Relaxing Financing Constraint
In The Microfinance Industry:
Is Commercialization The Answer?

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ABSTRACT

A critical question facing Microfinance Institutions (MFIs) is whether they can attract commercial capital as a solution to their financing problem and as a way of relaxing strained development aid. While donations have made enormous contributions to microfinance development and poverty reduction among the poor to date, an attempt to scale-up funding from this traditional source has been an uphill task. It is argued that vast resources of commercial capital can become available to microfinance if critical success strategies of access to commercial funding are developed. This paper offers research evidence that identifies significant predictors for successful Commercialization of microfinance based on firm-level data from African MFIs for three financial years between 1998 and 2003. The research develops and tests a commercial rating rule (predictive model) for determining success in tapping commercial capital. The results indicate the emergence of new finance sources, widened financing options for MFIs and the capacity to relax growth constraints in the industry. However, the findings also suggest the need for MFIs to satisfy the interests and requirements of prospective commercial investors to overcome new challenges.

Keywords: Development Finance and Assistance; Commercial Capital*;* Financial Markets; Donor Funding; Commercialization; Critical Success Factors

INTRODUCTION

For a long time now, the main source of financing for the microfinance[1] sector has been dominated by development aid (non-commercial sources of capital). Understandably, financial markets or private capital has played a minimal role in this poverty-focused industry which continues to thrive on finance sources whose allocation is based on development aims as opposed to profit maximization. However, if the sector is to relax the current financing constraint on growth and meet its goal of serving a large portion of the world's poor with much needed financial services, it must develop access to commercial capital as an alternative financing strategy. This paper presents research evidence and insight into how microfinance institutions (MFIs)[2] can achieve successful Commercialization by integrating their financing strategies to the larger financial system[3] (Meehan, J., 2004; De Sousa-Shields, M. et al., 2004; Ivatury, G. and Abrams, J., 2004; Ivatury, G. and Reille, X., 2004; and ADB, 2000).

MFIs' concerns on ability to succeed in attracting commercial finance, the lack of management capacity and exposure in dealing with commercial markets are investigated (USAID, 2005). This study underscores the importance of Commercialization (defined as the funding of a MFI's expansion operations and lending portfolio with commercial finance) and the relevance of its contribution to the furtherance of the aims and objectives of the microfinance initiative.

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[1] Microfinance is defined as the provision of a broad range of financial services, such as deposits, micro-loans, payment services, money transfers, and insurance to poor and low-income households and their micro-enterprises. (ADB, 2000).
[2] Microfinance institutions or MFIs are defined as institutions whose major business is the provision of microfinance services.
[3] Microfinance can contribute to the development of the overall financial system through integration of financial markets.

RELEVANT LITERATURE AND MICROFINANCE FUNDING ENVIRONMENT

The definitions of the word 'commercialization' include the following terms: managing on a business basis, expansion of profit-driven or commercially-oriented microfinance; and financing microfinance operations for the poor from commercial sources (Christen and Drake, 2001; Poyo and Young, 1999; Charitonenko, S. et al., 2004; Halpern and Kelly, 2002; Dunford, C., 2000; Christen, R., 2000; ADB, 2000; and Kiweu, J.M. and Biekpe, N., 2005). The term also refers to the evolution of MFIs from donor-driven to market-driven microfinance. This paper adopts a comprehensive view of microfinance commercialization (defined as the funding of a MFI's expansion operations and lending portfolio with commercial finance) and considers use of commercial sources as part of the definition.

Relevant Literature

The literature on microfinance is abundant, but the majority of the studies tend to be descriptive with little evidence and tentative research findings due to inadequate data. Early studies in the microfinance sector were faced with the problem of data unavailability for rigorous empirical analysis. Subsequently, a few studies have begun to offer in-depth analysis of specific topics and dimensions (Meehan, J., 2004). Notwithstanding, these studies have contributed to a better understanding of the general issues and emerging trends in microfinance development. The studies and survey cases related to the idea of commercializing microfinance[4] are focused on conceptual industry trends rather than empirical perspectives.

Maria Otero (1997) acknowledges that commercialization is inevitably necessary for microfinance to prevail beyond our lifetime (Halpern and Kelly, 2002). McKee, K. (2001) also states, "financial growth with commercial debt has become more common in mature microfinance markets". Certainly the changing landscape in financing microfinance is tending towards the domain of the commercial markets and away from the donor-world (Rhyne, E. (1998); Christen, R. and Drake, D., 2001; CGAP, 2002; USAID, 2005; Halpern and Kelly, 2002; and IFC, 2001).

A recent survey by CGAP of 144 MFIs from around the world found that over 90% still feel donor funding is the most appropriate form of financing (De Sousa-Shields, M. and Frankiewicz, C., 2004). A number of studies have emphasized the challenge MFIs are likely to face in accessing commercial funds (Halpern and Kelly, 2002; ADB, 2000; USAID, 2005; and Meehan, J., 2004). This is expected because approaches to raise funds from the commercial markets are not well developed. However, the change from traditional methods of funding (such as donations) is essential, and therefore the transformation process is inevitable to escape from the donor trap.

Pioneers and promoters of microfinance development agree that commercialization is the most appropriate financing strategy for the microfinance sector (Mcgillivrary, G., 2002; Halpern and Kelly, 2002). This paper addresses the central question of how MFIs can access commercial capital and become part of the larger financial system, and it examines the strategy of commercialization, in general, and, in particular, seeks to contribute to the debate by availing evidence based on the experience of African MFIs, as well as the extent of integration of MFI financing to the financial markets. It develops the pathway through which a MFI can become part of the financial landscape and investigates the factors that underpin success in commercializing microfinance institutions.

Traditional View

The appropriate method of financing microfinance has been a fundamental issue of concern over the last five years. Proponents of poverty-focused microfinance (Charitonenko, S., 2003) believe that microfinance, as a social product, should not be offered on a for-profit basis. The basis of this argument is that pioneer institutions in the sector were non-profit making, mostly microfinance NGOs that were favoured by non-commercial capital. This created the unique precedence where funding continued to come from "donor sources", hence the name donor

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[4] This paper considers commercial microfinance to be the provision of microfinance services based on a for-profit agenda and sustainable principles. It also includes embracing commercial attitudes and beliefs as well as market-based practices for efficient delivery of financial services to a customer base that is essentially poor.

industry. As a result, allocation of capital is based on development aims as opposed to profit maximization (De Sousa-Shields, M. and Frankiewicz, C., 2004).

The main concern of the adoption of the cmmercialization process is called mission drift[5] by international microfinance professionals because the industry is mostly driven by a social mission (Christen, R., 2000; Rhyne, E., 1999; and Dunford, C., 2000). According to this school of thought, MFIs require loan capital that is not charged on a commercial basis and embracing commercial practices would hurt their core clients. While the traditional view of microfinance funding has evolved over time, the transition from traditional funding sources to commercial capital has been a struggle for many MFIs because of the donor influence.

