-.179** 721	.000 720	-.065 344	.112** 750	-.154** 675	.203** 719	-.063 765	-.072* 765	-.095** 717	-.148** 721	.274** 698	-.090* 714	-.307** 654	1.000 765		
GDP	-.035 913	.171** 908	-.099 366	.036 775	-.070* 844	.132** 913	.248** 929	.021 929	-.090** 912	-.003 915	.139** 885	.086** 906	-.016 817	.016 694	1.000 929	
INF	-.028 935	.103** 930	-.026 371	.004 796	-.036 863	.144** 935	.048 951	-.105** 951	-.034* 934	.023* 937	.193** 906	.132** 927	-.025 898	.142** 712	.378** 929	1.000 951

** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed). Figures beneath are the observations (N)

Where ROA=Return on Assets; AG= Age of the MFI; S= Size; CAP=Capital; EFF= Efficiency; PAR=Portfolio at Risk; LS=loan size; WOW=share of lending to women; INF= Lagged Inflation; GDP=Growth of per capita income; DEPASS=deposit to assets; DEPLOA=deposit to loans; PAsset=gross loan portfolio to assets; GR=gearing ratio; RURALPOP=share of rural population; POPGROW=growth of rural population; ACDEP is a dummy variable for MFIs that accepts deposits

5.6 Empirical results and discussion

The main aim of this chapter was to determine the extent to which microfinance profitability depends on MFI financing choice. The summary statistics in the previous sub-section led us to a more comprehensive model specification to test further the link between MFI profitability and financing choice, while controlling for other MFI specific characteristics and factors that are not within the control of MFI management.

Table 5.7 reports results from our basic specification using ROA as the profitability measure. Our preferred system GMM estimates in model 2 suggest that the choice of funding is important for MFI profitability, which is an overwhelming support for our main hypothesis. In particular larger share of deposits to assets appears to boost MFI profitability. A plausible interpretation of these results is that the more deposits are transformed into loans, the higher the interest margin and profits. Thus a proportionally larger deposit base will typically lead to an overall lower cost of funds for the MFIs with an implication of improved profitability—assuming that the deposits program is efficient.

This finding is especially interesting in light of recent calls suggesting that MFIs should broaden their services towards deposits mobilization. This would also broaden the lending capacity of these institutions. However, Cull et al. (2011) shows that such an approach may not be welfare enhancing. These results are however contrary to García-Herrero, (2009) who do not find significant results in the Chinese banking industry. All banks by default mobilize deposits and as such our finding cannot be generalized in banking.

We also find portfolio to asset ratio to significantly influence profitability in the anticipated way. MFIs that dedicate a higher proportion of their balance sheets to lending activity are, on average, more profitable. Traditional lending business is the main source of income for the many MFIs across Sub-Sahara Africa (see Appendix A, Table 9). Making loans provides informational advantages, which may lower intermediation costs and improve profitability (Freixas, 2005). A larger share of loans to total assets may therefore translate to

more interest revenue because of the higher risk. This finding is contrary to Demerguç-Kunt and Huizingha (1999) who in the conventional banking report that a larger ratio of bank assets to GDP lead to lower margins and profits. MFI's gross loan portfolio is however different from that of traditional bank. This is because not only is the loan portfolio generally semi-or uncollateralized, but because loan maturity is generally short, ranging from 3 to 12 months (Cull et al 2009a). Thus the quality of the loan portfolio can deteriorate in a matter of weeks only.

Another new and interesting finding is that of debt to equity ratio which is positive and significantly related to profitability. Although comparative evidence in microfinance is lacking, this finding is consistent with the agency costs hypothesis (Jensen and Meckling 1976) where higher leverage or a lower equity capital ratio is associated with higher profitability over the entire range of the observed data. Beyond internal resources, debt may therefore be preferred to equity because the issuing costs are usually lower and because debt reduces verification costs (e.g., Townsend 1979). This is likely to be the scenario with MFIs which typically face very high transactions costs in issuing new equity due to their average small size.

Additionally, MFIs managers may have incentives to take excessive risks as part of risk shifting investment strategies as postulated by Jensen and Meckling, (1976) and Williams (1987). Thus a higher level of leverage may be used as a governance mechanism to reduce managerial cash flow waste through the threat of liquidation (Grossman and Hart, 1982; Williams 1987) or through pressure to generate cash flow to honour debt obligations (Jensen, 1986), to reduce expense preference behaviour and make better investment decisions. Under these circumstances, higher leverage will impact poisitvely on MFI profitability. If higher debt to equity ratio were to increase profitability by a greater margin than the cost of the debt, then the shareholders would benefit as more earnings are being spread among the same number of shareholders.

Evidence in the banking industry include Berger and di Patti (2006) who found that leverage affects agency costs and thereby firm performance in the US banking industry data. Their results were statistically significant. This is also consistent with Hadlock and James (2002) and Michaelas et al. (1999) who find that banks with high leverage report high level of profitability.

The previous evidence on banking is difficult to generalize in microfinance industry. MFIs are characterized by a different production function and with risk and return profile different from that of conventional banking. While traditional bank loans are characterized by large sizes, large markets, long maturities; microfinance receivables are uncollateralized and with a short term maturity. Moreover, MFIs also have a double bottom line mission of reducing poverty while at the same time maximizing firm value. Additionally, the presence of the regulatory safety net that protects the safety and soundness of banks which is likely to lower bank capital and regulatory capital requirements may not apply to all MFIs. It is therefore plausible that what holds for banks may not in the microfinance industry. Berger and di Patti (2006) in particular use profit efficiency rather than ROA or ROE as a measure of performance. Although the use of profit efficiency addresses some of the difficulties in other performance measures employed in the literature, the profit efficiency measures are also imprecise and embody measurement error.

There is also some empirical work that has unearthed some stylized facts on the influence of capital structure choice on firm performance, but this evidence is largely based on non-financial firms; it is not at all clear how these facts relate to different theoretical models and how the same would apply to MFIs. For instance, Margaritis and Psillaki (2010), Arbabiyan and Safari (2009) and Abor (2005) finds evidence supporting the theoretical predictions of the Jensen and Meckling (1976) hypothesis. On the contrary, Chakraborty (2010), Huang and Song (2006), Caesar and Holmes (2003), Esperance et al. (2003) and Chiang et al. (2002) find a negative influence on firm performance.

Although microbanking is to some extent a regulated industry, MFIs are subject to the same type of agency costs and other influences on behaviour as other non-financial firms. But without testing the robustness of these non-financial firms findings outside the environment in which they were uncovered, it is hard to determine whether these empirical regularities are merely spurious correlations, let alone whether they support one theory or another. The mixed results in the previous studies may also be due to the possibility of reverse causation from performance to capital structure (Berger and di Patti 2006). Overall it appears that the investigation of the influence of capital structure on MFIs profitability has been largely overlooked.

The effect of other MFI-specific and macroeconomic variables on profitability is in line with expectations, with notable exception of age, loan size, share of lending to women which are insignificant. The coefficient on the linearly separable AGE term is statistically insignificant.

The insignificant result on share of lending to women coefficient may point to the fact that high repayments may not necessarily translate to profitability, perhaps because MFIs that target women clients are also less efficient and therefore less profitable (Hermes, Lensink, and Meesters 2011). It may also point to the fact that MFIs which focus on women usually extend smaller loans, which reduces their operational efficiency and subsequently lowers profitability (D'Espallier, et al 2010). Consistent with the previous chapter, the results also provide strong evidence that credit risk represents a serious obstacle to microfinance profitability, while capital adequacy matters for MFI profitability.

Rural population share (in 1990) similarly turns out as insignificant perhaps because the bulk of the population in Africa is rural with a low population density at 77 people per square kilometre. This population density is among the lowest in the world (World Bank, 2009). We however find evidence that rapidly growing rural areas may attract MFIs with a different profitability profile. Rapidly growing rural areas is negatively associated with profitability

which suggests that microfinance operations may be more difficult in rural areas characterized by weak infrastructure since micro-banking is heavily dependent on personal contact for its execution. Intuitively, MFIs that chose to locate in urban settings may be more profitable.

The coefficient on the lagged dependent variable is about 0.2 and significantly greater than zero. This implies that there is some moderate persistence in microfinance profitability. It is plausible that if there is a shock to profitability level in the current year, about 20% of the effect will persist into the following year.

Table 5.7: The impact of financing choice on MFI profitability

Variable	Notation	Variant of model specifications	
		1	2
Lagged ROA	Π_{t-1}	0.2126*** (9.03)	0.2278*** (9.16)
Deposits to assets ratio	DEPASE	0.1194*** (10.60)	0.1630*** (13.81)
Portfolio to assets	PAsset	0.1470*** (2.61)	0.0610*** (3.19)
Debt to equity ratio	GR	0.0044** (1.93)	0.0067*** (4.97)
Capital	CAP	0.2370*** (7.66)	0.1332*** (9.31)
Log Age	AG	-0.0033 (-1.16)	-0.0072 (-0.36)
Log size	S	0.0435*** (2.75)	0.0353*** (2.59)
Efficiency	EFF	-0.3172*** (-13.59)	-0.2984*** (-15.14)
Portfolio at risk	PAR	-0.2319*** (6.76)	-0.2347*** (-8.29)
Loan size	LS	0.0051 (0.49)	
Share of lending to women	WOM	0.0149 (0.56)	
Rural population share	RURALPOP	0.0523 (0.34)	
Growth of rural Population	POPGROW	-0.0723*** (-2.86)	-0.0813*** (-2.91)
GDP Per capita	GDP	-0.0013 (-0.81)	
Inflation expectations	INF	-0.0137 (-0.20)	
Number of instruments		59	55
Wald-test		$\chi2(15) = 120.6$ Prob>chi2=0.000	X2(10)= 316.7 Prob>chi2=0.000
Sargan-test[a]		$\chi2(60) = 54.08$ Prob>chi2=0.691	X2(50)= 43.03 Prob>chi2=0.747
AR(1)[b]		z =-4.419 p-value=0.000	Z=-1.923 p-value=0.0546
AR(2)[c]		z =0.064 *p-value* = 0.9489	Z=0.113 *P*-value = 0.9104
Observations		545	312

This Table presents estimations performed using Blundell and Bond (1998) system robust GMM (Two-step) estimator. For the definition of the variables see Table 5.3. Robust z values are in parentheses and significance at the 10%, 5%, and 1% level is noted by *, ** and *** respectively.

The Wald test is a test of the null hypothesis that the coefficients in the given equation are all zero (Greene, 2008). A low value indicates null hypothesis rejection.

[a] Test for over-identifying restrictions in GMM dynamic model estimation.

[b] Arellano-Bond test that average autocovariance in residuals of order 1 is 0 (H0: no autocorrelation).

[c] Arellano-Bond test that average autocovariance in residuals of order 2 is 0 (H0: no autocorrelation).

5.6.1 Interaction effects

One might wonder if a combination of MFI specific factors comes into play in explaining profitability. Although evidence adduced so far in the previous chapters shows MFI age may not be relevant on influencing profitability, it could be the case that portfolio-assets (PAsset) ratio depends on MFI age (AG). It could also depend on portfolio at risk (PAR). We thus interact portfolio-assets ratio with age (AG*X*PAsset) and PAR (PAsset*X*PAR). Young MFIs are less likely to have been licensed to mobilize deposits and therefore may have a higher portfolio-assets ratio, *ceteris paribus*. From this perspective, we interact age with portfolio-assets ratio (AG*X*PAsset) and age with deposits to assets ratio (AG*X*DEPASE).

MFI age may also affect the debt-equity composition because as firms mature they become known to the market, which enables them to expand their access to capital. As MFIs mature, the weight of external financial sources steadily decreases while the equity becomes a more important source of finance. Additionally, mature MFIs may have lower debt ratios as they accumulate deposits and/or utilize the retained profits. Towards this end we interact age with debt-equity ratio (AG*X*GR). There could also be an association between deposit mobilization and gearing ratio. Since deposits are a cheap source of funding, MFIs that mobilize deposits may be able to offset the cost of long term debt with implications on higher profitability. If this is found to non-negligibly predict profitability, then it may be the optima mix of the MFIs capital structure. We therefore interact being licensed to collect public deposits with debt-equity ratio (ACDEP*X*GR).

MFI age may also affect the impact of changes in the PAR rate. Informational constraints may affect the younger MFIs more than the older MFIs. Older MFIs are likely to have more information capital through relationship lending which generates valuable information about the borrower's quality in line with Berger, and Udell (2006) theoretical postulations. Hence, their ability to screen borrowers is likely to be better than that of younger MFIs. The adverse selection problem is likely to be more acute for younger MFIs, for any given average quality of borrowers. We therefore interact age with PAR (AG*X*PAR). The estimated coefficients is a good measure of the length of time period the MFI needs before it accumulates enough information capital to overcome the adverse selection effect. It also implies building trust in both informal and formal lending (Turvey and Kong 2010). We thus augment the baseline model with interaction terms and report the results in Table 5.8

While our previous findings are preserved, the results from interacted variables indicate that mature MFIs that mobilize deposits are more profitable. Age of the MFI therefore matters on MFIs that collect deposits. Therefore older MFIs have higher deposit to assets which translates to lower cost of capital and higher profitability. We also find that portfolio-assets ratio depends on age of the MFI with an implication on higher profitability. Our hypothesis that the effect of credit risk on MFIs profitability diminishes with the age of the MFI, is not supported here as indicated by the negative and insignificant sign of the interaction of the portfolio at risk with MFI age. Our hypothesis that older MFIs may have accumulated sufficient information capital to counteract the negative effect of default rate is not supported here. Indeed, McIntosh, de Janvry, and Sadoulet (2005) shows that young MFIs are willing to enter the market where other MFIs are already present to take advantage of the effect of training and screening already conducted on clients by the incumbent lenders.

Table 5.8: The impact of financing choice on MFI profitability-alternative model

Variable	Notation	Estimation coefficients
Lagged ROA	Π_{t-1}	0.1169*** (4.14)
Deposits to assets ratio	DEPASE	0.1288*** (9.49)
Portfolio to assets	PAsset	0.0786*** (4.45)
Debt to equity ratio	GR	0.0102** (2.18)
Capital	CAP	0.1162*** (4.59)
Log Age	AG	-0.0022 (-1.26)
Log size	S	0.0649*** (4.13)
Efficiency	EFF	-0.2496*** (7.67)
Portfolio at risk	PAR	-0.1977*** (-4.90)
Growth of rural Population	POPGROW	-0.0352** (-2.20)
Portfolio-asset**X**Portfolio at risk	PASSET***X***PAR	0.2282 (0.76)
Age**X**Portfolio-asset	AG***X***PASSET	0.0163*** (4.37)
Age**X**Deposit-asset ratio	AG**X**DEPASE	0.0023*** (4.05)
Age**X**Gearing	AG**X**GR	0.0002 (0.52)
Age**X**porfolio at risk	AG**X**PAR	-0.0102 (-1.61)
Accept deposits**X**gearing	ACEP**X**GR	0.0041*** (6.43)
Number of instruments		60
Wald-test		X2(16)= 315.0 Prob>chi2=0.000
Sargan-test[a]		X2(40)= 37.30 Prob>chi2= 0.6925
AR(1)[b]		Z=-2.30 *P*-value = 0.0021
AR(2)[c]		Z= 1.29 *P*-value = 0.7985
Observations		276

This Table presents estimations performed using Blundell and Bond (1998) system robust GMM (Two-step) estimator. For the definition of the variables see Table 5.3. Robust z values are in parentheses and significance at the 10%, 5%, and 1% level is noted by *, ** and *** respectively.

The Wald test is a test of the null hypothesis that the coefficients in the given equation are all zero (Greene, 2008). A low value indicates null hypothesis rejection.

[a] Test for over-identifying restrictions in GMM dynamic model estimation.

[b] Arellano-Bond test that average autocovariance in residuals of order 1 is 0 (H0: no autocorrelation).

[c] Arellano-Bond test that average autocovariance in residuals of order 2 is 0 (H0: no autocorrelation).

5.6.2 Does organization type matter?

Since MFI type may be correlated with some of the capital structure variables, we split the sample of MFIs into four sub-samples (see Table 5.9) based on the charter that established the MFIs and estimate a random effect model for each sub-sample. MFIs formally constituted as non-government organizations (NGOs) are more likely to be non-profits (social mission driven), tend to be slightly older, employ group lending methodology that entail smaller loans, more female clients, greater reliance on subsidized funding, higher costs per dollar lent, and less profitability. On the contrary commercially-oriented MFIs are more likely to have for-profit status and to use standard individual debt contracts, with larger loans, fewer women clients, lower costs per dollar lent and higher profitability (Cull et al, 2009a, c).

The results show that MFIs formally constituted as NGOs but mobilize deposits are more profitable. This is contrary to Tchakoute-Tchuigoua (2011) who does not find significant difference in profitability between for profit and NGOs amongst MFIs in Sub-Saharan Africa. All other findings are preserved with some few exceptions on credit union and banks perhaps due to low degrees of freedom. The findings for the subset of MFIs therefore reinforce our findings for the full sample.

Table 5.9: GLS estimation by charter type

Variable	Notation	NGOs	Credit unions	NBFIs	Banks
Intercept	α_{it}	-0.6825*** (-2.72)	0.2064** (1.90)	0.4905*** (3.22)	2.3799* (1.78)
Accepts Deposits	ACDEP	0.1638** (2.01)	0.0173 (0.30)	0.0118 (0.26)	—
Portfolio to assets	PAsset	0.1787*** (3.04)	0.1346** (2.23)	0.1022** (2.22)	0.1801 (1.53)
Deposits to assets	DEPASE	0.2075*** (2.92)	0.0024 (1.47)	0.1105** (2.06)	0.1287* (1.87)
Debt to equity ratio (gearing)	GR	0.0099*** (3.16)	0.0019. (1.17)	0.0049* (1.81)	0.0161*** (3.63)
Capital	CAP	0.3418*** (7.34)	0.2192*** (2.62)	0.1132*** (3.56)	0.3078** (2.27)
Log Age	AG	-0.0020 (-0.67)	-0.0052 (-1.01)	-0.0024 (-0.34)	0.0108 (0.38)
Log size	S	0.0283*** (2.59)	0.0369* (1.79)	0.0088 (0.99)	0.0195*** (2.63)
Efficiency	EFF	-0.4375*** (-12.45)	-0.4171*** (-7.70)	-0.2347*** (-8.77)	-0.1962*** (-3.11)
Portfolio at risk	PAR	-0.2612* (-1.75)	-0.2472*** (-3.21)	-0.3146*** (-3.27)	-0.1993 (-1.37)

Loan size	LS	0.0149 (0.84)	0.0074 (0.75)	0.0069 (0.49)	-0.0002 (-1.66)
Share of lending to women	WOM	0.0269 (1.40)	0.0315 (1.59)	0.0024 (0.08)	-0.2200 (-0.57)
Rural population share	RURALPOP	0.0022 (0.98)	-0.0004 (-0.24)	-0.0009 (-0.86)	-0.3705 (-0.84)
Growth of rural population	POPGROW	-0.0649** (-2.16)	-0.0179* (-1.74)	-0.0428* (-1.78)	-0.0303 (-1.00)
Inflation expectations	INF	0.2217 (1.18)	0.1661 (1.13)	0.0627 (0.81)	-0.4284 (-0.59)
GDP Per capita	GDP	-0.0016 (-0.25)	0.0371 (0.38)	0.0026* (1.85)	0.0015 (0.10)
Wald-test		Wald chi2(16)= 178.5 Prob>chi2= 0.0000	Wald chi2(16)= 76.86 Prob>chi2= 0.0000	Wald chi2(16)= 121.24 Prob>chi2= 0.0000	Wald chi2(16)= 61.67 Prob>chi2= 0.0000
R^2		0.67	0.72	0.34	0.57
Number of obs		85	55	118	31

This Table presents the results from regressions conducted to determine the influence of financing choice on MFI profitability in Africa. t-statistics are in parentheses and significance at the 10%, 5%, and 1% level is noted by *,** and *** respectively. For the notation of the variables see Table 5.3

5.6.3 Robustness

In order to test the robustness of the results, we perform some alternative regressions. We estimate fixed effect regressions as a robustness test for the System-GMM estimations, at least for the sign of the coefficients and report the results in Table 5.10. A fixed effect model can account for regional, country or MFI differences. Using fixed effect regressions does not fundamentally change the picture. The significance and the direction of influence of the financing choice variables shown in the estimations are preserved.

