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The Performance of Microfinance Institutions in Cameroon: Does Financial Regulation Really Matter?

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Abstract:
Microfinance and its origin are associated with poverty reduction. Despite increased regulation on microfinance institutions, challenges in terms of financial sustainability and social responsibility still persist. The main goal of this paper is to assess the effect of financial regulation on the dual performance of microfinance institutions in Cameroon. The Data Envelopment Analysis method and the censored Tobit model were used on data of 169 microfinance institutions of the Cameroon Cooperative Credit Unions League network for the year 2009. The results reveal that the input oriented efficiency level of the network is estimated at 0.422 when return to scale was constant and 0.534 when they were variables. Further findings reveals that elements of financial regulation such as risk coverage ratio and fixed assets coverage ratio significantly compromise MFIs efficiency where as the size of the MFI, the deposit interest rate and belonging to the Anglophone regions significantly has a positive influence on the MFIs efficiency. The paper therefore recommends the adoption of regulatory rules which account for country peculiarities.
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JEL classification: C14, C24, C61, C67, E44, G21, G28.

1. Introduction

The history of microfinance is closely linked with poverty reduction. Although the beginning of cooperative savings and credit activities can be traced back as far as in 1849 with the foundation in Rhineland of the first cooperative society of saving and credit by Raiffeisen, it is truly with Yunus in 1976 with the creation of the Gramen Bank that one can situate the birth of "modern microfinance" (Blondeau, 2006). Microfinance was originally conceived as an alternative to banks, which in most developing countries serve only 5 to 20% of the population (Gallardo et al., 2003), and informal moneylenders. With the passage of time, the microfinance sector has evolved. Microfinance institutions now have more than 100 million clients and achieve remarkable repayment rates on loans (Cull et al, 2009).

The rapid growth of microfinance has brought increasing calls for regulation, but complying with prudential regulations and the associated supervision can be especially costly for microfinance institutions (Cull and al., 2009). Since regulation remains a precondition for deposit taking in many countries, more MFIs seek to transform into regulated entities to access cheap and local currency deposits. Regulation also opens the door to a variety of funding opportunities and helps to reduce the overreliance on subsidies. Donors and microfinance practitioners are well aware that micro lenders need to prepare for the day when subsidies disappear (Aghion and Morduch, 2005).

Just like many other African countries, the microfinance sector's springboard in Cameroon was the banking system restructuring engaged by the Ministry of Finance (MINFI) and the Banking Commission for Central Africa (COBAC). The expansion of MFIs in Cameroon during the 1980s can highly be explained by the gap left by the restructuring of the banking sector in most developing countries, which was characterized by the restraining or rationing of credit opportunities. Cameroon was not an exception.

In Cameroon, the history of microfinance dates back to more than one century in its traditional form popularly known as "*Njangi* or *Tontine*"[1]. The introduction of "modern" microfinance in Cameroon started in 1963 by a Catholic priest Father Alfred Jansen, in Njinikom in the North-West Region of Cameroon (Creusot, 2006). This idea of Credit Unionism spread all over the North-West and South-West regions of Cameroon and by 1968, 34 credit unions that were already in existence joined together to form the Cameroon Cooperative Credit Union League (CamCCUL) Limited. CamCCUL is therefore the umbrella organisation of cooperative credit unions and the largest MFI in Cameroon and the *Communauté Économique des États de l'Afrique Centrale* (CEMAC) sub-region (www.camccul.org). There are more than 460 registered MFIs in Cameroon with a sum

[1]"*Njangi* or *Tontine*" is a common type of informal financial arrangement found throughout the world known in microfinance literature as Rotating Credit and Savings Association (ROSCA).A ROSCA consists of a group of community members who meet regularly and pool their savings. The savings are then lent out to one member of the group, who repays it; and the circle continues.

amounting to over FCFA 258 billion which has been accumulated by way of deposits from close to one million customers (Gwasi and Ngambi, 2014).

Microfinance has been defined therefore as "a credit methodology that employs effective collateral substitutes to deliver and recover short-term, working capital loans to micro entrepreneurs"(CGAP[1], 2003). The roots of microfinance lie in a social mission of enhancing outreach to alleviate poverty. More recently there has been a major shift in emphasis from the social objective of poverty alleviation towards the economic objective of sustainable and market based financial services (Rauf and Mahmood, 2009). The difference between microfinance and commercial lending lies within the concepts of joint liability or group lending, dynamic incentives that allow for an increase in size of loans over time, regular repayments schedules and alternative collateral through forced savings (Gine 2003). For example, joint liability helps to overcome adverse selection (borrowers know who in their community is a credit risk) and moral hazard (borrowers can monitor each other), and to enforce auditing (by ensuring borrowers are honest in the case of default) and repayment as borrowers can impose social sanctions on defaulters (Ghatak and Guinnane, 1999). These alternatives to collateral are especially important for borrowers who do not have assets to pledge, and for lenders who operate in countries with weak secured lending laws and enforcement.

On a global note, the microfinance industry has realised important growth rate and as the number of microfinance institutions and customers continue to grow, regulation of the industry becomes a question of interest since the sustainability of these institutions is highly debated. A more efficient micro financial sector may eventually translate into higher rates of economic growth and thus the ability of governments to alleviate poverty. Despite the increasing regulation of the microfinance sector in Cameroon and the constant efforts being made by the government authorities[2] to enhance the performance of these MFIs, the sector still faces a lot of challenges. Regular news about the microfinance sector in Cameroon is the constant close down of several microfinance establishments or the sudden and spectacular bankruptcy of some MFIs which reduce customers' confidence. We still have in mind the COFINEST and FIFFA cases. The sector is also criticized for providing services only to bankable customers and on almost same conditions as banks forgetting their social responsibility of providing financial services to those who are excluded from the traditional banking system. This can be explained by the fact that these MFIs are mostly emanations of banks and therefore operate with their mother bank conditions. According to the COBAC report on the microfinance sector (2008), the level of not performing loans and default rate are still very high in the sub-region.