Commercial View

Proponents of commercialization argue that there is a direct relationship between the growth of an organization and the need for external financing. All things being equal, the higher the rate of asset growth, the greater the need for external financing will be (Upneja and Dalbor, 2001, and Vasilious and Karkaziz, 2002). Funding growth with commercial debt has become more common in mature microfinance markets such as Indonesia, Latin America, Bosnia, Uganda, Morocco, Ghana and Sri Lanka (McKee, K., 2001, and Charitonenko, S. et al., 2004). Meehan, J. (2004) observes that the industry is quickly transforming, but its funding approach is still sandwiched between donations and a transition to commercial sources.

From the commercial point of view, the practice of commercial microfinance observes the principle of offering financial services to the poor on a sustainable basis and believes that financing should therefore not be tied to donations only. Recent studies (Meehan, J., 2004; Charitonenko, S. et al., 2004, and De Souza, M. et al., 2004) show an increasing interest by the commercial markets in financing microfinance. Both are motivated by the huge funding gap of $300 billion and exploration for other sources by MFIs. Sustainable development for microfinance now depends upon capacity of MFIs to access additional capital.

DATA AND METHODOLOGY

For this study, cross-country data of 103 African MFIs were sampled from the MIX MARKET ™ web-based microfinance information database. MIX MARKET ™ (Microfinance Information eXchange) is a global database with data on 435 MFIs, 68 investors and 112 partners at the time (2004) of this study.

Data Collection and Sample Description

The sampling frame consists of the total population of African MFIs contributing data to the MIX between 1998 and the end of calendar year 2003. This constituted 188 African firms. According to Ozkan (2001), Peyer; U.C. and Shivdasani, A., 2001; Hendricks, K.B. and Singhal, V.R., 2001) and Laitinen (2002), the sampling criterion for the inclusion of a firm in the model was defined as those MFIs with financial data for three consecutive years between 1998 and 2003. This definition resulted in a final sample of 103 MFIs and 309 observations after eliminating firms with missing observations or those with non-continuous data series. This represented 55% of the total population of all 188 Africa firms drawn from 21 countries.

Measuring Success in Commercialization: Conceptualization of the Dependent Variables

The measure of success in commercialization was one of the challenges of this study. Two measures of the likelihood of success in Commercialization were investigated at two levels and constructed as:

Level I Success of Measure: Leverage Multiplier Added

Success in level I was measured by a single cardinal measure for gauging the probability of success in tapping the commercial markets. This measure was defined as the *equity multiplier* (**EM**), which is the basic ratio of

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[5] The conflict on commercialization and its impact on depth of outreach relates to the trade-off between commercialization (concern for profit maximization) and the provision of financial services to the poor and the poorest. Relating to commercialization studies in Asian countries, Charitonenko, S. et al. (2004) proves that experience to date indicates that there have been no negative effects of commercialization serving the poor because of the continued existence of a demand/supply gap.

total assets to equity (sometimes called capital). It represents the amount of assets supported by each shilling of equity/capital. Using the traditional balance sheet equation, total assets are financed by either equity or liabilities (**L**).

$$ASSETS(A) = LIABILITIES(L) + EQUITY(E) \tag{1}$$

Equity multiplier is therefore expressed as total assets (**A**) divided by total equity (**E**).

$$EM = A/E \tag{2}$$

This ratio is the inverse of the capital ratio used by banks to evaluate financial distress and capital adequacy (Panday, 1981; Whitaker, 1999; Demirguc-Kunt, A. and Maksimovic, V., 1998; Pille and Parade, 2002; Motwal, 2002, and Ozkan, A., 2001). An increase in EM indicates a higher level of commercial financing (**L**) or debt financing. When this ratio is 2:1, it represents 50% financing by interest-paying liabilities (debt). The ratio, therefore, indicates the degree of financial leverage. If a MFI has no debt (that is if **L** tends to zero), the EM is equal to one [1] and it increases as more debt is taken into the balance sheet. This increase in financial leverage over time was defined as **LMA** (leverage multiplier added) and is formulated as:

$$EM\,Rating\,(t+1) - EM\,Rating\,(t) \geq LMA \tag{3}$$

The equity multiplier rating is by itself a measure of how successful a MFI was in attracting commercial financing. LMA is maximized if the EM rating increases from one period to the next. Success in commercialization was measured by the demonstrated increase of LMA (*t+1*) compared to that of the previous period. Thus, the relative change in EM rating for two consecutive years over a three-year time interval (between 1998 and 2003) was used to classify sample MFIs into successful and less successful in commercialization (Hendricks, K. and Singhal, 2001, and Jain, B.A., 2001). The increase in relative LMA in years 1 and 2 was used rather than over the three-year interval in order to provide a control measure for chance events. Thus success, as defined in this way, captures a working commercial financing strategy rather that erratic movements that result from business cycles (St. John, C.H. et al., 2000, and Laitinen, E.K., 2002).

Those MFIs that demonstrated an increase in LMA rating in both periods 1 and 2 were classified in the model as successful and coded **1,** while those that showed a decline in relative LMA were classified as less successful and coded **0.** This measure of success used for the binary classification of the sample resulted in 55 successful and 48 less successful MFIs.

*Level **II** Measure of Success: Commercialization Index*

The second success measure of commercialization is a composite index called commercialization index or C-index. This is a ranked measure of success estimated as a factor of several integrated financial performance measures (Neely, A. et al., 2000). The performance measures seek to convey relevant dimensions of sustainable success in commercial microfinance from the viewpoint of a potential investor. The index aggregates nine performance indices and 15 measurement criteria - m_{1-15} weighted on a scale of -12 to 12 and centered at zero. The following indices were used to form the data for index construction:

1. Access to commercial funding; (equity multiplier rating [*EMR*]- m_1) **, P** $_{i1}$
2. Sustainable growth rate (SGR); (return on equity [*ROE*]- m_2.), (total asset growth % [*TAG*] –m_3), (return on assets [*ROA*]- m_4) **, P** $_{i2}$
3. Service quality; (number of borrowers [*NB*] – m_5), **P** $_{i3}$
4. Quality of portfolio (control for rapid growth); (portfolio at risk [*PAR*]-m_6), **P** $_{i4}$
5. Earning potential and long-term viability of the MFI; (net interest position [*NIP*]- m_7), (return on equity [*ROE*]- m_2), (inflation [*i*]- m_8), (commercial lending rate [*lR*]- m_9), **P** $_{i5,}$
6. Country level of economic growth; [*GDP-r*]- $m_{10,}$(growth –retrenchment [*G-R*]-m_{11}), **P** $_{i6}$
7. Cash flow adequacy; (Internal cash ratio [*ICR*]-m_{12}), (operating self-sufficiency [*OSS*]-m_{13}) and, **P** $_{i7}$

8.   Financial distress and mortality risk; (capital ratio [CR]-m_{14}, P_{i8}
9.   Financial reporting transparency/standard; (information opacity/disclosure level [OL]-m_{15}) P_{i9}

        Table 1 lists performance criteria variables and their definitions and references, as appropriate and as selected in estimating the C-index. The performance measure m_1 indicates effective access to commercial funding, while the set of measures m_2—m_4, m_7 and m_{13}, were converted into ratios that reflect the earning potential of a MFI. All the other measures are either closely related to cash flow generation and/or they support an environment for strong financial performance. The purpose of measurement criteria is also indicated, capturing investors' attitude toward risk and expectation for returns.