One limitation of using system GMM estimator is that the differencing removes any time invariant explanatory variable which does not allow us to control for the policy choice variable of accepting deposits. Without necessarily controlling for profit persistence, a random effect model seems to be our choice. A random effect model may also control for the potential correlation that may exist between regressors and for unobservable individual MFI effects. We therefore re-estimate model 5.1 in a linear fashion by assuming random effects (RE). While the number of observations is considerably reduced, some of our findings hold. In particular, Table 5.10 shows that we cannot confirm the hypothesis that MFIs who mobilize public deposits are more profitable. Perhaps what matters is the magnitude of the

deposits. Higher proportion of deposits to assets also appears to enhance MFI profitability, while MFIs with higher loans to assets ratio are more profitable. Better capitalized MFIs are more profitable, while higher gearing translates to greater profitability.

Table 5.10: Robustness results (dependent variable: ROA)

Variable	Notation	Fixed effects regression	Random-effects GLS regression
Intercept	α_{it}	-0.3077*** (-3.03)	-0.2568** (-2.40)
Accepts Deposits	ACDEP		-0.0041 (-0.10)
Portfolio to assets	PAsset	0.0816** (1.96)	0.1026*** (2.72)
Deposits to assets	DEPASE	0.0706*** (2.24)	0.0725** (1.85)
Debt to equity ratio (gearing)	GR	0.0066*** (3.04)	0.0053*** (3.43)
Capital	CAP	0.2158*** (5.98)	0.2158*** (8.07)
Log Age	AG	-0.0062 (-0.96)	-0.0020 (-1.57)
Log size	S	0.0135** (2.12)	0.0141*** (2.83)
Efficiency	EFF	-0.3753*** (-9.11)	-0.2258*** (-8.74)
Portfolio at risk	PAR	-0.1484* (-1.80)	-0.1676*** (-2.30)
Loan size	LS	0.0082 (0.57)	0.0011 (0.11)
Share of lending to women	WOM	0.0206 (0.57)	0.0313 (1.14)
Rural population share	RURALPOP	-0.0095 (-0.98)	-0.0004 (-0.40)
Growth of rural population	POPGROW	-0.0313 (-1.40)	-0.0102 (-1.66)
Inflation expectations	INF	0.1118 (1.61)	0.1159 (1.65)
GDP Per capita	GDP	0.0014 (0.90)	0 .0008 (0.57)
Wald-test			Wald chi2(16)= 230.6 Prob>chi2= 0.0000
R^2		0.57	0.53
Breusch and Pagan Lagrangian multiplier test			chi2(1)= 27.3 Prob>chi2= 0.0000 H0:Var(u_i)=0
Hausman specification test			chi2(15) = 46.09 Prob>chi2 = 0.0001 Ho: difference in coefficients not systematic
Number of obs		278	278

This Table presents the results from regressions conducted to determine the influence of financing choice on MFI profitability in Africa. t-statistics are in parentheses and significance at the 10%, 5%, and 1% level is noted by *,** and *** respectively. For the notation of the variables see Table 5.3

5.7 Conclusions and policy implications

In the context of Africa microfinance industry, this chapter is pioneering in analyzing the impact of financing choice on microfinance profitability. It is also pioneering in using dynamic GMM estimators and in using the two-step estimation method in studies of determinants of microfinance profitability. While most information on the financing choice is highly fragmented, this study has taken a first empirical step to synthesize the information to better understand the link between MFI funding and profitability.

Although previous empirical evidence on the impact of capital structure on firm performance remains mixed and contestable, microfinance industry appears to have been neglected in this research agenda. This study identifies a series of novel findings. Key among new findings is that highly leveraged microfinance institutions are more profitable. Therefore this study calls for the development of appropriate regulatory policies that enable MFIs to have access to long-term debt to improve their profitability. This may include relaxation of the listing requirements in the capital market.

Another new finding is that a proportionally higher deposit as a percentage of total assets is associated with improved profitability, assuming that the deposits program is efficient. Deposit mobilization may therefore help MFIs achieve independence from donors and investors. Savings mobilization may therefore lead to greater profitability since it provides MFIs with inexpensive and sustainable source of funds for lending. This perhaps explains why it is an indispensable element for well-performing MFIs.

Deposits may however require widespread branching and other expenses. Moreover, for MFIs to mobilize deposits, they require license which calls for transition to regulation. Though MFIs located in many of the Latin American countries have undergone a transition to regulation with implications which enables them access market funding (Jansson, 2003), many in Africa remain unregulated with NGO structures. This implies that Africa MFIs may be constrained in financing options, with no shareholder structure for attracting equity or

license to mobilize deposits. That notwithstanding, the question of whether transformation into regulated entities has positive effect on profitability remains contested.

We also evidence that higher portfolio to total assets may also translate to more interest revenue and therefore profitability because of the higher risk. Although a contrasting finding has been documented in the banking literature (see for example García-Herrero, 2009), it is a novel finding in the microfinance industry. Portfolio to assets ratio is however very much influenced by regulation which through administered lending and deposit rates may result in the misallocation of credit. Stakeholders should note that since MFIs in Africa are capital constrained an optimal combination of long-term debt instruments and deposits are perhaps the optimal combination of MFI financing choice.

Another new and interesting finding is that mature MFIs that mobilize deposits are more profitable. Older MFIs have higher deposit to assets which translates to lower cost of capital and higher profitability. The impact of portfolio-assets ratio on MFI profitability similarly depends on age of the MFI.

These findings have responded to the main aim of our study appropriately. To improve on profitability, MFIs should employ innovative financing and instruments. This is likely to lower transaction costs so that more new financial instruments can increase the liquidity in the MFI funding market.

This work is a first attempt to study the influence of capital structure on microfinance profitability in Africa economies. Future research could address the impact of (i) grants (ii) retained earnings, (iii) share capital, (iv) debt relative to assets and (v) commercial funding liabilities ratio on microfinance profitability. A focus on country-specific studies that may provide country-level policy conclusions would also be relevant. Other issues that could be covered in future research include the impact of capital structure on MFIs profitability while controlling for contract design and the industrial organization. Recently available data could be used to clarify important issues that may affect the direction of microfinance. For example

the interaction of economies of scope in the provision of deposits and loans and the subsequent influence on profitability are yet to be estimated for various environments.

CHAPTER SIX

DO INSTITUTIONS MATTER FOR MICROFINANCE PROFITABILITY?[63]

6.1 Introduction

The Microbanking Bulletin 2010[64] shows that for the years 2005-2008, MFIs operating in Africa consistently posted negative profits (see Table 1.2). On the contrary MFIs across the other continents have recorded positive profits over the same time period. Are there constraints unique to Africa environment that hinders MFIs profitability?

The main goal of this chapter is to investigate the extent to which microfinance profitability depends on institutions of the host country. To achieve this objective, we used a panel data for a broad sample of 167 MFIs across 32 Africa economies for the period 1997-2008. Researchers use diverse definitions and measurements of institutions which include political instability, the attributes of political institutions, social characteristics and social capital and measures of the quality of institutions that affect economic exchange. Although the concept of governance is widely used by policymakers and in the academia, there is no strong consensus on a single definition of governance or institutional quality (Kaufmann 2009). Drawing from institutions theory, we use governance institutions to proxy country specific institutional environment.

In an attempt to explain differences in the level of microfinance performance, there is a substantial literature focusing on governance. Much of the existing literature has dealt on corporate governance. Studies on this front include performance and corporate governance (Mersland and Strøm 2009); external control exercised by stakeholders and accountability mechanisms to enforce internal governance (Hartarska 2009); governance history (Mersland 2009a); cost of ownership in microfinance (Mersland 2009b); ownership structure and

63 A previous version of this chapter was presented at Maxwell Fry Financial Sector Development Workshop held at Birmingham Business School, on 21st Jan 2011 and the II World Finance Conference, held at Rhodes Island, Greece, 15-17 June 2011. I acknowledge the inputs of the conference participants.

64 http://www.themix.org/publications/microbanking-bulletin/2010/09/microbanking-bulletin-september-2010-issue-no-20-0

transparency (Mersland and Strøm 2008); organizational governance—performance based compensation, external directors, auditing, rating, or supervision (Hartarska 2005). There is hardly any rigorous analysis and evidence documented on the influence of country level governance institutions on MFIs profitability, while controlling for MFI specific factors and cross-country differences in macroeconomic and financial sector development. This study is a first attempt to quantify this contribution and fill this important research gap.

Good governance is a prerequisite to secure property rights, enforcement of contracts and for the provision of adequate public goods (Dixit, 2009). One would expect a country's institutional environment to remain the same over time, in which case institutional variables might be considered fairly exogenous to MFI profitability. However, in many developing countries, institutional quality can deteriorate sharply and periodically as a result of political instability, policy reversals, or fiscal austerity programs (Aron, 2000) and even historical origin of a country's laws (La Porta et al 2008).

Although a well functioning government is known to influence the performance of the financial sector, there is little evidence linking well-functioning institutions to financial intermediaries' outcomes (Kaufmann et al. 2009). Using stochastic frontier analysis, Lensink et al (2008) examine whether the efficiency of foreign banks depends on the institutional quality of the host country and on institutional differences between the home and host country. Hasan, et al (2009), extends this study by investigating the impact of 'good' institutions on bank efficiency in China. It is however not clear from these studies how institutional development would influence microfinance profitability.

The relationship between microfinance profitability and the institutional environment cannot be extrapolated from results on traditional retail banking industry. There are clear and substantial differences. MFIs serve a more economically marginal clientele and finance small and medium enterprises which are mainly informal (Cull, et al 2009a; c). Their service delivery technologies that include screening and monitoring may therefore significantly differ

from that of the conventional retail banks. Moreover, a number of MFIs are subsidized, indefinitely or at least during an initial start-up phase-which explains why MFIs failing to break even for a number of years cease to exist (Armendáriz and Morduch 2010).

Whereas quality of institutions may cause poor countries and poor people to stay poor (Pande and Urdy 2005; Xu, 2010), stylized facts show that financial sectors in Africa economies operate within weak institutional environments (Anayiotos and Toroyan 2009). Additionally, Africa is characterized by weak; judicial system, bureaucracy, law and order, property rights and political incentives (Creane, et al 2004). Of the 30 Africa countries covered in the 2010-2011 Global Competitiveness Index of the World Economic Forum; 25 score below 4, placing them among the worst 58 countries. Among the 10 worst performers in the same competitiveness index, 8 are from Africa. Additionally, 38 of the 44 Africa countries that are covered by the 2011 Economic Freedom Index (of the Heritage Foundation) are considered either "mostly unfree" or "repressed". It is also evident from Table 6.1 that although Africa economies rank poorly globally in terms of institutional development, there is also a wide variation within the same continent[65].

Table 6.1: Ease of doing business-global rankings (2010)

Economy	Ease of Doing Business	Starting a Business	Getting Credit	Protecting Investors	Paying Taxes	Enforcing Contracts	Closing a Business
Mauritius	17	10	87	12	12	66	73
South Africa	34	67	2	10	23	85	76
Botswana	45	83	43	41	18	79	27
Namibia	66	123	15	73	97	41	55
Rwanda	67	11	61	27	59	40	183
Tunisia	69	47	87	73	118	77	34
Zambia	90	94	30	73	36	87	83
Ghana	92	135	113	41	79	47	106
Kenya	95	124	4	93	164	126	79
Egypt	106	24	71	73	140	148	132
Ethiopia	107	93	127	119	42	57	77
Seychelles	111	81	150	57	34	70	183
Uganda	112	129	113	132	66	116	53

65 North (1990:110) argues that Third World countries are poor because the institutional constraints define a set of payoffs to political/economic activity that does not encourage productive activity. Such rules affect both individuals and organizations, defined as political organizations (city councils, regulatory agencies, political parties, tribal councils), economic organizations (firms, trade unions, family farms, cooperatives, rotating credit groups), educational bodies (schools, universities, vocational training centers), and social organizations (churches, clubs, civic associations).

Swaziland	115	158	43	180	54	130	68
Nigeria	125	108	87	57	132	94	94
Lesotho	130	131	113	147	63	105	72
Tanzania	131	120	87	93	120	31	113
Malawi	132	128	87	73	24	142	130
Madagascar	134	12	167	57	74	155	183
Mozambique	135	96	127	41	98	129	136

Source: The World Bank (http://www.doingbusiness.org/)

This prompts us to address the following question; does the institutional environment matter for MFI's profitability? Put differently, do MFIs perform better in the context of well-developed institutions, or do good institutions crowd MFIs out? These are broad questions that do not find unambiguous answers in economic theory. This is the focus of this chapter.

Our dataset enables us to shed light on these questions in a large cross country study. Beyond evaluation of MFI profitability, answers to these questions may provide indirect evidence on how microfinance fits into the process of development in line with Ahlin and Jiang (2008) theoretical postulations.

This study makes contributions to policy and existing literature fivefold. First, it is timely in view of the broader issue of how governance may affect access to financial services, especially among the poor.

Second, it is of policy interest to the regulators and the MFI management since any evaluation of microfinance performance would be incomplete if institutional environment is found to robustly predict profitability. MFIs may for instance require a lower risk contribution on their investment in economies with strong institutions.

Third, although most MFIs use joint liability or informal mechanisms to secure high levels of repayment, MFIs that employ the standard individual lending contract might benefit from adherence to the rule of law. Well-functioning supporting institutions that help to enforce contracts such as courts may improve MFI profitability. While this proposition seems straightforward, no serious and rigorous empirical work has been carried out in microfinance to support it.

Fourth, microfinance has become attractive to foreign capital investment (CGAP, 2009a) and foreign investors place a greater emphasis on institutional development when selecting an investment location (Bevan et al. 2004).

Fifth, we employ a rigorous analysis that tackles endogeneity problem that has largely been ignored by the existing literature. Most of the literature makes use of a static linear panel framework with a few exceptions.

The rest of this chapter proceeds as follows. In the next section we review the related literature. Section 6.3 describes data and the measurements of our variables of interest. Section 6.4 outlines the conceptual framework and the model specification. Section 6.5 outlines econometric methodology. In section 6.6 we present the empirical results and explore a number of robustness checks. In section 6.7 we discuss the results while at the same time draw some policy implications and offers directions for future research.

6.2 Previous evidence

How does this study relate to the existing literature? The influential study of North (1990) raised awareness of the role of institutions in establishing incentives for economic activity in general and for investment in particular. Unfortunately, hardly any empirical evidence has been provided on this issue in the microfinance front.

Most of the existing literature on MFI performance has focused on institutions' success or otherwise with a view of arriving at best practices. These studies include Patten, et al (2001), Mosley and Rock (2004), Kaboski and Townsend (2005), Cull, Demirgüc-Kunt and Morduch (2007), Hartarska and Nadolnyak (2008b), Caudill, et al (2009), Armendáriz and Morduch (2010) and Ahlin et al. (2011). This chapter however differs from previous studies in focusing on the institutional environment, rather than micro-institutional, or macroeconomic determinants of MFI success. Ahlin et al. (2011) in particular focus on macroeconomic environment and macro-institutional environment. But whereas their focal

MFI performance indicators are operational self-sufficiency (measured as the ratio of annual financial revenue to annual total expense) and extensive and intensive MFI growth; our focal outcome is profitability. Operational self-sufficiency as a measure of MFI performance can be misleading as it lumps together genuine operating net revenue with transfers and financial sustainability does not imply profitability (Armendáriz and Morduch 2010).

Another study that has utilized institutional environment as a control variable is Hartarska and Nadolnyak (2007) but whose focus is on the impact of regulation on MFI sustainability. With regard to institutional environment, our paper makes a point related to Ahlin et al. (2011) and Hartarska and Nadolnyak (2007), but differs from both mainly in our econometric methodology that tackles endogeneity besides using a richer set of MFI controls. We view the results as complementary and in agreement where they overlap.

The law and finance theory shows that the different legal traditions that emerged in Europe over previous centuries and were spread internationally through conquest, colonization, and imitation help explain cross-country differences in investor protection, the contracting environment, and financial development today (La Porta et al 1998).

Contrary to law and finance theory, Qian and Strahan (2007) investigate how financial contracts respond to the legal and institutional environment, and consistent with the law and finance theory (La Porta, et al 2000, 2002), they find that strong creditor rights seem to enhance loan availability as lenders are more willing to provide credit on favourable terms. In Africa and for countries with similar financial liberalization efforts, McDonald and Schumacher, (2007) find that those with stronger legal institutions and information sharing have deeper financial development. Using firm-level data from 52 countries Demirgüç-Kunt, et al (2006), similarly find evidence of higher growth of incorporated businesses in countries with good financial and legal institutions.

While corruption in delivery of public goods and services is expected to have negative impact on bank credit, the role of corruption in bank lending is not straightforward.

Corruption may reduce the portfolio-assets ratio, but may nevertheless suppress asset and liability growth (Demetriades and Fielding 2011). On the contrary, bureaucratic corruption may not necessarily be bad for business (Pierre-Guillaume and Sekkat 2005). Corruption might serve to ‘‘grease the wheels of commerce’’, by reducing transaction cost and lowering the cost of capital. Indeed, Cai, et al. (2011) shows that although bribery to government officials both as “grease money” and “protection money,” expenditures has a significantly negative effect on firm performance, its negative effect is much less pronounced for those firms located in cities with low quality government service, those who are subject to severe government expropriation, and those who do not have strong relationship with suppliers and clients.

There is however large empirical literature suggesting that corruption undermines confidence in and the functioning of democratic institutions, (see Clausen, et al 2009) for a contributions and a thorough discussion of the identification problem in that context. Using controlled field experiment on corruption, Armantiera and Amadou (2011) concludes that monitoring and punishment can deter corruption, but they cannot reject that it may also crowd-out intrinsic motivations for honesty when intensified. Along the same vein, Weill (2010, 2011) shows that while the overall effect of corruption is to hamper bank lending, it can nevertheless alleviate firm’s financing obstacles which is consistent with theoretical postulations that corruption may greese wheels of commerce. Further evidence of corruption is discussed by Dreher and Schneider (2010) and on West Africa by Demetriades and Fielding (2011). Cross-country micro evidence on the role of corruption in bank lending to firms is documented by Bartha et al (2009) and in Sub-Sahara Africa by Bissessar, (2009). Evidence for a link between corruption and confidence in public institutions is discussed in Bianca, et al (2009) while that of corruption and competition in public administration is documented in Gioacchino and Franzini (2008). Direct evidence on the link between bribes and companies’ operating cost is documented by Ng, (2006). Their finding confirms Gelos and Wei (2006)

who finds lower country transparency to be associated with lower investment from international funds. Corruption also imposes substantial economic costs, particularly in less developed economies (Olken, 2007; Lambsdorff, 2007; Cho, et al 2007; Chang, et al 2006; Ito 2006; Catterberg and Moreno 2005; Svensson, 2005; Beck et al. 2005). This provides some validation for firm-level theories of corruption which posits that corruption retards the development process to an even greater extent than taxation (Fisman and Svensson 2007).

Efficient economic regulation reduces government and market failures while assuring that the markets function without distortions (Djankov, 2009; Barseghyan, 2008; Crafts, 2006; Klapper, et al 2006; Loayza et al. 2005). Moreover, the positive effect of deregulation is found to differ by the initial level of regulation. This is important for the development of private investments.

Without a proper protection of intellectual property rights, firms fear expropriation of investment in intellectual property and intangible assets. This argument is consistent with numerous studies that show that at the country level, regulations and the quality of their enforcement impacts upon the protection of investor rights. Djankov, et al (2007) investigate credit institutions in 129 countries over 25 years and show that contract rights and enforcement institutions influence the development of financial markets. Their finding is consistent with Djankov et al. (2006) who evidence that secure property rights are a significant predictor of firm reinvestment. Acemouglu and Johnson (2005) unbundled institutions into "property rights institutions" and "contracting institutions." Based on cross-country evidence, they conclude that property rights institutions tend to be far more important than contracting institutions and that it is harder to avoid government expropriations. Using cross-country firm-level data, Claessens and Laeven (2003), finds that industrial sectors that use relatively more intangible assets develop faster in countries with better protection of property rights. Further cross-country evidence suggests that countries with worse property

rights tend to have lower aggregate investment and worse accesses to finance (Acemoglu et al. 2001).

Further evidence of economic regulation has been documented by Ciccone and Papaioannou (2007) who shows that in countries where it takes less time to register new businesses, there has been more entry in industries that experienced expansionary global demand and technology shifts. Besley and Burgess (2004) show that the Indian states that amended the regulation of the labour market in favour of workers are those that experience a slow growth of investment in the formal manufacturing sector. Demirgüc-Kunt, et al (2004) finds that rigid regulations on bank entry and bank activities lead to an increase of the cost of financial intermediations.

There also a few studies that have examined the role of political stability in the financial intermediation process. Roe and Siegel (2009) for instance, draws a link between political stability; economic growth and financial development, which is consistent with the argument advanced by Rajan and Zingales (2003) in exploring political economy as determinants of financial development. Evidence on the possible link between political stability and rule of law on the access to finance in many Africa economies is provided by Anayiotos and Toroyan (2009). Evidence of the impact of political stability, government effectiveness, rule of law, and regulatory quality on financial development is documented by Gani and Ngassam (2008).