Moreover, interest rates still remain globally very high than those of the banks although less than interest rates charged by informal moneylenders in spite of competition (COBAC 2008). The volume of loans and savings mobilised by the sector is still very low as compared to that of the banking sector (about 5.5% of the banks' deposits and 4.8% of the banks' loans in 2008 against 7% and 6% respectively in September 2007). More so, there is uneven geographical distribution of MFIs across the national territory (Fotabong, 2012; Kobou et al., 2009), with less than 48% of these MFIs located in rural areas meanwhile close to 60% of the population of Cameroon leaves in rural areas. Despite the remarkable expansion of savings, the transformation coefficient into credit still remains very low and more seriously, is the violation of basic prudential norms stipulated by the Banking Commission as well as poor internal control.

Many research studies have been carried out on the effect of financial regulation on micro financial institutions performance among which are those of Hubka and Zaidi, 2005; Cull and al., 2009; Ndambu, 2011 and broadly on the determinants of MFIs performance (Kobou et al., 2009; Kablan, 2010). However, these empirical studies yield divergent results. While some studies revealed a positive relationship between regulation and MFI performance other showed a negative effect. Also, a third group of studies showed no significant effect of financial regulation on MFI performance. Though increasing regulation has become an issue in the microfinance sector; studies analyzing its effect on performance remain limited in number in Cameroon (Fouda-Owoundi, 2010). Even when these studies exist, they failed to account for the dual mission of MFIs which is providing banking services to the poor while remaining financially sustainable. Most importantly, there is no definite answer as to whether increasing regional regulation affects MFIs financial performance positively or negatively.

Based on the above, the present paper seeks principally to assess the influence of financial regulations on the efficiency of MFIs in Cameroon. In other words, does financial regulation really matter for the performance of MFIs in Cameroon? The rest of the paper is organised into four sections. Section two looks at the conceptual, theoretical and empirical literature while section three deals with the methodology. Section four presents and discusses the findings and section five summarises the major findings and outlines some policy

[1]Consultative Group for Assistance to the Poor

[2]These efforts are perceptible through programmes such as Rural Microfinance Development Support Project (RMDP) known in his French acronym as PADMIR and the National Microfinance Support Project which a broader program than the previous one

implications.

2. Literature Review

2.1 Conceptualization of Financial Regulation

The rapid growth of microfinance has brought increasing calls for regulation, but complying with prudential norms and the associated supervision can lead to additional costs for microfinance institutions. For example, the costs of complying with regulation in the United States are approximately equal to 12 to 13 percent of banks' non-interest expenses (Elliehausen, 1998). According to Christen et al. (2003), compliance with prudential regulations could cost a microfinance institution (MFI) 5% of assets in the first year and 1% or more thereafter.

Regulations on banks are meant to preserve their stability and protect public deposits (Carrasco, 2006). Because of information asymmetries between shareholders, debtors, and depositors, banks are generally more heavily regulated than other companies. Depositors are vulnerable to banks engaging in risky high-profit operations that threaten the security of their deposits. To counterbalance this vulnerability, regulations are placed on banks. These regulations either impose constraints on the bank to deter them from engaging in excessively risky activities, or provide the bank with a set of incentives to align their private objectives with their social goals (Carrasco, 2006). These regulations can be divided into two different types: prudential and non-prudential. Prudential regulation intends to preserve the stability of the bank by establishing penalties that deter institutions from taking excessive risks. Non-prudential regulation seeks to promote good behaviour in the system by requiring consumer protection, information disclosure, and fair business practices (Llewellyn, 1999).

The rationale behind banks regulation can also be applied to MFIs, especially because MFI depositors possess only micro savings as compared to their counterparts at traditional banks. Any failure of a MFI might lead to indefinite discouragement from participating in the financial system (Carrasco 2006). Furthermore, the regulation of MFIs serves as a means to build the confidence of commercial banks in these institutions, which is their main funds provider.

There are several ways in which the industry might gain from financial regulation (Llewellyn, 1999). It might enhance competition and the overall efficiency of the industry; increase consumer welfare and encourage a better management of financial risks by the supervisees. However, regulation is not imposed without costs, which are faced by the supervisees, the supervisor and the market itself. The latter could include a possible inhibition of competition, the stifling of innovation and forced choice of consumers (Goodhart et al, 1998).

Financial regulation formulated to enhance the development of the financial sector has sometimes been the result of pure intuitions, of rational reflections that transit throughout reality's periphery without arriving at it, and, in other cases, a mere transposition of foreign experiences or purely empirical normative models. There may be countervailing or amplifying effects between various elements of regulations, if implemented simultaneously (Caprio et al. 2008). Greater restrictions on bank activities can be essential in countries with insufficient private monitoring, whereas restricting bank entry with weak official supervision may lead to financial stability (Barth et al. 2008).