Table 1: Financial Variables and Investor Criterion
C-index Financial Ratio Variable Descriptions and Predicted Relationship with Commercialization

Variable (*m*) Definitions	Theoretical Relationship	Support
M_1 - Equity multiplier rating *(EMR)*	Financial leverage, access to commercial funds	+Ve; Kolari, J. et al. (2002); Peyer, U.C. and Shivdasani, A. (2001); Vasiliou & Karkaziz (2002).
M_2 - Return on equity *(ROE)*	Profitability for shareholders and proxy for sustainable growth, and relative high growth potential	+Ve; Demirguc-Kunt, A. and Maksimovic, V. (1998); Harris and Raviv (1990); Vasiliou and Karkaziz (2002); Hasan, I.and Marton, K. (2003); Ozkan, A. (2001); St. John, C.H. et al. (2000).
M_3 - Total asset growth *(TAG)*	Total funding gap and requirement. Portfolio investment proxy	+_Ve; Watson and Wilson (2002); Vasiliou and Karkaziz (2002); Upneja andDalbor (2001); Gibson, B. (2002); Demirguc-Kunt, A. and Maksimovic, V. (1998); Hendricks, K.B. and Singhal, V.R. (2001); Watson, R. and Wilson, N. (2002); Konish, M. and Yasunda, Y. (2003);
M_4 - Return on assets (*ROA)*	Profitability of MFI	+Ve ; Kolari, J. et al. (2002); Hussain Md., M. and Hoque, Z. (2002); Hasan, I.and Marton, K. (2003); Demirguc-Kunt, A. and Maksimovic, V. (1998); Ozkan, A. (2001); St. John, C.H. et al. (2000); Vasiliou and Karkaziz (2002).
M_5 - Number of borrowers (*NB)*	Defines size, is sign of growth and good service quality. Proxy for effective demand	+Ve; WOCCU (2003);
M_6 - Portfolio at risk *(PAR)*	Asset quality and riskiness of portfolio (loan default level) and/or measure of riskiness of MFI	-Ve; Jacobson, T. and Robzbach, K. (2003); Barrios, V.E. and Blanco, J.M. (2003); WOCCU (2003); Pille, P. and Parade, J.C. (2002); Clarence, N.W. (2001); MIX (2006).
M_7 - Net interest position *(NIP)*	Earning potential	+Ve ; Hussain Md., M. and Hoque, Z. (2002).
M_8 - Annual inflation (*i*)	Benchmark for high earning potential and good financial health. Adequate equity capitalization if ROE> *i*	+Ve; Demirguc-Kunt, A. and Maksimovic, V. (1998).
M_9 - Commercial lending *r*ate (*LR)*	Benchmark for wealth creation and repayment capacity if ROE> *LR*	+Ve; Demirguc-Kunt, A. and Maksimovic, V. (1998).
M_{10} - Gross domestic product *(GDP)*	Macro-economic expansion and level of development, control for country differences	+Ve; Jeng and Wells (2000); Laitinen (2002); Demirguc-Kunt, A. and Maksimovic, V. (1998);
M_{11} - Growth – Retrenchment *(G-R)*	Portfolio investment overtime	+Ve; St. John, C.H. et al. (2000);
M_{12} - Internal cash ratio *(ICR)*	Liquidity and cash flow adequacy	+Ve; Laitinen (2002); Kang and Long (2001); Metwally, M.M. (1997); Peyer, U.C. and Shivdasani, A. (2001); Hasan, I. and Marton, K. (2003); Berger et al. (1995);
M_{13} - Operating self-sufficiency (*OSS)*	Cost coverage from operating income	+Ve; Hussain Md., M. and Hoque, Z. (2002); Ozkan, A. (2001); MIX (2006);
M_{14} - Capital ratio (*CR)*	Financial distress, mortality risk and capital adequacy.	-Ve; Laitinen (2002); Demirguc-Kunt, A. and Maksimovic, V. (1998); Pille and Parade (2002); Metwally, M.M. (1997); Ozkan, A. (2001); Berger et al. (1995); Hasan, I. and Marton, K. (2003); Konish, M. and Yasunda, Y. (2003); Barrios, V.E. and Blanco, J.M. (2003); WOCCU (2003);
M_{15}-Opacity level (*OL)*	Level of information disclosure and transparency	+Ve; Berger, A.N. et al. (1995); Myers and Majluf (1984); Demirguc-Kunt, A. and Maksimovic, V. (1998); Watson, R. and Wilson, N. (2002); MIX (2006);

C-index Construction

The index was modeled using a three-year time series data (2001–2003). It uses the later two years' (2002 – 2003) data for development of the measure of future success and one year's (2001) financial information for predicting the success in Commercialization over two years (Laitinen, 2002; Pille, P. and Paradi, J.C., 2002; and Kolari, J. et al., 2002). Index values are determined by a scoring process of the 15 criteria measures -m_{1-15} (financial ratio variables) grouped in the nine indices. The C-index consists of both a weight and a commercial financing rating (CFR) component for each of the nine performance indices (Hendricks, K.B. and Singhal, V.R., 2001, and Laitinen, 2002). The following formula demonstrates how index values are obtained through the CFR scores of each MFI:

$$\textbf{CIij} \text{ (Index 2002-2003)} = \textbf{SUM\{CFR} \text{ Scores } [\textbf{ P i 1, P i 2,, P i 3, P i4, P i 5, P i6, P i7, P i 8, P i 9 }] m j\}$$

The measures of the index indicate the ease with which a MFI can tap capital from the wider financial market system. The index, therefore, defines the degree of commercial orientation and informs management of the likelihood of success, should the MFI decide to seek commercial funding.

The **CIij** index scores are scaled from 0 – 25, with a maximum possible score of 25 whilst the least is 0. Higher CFR scores indicate the likelihood of successful commercialization. The median score (**M)** under this scale is 13 CFR scores, which is the critical value for the binary classification.

Classification of sample MFIs into successful and less successful in commercialization was based on the index values (or CFR scores), with the cut-off being the median score of 13 CFRs. The binary classification indicates those classified as "successful" and coded as **1,** while those scoring less than 13 CFRs were classified as "less successful" and coded as **0.** This measure of success used for the binary classification of the sample resulted in 45 successful and 58 less successful MFIs.