The literature survey presented in this section underscores the importance of institutional reforms for financial intermediation. We posit that institutions matter for microfinance profitability because they influence the costs of transactions and the efficiency of microbanking. This may have an impact on MFIs profitability. In section 6.4, we review several *a priori* arguments that suggest a positive relationship between good institutional environment at the country level and MFI profitability, while controlling for the macroeconomic context and firm level factors.

6.3 Data set, description and measurement

Data description

Consistent with the previous chapter, our data sample contains 2,004 observations corresponding to 167 MFIs for the period 1997-2008. The dataset was assembled from four sources namely the MIX Market database, World Development Indicators (WDI) and World Bank—World Governance Indicators[66] (WGI). We also used complementary institutional data from the Heritage Foundation.[67] Our focal measurements of economic performance control variables are per capita GDP growth and private credit as a fraction of GDP. Auxiliary indicators, include inflation and rural population share (in 1990). These are all taken from WDI. We merge the MFI level dataset with country-level data from WDI on macroeconomic variables and institutional development indices from WGI, for each of the countries and years corresponding to MFI's in the dataset.

The WGI aggregate indicators for all periods, as well as virtually all of the underlying indicators, are described and discussed in Kaufmann et al. (2009) and available at www.govindicators.org. For some years (1999 and 2001) in our WGI sample, data is missing. Consistent with Lensink et al. (2008), we proxy values for the missing years by interpolating the data.

A key advantage of the WGI is that the authors are explicit about the accompanying margins of error, whereas in most other cases they are often left implicit or ignored altogether. It is worth noting that over time the standard errors have been reduced due to the increase in the number of sources utilized. Indeed, while average standard errors in 1996 averaged 0.34 across the 6 indicators; in 2005 this reduced to 0.21.

66 Governance can be broadly defined as the process by which governments are selected, monitored and replaced, the capacity of the government to effectively formulate and implement sound policies, and the respect of citizens and the state for the institutions that govern economic and social interactions among them (Kaufmann, et al 2009)

67 http://www.heritage.org/index/) that capture the business environment

WGI are based exclusively on subjective or perceptions on governance reflecting the views of a diverse range of informed stakeholders, including tens of thousands of household and firm survey respondents, as well as thousands of experts working for the private sector, NGOs, and public sector agencies.

Definition and measurement of the variables

We explore the impacts of country specific institutional measures on MFI profitability using return on assets (ROA). It is important to demonstrate how institutional measures are categorized which is important when interpreting our results. Institutional variables in most African countries are correlated with financial stability, and therefore difficult to identify precisely (Demetriades and Fielding 2011). Dietsche (2007) observes that 'good' institutions can sometimes have 'bad' outcomes, and that very different institutional arrangements can lead to the same outcomes, making it very difficult to measure institutional quality. Researchers have used diverse measures (see Table 8 in Appendix B)[68] to proxy institutional environment.

Why do we use subjective measures as opposed to objective indicators? Kauffman et al (2009), show that perceptions matter because agents base their actions on their perceptions, impression, and views. If the courts are perceived as inefficient by the general population or the organs of state security are corrupt, people are unlikely to avail themselves for the services offered. Firms similarly base their investment decisions on their perceived view of the investment climate and the government's performance.

One of the limitations of subjective measures provided by the risk-rating agencies and widely used in the literature is that these indexes may be subject to biases through herd effects (Aron 2000). This implies in the case of MFIs management, judgments maybe too optimistic

68 There are variations in the measurement of governance in the literature. One is a subjective measurement in which people's opinions about institutions are evaluated through a survey and then aggregated into a quantitative index. The alternative is an objective measurement based on statistical facts on the effects of institutions. For example, the wait time for obtaining government approval to start a business can be observed and used as a measurement for institutions.

or too pessimistic for long periods. When there are many components, factor analysis—a technique that aggregates components with unknown weights—is a convenient and superior alternative (see Table 8 in the Appendix B).

We analyze the impact of country specific institutional development on MFI profitability using WGI as compiled by Kaufmann, et al (2009) for the period 1997-2008. These include (i) Voice and Accountability (VA), (ii) Political Stability (PS), (iii) Government Effectiveness (GE), (iv) Regulatory Quality/ regulatory burden (RQ), (v) Rule of Law (RL)[69] and (vi) Control of Corruption (COR). Studies that have used similar data include; Ahlin et al (2011), Demetriades and Fielding (2011), Cull et al (2011, 2009b), Arun and Annim (2010), Lensink et al (2008).

Voice and Accountability measures the extent of a free media, free and fair elections, freedom of expression and freedom of association. Political Stability (PS) measures the possibility that a government will be overthrown by unconstitutional/violent means which includes domestic violence and terrorism. Government Effectiveness (GE) measures the quality of service delivery by the government which includes the quality of policy formulation and implementation, independence from political pressures and the credibility of the government's commitment to stated policies.

To promote private sector development, Regulatory Quality (RQ) measures the ability of government to formulate and implement policies and regulations. Rule of Law (RL) measures the agents' confidence levels in abiding by the rules of society particularly the criminal and commercial justice system.

Finally, our measure of the extent to which a country is corruption-free is the "control of corruption" (COR) index. For MFI *i* in year *t*, COR_{it} indicates the value of the index for the

69 These aspects include: enforceability of private contracts, assessment of the strength and impartiality of the legal system, whether existing laws are actually implemented in a reliable and impartial fashion, quickness of court decisions, trust in police and courts, judicial independence from the state and other powerful groups, impact of crime on business, etc.

country in which the MFI operates. Apart from control of corruption, the rest of the governance indicators capture the ease of contract enforcement.

Complementary business environment measures from Heritage foundation capture two aspects of institutional development. Business Freedom (BF) measures the ability to start, operate and close a business and represents the overall burden of regulation as well as the efficiency of government in the regulatory process. Business freedom is a composite index equivalent to the doing business indicators indices used by Ahlin et al (2011). Property rights (PR) is a composite Index ranging from 10 (Private property is rarely protected) to 100 (Private property is guaranteed by the government). Freedom from Corruption is a quantitative measure that is derived from Transparency International's Corruption Perceptions Index (CPI). This measures the level of corruption in 179 countries. Previous studies that have used this data set include Mersland and Strøm (2009), Hartarska and Nadolnyak (2007).

Consistent with the previous chapter, we use the MIX Market definitions of key MFI specific variables. In order to avoid duplication we shall not dwell into a detailed discussion of the same. Reference should be made to chapter three on a formal discussion of the data and measurement of the variables.

The regressions also include an additional set of country-level controls. The impact of competition by conventional banks on MFI profitability is measured by the ratio of amount of domestic credit to the private sector, divided by GDP. It is arguably the most common measure of financial development in the finance and growth literature, and it is included to proxy the overall financial depth of the country in which the MFI operates (see e.g. Levine, 2005).

6.4 Conceptual framework and empirical specifications

6.4.1 Theoretical predictions

Economic governance is important because markets, economic activity and transactions cannot function optimally in its absence. Good governance is a prerequisite to secure property rights, enforcement of contracts and for the provision of adequate public goods and the control of public "bads" (Dixit, 2009). Without this assurance, the public lose the incentive to save and invest. Overall political stability and the quality of contract enforcement in the country may affect the extent of moral hazard that MFIs face when advancing loans. Institutions promoting the rule of law may enhance MFIs' ability to enforce loan contracts, and hence increase MFIs growth (Messick, 1999). This has implications on profitability.

The gains on MFIs profitability emanating from institutional environment come through various transmission channels. Institutions[70] affect performance of financial intermediaries because they influence the costs of transactions and the efficiency of production (Aron, 2000). The Voice and Accountability (VA) index defines the ability of citizens to hold politicians accountable, including freedom of press, association, and media. Conceptually, therefore VA and corruption (COR) are either related by definition or causally related. Higher transparency of government policymaking would especially benefit foreign MFIs operating in Africa. We predict a positive association between VA and MFI profitability.

Political parties with a long time horizon (PS) will not support highly ineffective government (GE) and prefer the rule of law (RL) to the rule of the jungle. When government transitions are decided by well-defined and long-lived rules, rather than perennial coups, government officials are more likely to have a longer time horizon, and to seek investment for growth rather than corrupt transfers (COR). Thus, PS is related to COR, RL and GE either causally or by definition. Higher values of PS impacts positively on MFIs profitability

70 In the empirical literature the term institutions encompass a wide range of indicators, including institutional quality (the enforcement of property rights and governance), political instability (riots, coups, civil wars), characteristics of political regimes (elections, constitutions, executive powers), social capital (the extent of civic activity and organizations), and social characteristics (differences in income and in ethnic, religious, and historical background).

especially if MFIs have relatively high loan loss provisions because of the inherent security costs associated with unstable political regimes[71]. We therefore postulate a positive relationship between PS and MFI profitability.

Effective governments (GE) make transfers that are not hidden from the public (VA). Similarly, effective governments use public resources, often for public gain, so that the spending is not a deadweight loss (RQ). Effective governments charge for services provided to the citizens, implying again no or minimal deadweight loss. Indeed the Global Competitiveness Report 2009-2010 (see http://www.weforum.org/) points to government inefficiency as the most problematic for doing business in most Africa economies. Foreign MFIs are assumed to face more difficulty in dealing with the host economy bureaucracy. We therefore expect a positive association between government effectiveness and MFIs profitability.

The impact of the rule of law (RL)[72] is felt through the effectiveness and predictability of the judiciary. This is crucial when it comes to contract enforcement or costly state verification. Rule of law is intended to create a stable environment within which micro borrowers operate; but it may also make it harder for small and medium enterprises to operate thus avoiding regulations and tax (COR). Corrupt activities are typically illegal, indicating rule of law weaknesses. Thus, RL and COR are also related by definition or causality. When going to court is time consuming, particularly if it takes years to realize collateral on real estate, this translates to higher costs. As elucidated by Long (2010), firms tend to post a higher investment rate when most of the business disputes are resolved through the court system. The legal system helps firms grow by improving the trust needed for new transaction relationships (Johnson et al. 2002). Similarly Laeven and Woodruff (2008) find that firm size

71 This is particularly so if MFI is not domestic as domestic MFIs may be more willing to take on higher levels of risk because of moral hazard. Foreign MFIs may also run a higher risk of becoming a victim of violence.

72 Rule of law implies an open and transparent market, where contracts are enforced by a 'rule' that is publicly known to parties outside the contract and applied equitably no matter who the enforcer or the contract parties are

increases as a result of the quality of local legal system. We predict a positive relationship between effective rule of law and MFI profitability.

Corrupt deals (COR) are typical of a black market, where contracts are enforced not by public law but by private players. Corruption is a costly, hidden (in the absence of VA) and usually illegal (absence of RL) transfer of revenues. Government officials often collect bribes as an *ex-officio* tax fee in exchange for a license or service (for example, utility connection), or for exemptions to rules or taxes (implicating GE). Additionally, corruption undermines the rule of law thereby damaging the legitimacy of the political process (Knox, 2009). Higher levels of corruption may also hinder small and medium enterprises ability to operate and grow (see e.g. Fisman and Svensson, 2007). On the contrary, when corruption does not hinder micro-enterprises directly, its main effect may be lowering wages (Ahlin, et al 2011) and pushing more households towards small-scale self-employment, allowing for faster MFI extensive growth. We therefore anticipate a positive relationship between effective control of corruption and MFIs profitability.

When governments establish numerous barriers to conducting business (regulatory quality-RQ), it creates opportunities for public officials to collect bribes before delivering a service (COR). By definition, corrupt governments set up entry barriers so that public officials can act as gatekeepers and collect (hidden) bribes and pocket the transfer before opening the gate to the briber-client (in the absence of VA). High quality regulation implies there are no excessive rules, and that rules are efficiency enhancing. Burden of government regulation, inefficiency of legal framework in settling disputes and inefficiency of legal framework in challenging regulations will all translate to higher implicit costs on MFI profitability. We therefore predict a positive relationship between quality regulatory practices and MFIs profitability.

Turning to further country level controls, the level of financial deepening can either complement MFI profitability or crowd them out. Although McIntosh, de Janvry, and

Sadoulet (2005) do not test whether entry into the MFIs activities by a conventional bank affects incumbents' profitability, they do show that repayment rates declined in areas where entry was most pronounced, which should have a negative impact on MFI profitability. Competition should also depress MFI profits since they are likely to lose some of their better customers to commercial banks. We thus expect a negative relationship between financial deepening and MFI profitability. All of these factors are relevant to most African countries where the quality of institutions, is poor albeit with some disparities between the different economies (Creane et al, 2004).

6.4.2 Interaction of variables

Microbanking is heavily dependent on personal contact for programs execution. Political stability may make it more conducive for young MFIs to form relationships with reliable new borrowers. In this case, the impact of political stability on deposits mobilization or growth of portfolio-assets ratio will decline with MFI age. Put differently, If young MFIs face high costs in identifying reliable borrowers, then the growth in portfolio-assets following a rise in political stability may outstrip their capacity to make new loans, in which case their loans-assets ratio may fall, even if that of older MFIs is rising. This leads to a decline in MFI profitability. To this end we interact age with political stability (AgxPS).

The impact of corruption on MFI profitability may also vary with MFI age. Some older MFIs with ties to the political establishment may benefit from corruption, in so far as overcoming government bureaucracy is concerned. On this perspective, controlling corruption will raise older MFIs operational costs, but may benefit younger MFIs with weaker ties to the political establishment. Since new MFIs are likely to take away business from the more established MFIs, control of corruption may act as a deterrent to the growth of older MFIs. One would however expect that control of corruption would create a more level playing field which encourages the emergence and growth of new MFIs. We therefore interact corruption

with age (CORxAg). Portfolio-assets ratio may also depend on control of corruption. Controlling corruption should encourage all MFIs to lend a larger fraction of their assets. We thus interact corruption with portfolio-assets ratio (CORxPAsse).

The impact of rule of law (RL) on MFI profitability may also depend on the age of MFIs. Mature or older MFIs may have established relationship lending particularly those that employ joint liability contracts. Costly state verification may be more of a problem on young MFIs, who has less information capital to overcome the adverse selection effect. We thus interact age with rule of law (AgxRL). The specific definition and source of all explanatory variables is presented in Table 6.2.

Table 6.2: Summary of variables, measurement and predicted effect

Variable	Notation	Measure	Predicted effect	Source of data and period of availability
Dependent variable				
Return on assets	ROA	Net profits after taxes/Assets		The MIX 1997-2008
Institutional environment				
Governance measures				
Voice and Accountability	VA	Measures the extent of political and civil rights	Positive	WGI-World Bank 2008,2007,2006, 2005,2004, 2003,2002,2000, 1998,1996
Political Stability	PS	Measures the likelihood of violent threats or changes in government	Positive	
Government Effectiveness	GE	An indicator of the competence and the quality of public service delivery	Positive	
Regulatory Quality	RQ	Measures the incidence of market-friendly policies	Positive	
Rule of Law	RL	A proxy for the quality of contract enforcement, the police and the courts, as well as the likelihood of crime and violence	Positive	
Control of Corruption	COR	Measures the exercise of public power for private gain, including both soft and grand corruption and state capture	Positive	
Other complementary business environment measures				
Business freedom	BF	The score is based on 10 factors, all weighted equally, using data from the World Bank's Doing Business Indicators (2010)	Positive	Heritage Foundation 1997-2008
Property rights	PR	Composite Index ranging from 10 (Private property is rarely protected) to 100 (Private property is guaranteed by the government)	Positive	
MFI-specific				
Capital	CAP	Equity/Assets	Positive	The MIX 1997-2008
Debt to equity ratio (gearing)	GR	Debt/equity ratio	Indeterminate	
Deposits to assets	DepAsse	Voluntary Deposits/Adjusted Gross Loan Portfolio	Positive	

Portfolio to assets	PAsset	Adjusted Gross Loan Portfolio/Adjusted Total Assets	Positive	
Age	Ag	Log of age of the MFI in years	Indeterminate	
MFI Size	S	Log of total assets in period *t*	Indeterminate	
Portfolio at Risk	PAR-30	Outstanding balance, portfolio overdue> 30 Days + renegotiated portfolio/Adjusted Gross Loan Portfolio	Negative	
Efficiency	Eff	Adjusted Operating Expense/Adjusted Average Gross Loan Portfolio	Negative	
Loan size	LS	Average Loan Balance per Borrower/GNI per Capita (outreach measure)	Positive	
Share of lending to women	WOM	Share of MFI borrowers that are women	Positive	
Country specific variables				
Inflation Expectations	INF	Inflation, consumer prices (annual %) in period *t-1*	Indeterminate	World Bank (WDI) 1997-2008
Per capita Income growth	GDP	Gross Domestic Product (at current US$) divided by midyear population in period *t-1*	Positive	
Domestic credit to private sector	PCRED	Domestic credit to the private sector, divided by GDP.	Indeterminate	
Rural population (%)	RPOP	Rural population share (in 1990)	Negative	

6.4.3 Design of the model

Our empirical specification takes the following general form:

$$\Pi_{ict} = \alpha + \eta\Pi_{ict-1} + \sum_{j=1}^{J}\beta_j X_{ict}^{j} + \sum_{n-1}^{N}\beta_n X_{ct}^{n} + \sum_{m=1}^{M}\beta_m X_{ct}^{m} + \varepsilon_{ict} \quad \text{.....(6.1)}$$

Where Π_{ict} is the profitability of MFI *i* located in country *c*, at time *t*, with i=1, . . .,N, t=1, . . ., T; α is the regression constant, X_{ict}^{j} is a vector of MFI-specific characteristics (*j*) of MFI *i* in country *c* during the period *t* which varies across time and MFIs; X_{ct}^{n} is a vector of institutions quality indicators (*n*) in country *c* during the period *t*; X_{ct}^{m} is a vector of country-specific variables (*m*) in country *c* during the period *t*; and $\varepsilon_{itc} = \upsilon_i + \mu_{itc}$ is the disturbance, with υ_i the unobserved MFi-specific effect/heterogeneity across MFIs, which could be very large given the differences in corporate governance and μ_{itc} the idiosyncratic error. This is a one-way error component regression model[73], where $\upsilon_i \sim IIN(0,\sigma_\upsilon^2)$ and independent of $\mu_{it} \sim IIN(0,\sigma_\mu^2)$.

73 The work horse for unbalanced panel data applications is the one-way error component regression model (see Baltagi and Song 2006)

6.5 Empirical methodology

6.5.1 Estimation and testing

MFI profitability is predicted in linear regressions by the institutional context indicators, other country level and MFI-level control variables. Given the nature of the data, we focus on estimation approaches that are robust to outliers. When estimating equation (6.1), we are likely to encounter several econometric problems. First is endogeneity: If it is possible that good institutions drive MFI profitability, it is also possible that countries that experience sustained growth in microfinance profitability are also likely to offer well-developed institutions. We observe that due to this endogeneity, these regressors may be correlated with the error term.

Second, because of the subjective nature of institutional quality measurement, one cannot exclude the possibility of measurement errors in the various indices which may bias our results. Third, countries equipped with good institutions can also have other factors favourable for microfinance profitability, the omission of which adds another potential layer of endogeneity. There may be other factors, such as geography, that affect both institutions and MFI profitability. If omitted factors determine both institutions development and MFI profitability, one could erroneously infer the existence of a relationship between them.

Because of the endogeneity of institutions, the OLS estimate of the effect of institutional measures on MFI profitability is biased[74]. In order to obtain a consistent estimator, it is necessary to use an instrumental variable for country specific institutions. Since we use panel data and most instrumental variables for institutions are constant over time, we do not have suitable instruments to correct for endogeneity. We resolve these problems by moving beyond the methodology currently in use in the empirical literature of bank profitability (mainly fixed or random effects). Consistent with the previous chapter, we resort to the system GMM method of Blundell and Bond (1998) which allows us to use internal instruments; namely,

74 The estimation methods based on the OLS principle are vulnerable to the omitted variable bias if some important determinants of MFI profitability are not included among the regressors.

lagged levels and lagged differences. Further estimation challenges are similar to those documented in chapter four. To avoid duplication, reference should be made to chapter four for a formal discussion of the same. In order to allow for comparison with previous studies, we conduct robustness tests with fixed effects and OLS.

6.5.2 Univariate analysis

Table 6.3 shows that governance indicators are normalised so that the mean of each is equal to zero across the worldwide sample. The minimum values are a clear indication that governance is highly negatively skewed, which may impede on MFIs performance. Negative means in our sample indicate that Africa economies perform below the worldwide average in terms of governance. It is a matter of considerable concern that governance institutions in Africa are on average quite weak. This is consistent with studies that have found strong positive effect of governance on development using governance indicators (See e.g. Ritzen et al., 2000; Kaufman and Kraay, 2002).