2.2 Microfinance Performance

Performance in microfinancial orientation is a subjective measure of how well a MFI can use assets to attain its objective. It is a multidimensional concept without an acceptable and uniform definition. Performance can be broken down into two sub concepts: effectiveness and efficiency. While the former measures the ability to attain the organisational goals, the later measures the ability to attain the organisational goals at the minimum costs. The microfinance sector faces a dual objective usually referred to as the microfinance schism, that is, how to reach the maximum number of poor (social performance) while remaining financially sustainable (financial performance).

As microfinance are viewed predominantly as instruments of social change, their performance are often measured by non-financial parameters. The concept of social performance has seemed to overshadow the state of financial health of these enterprises. However, tradition in microfinance analysis studies has been the combination of Financial Performance and Outreach (Chaves and Gonzales-Vega 1996, Ledgerwood 1999, Yaron, 1992, Yaron 1994, Yaron et al., 1998).

Traditionally, some financial ratios like return on asset (ROA) and return on equity (ROE) are used to measure financial performance. However, with the evolution of quantitative techniques, more sophisticated and inclusive measures have been developed. This study focuses on the efficiency of microfinance institutions and to be more precise, on the financial and outreach technical efficiency of MFIs in Cameroon. Unlike traditional measure of performance, the financial outreach approach provide a performance measure that account for both the financial and social role of MFIs. As such it is a more comprehensive measurement approach.

Efficiency means allocating scarce resources to generate the maximum potential benefit. Getting better results with the same inputs as well as using the smaller amount of inputs to achieve the same results is still a sign of efficiency. There are basically two types of efficiency: technical efficiency and functional efficiency or

allocative efficiency. The first, also called productive efficiency refers to the ability of a program, or an institution to produce the maximum amount of production using available inputs (that is, to produce at the production possibility frontier). Put differently, technical efficiency implies the maximum possible output from a given set of inputs. Within the context of microfinance, technical efficiency then refers to the physical relationship between the resources used (capital, labour and equipment) and, financial and social outcomes (loans, number of borrowers, average loan per borrower, percentage of women borrowers etc).

Secondly, allocative efficiency reflects the ability of an organization to use these inputs in optimal proportions, given their respective prices and the production technology. Productive efficiency is concerned with choosing between the different technically efficient combinations of inputs used to produce the maximum possible outputs. Thus, the overall *economic efficiency* means the ability of a production unit (MFI in our case) to achieve both technical and allocative efficiency.

2.3 Brief Overview of Cameroon Regulatory Framework for Microfinance Activities

Providing access to finance to the poor has been considered as one of the tools for poverty reduction and economic development (Morduch and Haley, 2002). Asymmetric information and transaction costs (markets imperfections) and lack of collateral explain, at least partially why the poor lack access to financial services (Meyer and Nagarajan, 2000). However, innovative lending technologies such as join-liability lending (Ghatak, 1999), prior savings lending and co-making lending may serve as the solutions to asymmetric information problems and lack of collateral. Irrespective of the approaches to microfinance, millions of poor people are in need of financial services and this calls for regulation in order to protect both the depositors and the lenders, and in a long run, to prevent the systemic risk.

Before 1998, MFIs activities in Cameroon were placed under the tutorship of the Ministries of Agriculture and the Ministries of Finance because microfinance was initially seen as essentially suited for the promotion of rural and agricultural activities (Mbemap, 2009). As a result of many irregularities in the field and due to little or no supervision and control expertise at the level of personnel working in the Ministry of Agriculture, there was an urgent need to protect the public and guard depositors' funds. This led to a Prime Ministerial decree that puts the granting of licenses, supervision, and control of all MFIs under the Ministry of Finance and the Central Africa Banking Commission (COBAC).

In Cameroon, MFIs are regulated by three different laws: (1) the national law, (2) the COBAC law, (3) the Pan African Organization for Harmonization of Business Law in Africa (OHADA). Each institution is compelled to comply with these frameworks paying attention to the basic prudential norms as stated by COBAC[1]. However, despite the existence and clear definitions of these laws and regulations, dissemination among major stakeholders remains relatively poor (Mbemap, 2009).

The regulatory framework of microfinance activities in the CEMAC region used till date was implemented in 2002 and is known as "Standard n° 01/02/CEMAC/IMAC/COBAC Organization and supervision of microfinance activities in the CEMAC". It focuses on the nature of the activities and defines microfinance in its article one as "activities undertaken by authorized entities that are neither banks nor financial institutions but take savings or deposits, give out credits or loans and offer specific financial products to those generally excluded from banking networks". The text classifies microfinance institutions under three categories.

- *Category one* are institutions that collect savings and deposits and lend them exclusively to their members. This category includes associations, cooperatives and credit unions**.** There is no stipulated capital for category one institutions, instead COBAC text requires the capital to be sufficient to cover and meet up with stipulated prudential norms.
- *Category two* are institutions that collect savings and deposits and lend them to third parties. This category groups limited liability companies that function more like mini banks. The minimum capital for category two institutions as stipulated by the text is 50million FCFA.
- *The third category* is made of lending institutions that do not collect savings and deposits. They include micro credit and project finance institutions. The minimum capital requirement for a category three institution is 25millions FCFA.

In addition, there are networks which are not a special category *per se* but which may be required to comply with an additional layer of requirements pertaining to the legal status. The COBAC regulation standard recommends the creation of a single professional association in each member country for all microfinance operators. These professional associations are expected to serve as link between policy makers, donors and MFIs and also provide input into the development of microfinance strategic plans. They are also expected to facilitate the prudential role of regulators by fostering transparency and sustainability in the sector through improved professionalism and innovation (Mbemap, 2009).