Independent Variable Description

The set of explanatory variables ($x_1, \ldots, x_n$) used were selected based on a literature review. This research intends to provide an exploratory analysis of investor attraction factors for the unique industry of microfinance. In-depth analysis of the 33 variables was carried to determine significant drivers of commercial funding. Table 2 provides a description of the independent variables used in this study.

The list of predictor variables can generally be categorized into firm level financial parameters and non-financial performance indicators (St. John, C.H., 2000). The set consists of three types of independent variables: 1) financial sustainability factors and the all-familiar traditional banking indicators of sound banking practice and safety in lending, 2) microfinance industry critical performance indicators and benchmarks, and 3) macro-economic factors included to mitigate the differences between countries and control for both observable and unobservable time effects (Laitinen, 2002, and Demirguc-Kunt, A. and Maksimovic, V., 1998).

Research Methods: Model Estimation

In this study, an examination of the relative importance of the 33 variables in explaining success in commercialization of African MFIs is undertaken. The focus is to develop significant predictors for successful commercialization. The main hypothesis for all the tests is: Success factors differ for MFIs that are less successful in commercialization than those that are not. In order to obtain robust results for the predictive ability of the explanatory variables and sub-models, their performance was tested with different estimation methods.

Initial tests use random forests technique (RF) to identify significant predictors of success. Besides being computationally effective, the method is proven not to overfit and is less sensitive to system complaints (noisy data) compared to convectional logistic regression and discriminant analysis methods (Laviriere, B. and Van den Poel, D., 2004).

Table 2: Independent Variables Description and Formulae

Predictor Variables Used in this Study (Notes, Notation Used in Analysis)

X_1 Number of years since started operations (Maturity, AGE)
X_2 MFI supervision by the national central bank (Regulation, d_REGUL)
X_3 Registration form (Legal structure, d_LFORM: fi, ngo, coop, bank)
X_4 Portfolio Investment overtime or divesture (Growth-retrenchment, d_GRPOST)
X_5 Profit margin (Sustainability level, PROFIT)
X_6 Efficiency in operations (operating efficiency, OEXPR)
X_7 Earning potential of performing assets, cost saving ability (Earning Asset Ratio, EAR)
X_8 Number of borrowers (Active clients – Size, BORROWERS)
X_9 Portfolio size (Dollar amount, SIZEGPF)
X_{10} Information disclosure and level of opacity (information asymmetry, d_INFOTPR)
X_{11} Asset quality and default risk (Portfolio at risk, PAR)
X_{12} Asset structure (Net loans to total assets, ASETSTRUC)
X_{13} Level of indebtedness, risk profile of MFI (Debt equity ratio, GEARING)
X_{14} Poverty outreach (Average loan size in dollars, LONSIZE)
X_{15} Poverty lending focus, depth of outreach (Average loan size per GNI, DEPTHRCH)
X_{16} Level of richness of country of operation (GNI per capita, GNI)
X_{17} Economic stage of the country of operation (GDP growth %, GDP)
X_{18} Pricing efficiency, economic cost of capital (Annual inflation rate, INFLA)
X_{19} Cost of funds/capital (market lending rates and/or 90-day treasury bills rates, LEDGRTE)
X_{20} Size of equity, Investor safety (Equity to total asset %, EQBASE)
X_{21} Level of savings on financing costs, increased earning potential (EAR*interest rates, COSTSAV)
X_{22} Access to donations or quasi-equity (main source of funding, d_DONOR)
X_{23} Number of personnel, total staff level (Size, PERSONEL)
X_{24} Asset base (Total assets, size, TASSETS)
X_{25} Capacity to generate cash flow from performing assets (Retained earnings/G portfolio, EARNSUFF)
X_{26} Operating self-sufficiency, (Operating/operating/expenses, OSS)
X_{27} Return on assets (Net income/total assets, ROA)
X_{28} Return of equity (Net income/equity, ROE)
X_{29} High earning potential, maintaining equity base(ROE>= inflation, d_FINHEALTH)
X_{30} Maximising shareholder value, capacity to repay costly debt (ROE>=lending rates, d_RPMTCAP)
X_{31} Fast growing MFI (TAG>=ROE, d_FASTGRO)
X_{32} High growth prospects, enabling environment (TAG>=inflation, d_HGOP)
X_{33} Relative access to commercial funds (d_LMR/CFR)

The prefix "d_" reflects that the variable was operationalised as a dummy number or character.

Random Forests Technique

       In this study, the random forests (RF) technique was used to predict MFIs' success in commercialization and to identify significant predictors. In the conceptualization of the dependent variable, random forest was used as a binary classification tool. RFs, as part of decision trees[6] (DT), have become very popular because of their ease of use and interpretability (Lariviere, B. and Van den Poel, D., 2004), as well as their ability to deal with covariates measured at different measurement levels (including nominal variables).

       The random forests method[7] uses single classification trees where many trees are grown to form a forest, and each tree predictor in the forest depends on the value of some random vector (Breiman, L., 2003). After a large number of trees are generated, the trees vote for the most popular class; hence, this method is called "random forests". According to Breiman, L. (2003), a random forest is a classifier consisting of a collection of tree-structured classifiers $\{h(x,0_k), k=1,\ldots\}$ where the $\{0_k\}$ are independent, identically distributed random vectors and each tree casts a unit vote for the most popular class at input X.

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[6] A Decision Tree Forest is an ensemble (collection) of decision trees whose predictions are combined to make the overall prediction for the forest.

[7] The theoretical underpinnings of the random forests program are laid out in the paper "Random Forests" by Leo Breiman and Adele Cutler. It's available on "Random Forest reference manual", http://ucsu.colorado.edu/ breitenm/. Also found in http://oz.berkeley.edu/users/breiman/Using random forests V3.1.pdf.

In this study, the random forests are selected as proposed by Breiman (2001) who uses the strategy of a random selection of a subset of *m* predictors to grow each tree, where each tree is grown on a bootstrap sample of the training set. Each tree then gives a classification which, as it were, constitutes the tree's vote for that class. These votes are combined to make the overall prediction for the forest. The forest chooses the classification having the most votes (over all the trees in the forest). By this process, the model estimates the variables that are important in the classification.

THE EMPIRICAL RESULTS: FINDINGS

This section presents the findings of relative importance of each of the explanatory variables with respect to successful commercialization.

Relative Important Indices for the Explanatory Variables

RF classifies the importance of the variables in terms of the ones that have the greatest impact on the dependent variable of investigation. Thus, the most important one (the one used the most for the splits of the classification trees) is scored as 100 and the rest are scored relative to the most important one. The seven most important variables are graphed in Figures 1 and 2[8]. The variable ROA came out as most important, with a score of 1.0000. By using a cut-off value of 0.005 (derived from the training data), it was able to classify 78% of the 0's correctly and 70% of the 1's correctly. The listing of important indices, with regard to each explanatory variable of the study, indicate that the next seven variables, in order of importance, are: profit, depth of reach, GDP growth rate, loan size, gross portfolio, personnel, and age.