Table 6.3: Descriptive and summary statistics

Variable	Notation	Obs	Mean	Median	Standard Deviation	Minimum	Maximum
Return on assets	ROA	946	-0.016	0.007	0.121	-0.851	0.830
Log Age	AG	945	2.180	2.197	0.607	0	3.7
Log Size	S	947	15.02	14.79	1.821	7.86	20.71
Efficiency	EFF	914	0.379	0.294	0.285	0.025	1.92
Portfolio at Risk	PAR	937	0.066	0.037	0.093	0	0.737
Capital	CAP	945	0.369	0.307	0.279	-0.983	1.000
Debt to equity ratio (gearing)	GR	844	0.257	1.602	1.348	-6.215	3.218
Deposits to assets ratio	DepAsse	382	0.386	0.329	0.255	0.000	0.960
Portfolio to assets	PAsset	805	0.659	0.673	0.173	0.057	0.990
Loan size	LS	847	0.790	0.569	0.709	0.000	3.541
Share of lending to women	WOM	764	0.604	0.615	0.260	0.000	1.000
Rural population share	RPOP	950	0.687	0.684	0.132	0.390	0.910

GDP Per capita	GDP	784	0.998	2.837	0.845	-2.43	2.37
Lagged Inflation rate	INF	951	0.672	0.062	0.063	-0.090	0.431
Domestic credit to private sector	PCRED	959	0.1347	0.1306	0.0768	0.000	0.442
Voice and Accountability	VA	963	-0.454	-0.385	0.619	-1.766	0.846
Political Stability	PS	963	-0.666	-0.408	0.823	-2.638	0.712
Government Effectiveness	GE	963	-0.649	-0.584	0.429	-1.893	0.951
Regulatory Quality	RQ	963	-0.539	-0.444	0.431	-2.369	0.635
Rule of Law	RL	963	-0.686	-0.616	0.424	-1.897	0.242
Control of Corruption	COR	963	-0.668	-0.717	0.406	-1.576	0.595
Business freedom	BF	806	55.25	55.0	5.33	32	67.1
Property rights	PR	806	37.78	30.0	11.28	10	70.0

This Table presents the summary statistics. A detailed description of the definition and sources of the variables is given in Table 6.2. Data has been winsorized at 10%

The Correlations

Correlations among MFI specific variables are significant but the level of correlation is very low (see Table 6.4). The bi-variate relationships follow expectations based on the existing literature that uses this or similar data (See Cull et al 2009c). Of particular concern however are the correlations among the institutional factors. The six WGI variables show very high and significant bivariate correlations. This correlation may be due to a causal impact from one variable to another (in either direction) as discussed in the theoretical framework (see *section 6.4.1*), or it may reflect the effect of some unobserved confounding factor such as "good government". Intuitively, one might argue that absence of democratic accountability (VA) might foster corruption (COR). Licht et al. (2007), for instance show that some aspects of 'national culture' affect COR, RL and VA. Roe and Siegel (2011), Damania et al. (2004) show that political instability impairs rule of law, in turn stimulating corruption. Alence (2004) finds that democratic contestation and executive restraints affect RQ, GE and COR. This perhaps explains the high correlations among the institutional variables and therefore good governance correlates with positive development outcomes. Panel regression analysis

allows us to investigate the strength of these correlations after controlling for other relevant covariates. The multicollinearity between these governance indicators precludes the inclusion of more than one of these variables in the regression equation, so we fit a series of regressions, each with a single variable of these governance indicators. The section that follows explains how we deal with the multicollinearity of the governance indicators.

Table 6.4 Correlations

	ROA	DepAsse	PAsse	GR	CAP	AG	S	EFF	PAR	LS	WOM	RPOP	GDP	INF	PCRED	VA	PS	GEF	RQ	RL	COR	BUSF	PR
ROA	1.000																						
DepAsse	.066	1.000																					
PAsse	0.65	-.012	1.000																				
GR	.172**	.339**	.001	1.000																			
CAP	-.101**	-.541**	-0.21	-.367**	1.000																		
AG	.142**	.254**	-.002	.110**	-.204**	1.000																	
S	.111**	.213**	-.030	.124**	-.142**	.351	1.000																
EFF	-.524**	-.189**	-.075*	-.130**	.216**	-.190**	-.086**	1.000															
PAR	-.046	.209**	-.004	.101**	-.062	.056	.007	.019*	1.000														
LS	.178**	.322**	.102	.058	-.242	.052*	.133**	-.198**	-.002**	1.000													
WOM	-.179**	-.415**	.112**	-.154**	.201**	-.094	-.149	.273	-.084	-.309	1.000												
RPOP	-.072	-.156**	.028	-.097**	.099**	-.094**	-.011	.046	-.078*	.063	-.081*	1.000											
GDP	-.035	-.266**	.036	-.070*	.132**	-.090**	-.003	.139**	.088**	-.016	.016	.254**	1.000										
INF	.011	-.119*	.004	-.017	.130**	-.052	-.052	.227**	.102**	-.120**	.197**	-.081**	.294**	1.000									
PCRED	.050	.002	-.062	-.006	-.125**	.112**	.106**	-.210**	.023	-.027	-.012	.271**	.003	-.148**	1.000								
VA	-.011	.098	-.052	-.012	-.018	.152**	.116**	.058	-.067*	.006	.079*	-.328*	-.076*	-.001	-.061	1.000							
PS	-.054	.077	.026	-.028	.003	.022	-.006	.019	-.085**	.170**	-.036	-.210**	-.143**	-.039	-.131**	.683**	1.000						
GEF	.000	-.003	.029	-.038	.079**	.033	.157**	.090**	-.145**	-.014	-.020	-.092**	.140**	.038	-.196**	.708**	.535**	1.000					
RQ	.011	.184**	-.015	.010	-.070*	.175**	.184**	.063	-.124**	.050	-.012	-.049	-.071**	-.076**	-.194**	.706**	.492**	.771**	1.000				
RL	-.025	.020	.012	-.060	.019	-.015	.058	-.006	-.145**	.086**	-.067	-.038	.065**	-.046	-.156**	.707**	.691**	.815**	.730**	1.000			
COR	-.026	.101**	.045	-.020	.015	-.027	.063**	-.007	-.095**	.125**	-.106**	-.120**	.022	-.071*	-.210**	.588**	.615**	.756**	.627**	.849**	1.000		

BUSF	-.007	-.037	-.033	-.114*	.167**	-.050	.099**	.120**	-.019	.027	-.032	.149**	.168**	.034	-.006	.242**	.050	.402**	.299**	.317**	.245**	1.000	
PR	.000	.082	-.036	-.092**	.115**	.033	.078*	.102**	-.028	.027	.049	.107**	-.027	.048	-.091**	.369**	.195**	.496**	.575**	.477**	.386**	.510**	1.00

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed). Where ROA=Return on Assets; AG= Age of the MFI; S= Size; CAP= Capital; GR=Gearing;DepAsse=Deposit to Assets ratio; EFF= Efficiency; PAR=Portfolio at Risk; WOM=Share of lending to women; RPOP=Rural population share; INF=Lagged Inflation; GDP= Growth of per capita income; PCRED=Domestic credit to private sector; VA=Voice and Accountability; PS=Political Stability; GE=Government Effectiveness; RQ=Regulatory Quality; RL=Rule of Law; Control of Corruption; BF=Business freedom; PR=Property rights

6.6 Empirical results and discussion

The main aim of this chapter was to determine the extent to which microfinance profitability depends on institutional environment of the host country. Since the governance indicators are highly and significantly correlated (perhaps for the reasons elucidated in *section 6.4.1*), we fit a series of regressions, each with a single of these governance indicators. We start by regressing profitability on the general model and report the results in the Appendix B (see Table 7). We then narrow down to the specific model and report the results in Table 6.5. It is important to note that the robustness of system GMM to omitted variable bias helps us in this setting, since exclusion of some insignificant variables does not affect the consistency of our results. The hypothesis of over identifying restrictions can't be rejected based on the Sargan-test. The Arellano-Bond test for serial correlation in the first-differenced residuals is not significant in all specifications supporting the appropriateness of our empirical specification. We comment on all regressions together.

The results suggest that institutional environment matters for MFI profitability. Political stability, government effectiveness, rule of law, regulatory quality and corruption are quantitatively strong predictors of microfinance profitability. As predicted, the results indicate a positive and significant coefficient on political stability. On average, MFIs are more profitable when there is political stability. Perhaps in more stable environments there is higher demand for credit, which is channelled to higher-growth activities. Upon interaction with age, the results show that political stability may make it more conducive for young MFIs to form relationships with reliable new borrowers. In this case, the impact of political stability on MFIs profitability through deposits mobilization and/or growth of portfolio-assets ratio will decline with MFI age. This calls for by policies that would improve the informational capital of new MFIs. Our findings complements Anayiotos and Toroyan (2009), who finds that political stability determines access to finance in many Africa economies.

Our results show a statistically significant positive coefficient on the rule of law variable (RL) and a statistically significant negative coefficient on the interaction term AG·RL. Results are consistent with the conjecture that young MFIs face high costs in contract enforcement and costly state verification. Therefore, rule of law may create the stable environment micro-borrowers need to succeed. Profitability of young MFIs rises when the rule of law improves, while that of older MFIs falls. A key problem facing MFIs is the high degree of information asymmetry between them and the borrowers. Our results are consistent with the conjecture that young MFIs face high costs in identifying reliable borrowers, as opposed to the older MFIs who may have established relationship lending particularly those that employ group lending. Intuitively young MFIs may not have accumulated enough information capital to overcome the adverse selection effect. Consistent with this finding, Behr, Entzian and Güttler (2011) show that relationship intensity between MFIs and their borrowers helps to overcome existing information asymmetries. Access to credit improves and that the loan approval process takes less time. Additionally, borrowers benefit from a more intense relationship through lower guarantee requirements.

Results also suggest that government effectiveness may reduce the costs of doing business for both MFIs and micro-borrowers. Indeed the Global Competitiveness Report 2009-2010 points to government inefficiency as the most problematic for doing business in Africa economies.

Table 6.5 provides strong evidence that growth of portfolio to assets ratio may be slower where there is more corruption which is consistent with corruption acting as a barrier to micro-enterprise activities, at least in start-up if not on subsequent growth. This has implications on profitability. Intuitively, high corruption taxes micro-enterprise operations and creates barriers to their expansion, reducing demand for and quality of microloans. Corruption may therefore reduce the probability that MFI will invest in a country. Upon

interaction with portfolio to assets ratio, the results suggest corruption may make it harder for MFIs to boost their asset base.

The positive coefficient of regulatory quality is an indication that a lighter burden of government regulation, efficiency in settling commercial disputes and in challenging regulations may all translate to lower implicit costs on MFI operations with improved profitability.

Voice and accountability is however not significant in explaining MFI profitability. The conjecture that a higher level of media independence would increase the quality of information on local developments and transparency of government policy making is not supported here.

A plausible interpretation of our findings is that well-developed institutions and government may actually make it less costly for MFIs to operate in a fully compliant way which would be consistent with arguments that favour relaxed regulations for MFIs. Contrary to Hartarska and Nadolnyak, (2007), we do not find evidence that business environment measures as proxied by business freedom and property rights influence profitability perhaps due to low variability of data. Our findings are inconsistent with Ahlin et al (2011), who although their focus is not on profitability; they do not find MFI operational self-sufficiency (OSS) to be significantly influenced by governance measures. Our findings are also inconsistent with Arun and Annim (2010) who while investigating the effect of external governance structure and functioning on outreach and profitability of MFIs conclude governance does not cause changes in MFIs profitability. Similar inconsistent findings were arrived at by Cull et al (2009b) who while controlling for the same governance indicators for the period 1996-2006 arrive at inconsistent findings. One major shortcoming with these previous studies is that they do not attempt to control for endogeneity. Our findings are consistent with Hallward-Driemeier (2009) who using new panel data from 27 Eastern European and Central Asian countries test the importance of five areas of the business climate

on firm exit, and concludes that inefficiency of government services, endemic corruption, regulatory burdens, less developed financial and legal institutions all raise the probability that more productive firms exit. It is however, far from a fore-drawn conclusion that what holds true for the corporate firms as a whole will also hold true for MFI's.

Table 6.5: The impact of institutions of the host country on profitability (including Interaction terms)

Variable	Variant of model specifications					
	1	2	3	4	5	6
Lagged ROA	0.2278*** (9.18)	0.2086*** (11.76)	0.2133*** (10.94)	0.2039*** (9.30)	0.2124*** (11.08)	0.2109*** (10.88)
Log Age	-0.0072 (-0.38)	-0.0039 (-1.35)	-0.0033 (-1.24)	-0.0033 (-1.27)	-0.0036 (-1.34)	-0.005 (-1.28)
Log size	0.0353*** (2.63)	0.0096*** (2.57)	0.0036*** (2.74)	0.0033*** (2.96)	0.0049*** (3.35)	0.0048*** (3.11)
Capital	0.1332*** (9.33)	0.1412*** (6.27)	0.1391*** (12.11)	0.1410*** (12.33)	0.1492*** (7.08)	0.1415*** (14.01)
Gearing	0.0067*** (4.97)	0.0062*** (3.13)	0.0068*** (4.51)	0.0069*** (4.07)	0.0074*** (4.46)	0.0071*** (4.04)
Deposit/Asset	0.1630*** (13.84)	0.0797*** (4.73)	0.1457*** (9.25)	0.1318*** (8.51)	0.1539*** (12.00)	0.1366*** (8.97)
Portfolio/Asset	0.0610*** (3.22)	0.0330** (2.32)	0.0342*** (3.09)	0.0305** (2.40)	0.0263** (2.23)	0.0340*** (2.67)
Efficiency	-0.2984*** (-15.17)	-0.2863*** (-10.55)	-0.2890*** (-12.50)	-0.2865*** (-14.02)	-0.2875*** (-14.12)	-0.3039*** (-14.56)
Portfolio at risk	-0.2347*** (-8.28)	-0.1549*** (-4.23)	-0.2607*** (-8.93)	-0.2364*** (-8.18)	-0.2509*** (-9.62)	-0.2208*** (-8.89)
Voice and Accountability	0.0053 (0.14)					
Political Stability		0.0277*** (3.02)				
Stability**X**Age		-0.0005*** (-4.03)				
Government Effectiveness			0.0643** (3.24)			
Regulatory Quality				0.0332*** (4.95)		
Rule of Law					0.0463*** (5.68)	
Rule of law**X**Age					-0.0136*** (-4.55)	
Control of Corruption						-0.0254*** (-3.28)
Corruption**X**Age						0.0038 (1.53)
Corruption**X**Portfolio-assets						0.0387*** (4.39)
Business Freedom	-0.0004 (-0.45)	-0.0001 (-0.18)	-0.0008 (-1.00)	-0.0002 (-0.22)	-0.0004 (-0.52)	-0.0002 (-0.21)
Property Rights	-0.0008 (-0.65)	-0.0009 (-0.77)	-0.0007 (-0.61)	-0.0011 (-0.88)	-0.0008 (-0.64)	-0.0012 (-1.03)
Wald-test	$\chi2(12)$= 313.01 Prob>chi2= 0.000	$\chi2(13)$= 321.80 Prob>chi2= 0.000	$\chi2(12$= 316.29 Prob>chi2= 0.000	$\chi2(12)$= 304.55 Prob>chi2= 0.000	$\chi2(13)$= 315.45 Prob>chi2= 0.000	$\chi2(14)$= 323.44 Prob>chi2= 0.000
Sargan-test[a]	$\chi2(45)$= 38.29 Prob>chi2=	$\chi2(45)$=32.55 Prob>chi2= 0.92	$\chi2(45)$= 40.9 Prob>chi2= 0.89	$\chi2(45)$=37.54 Prob>chi2= 0.92	$\chi2(45)$= 33.29 Prob>chi2=	$\chi2(45)$=36.40 Prob>chi2= 0.89

	0.86				0.90	
AR(1)[b]	Z=-1.6665 p-value=0.009	z= -2.020 p-value=0.004	z =--1.6067 p-value=0.000	z =-1.88 p-value=0.006	z =-1.93 p-value=0.005	z =-1.7884 p-value=0.007
AR(2)[c]	z=1.1036 P-value = 0.2698	z=1.1161 P-value = 0.2644	z =0.98211 p-value = 0.3260	z = 1.44 p-value = 0.3402	z =1.09 p-value = 0.2236	z =1.245 p-value = 0.2131
Number of instruments	55	56	55	55	56	57
Observations	303	336	303	303	303	341

This Table presents estimations performed using Blundell and Bond (1998) two-step system robust GMM estimator. For the definition of the variables see Table 6.2. Robust z values are in parentheses and significance at the 10%, 5%, and 1% level is noted by *, ** and *** respectively.

The Wald test is a test of the null hypothesis that the coefficients in the given equation are all zero (Greene, 2008). A low value indicates null hypothesis rejection.

[a] Test for over-identifying restrictions in GMM dynamic model estimation.

[b] Arellano-Bond test that average autocovariance in residuals of order 1 is 0 (H0: no autocorrelation).

[c] Arellano-Bond test that average autocovariance in residuals of order 2 is 0 (H0: no autocorrelation).

The basic estimation results from the control variables do not change even when external factors are incorporated into the variant model specifications. We do not find evidence that the size and development of the financial sector affects microfinance profitability. Our hypothesis that competition from banks reduces the profits of microfinance institutions is not supported here. It is plausible that a well-developed financial sector complements microfinance by perhaps providing incentives to maintain good credit histories. This finding is consistent with Ahlin et al (2011), who do not find any empirical support to the effect that financial deepening impact on MFI's self-sufficiency. Cull et al (2009b), similarly finds no significant evidence that greater bank penetration in the overall economy is associated with lower microfinance profitability[75]. This suggests that banks' decisions to expand their branch networks are perhaps made independent of the presence and activities of microfinance institutions.

75 Their findings indicate that the standard measures of financial development (private credit/GDP), are statistically significant in only one of twelve possible cases.

6.6.1 Robustness check

In order to test the robustness of our results, we carry out some alternative regressions. We estimate fixed effect regressions as a robustness test for the results with the GMM system method, at least for the sign of the coefficients and report the results in Table 6.6. Using fixed effect regressions does not fundamentally change the picture. The significance and the direction of influence of the governance variables shown in the estimations are preserved. Since the proxies for institutional difference are highly correlated, and qualitatively yield the same result, we present only results for one of the proxies.

Table 6.6: Robustness results (dependent variable: ROA)

Variable	Notation	Fixed effects model
Intercept		1.0475 (1.14)
Log Age	AG	-0.0021 (-0.82)
Log size	S	0.0164*** (2.77)
Capital	CAP	0.2466*** (5.37)
Gearing	GR	0.0058*** (2.39)
Deposits to assets	DepAsse	0.1530* (1.75)
Efficiency	EFF	-0.3512*** (-7.58)
Portfolio at risk	PAR	-0.1391*** (-2.82)
Loan size	LS	-0.0122 (-0.70)
Share of lending to women	Wom	0.0508 (1.14)
Control of Corruption	COR	-0.1410*** (-2.91)
Business Freedom	BF	-0.0003 (-0.43)
Property Rights	PR	-0.0003 (-0.24)
Share of rural population	RURALPOP	-0.0164* (-1.81)
Inflation expectations	INF	0.1235 (0.98)
GDP Per capita	GDP	0.0022 (1.16)
Domestic credit to private sector	PCRED	-0.2147 (-1.64)
R2		0.6287
Hausman specification test		chi2(16) = 88.32 Prob>chi2 = 0.0000 Ho: difference in coefficients not systematic
Number of obs		228

This table presents the results from regressions conducted to determine the determinants of profitability for Africa MFIs. Estimations were performed using fixed effects OLS estimation. t-statistics are in parentheses and significance at the 10%, 5%, and 1% level is noted by *,** and *** respectively. For the notation of the variables see Table 6.2

6.7 Conclusions and policy implications

This chapter has taken a first empirical step to examine the role of institutional context on influencing microfinance profitability especially in Africa economies. At the outset, we sought to address the research question; does the institutional environment matter for MFI's profitability? This question highlights an important, but relatively under-examined channel through which well developed institutions may influence MFI profitability. This study is pioneering in using dynamic GMM estimators and two-step estimation method, in analyzing the impact of host countries institutional environment on MFI profitability. Our contribution relative to the existing literature is our treatment of potential endogeneity biases. We provide the first empirical justification for the hypothesis that microfinance profitability is non-negligibly driven by the surrounding institutional environment.