[1]As part of the 2002 regulation, COBAC also established 21 regulations defining prudential ratios, and existing MFIs were compelled to comply with these ratios by the end of April 2007.

2.4 Empirical Literature

Ledgerwood (1999) discussed the impact of policy and regulatory issues on MFIs. Many policy issues are addressed, but two are recognized as playing a large role for sustainability, an appropriate regulatory environment and strong property rights. Woller and Woodworth (2001) cited many impact studies and conclude that governments must "create a macroeconomic environment characterized by stable growth, low inflation, and fiscal discipline". They further suggested that poor macroeconomic, regulatory and trade policies will undermine the viability of small business owners and the MFIs that support them. Hubka and Zaidi (2005) found that governments can help market-based microfinance by eliminating unfair competition from public institutions; undertaking overall regulatory reform; and improving the overall business environment.

Mersland and Strøm (2009) used an endogenous equation approach to find that regulation (measured by a regulation dummy variable) does not have a significant impact on financial or social performance. Kablan (2012) used a Tobit model to demonstrate that good financial and portfolio management have positive effect on microfinance institutions in WAEMU[1].

Ndambu (2011) assessed the impact of regulation on microfinance performance (Operational Self Sufficiency) in a multivariate analysis using 2008 cross section data from 192 institutions in 32 Sub-Saharan African countries. The results obtained did not show sufficient evidence that the regulatory status increases the sustainability of MFIs nor does the deposit intermediation. However, after controlling for the regulatory capacity, there was clear evidence that countries with a high Official Supervisory Power had more sustainable MFIs and it is only after integrating the Official Supervisory Power in the model that the deposit intermediation coefficient became significant and positively associated with the Operational Self-sufficiency.

Yu et al. (2014) used the two Stage Least Squares (2SLS) model on data collected from the MIX market[2] dataset and the World Bank dataset to analyse the indirect impact of traditional prudential regulation, as proxied by the Capital Adequacy Ratio (CAR) requirements, on the sustainability and profitability of MFIs on one hand; the causal relationship between MFI outreach, represented by percentage of active female borrowers, and the MFIs profitability on the other hand. Their findings associate more stringent prudential regulation with increases in MFI profitability and decreases in outreach. Furthermore, the 2SLS results demonstrate a negative causal relationship between MFI outreach and profitability. The study therefore recommends that, when imposing regulation on MFIs, emerging market policy makers should look beyond standard balance sheet items, and account for metrics such as MFIs percentage of women borrowers.

Using a broad survey of 559 regulated and unregulated for-profit microfinance institutions (MFIs) in 86 countries to examine the effects of competition and regulation on MFIs performance during 2002 to 2009, Smith (2011) discovered that competition undermines MFIs performance and regulation enhances the negative effect of competition on MFIs. More precisely, the author constructed a measure based on the Lerner index and control for MFI-specific and country variation and the results showed that competition negatively affects MFI performance, in terms of cost expended per borrower and profit margin, but does not seem to significantly affect outreach. He also showed that regulation enhances the negative effects of competition, demonstrating that current regulatory practices seem to be impeding microfinance's objectives of efficiency and sustainability.

In Cameroon, Fouda-Owoundi (2010) examined the effect of some prudential ratios on the performance of some 180 MFIs of the CamCCUL network during the period 2007-2008. Using the Ordinary Least squares and panel data techniques of estimations, he discovered that regulation negatively affects these MFIs performance.

Several studies have been carried out to analyse the relationship between regulation and MFIs performance. The findings from these studies yield mixed conclusions. While those from Ledgerwood (1999), Woller and Woodworth (2001), Hubka and Zaidi (2005) revealed a positive or conditional effect of regulations on MFIs performance, those of Fouda-Owoundi (2010); Smith (2011); Yu et al. (2014) revealed a negative relationship between some regulatory instruments and MFIs' performance. Others among which are Hartarska and Nadolnyak (2007), Mersland and Strøm (2009), Ndambu (2011) observed no significant relationship between regulations and microfinance institutions performance. Based on the above, this study is designed to examine the relationship between financial regulation and MFIs performance in the Cameroon context.

3 Data and Methodology

3.1 Scope and Area of Study

This study used cross-sectional data of the CamCCUL network for the year 2009. Data were collected from secondary sources (balance sheet, trial balance, income and expenses statement, prudential ratios status document as prepared and validated by the Board of Directors of CamCCUL).

The choice of the Cameroon Cooperative Credit Union League (CamCCUL) was motivated by the fact

[1] West Africa Economic and Monetary Union
[2] Microfinance Information Exchange Market

that this network is a major actor of the microfinance sector in a Cameroonian financial sector dominated by traditional banks. Some additional statistics of the CamCCUL network are presented in table 1 below:

Table 1: Some statistics of the CamCCUL network in 2008

Localisation of 178 MFIs		**Members = 252 629**		
Rural	**Urban**	**Men**	**Women**	**Groups**
67%	33%	58,96%	33,50%	7,54%
Value in percentage				
			Cameroun	**CEMAC**
Market share			32%	-
Capital = 4,78 Billions Fcfa			21,5%	18,57%
Deposits = 74,89 Billions Fcfa			29%	19,75%
Loans = 44,89 Billions Fcfa			32,41%	25,40%
Members=252 629			23,53%	16,57%
Agences			23,40%	15,36%