A number of interesting, but not surprising, findings emerge from the list of effective predictors of success. The five most important variables are indicative of the importance of good financial returns (ROA and ROE) wanted by investors, but also reflects concern on the cost of funds. It is observed that the model was able to highlight information opacity as a key predictor of success in commercialization. This is a very important finding, given the scarcity of information provision for making investment decisions in Africa. The listing also underscores the importance of the risk profile, quality of asset (PAR) and ability to absorb new capital (level of indebtedness) for MFIs that would be successful in accessing commercial funding.

While the random forest analyses provide a clear understanding of the explanatory variables that have a strong impact on the two dependent variables of this study, the direction of their impact is still unknown. Therefore, further analyses were undertaken on the entire sample by the step-wise analysis of the logistic models to assist in exploring the direction of the most important predictors.
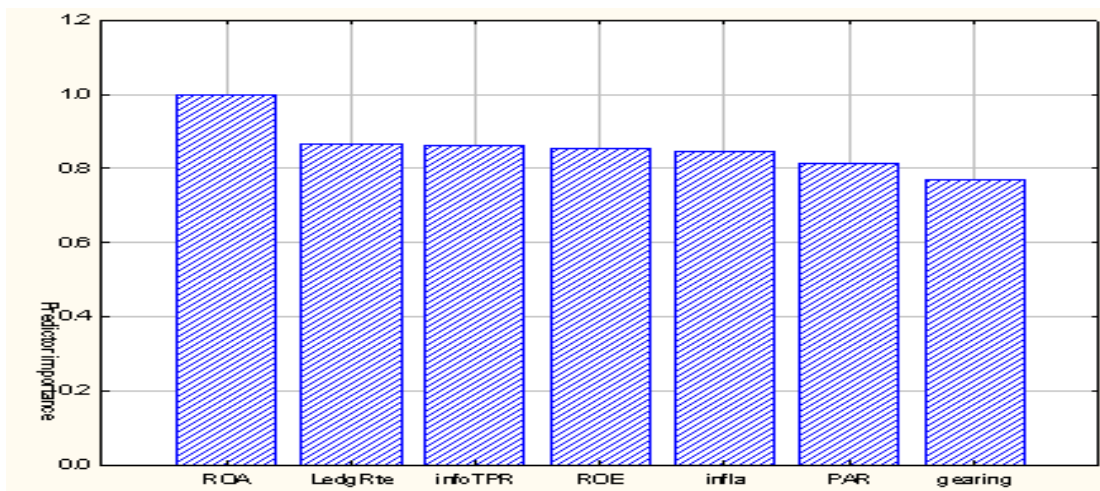
Figure 1: Top 7 Variables

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[8] This results are based on a random split of the data into 2 parts; a training set (60%) and a test set (40%). The model was built on the training set and then tested on the test set.
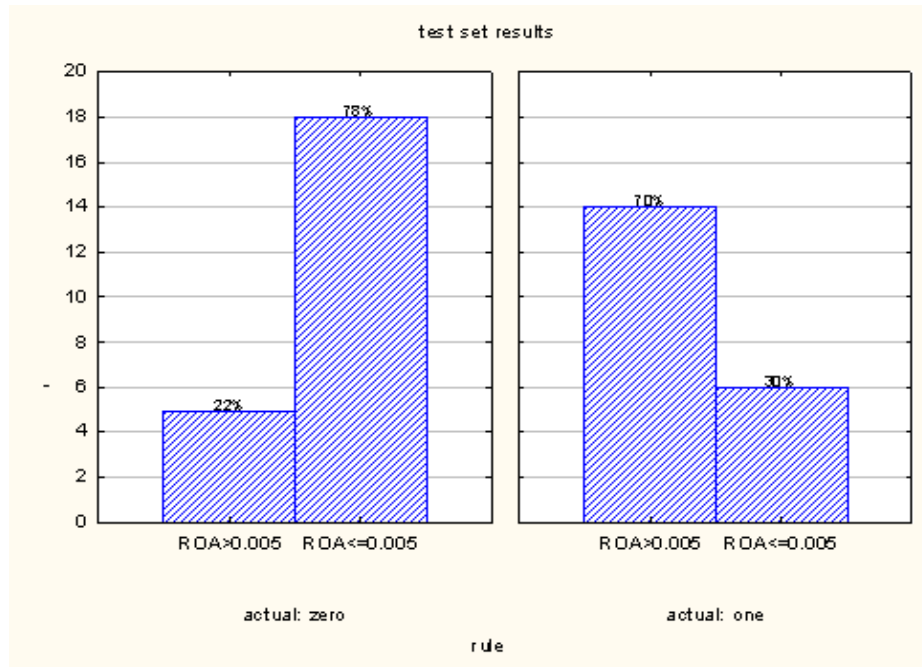
Figure 2: Most Important Variable, ROA

Factor Analytic Logit Model Results

To avoid both the problem of multi-collinearlity among explanatory variables and the possibility of too many variables in the analysis, a factor analysis was performed on all the variables, similar to that suggested by Jain, B.A. (2001) and Liu and Lee (1997). The general purpose of factor analytic procedure was to summarize the information in the original predictors with minimum loss and also to gain a strategic fit in the model as some variables could mask others. The other objective was to reduce the set of variables and use critical success factor scores[9] in estimating a maximum likelihood logit model with successful commercialization as a dependent variable.

The basic assumption is that each variable can be expressed as a linear combination of hidden factors that affect the variable and possibly other variables (Jain, B.A., 2001). Only 22 variables are subjected to a principal component analysis by the SAS FACTOR procedure to extract the most likely explanatory factors. It was not sensible to execute a factor analysis over nominal variables[10], so these were excluded together with the variable on age. A study of these factors helped to gain insight into the critical success factors affecting successful commercialization. Based on eigen-values greater than 1 criterion, a five-factor solution was selected, which accounted for 63% and 59% of the variance for C-index and LMA rating, respectively. Factor 1 accounted for 22% for LMA and 18% for C-index. Only factor loadings greater than 0.50 are used to interpret the factors.

The first factor for both dependent variables can be named the profitability model because it is loaded with commercial viability performance indicators. For the LMA, six variables are loaded onto this factor. It underscores the importance of financial sustainability and cash flow generation in attracting commercial capital. The most important three critical success factors are earning sufficiency in terms of cash flow adequacy, ROA and operating efficiency. This factor suggests that more profitable MFIs are likely to attract commercial capital and be successful in commercialization, all things being equal.