Our results show that the positive effect political stability has on profitability of young MFIs is mitigated by the reduction in profitability of older MFIs. This finding highlights the critical importance of information capital in both developing microfinance industry and reducing excess liquidity. Thus the quality of contract enforcement and overall political stability in the country could affect the extent of moral hazard that MFIs face when making loans.

Perhaps our most interesting result is that corruption makes it harder for MFIs to realize profits, irrespective of MFI age. Results also indicate that growth of portfolio to assets ratio may be slower where there is more corruption which is consistent with corruption acting as a barrier to micro-enterprise activities, at least in start-up if not on subsequent growth.

While the usual caveats about drawing strong policy conclusions from cross-country analysis applies, the evidence presented in this paper has clear implications for MFIs and policy makers. Well developed institutions and government may actually make it less costly

for MFIs to operate in a fully compliant way which would be consistent with arguments that favour relaxed regulations for MFIs. At the macro level, control of corruption will not have beneficial effects on microfinance profitability, unless it is also accompanied by policies that improve the informational capital of new MFIs.

This evidence may help guide the sequencing of institutional reforms to promote microfinance development. However, due to limited resources and cultural factors, institutions can only be reformed slowly. It is therefore prudent that policymakers prioritize the institutional reforms that would steer microfinance development. A policy prescription tailored towards MFI specific factors and institutional environment may invigorate the industry and subsequently profitability.

Given the crucial role that the microfinance industry plays in the financial intermediation, there is scope for further work which should be country-specific inorder to provide country-level policy conclusions. For example, one could explore whether the impact of institutions is approximately the same within a country as the effects are unlikely to be universal for all countries. A similar analysis could be done for regions or for all developing economies to draw country, inter and intra regional comparisons. We also contend that further research should carry out an analysis by lending technology and the type of contract. For instance are MFIs employing standard lending contract affected in the same way as those employing joint liability contracts? These are important considerations for microfinance development in Africa.

CHAPTER SEVEN

CONCLUSIONS

7.1 Introduction

This chapter concludes the thesis by a way of summarizing the main findings, policy implications and the emerging ideas for extending this research. While to date many academic and policy studies in microfinance present arguments on outreach-sustainability trade off (see Hermes and Lensink 2011 for a recent review), there has been relatively little discussion within the academia and almost no empirical analysis on what explains microfinance profitability. This thesis is therefore a first attempt and a response to the need for more understanding on constraints to microfinance profitability. To address these issues, we utilized data for 210 MFIs in Africa from the Mix Market database, thereby presenting the first evidence on the link between microfinance profitability, firm-specific, industry-specific, macroeconomic and institutional context within Africa economies.

In spite of the data limitations highlighted in *section 1.4*, we believe we have made an important contribution to the scant academic work on microfinance profitability discussion. First, we use information of MFIs over a longer period of time than any of the previous studies in this field. Secondly, we employ a rigorous analysis that tackles endogeneity problem that has largely been ignored by the existing literature.

This chapter is organized as follows. In what follows, we present the summary of the main findings based on the empirical analysis. Here we relate the innovations and empirical evidence to theoretical postulations then compare and contrast our findings with those of previous studies in order to clearly identify areas of controversy/disagreements. We also evaluate inconsistencies or otherwise with theoretical predictions while focusing on the point of departure and convergence. This is important in identifying emerging gaps and formulating questions that need further research. In section three, we present policy implications based on

the emerging evidence while the final section identifies promising research ideas (PRIs) on areas that deserve further research.

7.2 Main findings

Broadly, the main goal of this thesis was to carry out an empirical investigation of the potential determinants of microfinance profitability. We approached the issue by first carrying out a comprehensive literature review with a view of addressing both existing and emerging theoretical and empirical evidence and other important questions related to the main theme of this thesis. We then synthesized results into a summary of what is known and what is not and/or what is contestable from what is not, while at the same time identifying the emerging gaps.

Using panel data for 210 MFIs, from 1997 to 2007, across 31 countries in Africa, chapter three investigates the impact of MFI-specific, institutions development and macroeconomic environment on microfinance profitability. Using the same data set and a simple dynamic model, chapter four extends the previous chapter by examining persistence of MFIs profits while controlling for MFI specific, time invariant industry-specific and country level determinants of MFI profitability. All the estimated models or results are robust across various specifications while the results obtained in the chapter three are confirmed in chapter four. In chapter five, we examined the impact of financing choice on MFIs profitability using system GMM estimator and a new data set. We extend the same empirical framework to investigate the impact of institutional environment in chapter six. The main results of the four empirical chapters may be summarized as follows.

The broad conclusion that emerges from this thesis is that MFI profitability is mainly driven by firm level specific factors and the institutional environment of the host country. More specifically, we find that MFIs that are efficient in the management of operational expenses are more profitable across the four studies. Although this finding corroborates

Sufian and Habibullah (2009), Kosmidou (2008), Athanasoglou, et al (2008) among the retail profit seeking banks, comparable evidence in microfinance is lacking. This finding suggests that high repayments as reported by a vast majority of the MFIs may not necessarily translate to profitability, if MFIs are also not efficient (Hermes, Lensink, and Meesters 2011). Could failures in corporate governance in microfinance institutions explain our finding? Mersland and Strøm (2009), shows that the characteristics of MFIs' top management have an implication on both operational costs and the ensuing ROA. Guided by stakeholder and agency theories, Mersland (2009a) similarly draws a historical parallel found in savings banks to present corporate governance lessons for MFIs. Further empirical work is needed to investigate this issue more carefully.

We also observe that capital adequacy is significant in explaining MFI profitability. This suggests that well capitalized MFIs are not only more flexible in dealing with problems arising from unexpected losses but have also a lower cost of funding. It may also suggest that MFIs are capital constrained (Lafourcade, et al 2006) which perhaps explains the low MFI profitability in Africa. MFIs are however much less capitalized, since it's more difficult to leverage the risky microfinance loan portfolios (Conning, 1999). Though Cull, Demirgüc-Kunt, and Morduch (2007) attempt to address MFI capitalization and performance, the empirical specification which they employ does not address the question of whether capital adequacy matters in microfinance profitability. This is clearly a question on which further theoretical and empirical research would be useful.

Consistent with theory (see Cooper et al., 2003), our findings shows that loan defaults represent a serious obstacle to MFIs profitability. Although theoretical literature motivates collateral as a mechanism that mitigates adverse selection (Berger, et al 2011), MFIs are able to reach the poor or groups who need to harness resources to finance small scale investments by easing collateral requirements. Our findings suggest that MFIs may have insufficient information capital to overcome the adverse selection effect which leads to negative effect of

high default rate. The greater the information capital, the more MFIs would be willing to lend *ceteris paribus*. To the extent that increased financial intermediation is expected to come from the emergence and growth of new MFIs, this problem can be addressed through the development of credit bureaus and other mechanisms that help improve information on prospective borrowers (McIntosh and Wydick 2005). There is therefore a need to strengthen institution-client relationships in order to overcome informational asymmetries. This should however not necessarily be done through group lending as there is evidence that this approach may increase costs (Mersland and Strøm 2009). The case for more flexibility in lending technologies and contracts used in microfinance has been made by Collins, et al (2009). Our finding also suggests also that under some circumstances, self-financing could be used to mitigate adverse selection related problems (Amitrajeet and Beladi, 2010).

One of the most important questions underlying microfinance development policy is whether MFI size optimizes profitability. All empirical chapters provide support for the economies of scale hypothesis in the financial intermediation process and the relationship is linear. It can therefore be construed that failure to become profitable in microfinance is due to lack of scale economies among other factors. Our finding suggests that MFIs may have to institute a dual objective of profit maximization while presumably pursuing a managerial goal of firm size maximisation. Intuitively MFIs may be more profitable with lower repayment and a larger clientele base. These findings confirm Mersland and Strøm, (2009) and Cull, Demirgüc-Kunt, and Morduch (2007).

Another interesting finding is that financing choice matters in explaining MFI profitability. A proportionally larger deposit base will typically lead to an overall lower cost of funds for the MFIs with an implication of improved profitability—assuming that the deposits program is efficient. More specifically, we find this influence increases with MFI age; older MFIs that mobilize deposits are more profitable. Although comparable studies in microfinance are lacking, this finding suggests that MFIs may be able to effectively use local

depositors as in the case of Irish loan funds (see Hollis, and Sweetman, 2007) to lower the cost of funding with an implication on profitability. Savings mobilization may lead to greater profitability since it provides MFIs with inexpensive and sustainable source of funds for lending. But to mobilize deposits, MFIs require license which calls for transition to regulation. But evidence so far shows that regulation does not turn MFIs into profitable institutions (Tchakoute-Tchuigoua 2011, Cull et al 2011; Hartarska 2005). Clearly this issue remains unresolved.

Our results show that highly leveraged microfinance institutions are more profitable. Although comparative evidence in microfinance is lacking, this finding is consistent with the agency costs hypothesis (Jensen and Meckling 1976) where higher leverage or a lower equity capital ratio is associated with higher profitability over the entire range of the observed data. Consistent with theoretical underpinnings (Grossman and Hart, 1982; Williams 1987; Jensen, 1986) a higher level of leverage may be used as a governance mechanism to reduce managerial cash flow waste. Beyond internal resources, debt may therefore be preferred to equity because the issuing costs are usually lower and because debt reduces verification costs (e.g., Townsend 1979). This is likely to be the scenario with MFIs which typically face very high transactions costs in issuing new equity due to their average small size.

We also find that portfolio-assets ratio is significant in explaining profitability and the impact rises with MFI age. Lending specialization may provide informational advantages, which may lower intermediation costs and improve profitability (Freixas, 2005). Banking literature shows that highly diversified banks are more profitable. Banks can diversify their sources of revenue through investment banking, securitization, and fee-generating activities, which do not necessarily divert assets away from the loans portfolio (Goddard, et al 2010). MFI production function however differs significantly to that of traditional banks. It is far from a foredawn conclusion that what holds true for traditional banks as a whole will also hold true for MFI's.

Turning to the role of institutions, our results suggest that older MFIs suffer less from political instability and weak enhancement of the rule of law, which is consistent with accumulation of information capital and relationship lending all other things equal. Our findings are inconsistent with Arun and Annim (2010). Contrary to Hartarska and Nadolnyak, (2007), we do not find evidence that business environment proxied by business freedom and property rights influence profitability perhaps due to low variability of data. One major shortcoming with previous studies is that they do not attempt to control for endogeneity. Well developed institutions and government may therefore make it less costly for MFIs to operate in a fully compliant way which would be consistent with arguments that favour relaxed regulations for MFIs. This evidence may help guide the sequencing of institutional reforms to promote microfinance development.

Our findings of a moderate persistence in MFI profitability shows that microfinance industry in Africa is not competitive. This is consistent with literature that considers the persistence of profitability as a signal of barriers to competition reflecting either impediments to market competition or informational asymmetry (Berger et al., 2000). It may also indicate the existence of market power in the industry (Goddard and Wilson, 2009). Stronger competition among MFIs should therefore be encouraged. Increased competition may lead to well functioning markets and stimulate MFIs to reduce costs by improving on the quality of their services in order to retain clients with implications on profitability.

At the outset, the four empirical studies, sought to address several research questions. A comparison of our results with existing studies however suggests that the significance and magnitude of the factors under consideration may not apply to the conventional banking system in which most of the existing literature is drawn from. In view of these findings, this thesis underlines the importance of an appropriate policy framework to support profitable delivery of diversified microfinance services in Africa.

Although some answers in microfinance profitability have been found, more questions remain. We find it puzzling that loan size is insignificant in all our regressions. This is in spite of Cull, Demirgüc-Kunt and Morduch (2007), concluding that MFIs that mainly provide individual loans also advance larger loan sizes with an implication of improved profitability. We also find it puzzling that our estimation results do not confirm the hypothesis of a positive link between regulation and MFI profitability. The issue of microfinance regulation has become increasingly important since several of the largest MFIs raise increasing amounts of deposits from the public (Hartarska and Nadolnyak, 2007). What are the driving forces behind policy advocates' call for the overall regulation of MFIs? Mersland and Strøm, (2009), find that individual lending contract is not related to improved financial results, so why are MFIs shifting in their lending technology towards the standard individual loan contract? The puzzles are still many in the much celebrated microfinance industry. While this may be explained by the relative youthfulness of the research agenda and the programs themselves, we hope that this thesis will motivate researchers in microfinance development and pave the way towards more rigorous study of this so far under-researched field.

7.3 Policy implications and prescription

The empirical evidence confirms that firm level specific factors and the institutional environment of the host country should be taken into consideration when evaluating MFIs profitability. With respect to efficiency, more emphasis should be directed towards governance of MFIs. MFIs should effectively use local depositors and lower operational costs, as in the case of Irish loan funds because of the important discipline these depositors can impose on expenses management. This thesis sheds light on an important question: "Should MFI clients be allowed on the board?" Advocates have argued that clients are stakeholders because their welfare is affected by the performance of the organization, and therefore clients should be represented on the board.

MFIs may also embrace technology to minimize transaction costs. Using efficient management information software as well as other innovative banking technologies such as mobile phone banking, credit scoring technology, smart card operations and internet banking can lead to a decline in administrative costs, an increase in staff productivity and improvement in the reliability of financial accounts. Rather than build expensive branch infrastructure, MFIs could share local institutions infrastructure in line with Yoris and Kauffman (2008) arguments. However adopting new technology introduces additional costs, which can impact negatively on MFI profitability. Use of new technology requires capacity building on staff. The new technologies such as mobile banking and branchless micro-banking may also pose a major threat to the data privacy of MFI consumers. Thus it is the MFIs' responsibility to identify the best practices as well as the most cost-effective ways to use new technology which can improve profitability in an increasing competitive microfinance sector.

The evidence of financing choice variables on MFIs profitability calls for the development of appropriate regulatory policies that enable MFIs to have access to long-term debt to enhance their performance. This may include relaxation of their listing requirements in the capital market. Additionally, MFIs should mobilize deposits to lower operational costs. This is because it provides MFIs with inexpensive and sustainable source of funds for lending, assuming that the deposits program is cost efficient. But for MFIs to collect deposits, they require license for taking public deposits which calls for transition to regulation. Larger share of loans to total assets may also translate to more interest revenue and therefore profitability but portfolio to assets ratio is very much influenced by regulation.

With regard to capitalization, this thesis calls for a policy that advocates for better access to capital sources. MFIs should establish strong partnerships with commercial banks in order to source additional financial resources for lending and negotiate long-term funds for lending with local and external partners. There may however be a distortion arising out of the

fact that the NGO MFI is a motivated agent, and its interest may diverge from that of the social welfare maximizer (Roy and Chowdhury, 2009). Moreover, microfinance rating agencies may be able to impose market discipline and assist MFIs raise funds (Hartarska and Nadolnyak 2008a). Public policy should be designed in such a way that it facilitates the entry of private actors without abandoning the markets that may not work without the public support.

Evidence of scale economies implies that MFIs may have to institute a dual objective of profit maximization while presumably pursuing a managerial goal of firm size maximisation if they have to remain profitable. If failure to become profitable is due to the lack of scale economies, the consequences may be declining financial intermediation, which would imply some degree of inefficiency in the provision of financial services. In this regard, low profitability should prompt policymakers to introduce measures to remove MFI entry barriers as well as other obstacles to competition and lower regulatory costs.

We have established that the main source of MFI-specific risk is credit risk. We observe that serious loan default may have arisen from the failure of MFIs to recognise impaired assets and create adequate reserves for writing-off these assets which calls for enhanced credit risk management and more effective supervision. The policy focus should therefore be geared not on the volume but on the quality of loans made as well as the establishment of credit reference bureaus or internet based central risk-management systems, tailored towards the microfinance sector in Africa and which identify outstanding debt in addition to cases of default.

This piece of work has established that institutions matter for MFIs profitability. This evidence may help guide the sequencing of institutional reforms to promote microfinance development. Due to limited resources and cultural factors, institutions can only be reformed slowly. It is therefore prudent that policymakers prioritize the institutional reforms that would steer microfinance development.

7.4 Ideas for extending this research

The importance placed on microfinance as a policy instrument for development coupled with the increasing inflow of capital to the industry, indicates a need to better understand microfinance profitability. This research has brought to the fore numerous PRIs, that emanate from the literature reviewed and the empirical studies. We conclude this thesis by presenting the PRIs and giving some concluding remarks.

This thesis has uncovered that inefficiency in the management of operational expenses is associated with declining MFI profitability. Future research may consider how technology can optimally be used to enhance operational efficiency, and what partnerships are required to scale up technological solutions. To what extent can for example adoption of mobile banking such as the *M-pesa* which is widely used in Kenya lead to a decline in operation costs and therefore higher profits when most MFIs in Africa lack adequate back office systems? In order to improve the efficiency of MFIs there is need for further research perhaps using non parametric Data Envelopment Analysis (DEA) in line with Flückiger and Vassiliev (2007). This may be achieved by considering both inputs oriented and output oriented methods while assuming constant returns to scale and variable returns to scale technologies using cross-country data and based on multivariate analysis. The results may have an important policy implication on whether there would be need to enhance the managerial skills and improve on technology. It is also often argued that high MFI transaction costs are partly driven by the cost of frequent payment collection (Shankar 2006), which keeps MFI interest rates high and limit their ability to scale up operations and reach new clients in more remote locations (Armendáriz and Morduch 2010). This issue therefore deserves further empirical study to determine the impact of this lending technology on MFI profitability.

With regard to financing choice, future research could address the impact of (i) grants (ii) retained earnings, (iii) share capital, (iv) debt relative to assets and (v) commercial funding liabilities ratio on microfinance profitability in addition to the variables we have

covered in this research. A focus on country-specific studies that will provide country-level policy conclusions would also be relevant. Recently available data could be used to clarify important issues that could affect the direction of microfinance. For example economies of scope in deposits mobilization are yet to be estimated for various environments. Other issues that could be covered in future research include the impact of financing choice on MFIs profitability based on contract design and the organization type.

Since profit may be a source of finance for expansion, future research on the persistence of MFI profits should focus on country-specific studies that will provide country-level policy conclusions. The model put forward in this thesis can easily be extended to account for asymmetric profits and regime shifts in the autoregressive parameter governing the autocorrelation in profit rates. Additionally, competitive forces do not seem to affect all firms equally. Some evidence shows that industry effects, like concentration, may explain some of the observed differences in long-run projected profit rates. There is therefore need for long-run study of profits and its relation to endogenous and exogenous factors of market competition. Is the competitive process far more localized? Put differently, future research may seek to answer research questions such as; to what extent is the estimated speed of adjustment for MFIs reporting negative profits different from that of positive profits and the impact of contract design such as lending methodologies on profit persistence.

Market power can keep MFI profitability persistently high. The market-power hypothesis, which is sometimes referred to as the structure-conduct-performance hypothesis, asserts that increased market power yields monopoly profits (Athanasoglou et al 2008). Using disaggregated data on MFIs, this study can be extended further by testing for the existence of concentration and its impact on MFI profitability using measures of concentration that are standard in the industrial organization literature, such as the Herfindahl-Hirschman index (HHI) or the three-firm-concentration ratio.

The patterns of profitability vary considerably with lending technology. The shift from joint liability to individual liability loans has for instance accelerated as the microfinance stakeholders learn about some of the demerits of group lending mechanism. Should MFIs pursue individual, group or a combination of both lending mechanisms in order to enhance profitability? This issue remains contestable and deserves further study with disaggregated data.

We have also established that MFI profitability is significantly influenced by the institutional environment in which an MFI is located. Future research should explore whether the impact of institutional context is approximately the same within a country as the effects are unlikely to be universal for all countries. A similar analysis could be done for regions or for all developing economies to draw country, inter and intra regional comparisons. These are important considerations for microfinance development in Africa.

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APPENDICES

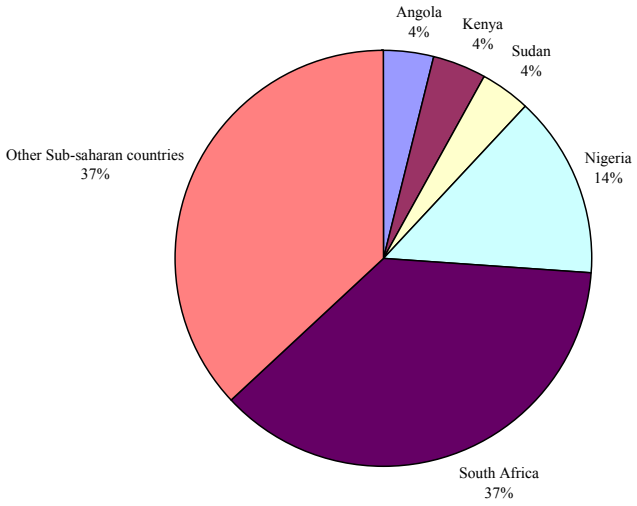
APPENDIX A

Microfinance landscape in sub-Sahara Africa

Africa economies are very diverse. While some major economies like Ethiopia are still predominantly based on agriculture, at the opposite end of the spectrum, agriculture represents less than 10 per cent of GDP in Botswana, Seychelles, South Africa, Mauritius, Angola, Gabon and Namibia. Heavy dependence on primary commodities remains a common feature of production, exports and growth in all the regions which exposes the continent to external shocks and makes economic diversification a top priority for growth policies on the continent (World Bank, 2007).