Source: COBAC, 2008

It is the oldest and most experienced microfinance organisation in Cameroon. Moreover, it is the most organised and important network at the national and regional level (Kobou, 2009). The CamCCUL network alone holds more than 29% of the volume of deposits collected and 32% of credit distributed by the microfinance sector in Cameroon (COBAC 2008). Thus, we can assume that our sample is representative of the national microfinance industry, hence can serve as a barometer. CamCCUL is also present in almost all the regions of the country both in the rural and urban areas as can been observed in table 2:

Table 2: National distribution of CamCCUL MFIs in 2008

Region	**AD**	**EN**	**CE**	**ES**	**LT**	**NO**	**OU**	**NW**	**SW**	**SU**	**Total**
Number of MFIs	1	4	6	0	16	21	16	66	44	4	**178**

Source: Cameroun-Tribune of July, 17th 2008 in Kobou et al.2009

Except from the East region of Cameroon, CamCCUL had 178 credit unions in 2008 spread all over the national territory with the majority 110 of them found in the North-West and South-West regions.

The present study looks at the levels of efficiency of MFIs affiliated to CamCCUL and factors that determine these levels of efficiency with main focus on financial regulation variables. Therefore, this is a two sided type of research: analytical on the one hand and causal on the other hand. In order to achieve our objective, the paper is centred mainly on two models: the Data Envelopment Analysis (DEA) and the censored Tobit model.

3.2 Methods of Data Analysis

3.2.1 The Data Envelopment Analysis Model

The present paper used a non parametric approach to estimate the score of efficiency of MFIs affiliated to CamCCUL. This was done taking into consideration the dual role of these institutions which is reaching the poor while remaining financially sustainable. DEA essentially calculates the economic efficiency of a given organization relative to the performance of other organizations producing the same good or service, rather than against an idealized standard of performance. It assumes the existence of a convex production frontier. This frontier in the DEA approach is constructed using linear programming method. The term envelopment comes from the fact that the production frontier envelops the set of observations and any point below the frontier is considered as technically inefficient. This non parametric approach offers two main advantages as compare to parametric approaches. In fact, two requirements condition the use of parametric approaches:

- It requires a perfect knowledge of the functional shape of the production function. The chosen functional shape implies specific hypotheses on the distribution of the error terms (for example identically, normally and independently distributed). Thus, if the model is wrongly specified, the measured efficiency will be skewed (biased) by an error of specification (Berger et Humprey, 1997).
- Parametric approaches are also recommended for production units using one input to produce one or many outputs which is not the case with microfinance institutions which are multi-inputs and multi-outputs organisations.

Given that the above conditions cannot be clearly established with the case of microfinance, the use of the non parametric approach is recommended. Consequently, the DEA method is preferable for our analysis since it does not require the knowledge of a particular functional form of the production function and MFI use many inputs to produce many outputs. DEA allows the calculation of technical efficiency measures of Decision Making Unit (DMU) that can be either input or output oriented. The purpose of an output-oriented study is to evaluate by how much output quantities can be proportionally increased without changing the input quantities used. One could also try to assess by how much input quantities can be reduced without changing the level of

output. It is the input oriented approach and this is the perspective taken in this paper. The two measures provide the same results under constant returns to scale (CRS) but give different values under variable returns to scale (VRS).

The DEA model is a mathematical model that gives the relation between inputs and outputs of a DMU. Though many studies adopted the production approach, this study used an intermediation - outreach approach of efficiency measurement quite similar to that of Kablan (2012). Our input oriented DEA model consists of three (3) inputs and four (4) outputs:

- **Input A** : capital measured by the sum total of capital and reserves plus long term loans from other financial institutions(Kobou et al, 2009; Kablan, 2012)
- **Input B** : savings including deposits
- **Input C** : Labour measured by the total amount of staff payroll (Kobou et al, 2009)
- **Output A** : Gross Loan Portfolio which is the total amount of loan offered by the credit union during the year (Cornée, 2006; Boudour and Boudabbous (2011); Kablan, 2012);
- **Output B**: Number of Active Borrower measured by the number of members of the MFI (Boudour and Boudabbous (2011); Cornée, 2006; Kablan, 2012);
- **Output C**: Percentage of Women Borrowers which is an indicator of the social performance of MFIs. In other words, it is highly believed in microfinance literature that institutions who provide financial services to women best fight against poverty (Boudour and Boudabbous (2011); Adair and Berguiga, 2010; Kablan, 2012);
- **Output D**: Average Loan per Borrower has been used by different authors to assess the social performance of MFIs; that is the lower the Average loan per borrower, the better the MFI reach the poorer (Adair et Berguiga, 2010; Kablan, 2012).

3.2.2 The Censored Tobit model

After assessing these levels of efficiency, we have used a censored Tobit model in order to identify factors affecting these levels of performance. Here we have used the level of efficiency estimated with the DEA as the dependent variable. Regulation ratios and other control factors are used as independent variables. Explicitly, we have estimated the following equation:

PERF = f(EFC, FACR, RISK, LIQUIDITY, RURAL, ANGLO, DIR, SIZE, SUB)……(1)

The functional form of our Tobit model can be written as follows:

$$PERF = \alpha_0 + \alpha_1 EFC + \alpha_2 FACR + \alpha_3 RISK + \alpha_4 LIQUIDITY + \alpha_5 RURAL + \alpha_6 ANGLO + \alpha_7 DIR + \alpha_8 SIZE + \alpha_9 SUB + \varepsilon \quad ..(2)$$

Where:

PERF is the vector of technical inefficiency coefficients under the assumption of variable return to scale (VRSTE) determined in the DEA model. Since our level of efficiency ranges from]0; 1], the censored Tobit model cannot be operational. In order to overcome this difficulty, we used the level of inefficiency measured by 1- efficiency. This level of inefficiency varies from [0; 1[rendering the tobit model operational. Consequently, a positive effect of any explanatory variable on the level of inefficiency will translate a negative effect on the level of efficiency (performance).