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[9] To create an entirely new set of variables for subsequent analysis, composite factor scores are computed to represent each of the factors. The factor scores are then used as the raw data to represent the independent variables in logit analyses.
[10] These were yes or no and also binary variables for: Age, Regul, Lform, GRpost, Donor, FinHealth, RpmtCap, FastGro, HGOp, InfoTPR

The second factor is size and it represents the growth and outreach model. Four factors are selected for the LMA variable while five factors are loaded for the C-index. Important indicators of size include total assets, gross portfolio amount, number of borrowers and number of personnel. This suggests that larger MFIs, measured by their asset base, are likely to be successful in commercialization. The third factor can be called the cost saving model. Five factors are loaded, which includes earning asset ratio, ability to obtain cheap finance and save on cost of funds, maintaining high portfolio quality and effective asset structure. The fourth factor - macro environment model - captures macro-economic variables, and the most important variables include the level of inflation, economic development, and cost of money in the country. Variables that load to the fifth factor include the loan size and depth of reach which are associated with social mission or poverty lending in microfinance. It is very clear from the LMA[11] factor loading that larger loan sizes are associated with commercialization. This finding suggests that commercializing MFIs are associated with mission drift. That is, MFIs that are likely to be successful do not lend to the poor in their society.

To measure the effectiveness of these five factors as predictors of success in commercialization, a factor analytic logit model was estimated using factor scores as independent variables. The factor scores were used for all cases where these five variables were combined with the nominal set for the prediction. The results for the null hypothesis (LMA, CI =0) are reported in Table 3.

Table 3: Factor Analytic Logit Models (stepwise analysis, 3 allowed) for Total Sample

Explanatory Variable	Coefficient Estimates: C-index	*p*- Values: C-index
Intercept	1.7150	0.0332
FACTOR 1	-0.9727	0.0228
FastGro (No)	1.8014	0.0194
RpmtCap ('0)	0.8149	0.0038
-2 log likelihood, constant only	= 141.143	
-2 log likelihood, full model	= 101.972	
Goodness of fit test, Pearson		*p* value = 0.5758
Goodness of fit test, Deviance		*p* value = 0.3988
Coefficient of concordance		82.2%
Contingency coefficient, original versus logistic fit classification,		c = 0.824
F- to-enter significant level	= 5%	
LMA: (stepwise analysis, 8 allowed respectively)		
Intercept	0.0278	0.9337
FACTOR 2	0.9068	0.0163
FACTOR 5	0.7193	0.0145
Finhealth ('0)	0.5336	0.1011
GRpost (G)	0.5068	0.0470
Lform (bank)	1.0977	0.0484
Lform (Coop)	0.7304	0.0938
Lform (FI)	-0.3834	0.0077
Regul (No)	0.7569	0.0147
-2 log likelihood, constant only	= 142.312	
-2 log likelihood, full model	= 118.088	
Goodness of fit test, Pearson		*p* value = 0.2006
Goodness of fit test, Deviance		*p* value = 0.0471
Coefficient of concordance		76.1%
Contingency coefficient, original verses logistic fit classification,		c = 0.762
F- to-enter significant level	= 0.2	

For the C-index, the final logistic model fitted does not include either of the size, macro-economic, or asset quality variables. The software allowed for testing the overall fit of the model; i.e., how well all the predictors of the constructs, taken simultaneously, satisfy the criterion validity requirement. To evaluate this overall goodness-of-fit, several measures were considered. The Pearson Goodness-of-fit test and the Deviance test both show that the fitted

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[11] The LMA factor analysis seems to be better than the C-index in grouping relevant variables. It also explains more variance.

model seems to be fitting well with p-values 0.5758 and 0.3988 for the null hypothesis. The value for the -2 LL measure indicates the model is good. The performance of the model is also satisfactory given a high coefficient of concordance of 82.2%. The percentages of predicted probabilities and observed responses mean that 82.2% of observations are classified as originally identified, while 17.4% are discordant with 0.4% ties. This is indicative of a high predictive accuracy of the factor analytic model with C-index as the binary variable.

The most significant variables in the logistic model are repayment capacity for commercial loans (Rpmt cap), existence of growth opportunities (FastGro), and underlying critical success factors in FACTOR 1. Five profitability indicators are selected in FACTOR 1, with the most influential being earning sufficiency of the portfolio or liquidity (EarnSuff), operating efficiency and return on assets (ROA). The negative coefficient for FACTOR 1 (profitability model) means that a MFI has a high probability of failure to succeed in commercialization (low CI-value) if its ability to earn profit on earning assets is low. As expected, low or no growth opportunity in the country of operation diminishes chances of success in commercialization. This result is interesting as it confirms other research findings that fast-growing firms need external finance (Upneja and Dalbor, 2001). The findings also emphasize that commercial funds are costly and that a MFI must have the ability to raise sufficient return to repay costly debt as well as maximize shareholder value.

The LMA measure of simple increase of leverage singles out the legal form of an institution as important in attracting investors. It emerges that being an NGO-MFI is positively associated with access to capital, unlike institutions that are banks, financial institutions or cooperatives. As can rightly be predicted, being under the supervision of the national central bank (regulated) is important in accessing commercial capital. Regulated institutions are seen by investors as more safe than unregulated ones. FACTOR 5 (social mission model) is significant with a positive coefficient. It settles the long-term debate as to whether commercialization causes mission drift in microfinance. It is clear that commercializing MFIs will have larger loan sizes and low depth of reach which is not consistent with serving the poor. Finally, the results support the conjecture that larger MFIs are successful in attracting commercial investors. The size of the organization says something about absorption capacity given small loan sizes in the microfinance industry. Investors, therefore, will be looking at larger and profitable MFIs for their investment portfolios.

Having identified the success factors for accessing commercial funding brings the question, "Are MFIs in Africa able to meet the conditions set by the indicators of success?" The next section explores the major issue of whether commercialization is taking root in Africa, and or profiles the degree of commercial access across firms, countries and regions in the continent. The trend in the region and what institutions are relying on for their growth needs is also reported.

Studying the Evolution of Commercial Funding Patterns across Countries in Africa

The country likelihood of future success with commercial microfinance is investigated in order to maximize the modelling of reality. The results of the examination of which sources of finance are likely to play a major role in relaxing the financing constraint on growth MFIs in Africa are also shown. Focus was put on efforts made by African MFIs in tapping the financial markets in comparison to waiting on donations. The examination of the 21-country sample looked at dynamics of commercial microfinance, following estimation procedure suggested by Demirguc-Kunt, A. and Maksimovic, V. (1998). Thus, for each MFI, the predicted rating binary variable was obtained for either the C-index or LMA rating. As necessary, dummy variables were formed for each MFI, based on the parameter under investigation that takes on the value of 1 and 0. For each country, the proportion of MFIs that have access to commercial funding over the sample period was found. Performance results on degree of success with commercialization per country are shown in Table 4 for the estimated leverage ratios of sample countries.