After a decade of decline (1975-1985) and another of stagnation (1985-1995), many African economies are moving towards a path of faster and steadier economic growth. Between 2000 and 2006 the average GDP per capita growth in Africa was 2.0%, up from -0.7% in 1990-1999. In the same period, entire Africa GDP was US$744 billion, which was equivalent to 28% of China's GDP, 69% of Brazil's, 74% of Russia's, and 80% of India's. Chart 1 show that more than half of the wealth in Africa is concentrated within two countries; South Africa and Nigeria who jointly constitute up 56% of Africa's GDP (World Bank 2008).

Figure 1: Main contributors to Sub-Saharan Africa's GDP



Source: African development indicators (2008)

Equatorial Guinea has the highest GDP per capita ($7,470) while the Democratic Republic of Congo has the lowest ($91) (World Bank, 2008). Although twenty eight of the fifty three countries accelerated their growth in 2006, compared to 2005, growth in Africa is projected to decline from under 5.4% in 2008 to 1.5% in 2009 (see Table 1) before recovering to about 3.8% in 2010 which is still below its pre-global financial crisis level (African Development Bank 2008; IMF 2009).

Table 1: Selected Indicators, 2005–2010 (Percent change)

	Actual			Estimate	Projections	
	2005	2006	2007	2008	2009	2010
Real GDP	6.2	6.4	6.8	5.4	1.5	3.8
Per capita GDP	4.1	4.2	4.6	3.1	-0.6	1.6
Percentage of GDP						
Exports of goods and services	36.5	37.9	38.9	40.8	32.1	33.1
Imports of goods and services	33.6	34.4	37.3	38.5	38.0	37.6
Gross domestic saving	22.8	24.7	23.6	24.5	17.6	18.7
Gross domestic investment	19.9	21.3	22.2	22.4	23.7	23.3
Fiscal balance (including grants)	1.9	4.9	1.0	2.1	-4.8	-3.1
Current account (including grants)	0.3	1.4	-1.6	-1.3	-7.5	-5.5
Terms of trade	9.9	9.6	5.0	12.2	-15.3	6.8

(percent change)						
Reserves (months of imports)	4.7	5.6	5.8	5.4	5.5	5.2

Source: IMF (2009)

Financial systems and the level of development vary significantly across sub-Saharan African economies and therefore the nature and degree of risk transmission also differs. Three groups of countries can be identified on the basis of financial depth indicators ranging from 0 for the least developed, to 4 for the most developed (see Table 2). Frontier market economies have a financial depth ratio of 30 percent or higher and a degree of financial market development of at least 2; or a degree of financial market development of 4 and financial depth of at least 15%. South Africa is the only emerging market in the region with a well-developed financial system and a full continuum of market segments that are interconnected and integrated with global markets. Frontier market countries include five middle-income countries (Botswana, Cape Verde, Mauritius, Namibia, and Seychelles) and seven low-income countries (Ghana, Kenya, Mozambique, Nigeria, Tanzania, Uganda, and Zambia). The linkages between financial segments with global markets are fewer in this category than in emerging markets although the countries vary in their degree of financial development. Financially developing economies are the other 31 sub-Saharan African countries that have narrow financial sectors, in which most segments are underdeveloped with few financial instruments. Additionally, access to global financial markets has been nonexistent or severely limited. Systemic and institutional constraints have also contributed to a low level of financial intermediation and limited availability of financing for productive investments (IMF, 2009).

Table 2: Indicators of financial development, 1990–2008

	Sub-Saharan Africa			South Africa			Frontier Markets			Financially Developing		
	1990-1999	2000-2004	2005-2008	1990-1999	2000-2004	2005-2008	1990-1999	2000-2004	2005-2008	1990-1999	2000-2004	2005-2008
Bank deposits /GDP	26.7	29.2	31.8	46.6	50.5	58.1	16.0	20.5	22.2	13.7	15.8	16.4
Private sector credit/GDP	27.4	29.4	33.8	55.6	63.5	72.1	11.1	14.0	18.4	10.9	9.8	10.5
M2/GDP	30.7	32.5	36.4	49.4	52.8	61.3	20.0	22.7	25.8	19.5	21.5	21.0
Liquid liabilities/GDP	16.1	18.1	22.4	28.7	33.0	43.5	10.2	12.4	14.2	6.9	8.4	8.5

Source: IMF (2009)

Unlike in Eastern and Central Asia (ECA) and Latin America and Caribbean (LAC), population density in Africa is low, making service delivery in rural areas costly. The GDP per capita is also low, which implies small banking transactions. Low bank penetration has given MFIs an impetus to thrive. This is reflected in the wide variety of financial service providers operating in lower income market segments on the continent, employing a broad range of lending methodologies in spite of the demanding macroeconomic environment.

Countries with higher levels of financial depth experience higher GDP per capita growth. African economies have lagged behind. Whereas private credit to GDP was 173.7% in the United States in 2005, it was only 2% in Mozambique (Beck, Demirgüc-Kunt and Levine, 2007). Access to banking services remains stark in Africa. It costs over $700, to open a checking account in Cameroon, while fees to maintain the same exceed 25 percent of GDP per capita in Sierra Leone (Beck, Demirgüc-Kunt and Peria 2008). The breadth and depth of financial systems remain weak in most of Africa economies where recent data suggests that not more than 20 per cent of adults have an account at a formal or semi-formal financial institution. In Ethiopia for example, there is less than one branch per 100,000 people and the role of different classes of institution savings such as banks, cooperatives, NGO-sponsored MFIs varies widely (Honohan and Beck, 2007).

Turning to deposit mobilization, African MFIs lead other MFIs in other global regions perhaps because savings culture is deeply engrained in most African societies. More than 70 percent of reporting MFIs mobilize voluntary deposits (Lafourcade, et al 2006). The large Micro banks have been able to refine their lending methodologies, and have become among the most productive in terms of both borrowers and savers per staff member.

Of the 3,552 microfinance institutions that have reported to Microcredit Summit Campaign Report (2009), 935 are in Sub-Saharan Africa, 1,727 are in Asia and the Pacific and 613 are in Latin America and the Caribbean (see Table 3). Africa has registered the slowest growth in the number of clients. It has also registered the lowest growth in the number

of poor clients (3%) and poorest women (-1%) and therefore has the lowest depth of outreach relative to other regions.

Table 3: Regional breakdown of microfinance

Region	MFIs	Total clients in 2006	Total clients in 2007	No. of poorest clients in 2006	No. of poorest clients in 2007	No. of poorest women clients in 2006	No. of poorest women clients in 2007
Sub Saharan Africa	935	8,411,416	9,189,825	6,182,812	6,379,707	4,036,017	3,992,752
Asia and the Pacific	1,727	112,714,909	129,438,919	83,755,659	96,514,127	72,934,477	82,186,663
Latin America and the Caribbean	613	6,755,569	7,772,769	1,978,145	2,206,718	1,384,338	1,450,669
Middle East and North Africa	85	1,722,274	3,310,477	755,682	1,140,999	621,111	890,418
Developing world totals	*3,360*	*129,604,168*	*149,711,990*	*92,672,298*	*106,241,551*	*78,975,943*	*88,520,502*
North America and Western Europe	127	54,466	176,958	25,265	109,318	11,765	72,576
Eastern Europe and Central Asia	65	3,372,280	4,936,877	225,011	233,810	142,873	133,815
Industrialized World totals	192	3,426,746	5,133,835	250,276	343,128	154,638	206,391
Global totals	*3,552*	*133,030,914*	*154,825,825*	*92,922,574*	*106,584,679*	*79,130,581*	*88,726,893*

Source: State of the Microcredit Summit Campaign Report 2009

Globally, MFIs expanded their outreach in 2005-2007 at the same pace as the previous years (see Table 4). As the total number of clients rose by an average of 26 percent over the same period, the median growth rate rose by 30 percent per annum. Africa recorded lower growth rate than the global average while the source of growth was remarkably from the smaller MFIs. Within the continent Kenya recoded the fastest growth in the number of clients.

Table 4: Growth in borrowers served, 2005-2007

Country/Region	Growth in Total Borrowers (%)	Growth in Median Borrowers (%)	Higher Growth Rates from Larger or Smaller MFIs?	Change in Growth Pace (total) Faster or Slower?	Total Borrowers (2007)
Globe	*26*	*30*	*even*	*even*	*49,176,522*
Asia	26	54	smaller	even	32,078,101
ECA	38	55	smaller	slower	2,146,133
LAC	23	24	even	even	9,002,012
MENA	41	42	even	slower	1,774,038
Africa	24	32	smaller	even	4,176,238
Cameroon	*8*	*93*	*smaller*	*slower*	*112,225*
Ethiopia	*15*	*50*	*smaller*	*even*	*1,390,877*
Ghana	*33*	*27*	*larger*	*slower*	*227,251*
Kenya	*65*	*45*	*larger*	*slower*	*757,979*
Mali	*-2*	*12*	*smaller*	*slower*	*121,091*
Mozambique	*22*	*35*	*smaller*	*even*	*49,077*
Tanzania	*3*	*-3*	*larger*	*slower*	*153,416*

Uganda	*4*	*-3*	*larger*	*faster*	*176,919*

Source: MIX Trend Lines Benchmarks 2005 – 2007. Microbanking Bulletin 2009, Issue 18

Table 5 outlines some of the largest financial service providers to low-income households in Africa comprising of banks, post office savings banks (POSB) credit unions (CUs), non-banking financial institutions (NBFIs), and non-governmental organizations (NGOs). By 2006, 16 countries in Africa had a microfinance sector outreach of more than 500,000 customers (World Bank, 2008). This excludes post office savings banks that tend to have low minimum required balances, making them accessible to low income groups, though the percentage is not known. Depth and breadth of outreach significantly varies by region. Inspite of the highest number of MFIs reporting to the MIX being located in West Africa, outreach is higher in East Africa with 52 percent of all savers and 45 percent of all borrowers. The top 20 MFIs as measured by Gross Loan Portfolio represent a staggering 79 percent of the total portfolio of all reporting MFIs (Lafourcade, et al 2006). Recent growth trends exhibit unprecedented rates of acceleration, particularly in Ethiopia, Kenya, Senegal and South Africa (African Development Bank 2008, OECD, 2008).

Table 5: Largest MFIs in Africa (2007)

Country	Name	Type	Outreach
Kenya	Equity bank	Bank	1,840,000 savers
Kenya	KPOSB	POSB	1,280,000 savers
South Africa	Capitec	Bank	783,000 savers
Rwanda	UBPR	CU	656,000 savers
Ethiopia	ACSI	NBFI	597,000 borrowers
Uganda	Centenary	Bank	559,000 savers
Burkina Faso	RCPB	CU	513,000 savers
Morocco	Al Amana	NGO	481,000 borrowers
Morocco	Zakoura	NGO	473,000 borrowers

Source: MIX Market (www.mixmarket.org accessed on December 2008).

Table 6 shows comparative performance benchmarks among microfinance institutions. It indicates that microfinance profitability is negative in Africa compared to other regions. One explanation for lower profitability is that Africa MFIs earn lower average financial revenues, which do not cover the high operating expenses in the region. However, in some markets MFIs have shaken up banking sectors that typically serve a small group of large

corporate clients. For instance, Equity Bank in Kenya managed to transform from building society into a bank and now ranks top in Africa in terms of market share and profitability.

Table 6 also shows that the main source of MFI-specific risk in Africa is credit risk perhaps due to poor enforcement of property rights, weak legal environment, and insufficient information on borrowers all of which expose these institutions to high credit risk. Loan default rates have risen in some economies. In Kenyan for instance, microfinance sector faced this problem at a greater magnitude, amplified by socio-political unrest at the 2007 year end.

Table 6: Selected performance benchmarks, July 2008 (per cent, unless otherwise indicated)

	Africa	Asia	ECA	LAC	MENA
Institutional characteristics					
Age (years)	10	11	8	12	8
Average assets (Million US $)	11.1	11.8	20.6	15.3	12.4
Institutions (number)	69	117	98	179	24
Offices (number)	16	27	13	12	15
Financing structure					
Capital/asset ratio	23	16	23.6	22.9	48.6
Commercial funding liabilities ratio	62.3	90.3	70.9	78.6	60.7
Gross loan portfolio to total assets	66	70.8	86	82.6	78.1
Outreach indicators					
Active borrowers (number)	23,787	41,483	10,341	16,497	26,093
Women borrowers (%)	62.9	99.4	45.1	61.4	67.9
Average loan balance per borrower (US $)	339	175	2,030	879	360
Average loan balance per borrower/GNP per capita	71.0	19.1	72.8	34.6	14.1
Financial indicators					
Return on assets	-0.6	0.6	1.1	2.1	2.0
Return on equity	0.5	5.0	6.0	9.3	7.9
Profit margin[76]	-0.7	7.1	10.0	10.8	8.1
Operating expense/loan portfolio	28.6	15	15.3	18.2	19.9
NPLs (overdue>30 days) to gross loans	4.0	2.1	1.0	3.2	1.4
NPLs (overdue>90 days) to gross loans	1.7	1.4	0.5	1.7	0.6

Source: Micro Banking Bulletin Issue 18, Spring 2009

Africa bureaucracy remains significantly burdensome. Based on doing business indicators[77]Table 9 identify the bureaucratic and legal hurdles that MFI must overcome to incorporate and register in Africa. It shows that although the average time spent during each procedure is higher in Latin America and Caribbean relative to Africa, the costs involved in

76 Net operating income/financial revenue

77 Doing Business ranks economies based on 10 indicators of business regulation that record the time and cost to meet government requirements in starting and operating a business, trading across borders, paying taxes, and closing a business. The rankings do not reflect such areas as macroeconomic policy, quality of infrastructure, currency volatility, investor perceptions, or crime rates

launching a commercial or industrial firm with up to 50 employees is far much higher in Africa.

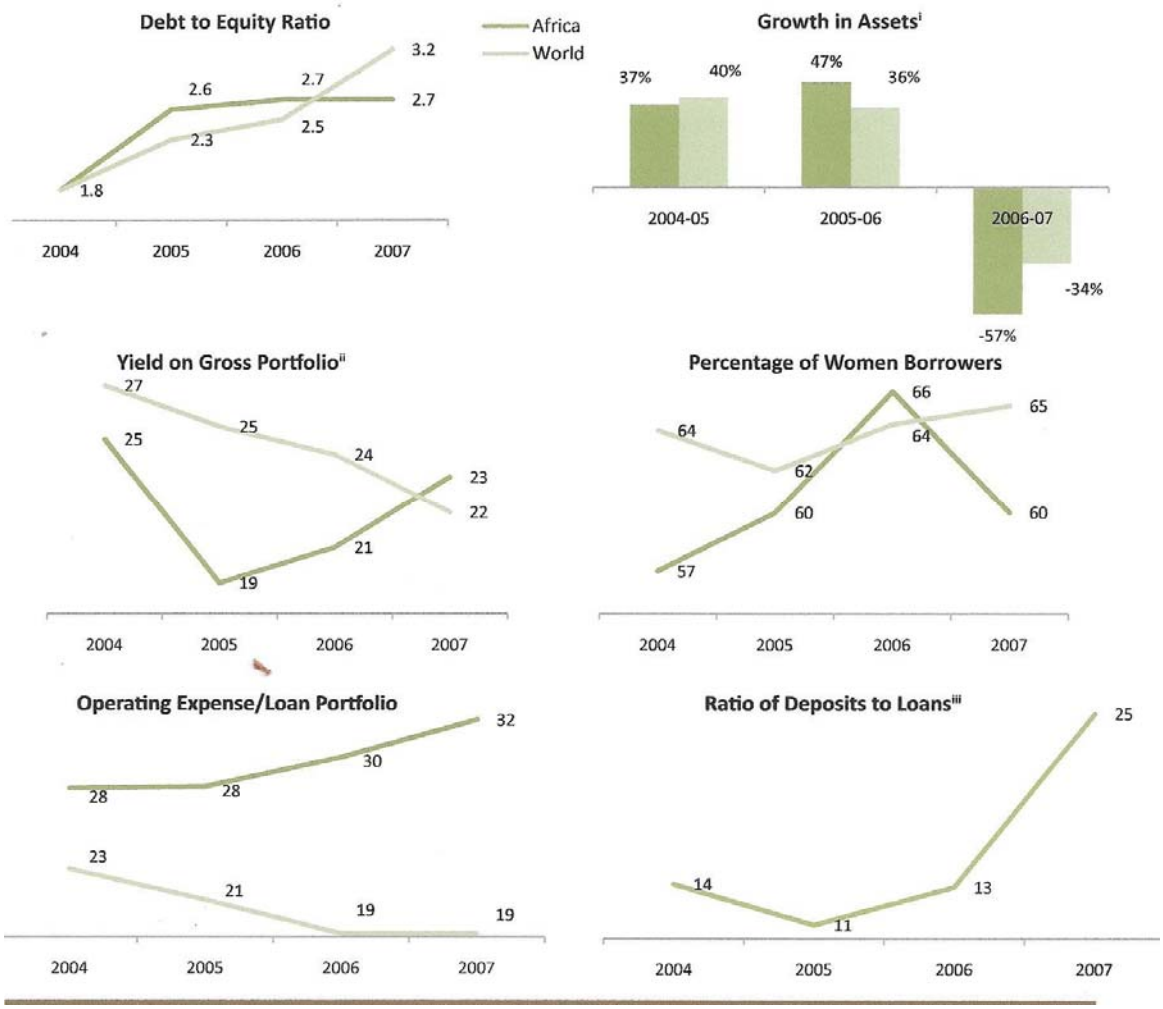
Table 7: Starting a business

Region	Number of procedures	Duration (days)	Cost (% GNI per Capita)	Paid in Min. Capital (% of GNI per capita)
East Asia & Pacific	8.6	44.2	32.3	37.3
Eastern Europe & Central Asia	7.7	22.6	8.6	36
Latin America & Caribbean	9.7	64.5	39.1	3.4
Middle East & North Africa	8.4	23.5	41	331.4
OECD	5.8	13.4	4.9	19.7
South Asia	7.4	32.5	31.9	0.6
Sub-Saharan Africa	10.2	47.8	111.2	173.4

Source: World Bank, Doing Business 2009

Figure 2 shows that one of the main impediments to the provision of financial services in Africa is the high cost of operating environment and the scarcity of skilled manpower at all levels (Aschcroft, 2008). Poor condition of the infrastructure, including decaying roads, unreliable and irregular provision of electricity and fixed line telephones, inhibits investments in microfinance. High communication costs makes it difficult to control production processes over long distances by computer-aided control systems and online communication, which subsequently reduce the need to co-locate management and technical staff with unskilled workers (World Bank, 2008).

Figure 2: Performance indicators from Africa MFIs 2004-2007



Source: compiled by the MIX but adapted from microfinance insights Vol 9, Nov/Dec 2008[78]

While much is made of Africa's distance from world markets, the primary problem is domestic-long distances within countries. Africa has one of the lowest road densities in the world (see Table 8). The bulk of the landlocked countries must rely on efficient or lack of investment of neighbours for access to ports and markets (World Bank, 2009). Physical factors, such as the relative absence of navigable rivers and natural harbours, have been serious barriers to trade. The average population density on the continent which stands at 77

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people per square kilometre is among the lowest in the world (World Bank, 2009). With such high unit costs, it is hard for MFIs to make small loans without relying on explicit or implicit subsidies. That notwithstanding, more MFIs are now reporting profits and, with funders shifting to loans and equity and donor grants are not as common (Honohan and Beck, 2007).