- ***Financial regulation variables***

EFC = external funding coefficient measured the capital to debt ratio. It is known in the WAEMU zone as the debt to equity ratio. However, in the CEMAC zone, this ratio is defined in the COBAC standard as the ratio of equity over debts. Therefore, the higher the ratio, the lower the level of risk taken by MFI. Consequently, we expect a negative sign of the parameter.

FACR = fixed assets coverage ratio: the more this ratio increases, the more the MFI finances its fixed assets through its capital. So we expect a negative sign of the parameter

RISK = risk coverage ratio measured by the ratio of adjusted capital and reserves to the sum total of loans to members and financial assets: the higher the risk coverage ratio, the lesser the MFI exposition to risk and the better they can face eventual losses.

LIQUIDITY = liquidity ratio; in conformity with the COBAC standard, MFIs are bound to respect a minimum ratio of 100% between current financial availabities (funds) and long term financial liabilities. The higher the ratio, the more liquid are the MFIs and the more they ration loans. We therefore expect a positive sign of the parameter.

- ***Control Variables***

SIZE = size of the MFI measured by the natural logarithm of total assets (Kablan 2012 and Kobou, 2009). Large size MFI might benefit from economy of scale in the distribution of financial services. However, a large size of the MFI can also lead to poor management and to an abandonment of the social mission of the MFIs. So the sign of the parameter is ambiguous.

SUB = subsidies measured by the volume of subvention received by the MFI. It is not trivial to mention here that some credit unions included in our study still receive subsidies. Subsidies give these MFIs the possibility to reach the maximum number of poor by distributing more loans without too much consideration in terms of profitability. In a nutshell, subventions can translate into lower lending interest rate and more loans to the poorer. Nevertheless, more subventions can translate into laxity in the granting of loans. Therefore our expected sign is ambiguous.
DIR = deposit interest rate remunerates savings and deposits and constitutes a charge to the credit unions. The higher this interest rate the higher the financial charges of MFIs. Therefore, we expect a positive relationship between DIR and MFIs inefficiency.
ANGLO = dummy variable Anglophone region (that is 1 if the MFI is situated in an Anglophone region and 0 if not): being the cradle of microfinance movement in Cameroon the inclusion of this dummy variable enable us to test the effect of history and culture on microfinance performance. We postulate a negative association between Anglophone region and MFIs inefficiency.
RURAL = dummy variable rural area (that is 1 if the MFI is situated in a rural area and 0 if the MFI is located in the urban area). Even though MFIs operates in both rural and urban areas, we believe that the target population of microfinance are mostly those living in rural areas where formal banking services are absent and where there is abject poverty. We therefore expect the location in rural area to have a negative effect on MFIs inefficiency.
α_0 is the constant term and $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_5, \alpha_6, \alpha_7, \alpha_8$ and α_9 are the coefficients of EFC, FACR, RISK, LIQUIDITY, RURAL, ANGLO, DIR, SIZE and SUB respectively. The Tobit model is estimated by maximizing the log likelihood of the model.

4 Presentation and Discussion of Results

4.1 Efficiency Analysis

Following the intermediation - outreach approach of microfinance, results from the DEA Program indicates a very low average efficiency level of 42.2% under constant return to scale (CRS) and 53.4% under variable return to scale (VRS). The difference between the scores under different hypotheses indicates that most of the MFIs operate under variable return to scale. The average scale efficiency has been estimated at 81.5%. A score of 53.4% following the inputs oriented DEA model implies that the network can still reduce up 46.6% (average level of inefficiency = 1 - efficiency) of its inputs while maintaining its level of outputs unchanged.

However, a difference between the CRS and the VRS indicates that the network operates under variable return to scale and that the MFI is facing a scale inefficiency problem. In such a situation only the scores under the VRS hypothesis are more meaningful. Figure 1 presents the efficiency frontier of CamCCUL network.