Table 4: Proportion of Portfolio Supported by Donations (quasi-equity financing) over Sample Period ('98-'03)

Country	Yr 3	Yr 2	Yr 1	Leverage ratio
All Africa	52%	52%	57%	48%
Benin	43%	57%	43%	57%
Cameroon	25%	13%	38%	75%
Congo DRC	0%	0%	25%	100%
Egypt	40%	40%	80%	60%
Ethiopia	64%	73%	64%	36%
Ghana	100%	100%	50%	0%
Cote d'Ivoire	0%	0%	0%	100%
Kenya	57%	71%	71%	43%
Madagascar	22%	33%	33%	78%
Mali	67%	33%	33%	33%
Morocco	100%	100%	100%	0%
Mozambique	0%	0%	100%	100%
Nigeria	75%	100%	75%	25%
Rwanda	100%	100%	100%	0%
Senegal	67%	67%	67%	33%
South Africa	50%	50%	50%	50%
Tanzania	80%	100%	100%	20%
Togo	40%	20%	20%	60%
Tunisia	100%	100%	100%	0%
Uganda	53%	40%	60%	47%
Zimbabwe	100%	67%	67%	0%

In terms of the relative proportions of the different types of financing, Table 4 indicates an almost equal proportion between IBF (interest bearing funds-all forms of debt plus savings deposits) and N-IBF (donations plus share capital and retained earnings) for MFIs in Africa. By and large, quasi equity (donations) play an important financing role. This notwithstanding, a transition is taking place. There is a greater use of IBFs over time. Columns II to IV provide an estimate of the trend over three years and defines commercialization efforts per sample country. For example, three years ago, 57% of the portfolio in sample Africa MFIs was financed by donations, internal resources, and share capital. This has continued to decrease over time and now stands at 52%. This reflects a gradual replacement of donations and equity capital with commercial capital. Different countries across Africa have differing choices of finance type and/or practice. Some have a reverse trend while others are moving away from donations.

While it is true that most MFIs tend to rely on donations, the importance of this source of finance seems to be declining. Clear examples of increased attraction of interest-bearing debt (commercial capital) include Egypt, Kenya, Madagascar, and Tanzania. From a country perspective, this is where the strategy of commercialization in Africa is taking root. The results are also consistent with what is happening in those counties; for example, the first microfinance bank in Africa was started in Kenya in 1999! Subsequently, in 2005, the first MFI to issue a bond was in Kenya. Countries with high levels of non-interest bearing finance sources include Ethiopia, Morocco, Nigeria and Senegal. It is to be noted that in Africa, Ethiopia was the first country to enact a microfinance regulatory bill in 1996. As expected, equity financing plays a key role.

Column V of Table 4 indicates the estimated proportion (All Africa - 48%) of portfolio financed by commercial funds over the sample period. Not surprisingly, sample MFIs generally obtain as much funding from donors as from commercial sources. The results are reflective of two things: 1) that some MFIs have been more successful in commercialization or 2) some countries have better enabling environment for commercialization to thrive more than others across the continent.. This development in Africa, per these results, is comparable with the larger trend of the industry as obtained in studies of funding patterns in Latin America (Jansson, 2003). Jansson (2003), in a study of 97 MFIs in 14 countries, reported that regulated institutions tend to rely less and less on subsidized funds and more on savings deposits. He notes that financial leverage generally increases after transformation, and if funding is accessible in the country, the leverage of institutions will increase rapidly. The results show that the speed of increase in financial leverage per country depends much on the dynamism of the

market[12] and level of development of the finance sector. Judging from the estimated leverage ratio and observed trend, it is indicative that the next important finance source for microfinance in Africa is commercial funds. This source of finance is therefore likely to play a major role in relaxing the financing constraint on growth of MFIs in Africa.

Where are the Next Portfolio Investments in Microfinance Likely to be Found?

In this section, the likelihood of success with commercialization based on the measures of success are explored: leverage multiplier added and C-index rating. Table 5 carries a summary of the degree to which MFIs in a country are likely to succeed in Commercialization and also the current access levels to private capital. Higher percentages indicate higher proportion of MFIs likely to succeed in the country or status of commercial capital access, while low values show higher dependency on donations.

Table 5: Commercial Access Status and Likelihood of Success Ranking

Country	Commercial Funding Access Status	Country	Success Likelihood
Nigeria	1.00	Tunisia	100%
Senegal	1.00	Morocco	100%
South Africa	0.75	Uganda	73%
Benin	0.71	Kenya	71%
Madagascar	0.67	Senegal	67%
Zimbabwe	0.67	Benin	57%
Ethiopia	0.64	Ethiopia	55%
Kenya	0.57	Nigeria	50%
All Africa	0.53	Congo DRC	50%
Congo DRC	0.50	All Africa	44%
Ghana	0.50	Tanzania	40%
Morocco	0.50	Mali	33%
Uganda	0.47	South Africa	25%
Tanzania	0.40	Cameroon	25%
Togo	0.40	Togo	20%
Mali	0.33	Madagascar	11%
Cameroon	0.25	Zimbabwe	0%
Egypt	-	Rwanda	0%
Cote d'Ivoire	-	Mozambique	0%
Mozambique	-	Cote d'Ivoire	0%
Rwanda	-	Ghana	0%
Tunisia	-	Egypt	0%

Column II of Table 5 presents an index measure of proportion of MFIs accessing commercial funding across countries in Africa and access increases with higher index values. This ranking of country attraction of commercial capital reflects the status and/or probability of firms likely to succeed in commercial microfinance. The critical value was set at 50% where the assumption was made that ranking of commercial success predicts an MFI/country as successful when a percentage higher than 50% is obtained. Thus, less than half (40%) of the MFIs in Tanzania have access to the capital markets and therefore adopted a commercialization strategy for funding their portfolio. The results show that the sample just passes the 50% mark (Africa overall - 53%) to suggest that most MFIs in the continent, as estimated, can attract and are tapping commercial capital. This status ranking confirms that Africa, as a continent, has just started the transition to private capital and is indeed breaking away from donations or traditional approaches of financing microfinance (Cheritonenko, S. et al., 2004).

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[12] In some countries such as Cote d'Ivoire, Rwanda, DRC Congo and Mozambique the results reflect more on the low development of the finance sector. In some cases, the stated percentages may reflect a dysfunctional economy or industry while in other countries it shows government subsidies or market distortion. This is the case of Tunisia, Morocco, and Zimbabwe.

Meehan, J. (2004) highlights four large pioneering capital access deals involving MFIs and the capital markets. The author notes that investors are beginning to see microfinance for the poor as an investment opportunity even though entry is slow. This is particularly so because leading MFIs that would have shown the way are still courting with donors. Notwithstanding, it is clear from the above results that the desire to tap the capital markets and capacity to link with commercial investors is a realizable vision[13].