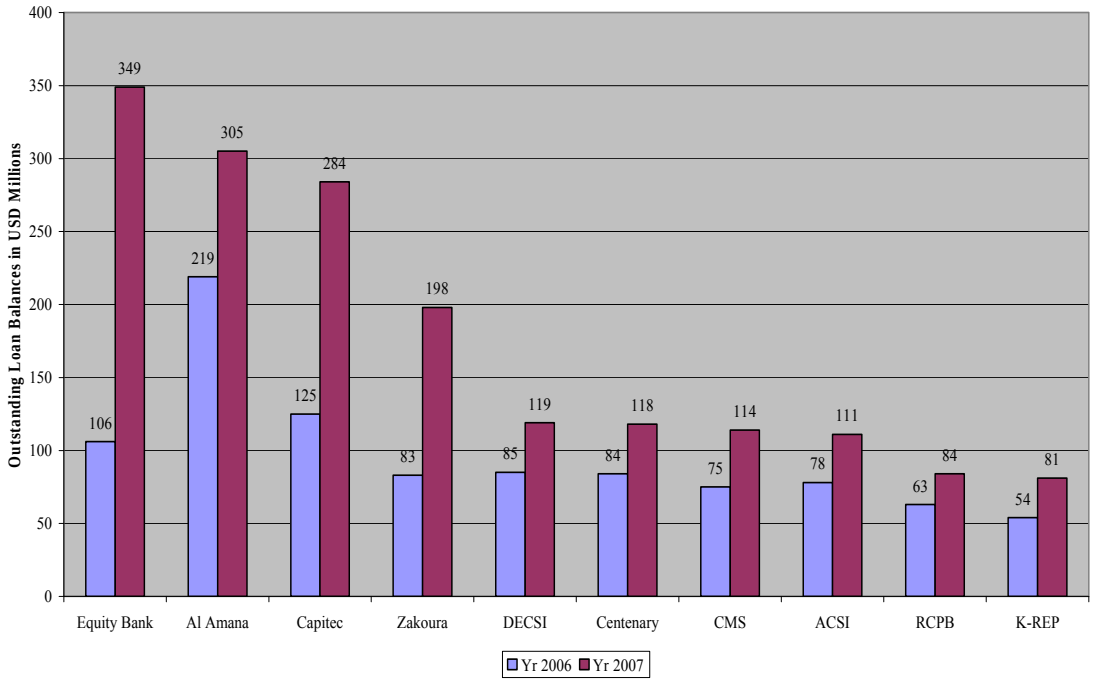
Table 8: Trading and transport costs

Region	Trading time across borders for exports (days)	Average transport costs ($ per container to Baltimore)	Population in landlocked Countries (%)	Road density (km2 of road per surface area) (1999)	Estimated number of civil conflicts, (1940–2000)
East Asia & Pacific	24	3900	0.42	0.72	8
Europe & Central Asia	29	Na	23	Na	13
Latin America & Caribbean	22	4600	2.77	0.12	15
Middle East & North Africa	27	2100	0	0.33	17
South Asia	34	3900	3.78	0.85	24
Sub-Saharan Africa	40	7600	40.2	0.13	34

Source: World Bank, World Development Report 2009

Weak capitalisation has also been typical to Africa MFIs, which has hampered outreach and sustainability. With loan portfolios increasing by over a billion dollars a year (see Figure 3), the provision of enough funding to the institutions remains a major challenge. MFIs finance their activities with funds from both debt and equity. A growing amount of commercial funding, such as bank lending and private equity, is supplementing funding from the donors. For example, Faulu-Kenya managed to tap private equity when it raised funds through the capital market after successfully floating a corporate bond worth 0.5 billion Kenya shillings in 2005 (the Mix Market; African Development Bank, OECD 2008). Whereas MFIs around the world (except in the LAC region) rely heavily on donations and retained earnings to fund their activities, Africa MFIs fund only 25 percent of their assets with equity. These institutions mobilize deposits as their main source of liabilities (at 72 percent), significantly more than MFIs in other regions (Lafourcade, et al 2006).

Figure 3: Growth in Portfolio of the 10 Large MFIs



Source: MIX Market (www.mixmarket.org) accessed on December 2008.

Revenues from other sources beyond lending are a key component of the revenue stream of most MFIs. The average MFI allocates only three-quarters of its assets as loan portfolio, and this creates the need to maximize the return of almost one-quarter of its assets in alternative activities beyond lending. On the regional level, Africa followed by South Asia has the lowest percentage of financial revenue being generated from loan portfolio in 2007 (see Table 9). For these two regions, the other revenues are equally distributed between other assets and other services. Similarly, Africa represents the lowest share of assets as a ratio of gross loan portfolio relative to other regions.

Table 9: Financial structure

Region	Sources of Revenue as Percentage of Financial Revenue			Asset Structure as Percentage of Total Assets			Average Returns by Asset Type	
	Loan Portfolio	Other Assets	Other Services	Gross Loan Portfolio	Other Assets	Net Fixed Assets	Gross Loan Portfolio	Other Assets
Africa	83	8	9	61	34	8	39	4
EAP	92	3	5	72	26	4	35	3
ECA	93	2	5	82	16	5	32	2
LAC	91	2	7	79	20	5	37	3
MENA	94	4	2	72	29	4	30	2
S Asia	87	7	6	72	27	3	24	3
Average	90	4	6	74	24	5	34	3

Source: the Micro Banking Bulletin, Issue 17, autumn 2008, the MIX market.

Financial structure does not vary significantly by region although it does vary by MFI type. Most unregulated MFIs rely on equity for financing. NGOs and unregulated MFIs often face challenges in attracting funding from banks and other potential investors because they have no corporate ownership structures and unclear legal status. Moreover, they are poorly leveraged because they are unable to mobilize savings. Cooperatives equally find it difficult to attract equity investment given their non-corporate ownership structure. MFIs in some economies face interest rate ceilings, such as the West African Monetary Union usury law that caps MFI and cooperative interest rates at 27 percent and bank interest rates at 18 percent. Although unregulated MFIs earn the highest financial revenues, they also report the highest expenses compared with other type of MFIs; their operating expenses represent 25 percent of assets. Cooperatives report the lowest ratio of financial revenue to total assets, just high enough to cover total expenses. Asset allocation varies by MFI type and understandably affects profitability. Gross Loan Portfolio represents more than 70 percent of assets for unregulated MFIs compared with 55 percent for cooperatives and 45 percent for regulated MFIs (Lafourcade, et al 2006).

Turning to commercialization of microfinance, Africa MFIs have not yet reaped the benefits of international and commercial funding. Only about 10% of the total Microfinance Investment Vehicle (MIV) portfolio is in Africa (see Table 12).

Table 10: Microfinance fund exposure to Africa

Fund	Total MFI investments (US$ million)	Percentage in Africa	Derive investment (US$ million)
Africap	13.3	100	13.3
CORDAID	63.5	18	11.4
Dexia	125.9	2	2.5
DOEN	79.1	15	11.9
Gray Ghost	75.0	7	5.3
HIVOS-Triodos	28.8	36	10.4
I&P	12.7	22	2.8
Impulse	23.8	5	1.2
Oikocredit	304.2	15	45.6
Procredit	110.9	6	6.7
ResponseAbility	96.2	4	3.9
Triodos Fair Share	18.6	12	2.3
Triodos Doen	45.2	15	6.8
Unitus	9.5	15	1.4

Source: www.microcapital.org accessed on April 2007

APPENDIX B

Table 1: Definition of core terminologies

Gross Loan Portfolio (in US$)	All outstanding principal for all outstanding client loans, including current, delinquent and restructured loans, but not loans that have been written off. It does not include interest receivable. It does not include employee loans.
Total Assets (in US$)	Total Assets, adjusted for Inflation and standardized provisioning for loan impairment and write-offs
Total Equity (in US$)	Total of all equity accounts
Capital / Asset Ratio	Adjusted Total Equity/Adjusted Total Assets
Debt / Equity Ratio	Adjusted Total Liabilities/Adjusted Total Equity
Deposits to Loans	Voluntary Deposits/Adjusted Gross Loan Portfolio
Deposits to Total Assets	Voluntary Deposits/Adjusted Total Assets
Gross Loan Portfolio / Total Assets	Adjusted Gross Loan Portfolio/Adjusted Total Assets
Return on Assets (%)	(Adjusted Net Operating Income - Taxes)/Adjusted Average Total Assets
Return on Equity (%)	(Adjusted Net Operating Income - Taxes)/Adjusted Average Total Equity
Operational Self-Sufficiency (%)	Financial Revenue/(Financial Expense + Impairment Losses on Loans + Operating Expense)
Financial Revenue Ratio	Adjusted Financial Revenue/Adjusted Average Total Assets
Profit Margin (%)	Adjusted Net Operating Income/Adjusted Financial Revenue
Total Expense Ratio (%)	Adjusted (Financial Expense + Net Loan Loss Provision Expense + Operating Expense)/Adjusted Average Total Assets
Financial Expense Ratio (%)	Total of financial expense on liabilities, net inflation adjustment, cost-of-funds adjustment and other expenses from financial services
Loan Loss Provision Expense Ratio (%)	Adjusted Net Loan Loss Provision Expense/Adjusted Average Total Assets
Operating Expense/Assets Ratio (%)	Adjusted Operating Expense/Adjusted Average Total Assets
Operating Expense / Loan Portfolio (%)	Adjusted Operating Expense/Adjusted Average Gross Loan Portfolio
Cost per Borrower	Adjusted Operating Expense/Adjusted Average Number of Active Borrowers
Portfolio at Risk > 30 days Ratio (%)	Outstanding balance, portfolio overdue> 30 Days + renegotiated portfolio/Adjusted Gross Loan Portfolio
Loan Loss Reserve Ratio (%)	Loan loss reserve/Value of loans outstanding
Risk Coverage Ratio (%)	Adjusted Impairment Loss Allowance/PAR > 30 Days
Write Off Ratio (%)	Value of loans written-off/Adjusted Average Gross Loan Portfolio
Number of Personnel	Total number of staff members
Loan Number of Active Borrowers	Number of borrowers with loans outstanding, adjusted for standardized write-offs
Average Loan Balance per Borrower (US$)	Adjusted Gross Loan Portfolio/Adjusted Number of Active Borrowers
Woman Borrowers (%)	Number of active women borrowers/Adjusted Number of Active Borrowers
Average Loan Balance per Borrower/ GNI per Capita (%)	Adjusted Average Loan Balance per Borrower/GNI per Capita
Deposits to Loans	Deposits/ Adjusted Gross Loan Portfolio
Deposits to Total Assets	Deposits/ Adjusted Total Assets
Portfolio to Assets	Adjusted Gross Loan Portfolio/ Adjusted Total Assets

Source: Microbanking Bulletin, Issue 17, autumn 2008- www.mixmarket.org/

Table 2: Tests for time and country-specific effects

Model	LM test	P-value
$D_2 = D_3 = ...D_C = 0$	$\chi 2$ (30) = 126.20	0.8200
$\gamma_2 = \gamma_3 = ...\gamma_T$	$\chi 2$ (11) = 4.19	0.7990
$D_2 = D_3 = ...D_C = \gamma_2 = \gamma_3 = \gamma_t = 0$	$\chi 2$ (41) = 35.44	0.8910

Where D_c represent country dummies and γ_t time dummies.

Table 3: Sargan test for alternative model with all variables strictly exogenous

Sargan test of over identifying restrictions chi2(27)=33.69 Prob >=chi2 0.18 H0: Over identifying restrictions are valid

Table 4: Granger-Causality test between Return on Asset and Capital without control variables

	ROA	Capital
Intercept	0.0041 (0.92)	-0.0258 (-1.38)
ROA(-1)	0.1662 (1.25)	0.1663 (0.31)
ROA(-2)	0.0268 (0.30)	-0.5262 (-1.63)
ROA(-3)	0.0601 (0.76)	-0.5523 (-1.53)
Capital(-1)	-0.0085 (-0.61)	0.4292*** (2.85)
Capital(-2)	0.0098 (0.49)	-0.0791 (-1.13)
Capital(-3)	-0.0001 (-0.02)	0.0856** (2.04)
AR(1)[a]	z =-2.52 p-value = 0.01	z =-2.60 p-value = 0.01
AR(2)[b]	z =0.13 *P-value* = 0.89	z =-0.71 *P-value* = 0.47

Significance at the 10%, 5%, and 1% level is noted by *, ** and *** respectively.
Figures in the parenthesis are the z-values
[a] Arellano-Bond test that average autocovariance in residuals of order 1 is 0
(H0: no autocorrelation).
[b] Arellano-Bond test that average autocovariance in residuals of order 2 is 0
(H0: no autocorrelation).

Table 5: Estimation results using FE (dependent variable: ROE)

	Variant model specifications	
Variables	7	8
Intercept	0.5817 (1.34)	0.5817 (1.34)
Log Size	-0.0474 (-1.29)	
Log Size^2		-0.0237 (-1.29)
Log Age	0.1577* (1.84)	
Log Age^2		0.0788 (1.84)
Capital	-0.2010** (-2.07)	-0.2010** (-2.07)

Gearing	-0.0285 (-1.60)	-0.0285 (-1.60)
Efficiency	-0.3203*** (-6.14)	-0.3203*** (-6.14)
Portfolio at risk	-0.1405 (-0.75)	-0.1405 (-0.75)
Risk coverage ratio		
Loan Loss Reserve Ratio		
Average Loan Size to GNP per capita	0.4832*** (3.38)	0.4832*** (3.38)
Inflation	0.0962 (1.39)	0.0962 (1.39)
GDP per capita growth	0.0240 (0.62)	0.0240 (0.62)
R^2	0.11	0.11
No of obs.	728	728

*significant at 10%; ** significant at 5%; *** significant at 1%.
Figures in the parenthesis are the t-Statistic

Table 6: Estimation Results Using Fixed Effects-within (Robustness-dependent variable: ROA)

Variant model specifications with robust standard errors			
Variable	Notation	2	3
Intercept		-0.4079*** (-3.18)	-0.5156*** (-3.54)
Log Size	S	0.0200* (1.86)	0.0183* (1.73)
Log Size^2	S^2	0.0100 (1.86)	
Log Age	AG	-0.0154 (-0.56)	-0.0061 (-0.23)
Log Age^2	AG^2	-0.00 (-0.56)	
Capital	CAP	0.0637*** (2.88)	0.0589*** (2.49)
Gearing	GR	0.0148 (1.49)	0.0130 (1.20)
Efficiency	EFF	-0.1335*** (-8.74)	-0.1379*** (-11.52)
Portfolio at risk	PAR	-0.0095 (-1.84)	-0.0100** (-2.19)
Inflation expectations	INF	0.0438 (0.63)	0.0293 (0.43)
Per capita incomes	GNI	-0.0043 (-0.10)	-0.0002 (-0.01)
Property rights	PR		0.0014** (1.86)
Freedom from corruption	COR		0.0020*** (2.61)
R^2		0.83	0.83
No of obs.		441	432

This table presents regression with robust standard errors results conducted to determine the determinants of profitability for Africa MFIs. Estimations were performed using fixed effects estimation. T-Statistics are in parentheses and significance at the 10%, 5%, and 1% level is noted by *, ** and *** respectively. A detailed description of the definition and sources of the variables is given in Table 3.2

Table 7: The impact of governance on MFI profitability (including Interaction terms)

Variable	Variant of model specifications					
	1	2	3	4	5	6
Lagged ROA	0.2300*** (2.49)	0.2050** (2.22)	0.2089*** (2.59)	0.1972** (2.11)	0.1798** (2.04)	0.1711** (1.99)
Log Age	-0.0036 (-1.38)	-0.0039 (-1.35)	-0.0033 (-1.24)	-0.0033 (-1.27)	-0.0036 (-1.34)	-0.0035 (-1.28)
Log size	0.0354*** (2.64)	0.0304*** (2.32)	0.0394*** (3.04)	0.0342*** (2.61)	0.0364*** (2.84)	0.0390*** (2.99)
Capital	0.2404*** (5.53)	0.2171*** (5.00)	0.2365*** (5.63)	0.2443*** (5.75)	0.2262*** (5.35)	0.2309*** (5.38)
Gearing	0.0076*** (3.72)	0.0058*** (3.89)	0.0074*** (3.53)	0.0078*** (3.70)	0.0072*** (3.40)	0.0079*** (3.69)
Deposit/Asset	0.3168*** (3.91)	0.2580*** (3.29)	0.2876*** (3.86)	0.2788*** (3.56)	0.2497*** (3.22)	0.2931*** (3.89)
Portfolio/Asset	0.0642*** (3.41)	0.0611*** (3.34)	0.0634*** (3.17)	0.0642*** (3.25)	0.0624*** (3.31)	0.0671*** (3.14)
Efficiency	-0.3003*** (-3.95)	-0.3475*** (-5.41)	-0.3145*** (-5.24)	-0.3098*** (-5.06)	-0.3166*** (-5.28)	-0.3103*** (-5.10)
Portfolio at risk	-0.2404*** (-2.42)	-0.2386*** (-2.47)	-0.1918** (-1.93)	-0.2356*** (-2.41)	-0.1865** (-1.88)	-0.1905** (1.87)
Loan Size	-0.0182 (-0.85)	-0.0234 (-1.11)	-0.0218 (-1.04)	-0.0228 (-1.07)	-0.0180 (-0.86)	-0.0241 (-1.13)
Women	-0.0211 (-0.44)	-0.0023 -0.05)	-0.0103 (-0.22)	-0.0111 (-0.23)	-0.0061 (-0.13)	-0.0096 (-0.20)
Voice and Accountability	0.0053 (0.14)					
Political Stability		0.0550*** (2.27)				
StabilityXAge		-0.0009*** (-5.14)				
Government Effectiveness			0.0746** (2.22)			
Regulatory Quality				0.0601* (1.81)		
Rule of Law					0.0821*** (2.35)	
Rule of lawXAge					-0.0159*** (-5.29)	
Control of Corruption						-0.0290** (-2.29)
CorruptionXAge						0.0044 (1.51)
CorruptionXPortfolio-assets						-0.0424*** (2.83)
Business Freedom	-0.0002 (-0.27)	-0.00002 (-0.03)	-0.0005 (-0.66)	0.00001 (0.02)	-0.0003 (-0.35)	0.0001 (0.06)
Property Rights	0.0006 (0.45)	0.0004 (0.31)	0.0005 (0.41)	0.0004 (0.31)	0.0006 (0.48)	0.0003 (0.22)
Share of rural population	-0.0055 (-0.52)	-0.0047 (-0.63)	-0.0048 (-0.61)	-0.0040 (-0.62)	-0.0036 (-0.69)	-0.0044 (-0.66)
Inflation expectations	0.0741 (0.78)	0.1040 (1.15)	0.0591 (0.66)	0.1285 (1.32)	0.1786 (1.68)	0.1173 (1.24)
GDP Per capita	0.0013 (0.69)	0.0003 (0.14)	0.0008 (0.45)	0.0006 (0.32)	-0.0016 (-0.82)	0.0009 (0.48)
Domestic credit to private sector	-0.1377 (-1.06)	-0.1258 (-0.98)	-0.0960 (-0.74)	-0.1209 (-0.93)	-0.1125 (-0.88)	-0.1509 (-1.18)
Wald-test	$\chi2(18)$= 333.03 Prob>chi2= 0.000	$\chi2(18)$= 344.80 Prob>chi2= 0.000	$\chi2(18)$= 346.39 Prob>chi2= 0.000	$\chi2(18)$= 334.74 Prob>chi2= 0.000	$\chi2(18)$= 350.45 Prob>chi2= 0.000	$\chi2(18)$= 336.69 Prob>chi2= 0.000

Sargan-test[a]	$\chi2(30)$= 32.22 Prob>chi2= 0.75	$\chi2(30)$= 29.01 Prob>chi2= 0.86	$\chi2(30)$= 31.47 Prob>chi2= 0.77	$\chi2(30)$= 34.74 Prob>chi2= 0.92	$\chi2(30)$= 33.48 Prob>chi2= 0.59	$\chi2(30)$= 36.40 Prob>chi2= 0.89
AR(1)[b]	z=-3.8406 p-value=0.000	z=-3.8406 p-value=0.000	z =-3.6658 p-value=0.000	z =-3.7941 p-value=0.000	z =-3.7252 p-value=0.000	z =-3.8153 p-value=0.000
AR(2)[c]	z=0.5776 *P*-value = 0.5635	z=0.5003 *P*-value = 0.6168	z =0.3409 *p-value* = 0.7332	z =0.5478 *p-value* = 0.5838	z =0.3861 *p-value* = 0.6994	z =0.4658 *p-value* = 0.6413
Observations	179	179	179	179	179	179

This table presents estimations performed using Blundell and Bond (1998) two-step system robust GMM estimator. For the definition of the variables see Table 4.1. Robust z values are in parentheses and significance at the 10%, 5%, and 1% level is noted by *, ** and *** respectively.

The Wald test is a test of the null hypothesis that the coefficients in the given equation are all zero (Greene, 2008). A low value indicates null hypothesis rejection.

[a] Test for over-identifying restrictions in GMM dynamic model estimation.

[b] Arellano-Bond test that average autocovariance in residuals of order 1 is 0 (H0: no autocorrelation).

[c] Arellano-Bond test that average autocovariance in residuals of order 2 is 0 (H0: no autocorrelation).