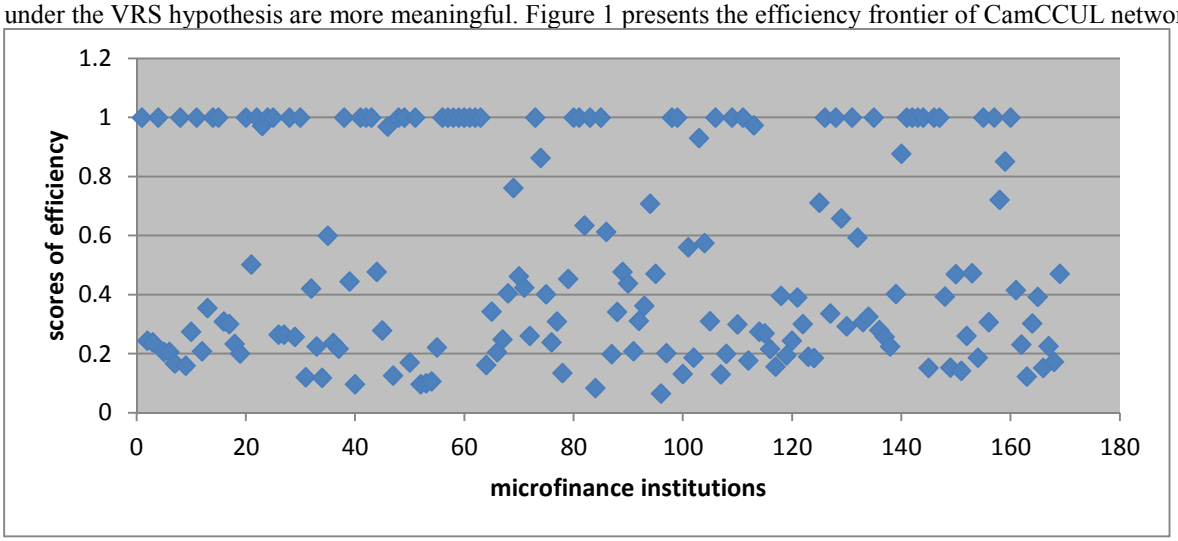

Figure 1: Efficiency levels under VRS Hypothesis
Source: Computed by the authors

From Figure 1, 50 institutions are efficient (efficiency score = 1) and form the benchmark envelop. Most of the observations are situated between 0.2 and 0.6 level of efficiency. Average efficiency levels per region and zone of residence are presented in table 3:

Table 3: Regional and zonal analysis

Zone	Regions	Scores per region	Scores per zone
Francophone	Northern Cameroon	0,41	0,47
	Centre- South -Littoral-East	0,46	
	West	0,50	
Anglophone	North West	0,56	0,56
	South West	0,55	
Zone of Residence	Urban		0,60
	Rural		0,48

Source: Computed by the authors

Further results, as presented in table 3, reveal that MFIs located in Anglophone regions are averagely more efficient than their francophone counterparts. Similarly, urban MFIs are averagely more efficient than rural MFIs.

Technical efficiency can be divided into pure technical efficiency and scale efficiency. In fact, the CRS model is only meaningful when all the firms are operating at their optimal scale which is rarely the case in reality. Difference between the scores obtained under the CRS hypothesis and the VRS hypothesis indicates that there is scale inefficiency in the network meaning that some MFIs do not operate at their optimal level of efficiency. Our estimation revealed that the average scale efficiency of the network is 0.8125. Therefore the scale inefficiency of the network is estimated at 18.75%. From the results of the DEA model, most of the MFIs are operating under decreasing return to scale meaning that the factors of production increase faster than the output level. Numerically, only 30 institutions operate at their optimal scale. 59 MFIs are under increasing return to scale while the 80 others (47.34%) are under decreasing return to scale.

4.2 The Effect of Financial Regulation on MFIs performance in Cameroon

The Tobit results of factors affecting MFIs inefficiency in Cameroon are consolidated in table 4 below.

Table 4: Tobit Regression Results

```
. tobit inefficiency efc facr risk liquidity rural anglo dir size sub, ll

Tobit regression                                  Number of obs   =        169
                                                  LR chi2(9)      =      55.56
                                                  Prob > chi2     =     0.0000
Log likelihood = -103.08632                       Pseudo R2       =     0.2123

------------------------------------------------------------------------------
inefficiency |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         efc |  -9.56e-06   .0000101    -0.95   0.346    -.0000295    .0000104
        facr |   .0017058   .0008689     1.96   0.051    -.0000101    .0034217
        risk |   .0732925   .0211757     3.46   0.001     .0314727    .1151124
   liquidity |   .0004188   .0005281     0.79   0.429    -.0006242    .0014618
       rural |   .0041441     .07744     0.05   0.957    -.1487922    .1570804
       anglo |  -.1591674   .0853453    -1.86   0.064     -.327716    .0093812
         dir |  -2.793825   1.325729    -2.11   0.037    -5.412008   -.1756417
        size |  -.0996578   .0247406    -4.03   0.000     -.148518   -.0507976
         sub |  -1.11e-09   7.51e-10    -1.49   0.139    -2.60e-09    3.68e-10
       _cons |   2.431416   .4867454     5.00   0.000     1.470142     3.39269
-------------+----------------------------------------------------------------
       /sigma |   .4000015   .0280091                      .3446862    .4553168
------------------------------------------------------------------------------

  Obs. summary:         50  left-censored observations at inefficiency<=0
                       119     uncensored observations
                         0 right-censored observations
```

Source: Computed by the authors using Stata12

The results as presented above indicate that 50 observations were censored at the left and the overall model is significant at 1% since Prob>Chi^2<0.01 (Prob>Chi^2 = 0.0000) implying that all the independent

variables put together significantly explain and predict MFIs performance. Recall here that, our dependent variable is inefficiency which implies that a positive sign of the estimate translate a positive effect on inefficiency and consequently a negative effect on efficiency (performance).

From the results of the Tobit estimation, it appears that the risk coverage ratio has a positive effect on microfinance inefficiency, which implies that there is a negative and significant relationship between risk coverage ratio and MFIs efficiency. This relation is significant at 1% level of significance. This result confirms the findings of Fouda Owoundi (2010) and Kablan 2012 who also discovered that risk coverage compromises MFIs efficiency in Cameroon and WAEMU respectively. This result can be explained by the fact that MFIs are bound to respect the risk coverage ratio requirement in order to avoid sanction by the COBAC and to remain under the umbrella organisation (CamCCUL). By so doing, these institutions might be reluctant to distribute loans, thus rationing credit and compromising their role of financial intermediary.