Column II of Table 5 reveals that only MFIs in 10 countries are not able to access commercial funding. Among the 10, five are noteworthy - Egypt and Tunisia show low proportions for reasons that in these countries microfinance thrives on government subsidies or donations. For Rwanda, Cote d'Ivoire, and Mozambique, the effect of war has resulted in a weak industry and therefore less interest by investors or absence of a well functioning banking/financial sector. On the other hand, 60 to 100% of MFIs in seven countries have good access to commercial capital to expand their loan portfolios. Results show that more than half of the countries in our sample will struggle (44% likelihood degrees of success) to be successful in commercialization.

Table 6 results reveal regions where successful commercialization is taking place. As per the findings, the LMA rating result in Column III is reflective of what is, than what is likely, to happen. That is "a temperature gauge" giving the status of commercial access to funding. It shows that two regions - West and Southern Africa - are experiencing greater access to commercial capital. Column IV, on the other hand, provides a prediction of which countries will achieve success in attracting commercial investors in the coming years. It is interesting to note that, in contrast to the LMA, the C-index is a good predictor in that it is able to distinctively show the shift of future use of commercial debt to northern countries and the eastern region of Africa. Attraction and future access to commercial funding differ across countries in the sample. Broadly, the findings conform to current commercialization trends in the microfinance industry (Meehan, J., 2004; Jasson, T., 2003; USAID, 2005; and Cheritonenko, S. et al., 2004) where most countries and MFIs have embraced commercialization as an alternative source of finance.

Inspection of column IV shows that all but 12 countries will most likely succeed in commercialization. Among the 12 countries likely to experience difficulties in accessing commercial capital, those in Southern Africa have particularly low proportions where our estimates show that only 0-25% of MFIs are likely to be successful in commercialization. On the other end of the spectrum are countries, such as Morocco, Tunisia, Uganda, Kenya, and Senegal, where higher proportions observed indicates a high degree of success (60 – 100%). Overall, the results suggest that less than half of the countries are likely to be successful with commercialization in the future.

By comparing across column III and IV, it is possible to obtain an indication of relative importance of commercial capital in relaxing financing constraint for MFIs in Africa. Thus, for example in the case of Ghana, 50% of MFIs have access to commercial capital over the sample period. But in the coming years, the model predicts that none of these MFIs will gain access to commercial debt. This suggests that for Ghana, the way to go is not commercialization because of the criteria for accessing private capital. In the case of Kenya, 57% of MFIs have access and a higher proportion (71%) will most likely succeed in obtaining commercial capital. For such a country, the results suggest that commercialization will play a major role in meeting the funding gap.

Whereas commercialization seems to play a vital role currently in relaxing financing constraint in Africa, the results suggest that this may not be the case in the future for most MFIs in sample countries. However, country success will be dependent on market development. This contention is consistent with observations made by McKee, K. (2001) and Charitonenko, S. et al. (2004) who noted that financing growth with commercial debt is more common in mature microfinance markets.

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[13] Meehan, J. (2004) predicts that in the next 5 to 10 years MFIs would be financing themselves exclusively with commercial sources of finance.

Table 6: Africa Regional Commercial Funding Access and Orientation Ranking

Country	Region Name	CFA Index	Degree (%) of Commercial Orientation
Egypt		0.00	0
Morocco		0.50	100
Mali	North &	0.33	33
Tunisia	Sahelian	0.00	100
Region	4	**0.21**	**58 %**
Uganda		0.47	73
Ethiopia		0.64	55
Kenya		0.57	71
Tanzania	Eastern &	0.40	40
DR Congo	Central	0.50	50
Rwanda		0.00	0
Region	6	**0.43**	**48 %**
Benin		0.71	57
Cameroon		0.25	25
Togo		0.40	20
Nigeria		1.00	50
Senegal	West	1.00	67
Ghana		0.50	0
Cote d'Ivoire		0.00	0
Region	7	**0.55**	**31 %**
Madagascar		0.67	11
South Africa		0.75	25
Zimbabwe	Southern	0.67	0
Mozambique		0.00	0
Region	4	**0.52**	**9 %**
Africa Survey	21 countries	**0.53**	**44%**

CONCLUSION

One major challenge for the theory of microfinance development is to explain the diversity of institutional performances in poverty alleviation across countries. There are still countries where people are very poor and where microfinance has not helped them, while others are making good progress and are moving away from poverty through microfinance interventions. In this study, the concern was "Why do some MFIs access funding, while others do not? What are the requirements for success in connecting to the financial markets for funding?" In an attempt to answer this question, the influence of 33 variables was analyzed to determine significant predictors of success with commercialization. The results are indicative of the importance of good financial returns and administrative efficiency (ROA, cash flow adequacy and operating expense ratio), transparent reporting and information disclosure (information opacity), and concerns for cost of funds (lending rates), as well as inflation levels in the country. Large MFIs with big loan sizes are particularly attractive. The listing also underscores the importance of the risk profile; quality of asset (PAR), and ability to absorb new capital (level of indebtedness) for MFIs that would be successful in accessing commercial funding.

Other key factors identified for enabling access to commercial funding include regulatory status, as well as whether an institution is registered as a NGO. As expected, existence of growth opportunities was highlighted as an important factor. Incidentally, the results show that it is irrelevant whether the main funding base is donations or not. This means a MFI can have multiple sources of funding, including donors, and still be attractive to investors.

The results shed light on the central issue and debate regarding whether MFIs in Africa can survive without donor funding (financial dependence). According to this study, more than half of sample MFIs are enjoying access to commercial finance while obtaining donations. However, the C-index predicts that Africa, as a continent, is entering a transitional phase and moving away from donations, but struggling to be successful in commercialization. MFIs in North African countries are more likely to be successful, followed by East and then West Africa. Each of

these groups of countries presents an opportunity for investors and indicates a likely destination for commercial funds.

Research findings support previous studies that have looked at the funding evolution of microfinance institutions. The results have important implications for investors, as well as for MFIs seeking capital. Regulated MFIs pursuing commercialization schemes in Africa need to show good financial performance metrics, a sizeable amount of assets (big balance sheet), and quality loan-book. Growth prospects and an enabling environment will also be more beneficial to commercial investors. Small, slow-growing and unprofitable MFIs that offers small loan sizes do not appear to access significant amounts of capital from commercial sources. Such institutions are probably better off seeking donor development funds.

This paper has developed the pathway through which a MFI can become part of the financial landscape, and it identified the factors that underpin success in commercializing microfinance institutions. It is suggested that this model can be useful within organizations to establish the baseline measures for future success in commercialization. It can also be helpful for investors to simply take MFI's temperature, relative to the level of access to commercial funding and possession of key performance requirements in microfinance. Among organizations, it can provide a useful industry profile and relative ranking in terms of adoption of the strategy of commercialization.

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