Table 8: Various measures of institutional development

Institutional measure	Source	Period, country	Components of index	References using the measures
Kaufmann, Kraay, and Maztruzzi (2009), Broad institutional development indicators: Subjective	World Bank	Annual, from 1996-2008; 212 countries	*Governance Indicators* Voice and Accountability; Political Stability and Absence of Violence; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption	Ahlin et al. (2011), Lesink et al (2008), Cull et al (2009b), Cull et al (2009b),
Heritage Foundation index of economic freedom: partly subjective (but not from risk-rating agencies)	Heritage Foundation, Washington, D.C.	Annual, from 1996; 161 Countries	*Dimensions of market efficiency* Economic freedom; Corruption; Trade policy; taxation; government intervention; monetary policy; capital flows and foreign investment regulations; banking regulations; wage or price controls; protection of property rights; efficiency of regulation; extent of parallel market	Hartarska and Nadolnyak (2007)
Gallup World Poll (GWP): subjective	Gallup World Poll	Annually or bi-annually in over 150 countries since 2006.	*Cross-country household survey* Voice and Accountability; Political Stability and Absence of Violence; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption	Clausen, Kraay and Nyiri (2009)
Doing Business (DB) Indicators: subjective (ranked by case studies and consultation with experts)	World Bank	Annual, from 2004-2009; 183 economies	*Ease of doing business* 10 topics covered. Starting a business; Employing workers; Registering property; Getting credit; Protecting investors; Paying taxes ; Trading across borders; Enforcing contracts; Closing a business	Ahlin et al. (2011)
Country Policy and Institutional Assessment (CPIA) composite index: objective	World Bank	Annual-publicly disclosed from 2006; 78 countries.	*Governance* 16 criteria clustered in four groups: (i) economic management, (ii) structural policies, (iii) policies for social inclusion and equity, and (iv) public sector management and institutions.	Dalgaard et al (2004)
BERI disaggregated business risk indicators: subjective (ranked by a "permanent" panel of experts	Knack and Keefer (1995), Data from business Environmental Risk Intelligence (BERI)	Annual from 1972; about 47 countries (7 African countries	*Security of contract and property rights* Bureaucratic delay; nationalization potential; contract enforceability; infrastructure quality	Knack and Keefer 1995,1997); Barro (1996);
ICRG disaggregated business risk indicators: indicators: subjective (ranked by staff of political risk service	Knack and Keefer (1995), data from International Country Risk Guide (ICRG): private firm for potential foreign investors	Annual from 1982; 135 countries (34 African countries); not all countries start in 1982	*Security of contract and property rights* Rule of law; corruption in government; quality of the bureaucracy; repudiation of contracts by government; expropriation risk of private investment	Knack and Keefer (1995, 1997); Barro (1996); Jeffrey D., and Warner, A. (1997).

Business International disaggregated risk indicators: subjective (ranked by local observers)	Mauro (1995), data from Business International (BI): private firm for potential foreign investors, now incorporated into the Economist Intelligence unit	1971–79, annual; 57 countries 1980–83, annual; 68 countries (10 African countries)	*Institutional quality* Corruption index; bureaucratic efficiency: sum of three measures (efficiency of judicial system, absence of red tape and absence of corruption); political stability: sum of six measures (institutional change, social change, opposition takeover, stability of labour, relationship with neighbouring countries, terrorism); institutional efficiency sums all nine	Mauro (1995); Clague and others (1996)
Borner, Brunetti, and Weder's political credibility index: subjective (ranked by local entrepreneurs)	Borner, Brunetti and Weder (1995), based on own 1992–93 survey of entrepreneurs in 28 countries	1981–90; 28 countries (8 African countries)	*Political credibility* Unexpected changes in laws and policies regularly affecting business; expectation that government sticks to major announced policies; changes in uncertainties over lawmaking in the last decade	Borner, Brunetti, and Weder (1995);
Measure of contract intensive money: objective	Clague and others (1995)	International Financial Statistics (IMF)	*Poor enforcement of contracts or property rights* M2 – C/M2; M2 is broad money, and C is currency outside banks (increases with efficiency)	Clague et al (1995,1996)
Gastil's political rights index (Freedom House index): subjective (ranked, but not by local observers)	Gastil (1989, 1991), based on published and unpublished information about individual countries	Annual, from 1973; 165 Countries	*Political rights measure (sometimes called "democracy")* Meaningful election of chief authority; meaningful election of legislature; fair campaigning; fair reflection of voter preference; multiple political parties; no military control; decentralized political power; informal consensus; significant opposition vote; recent shift in power through elections; no denial of self-determination of major groups "	Barro (1996); Isham, Kaufmann, and Pritchett (1997)
Institutional Investor rating of risk of default on sovereign debt: subjective (ranked by international panel of bankers)	*Institutional Investor* semi-annual publication	March and September, from 1979; more than 100 countries (25 African countries)	*Property and contracts rights* Credit rating	Clague et al (1996)
Political characteristics Clague, Keefer, Knack and Olsen's political regime indicators: objective	Clague and others (1996), constructed from Banks (1979), Gurr (1990) to 1986 and extrapolated to 1990 with *Europa Yearbook*	1969–90	*Type and duration of political regime* Dictatorship, almost dictatorship, intermediate category, almost democracy, and democracy; type of regime based on rankings from summing outcomes from Gurr's and Banks's measures of executive competitiveness, selection, and legislative effectiveness; duration variables refer to numbers of consecutive years spent in regimes, resetting variables when status changes	Clague et al (1996)
De Vanssay and Spindler's	De Vanssay and Spindler	OECD plus non-	*19 constitutional variables*	De Vanssay and Spindler

constitutional rights indicators: objective	(1992)	OECD Countries	Bill of rights; right to privacy; right to unionize; political attributes, such as whether supreme court has final constitutional authority	(1992)
Bates and others' measures of political transition: objective Bollen's democracy measure: objective	Bates and others (1996), work in progress Bollen (1990), drawing on Banks (1979) and Taylor and Hudson (1972)	1970–91; 49 countries all African) 1960, 1965; more than 110 countries	*Measures of political transition* Executive scale; legislative scale (further scales in progress) *Political components ("democracy")* Three concerning political liberties, three concerning political rights	None yet Helliwell (1994); Barro (1996)
Political instability Taylor and Jodice's and Banks's political instability indicators: objective	Persson and Tabellini (1994), using Taylor and Jodice (1983, 1988) and Banks (various issues)	Annual, from 1960; 136 countries	*Political instability and characteristics* Number of revolutions, successful coups, unsuccessful coups, and political assassinations; number of changes in the composition of the executive; number of riots and demonstrations; number of regular and irregular government transfers	Alesina and Rodrik (1994); Persson and Tabellini (1994); Isham, Kaufmann, and Pritchett (1997)
Barro's political instability measures: objective	Barro and Wolf (1989), using Banks (various issues); and Barro and Lee (1994) for wars measure	Average 1960–85, or sub samples	*Political instability* Counts of revolutions; coups and revolutions per year; assassinations per million population a year; strikes *Wars*	Barro (1991); Jeffrey D., and Warner, A. (1995); Caselli, Esquivel, and Lefort (1996)

This Table differentiates subjective measures, based on surveys and personal assessments, and objective measures, based on factual observations and economic data. Risk indicators typically comprise a weighted mix of both types of measures (for example, Euromoney issues of the 1990s). The table also tries to assess the coverage of Africa for these indexes, although in most cases data on Africa are very limited

Table 9: Type of MFIs used in the study and their regional distribution 1997-2008

MFI Name	Country	Region	Year of inception	MFI type	Regulated	Accepts deposits
ACEP	Senegal	WA	1987	CU	Y	Y
ACFB	Benin	WA	2004	CU	Y	Y
ACODE	Chad	CA	1996	NGO	Y	Y
ACSI	Ethiopia	EA	1995	NBF	Y	Y
ADCSI (Addis Credit & Savings Institution)	Ethiopia	EA	2000	NBF	Y	Y
ADEFI	Madagascar	SA	1995	CU	Y	N
AE&I (Afrique Emergence & Investissements)	Ivory Coast	WA	2003	NBF	Y	N
Akiba (Akiba Commercial Bank Ltd)	Tanzania	EA	1997	BK	Na	Y
Alidé	Benin	WA	2001	NGO	N	N
Alliance MFB (Alliance Microfinance Bank Limited)	Nigeria	WA	2005	NBF	Y	Y
APED	Ghana	WA	2001	NGO	N	Y
AVFS (Africa Village Financial Services)	Ethiopia	EA	1998	NBF	Y	Y
BG (Buusaa Gonofaa	Ethiopia	EA	1999	NBF	Y	Y
BIMAS	Kenya	EA	1997	NGO	Y	Y
BOM (Banco Oportunidade de Moçambique)	Mozambique	SA	2004	BK	Y	Y
CACOEC SUDUDIAWDI	Mali	WA	1998	CU	Y	N
CamCCUL (Cameroon CUerative Credit Union League Limited)	Cameroon	CA	1968	CU	Y	N
CAPEC Dahra	Senegal	WA	1994	NGO	Y	N
Capitec Bank	South Africa	SA	2001	BK	Y	Y
CBDIBA/RENACA	Benin	WA	1990	NGO	Y	N
CDS	Cameroon	CA	1997	CU	Y	Y
CECA	Togo	WA	1990	CU	Y	Y
CECIC S.A	South Africa	SA	1995	NBF	Y	N
CEDA	Sierra Leone	WA	2002	NGO	N	N
Centenary Bank (Centenary Rural Development Bank Ltd.)	Uganda	EA	1983	BK	Y	Y
CETZAM (CETZAM Opportunity)	Zambia	SA	1998	NBF	N	Y
CFE	Rwanda	EA	2003	NBF	Y	Y
CFF (Cedi Finance Foundation)	Ghana	WA	1999	NGO	Y	Y
CMCA (Crédit Mutuel de Centrafrique)	Central Africa Republic	CA	1994	CU	Y	Y
CML	Uganda	EA	2000	NBF	Y	N
CMMB	Benin	WA	1997	CU	Y	Y
CMS (Crédit Mutuel du Sénégal)	Senegal	WA	1988	CU	Y	Y
CODES	Benin	WA	1997	CU	Y	N
CUEC CAMEC MN	Democratic Republic Of Congo	CA	1988	CU	Y	N
CUEC HINFANI DOSSO	Niger	WA	2005	CU	Y	N
CUec Nyawera	Democratic Republic Of Congo	CA	1972	CU	Y	N

CUEDU	Kigali	CA	1998	CU	Y	N
COSPEC	Burundi	EA	2001	CU	Y	N
CRAN	Ghana	WA	1994	NGO	N	Y
CRG (Credit Rural de Guinée)	Guinea	WA	1989	NBF	Y	Y
CUMO	Malawi	SA	2003	NGO	N	Y
CVECA Kita/Bafoulabé	Burkina Faso	WA	1991	CU	Y	Y
DEC	Nigeria	WA	1987	NGO	Y	Y
DECSI (Dedebit Credit and Savings Institution)	Ethiopia	EA	1997	NBFI	Y	Y
DJOMEC	Senegal	WA	1999	CU	Y	Y
Duterimbere	Rwanda	EA	2005	NBF	Y	Y
Equity Bank (Equity Bank)	Kenya	EA	1984	BK	Y	Y
Equity Bank (Equity Bank)	Uganda	EA	19997	BK	Y	Y
Eshet (Eshet)	Ethiopia	EA	2000	NBFI	Y	Y
FADU (Farmers Development Union)	Nigeria	WA	1989	NBF	N	Y
FAM (Fonds d'Actions Mutuelles)	Congo	CA	1998	CU	Y	N
FASL	Ghana	WA	1996	NBF	N	Y
Faulu - KEN	Kenya	EA	1992	NBF	Y	Y
Faulu - TZA (Faulu - Tanzania)	Tanzania	EA	2002	NBF	N	Y
Faulu - UGA	Uganda	EA	1995	NBF	Y	Y
FCC (Fundo de Credito Comunitario	Mozambique	SA	1994	NGO	N	Y
FDM (Fundo de Desenvolvimento da Mulher)	Mozambique	SA	1996	NGO	Y	Y
FECECAM (Fédération des caisses d'épargne et de crédit agricole mutuel)	Benin	WA	1977	CU	Y	Y
FIDEVIE	Benin	WA	2002	NGO	Y	N
FINADEV Guinée	Guinea	WA	2005	NGO	N	N
FINCA - DRC	Democratic Republic Of Congo	CA	2003	NGO	N	Y
FINCA - MWI	Malawi	SA	1994	NGO	N	Y
FINCA - TZA	Democratic Republic Of Congo	EA	1998	NGO	N	N
FINCA - UG	Uganda	EA	1992	NBF	Y	Y
FINCA - ZMB	Zimbabwe	SA	2001	NBF	Y	Y
FINCORP	Swaziland	SA	1996	NBF	N	N
FUCEC Togo	Togo	WA	1983	CU	Y	Y
Gasha	Ethiopia	EA	1998	NBFI	Y	Y
GRAINE sarl	Burkina Faso	WA	2006	NBF	Y	Y
Hluvuku	Mozambique	SA	2001	NGO	Y	N
HOFOKAM	Uganda	EA	2003	NGO	N	Y
Hope Micro	Sierra Leone	WA	2002	NGO	N	N
ID-Ghana	Ghana	WA	1998	NGO	N	Y
IMF HOPE RDC	Democratic Republic Of Congo	CA	2004	NBF	Y	N
Jemeni	Mali	WA	1995	CU	Y	N
KADET	Kenya	EA	2002	NBF	Y	Y
Kafo (Kafo Jiginew)	Mali	WA	1987	CU	Y	Y
KixiCredito	Angola	SA	1999	NGO	N	Y

KOKARI (KOKARI)	Niger	WA	1994	CU	Y	Y
Kondo Jigima (Kondo Jigima)	Mali	WA	1991	CU	Y	Y
KPOSB	Kenya	EA	1978	BK	Y	Y
K-Rep (K-Rep Bank)	Kenya	EA	2000	BK	Y	Y
KSF (Kraban Support Foundation)	Ghana	WA	1996	NGO	N	Y
KWFT (Kenya Women Finance Trust)	Kenya	EA	1982	NBF	Y	Y
KYAPS	Uganda	EA	1999	CU	N	N
LAPO (Lift Above Poverty Organisation)	Nigeria	WA	1987	NGO	Na	Y
Maata-N-Tudu	Ghana	WA	1993	NGO	Y	Y
MAL (Micro Africa Limited)	Kenya	EA	2000	NBF	Y	N
MBT (MicroBankers Trust)	Zambia	SA	1996	NBF	Y	N
MC² (Réseau MC²)	Cameroon	CA	1992	CU	Y	N
MDB	Benin	WA	1995	CU	Y	N
MDSL	Kenya	EA	1999	NBF	Y	N
MEC Bosangani	Democratic Republic Of Congo	CA	2002	CU	Y	Y
MEC FEPRODES	Senegal	WA	1997	CU	Y	Y
MECBAS	Senegal	WA	2001	CU	Y	Y
MECREF	Nigeria	WA	1996	CU	Y	Y
MED-Net	Uganda	EA	1997	NGO	Y	Y
Meklit (Meklit)	Ethiopia	EA	2000	NBF	Y	Y
Metemamen	Ethiopia	EA	2002	NBF	Y	Y
MFSC	Uganda	EA	2001	CU	N	Y
MGPCC dekawowo	Togo	WA	2000	CU	Y	Y
MICROFUND	Togo	WA	1998	CU	Y	Y
Microloan Foundation - MWI	Malawi	SA	2002	CU	Y	N
Miselini (Miselini)	Mali	WA	1994	NGO	Y	Y
MRFC	Malawi	SA	1993	NBF	Y	N
Mutual Alliance S&L	Nigeria	WA	1992	NBF	Y	N
NovoBanco	Mozambique	SA	2004	BK	Y	Y
NovoBanco - MOZ	Mozambique	SA	2000	BK	Y	Y
Nyesigiso	Mali	WA	1990	CU	Y	N
OCSSC	Ethiopia	EA	1999	NBF	Y	N
OIBM	Malawi	SA	2002	BK	Y	N
OISL	Ghana	WA	2004	NBF	Y	N
OMO	Ethiopia	EA	1997	NBF	Y	Y
OPIC-TOGO	Togo	WA	1997	NGO	Y	N
Otiv Alaotra	Madagascar	SA	1996	CU	Y	N
Otiv Sambava	Madagascar	SA	1998	CU	Y	N
Otiv Tana	Madagascar	SA	1996	CU	Y	N
Otiv Toamasina	Madagascar	SA	1995	CU	Y	N
PADME	Benin	WA	1993	NGO	Y	Y
PAIDEK	Democratic Republic Of Congo	CA	1996	NGO	Y	N
PAMECAS	Senegal	WA	1995	CU	Y	Y
PAPME	Benin	WA	1993	NGO	Y	Y

PASED	Sudan	EA	2001	NGO	N	N
PEACE	Ethiopia	EA	1999	NBF	Y	Y
Pharma-crédit	Congo	CA	2002	NBF	N	N
PRIDE - TZA	Tanzania	EA	1994	NGO	N	Y
PRIDE- ZMB	Zimbabwe	SA	2000	NGO	N	N
ProCredit - GHA	Ghana	WA	2002	NBF	Y	Y
ProCredit Bank-DRC	Democratic Republic Of Congo	CA	2005	BK	Y	Y
PTF (Presidential Trust Fund)	Tanzania	EA	1984	NGO	N	N
Pulse	Zambia	SA	2001	NBF	N	N
RCMEC	Ivory Coast	WA	1997	CU	Y	N
RCPB	Burkina Faso	WA	1992	CU	Y	Y
RECEC-FD	Senegal	WA	2001	CU	Y	N
RENAPROV Finance SA	Cameroon	CA	1996	NBF	N	N
Réseau KARABARA	Mali	WA	1997	CU	Y	N
RML (Rwanda Microfinance SARL)	Rwanda	EA	2004	NBF	Y	N
SAILD (SAILD Microfinance)	Cameroon	CA	2000	NGO	Y	N
SAT	Ghana	WA	1994	NGO	Y	N
SEAP	Nigeria	WA	1998	NGO	Y	Y
SEDA (Small Enterprise Development Agency)	Tanzania	EA	1996	NGO	N	Y
SEF-TZ	Tanzania	EA	2000	NGO	N	N
SEF-ZAF (Small Enterprise Foundation)	South Africa	SA	1991	NGO	Y	N
SEM Fund	Senegal	WA	2004	NGO	Y	N
SFPI (Specialized Financial and Promotional Institution)	Ethiopia	EA	1998	NBF	Y	Y
Sidama (Sidama)	Ethiopia	EA	1998	NBF	Y	N
SIPEM	Madagascar	SA	1990	NBF	Y	N
SMEP	Kenya	EA	1975	NBF	Y	N
SOCREMO (SOCREMO - Banco de Microfinanças de Moçambique)	Mozambique	SA	1998	BK	Y	Y
SOFINA	Cameroon	CA	1996	NBF	Y	N
Soro Yiriwaso (Soro Yiriwaso)	Mali	WA	2000	NGO	N	Y
Tchuma	Mozambique	SA	1998	NBF	Y	N
TEBA (Teba Bank)	South Africa	SA	1976	BK	Y	N
TIAVO	Madagascar	SA	1997	CU	Y	Y
Turame Community Finance	Burundi	EA	2004	NBF	Y	N
UCEC/MK	Chad	CA	1993	CU	Y	N
U-IMCEC	Senegal	WA	2001	CU	Y	N
UMECTO	Togo	WA	2001	CU	Y	N
UNICECAM	Madagascar	SA	2000	CU	Y	N
Union des CUECs Umutanguha	Rwanda	EA	2005	CU	Y	N
UOMB	Rwanda	EA	1997	BK	N	N
U-Trust / UWFT	Uganda	EA	1984	NBF	Y	Y
Vital Finance (Vital Finance)	Benin	WA	1998	NGO	Y	Y
WAGES	Togo	WA	1994	NGO	N	N

Wasasa	Ethiopia	EA	2000	NBF	Y	Y
Wisdom	Ethiopia	EA	1999	NBF	Y	Y
Yehu (Yehu Microfinance Trust)	Kenya	EA	2000	NGO	N	N

Source: complied by the author from the MIX Market
Note: EA-East Africa; WA-West Africa; CA-Central Africa; SA-South Africa
Y-Yes; N-No
BK-Bank; COOP-Cooperative/credit unions; NBF-Non-bank financial institutions; NGO-Non-governmental Organizations (NGO's). There are 211 total MFI's, of which 10 are banks, 9 are cooperative/credit unions, 39 are non-bank financial institutions, and 54 are non-profits (NGO's). These are from 31 countries

Table 10: Description of the panel (MFIs per year)

1997	10
1998	19
1999	30
2000	42
2001	90
2002	125
2003	146
2004	159
2005	186
2006	178
2007	155
2008	167