Contrary to our prior expectation, the coefficient of FACR is positive (0.00170579) implying that there is a positive association between fixed assets coverage ratio and MFIs inefficiency. This result is significant at 10% level since the p-value is greater than 0.05 but less than 0.1. This finding reveals that most of the microfinance institutions collect savings and deposits from their members and transform them into fixed assets rather than distributing loans. Some of the institutions included in the sample have more than 600% as asset coverage ratio which is very high (See appendix 1). Unlike Kablan (2012), External funding coefficient (EFC) has a positive but insignificant effect on MFIs efficiency. Just like Fouda-Owoundi (2010), the liquidity ratio has a negative and insignificant effect on MFIs performance in Cameroon. This second outcome might be explained by the fact that most of the institutions found in our sample do not respect the regulation in terms of liquidity.

Going by the control variables, the results reveal that the size of MFIs positively and significantly influences their performance at 1% level of significance. This result means that large institutions are more efficient than small ones in the distribution of financial services and in reaching the financially disadvantaged. This result confirms the results previously established by the DEA model which provided different scores under constant and variable return to scale indicating that CamCCUL institutions benefit from economies of scale. This finding contradicts the findings of Kablan (2012) in WAEMU. However a study by Ndambu (2011) conforms to our result. In a nutshell, the larger the microfinance institutions the more pronounced are the economies of scale and scope of action. Contrary to our prior expectation, the deposit interest rate influences positively and significantly the efficiency of CamCCUL microfinance institutions. This finding is significant at 5% and is contrary to the finding of Kobou et al. (2009). This can be backed by the fact that deposit interest rate remunerate deposit and can served as an attractive tool to mobilise more savings which will in turn be made available in terms of loans to the members.

As expected belonging to the Anglophone regions has a positive and significant effect on MFIs performance. Two main reasons can justify this result. The first reason is associated with history and culture. In fact, the North-West Region is the cradle of microfinance movement in Cameroon which later on spread to the South-West Region. Hence, the populations of these two regions are very used to credit unions and these institutions benefit from more than 50 years experience in the distribution of microfinancial services. The second reason is that some big agricultural and mining companies of the country are found in the Anglophone regions such as CDC, SONARA, MIDENO and CTE. These companies provide income to their employees which permits them to join MFIs or to create their own credit union. This result falls in line with the result of Kobou et al. (2009).

Rural MFIs are less efficient than their urban counterparts but the result is not significant. A study by Kobou et al. (2009) arrived at the same result in Cameroon. This outcome can be justified by the composition of the sample which is made up in a great majority of rural institutions (see Appendix 1). Subventions (SUB) also associate negatively with MFIs inefficiency but the result is insignificant. This result is different from that of Kablan (2012) who discovered that subventions significantly participate in improving the performance level of MFIs in the WAEMU zone. Most of the MFIs included in the sample seem to reach financial self sufficiency (autonomy) so few of them still receive subsidies.

5 Conclusion and Policy Implications

The main objective of this study was to assess the effect of financial regulation on MFIs in Cameroon. In order to attain this objective we adopted a two steps analysis. Firstly, we estimated the efficiency coefficients of 169 MFIs affiliated to Cameroon Cooperative Credit Union League for the year 2009 using the Data Envelopment Analysis (DEA) method. Then, we analyse the determinants of these efficiency score using a censored Tobit model.

At the end of this methodological approach results indicate that, on average, MFIs affiliated to CamCCUL are inefficient. The average efficiency score of the network was estimated at 0.422 under constant return to scale and 0.534 under variable return to scale. Further analyses reveal that MFIs of the urban areas are more efficient than rural MFIs; the same as MFIs of the Anglophone regions are more efficient than those of the

francophone regions. Finally, regulation elements such as risk coverage ratio and fixed assets coverage ratio were found to affect MFIs performance negatively and significantly whereas the size of the MFI, the Anglophone region and Deposit interest rate were positively and significantly associated with MFIs performance.

In line with the above summary, a number of recommendations are made. Firstly, we suggest the implementation of a national regulation framework taking into account national and local realities by all microfinance stakeholders. The microfinance regulatory framework was merely a transposition of banks regulatory framework to the microfinance sector with some little adaptation. The fact that it is designed at regional level does not account for the national and local environments especially for the rural institutions. Secondly, government, together with other microfinance stakeholders should create a rating agency in order to evaluate and publish the performance of MFIs so that problems will be detected at early stage and tackled in order to avoid crisis in the sector.

Thirdly the government should provide support either financially or in kind (water, electricity, telephone, building…) especially to rural microfinance whose operational costs are usually higher than those of their urban counterparts due to the lack of some basic infrastructure. Finally, the actors of the microfinance industry should sensitize the population especially those of the northern part of the country on the importance of microfinance as a whole and micro saving in particular.

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Appendix: Summary of descriptive statistics of the Tobit model

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. summarize inefficiency efc facr risk liquidity rural anglo dir size sub
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Variable	Obs	Mean	Std. Dev.	Min	Max
inefficiency	169	.4657278	.3506326	0	.935
efc	169	-232.5456	3089.051	-40145.27	767.1295
facr	169	-63.58024	835.9503	-10837.05	665.5076
risk	169	-.6726527	2.796623	-24.7598	1.1078
liquidity	169	12.37759	60.25181	-6.4273	469.3076
rural	169	.7100592	.4550831	0	1
anglo	169	.3313609	.4721013	0	1
dir	169	.0270191	.0297193	0	.1670394
size	169	18.72662	1.84793	14.00138	23.447
sub	169	1.10e+07	7.81e+07	0	7.81e+08

Source: Computed by the Authors using Stata12