Refinancing and Efficiency of Microfinance Institutions in Niger

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Abstract

The aim of this study was to establish the effect of refinancing resources (deposits, loans, grants) on the efficiency of 24 microfinance institutions (MFIs) in Niger over the 2005-2008 period. The study's hypothesis was tested using a Translog function that was estimated in the form of a system with equations of cost-sharing of inputs. The outreach of the activities of the MFIs studied was established by using a descriptive analysis. A Principal Components Analysis revealed that the independent MFIs had recourse to deposits, loans, and grants more often than those affiliated to unions. Econometric results showed that the MFIs in Niger were not efficient. But they also showed that the use of deposits, physical capital and human capital led to a drop in the charges incurred by those MFIs. They further showed while deposits could replace loans and grants, the latter two could not be substituted for each other. The study also found that the social performance of the MFIs in Niger was low, due to the fact that their service outlets were still being set up and were located mostly in large towns. Men formed the majority of customers targeted by the MFIs, and these granted loans mainly to customers living in urban areas. A slowdown in the MFIs' loan granting was observed in all the country's regions, which had the effect of lowering the MFIs' costs related to economies of scale. Finally, the study found that there was a link between MFI efficiency and social performance.

Key words: *efficiency, social performance, microfinance, refinancing, Niger*

1. Background

History of microfinance in Niger

colonial period

In Niger, the spirit of mutual help developed through three stages: the colonial period, the Independence years, and the post-1987-banking crisis period. While institutions were organized in the form of cooperatives, the principle of mutual help was what it is today: people put their efforts together in order for each one of them to benefit from a given service.

The colonial period was marked by the putting in place of three types of cooperatives: reserve granaries, indigenous provident societies, and mutual aid societies for rural development. These structures were modelled on the British or Rochdale model of cooperatives and had the aim of helping the indigenous populations face spells of food shortages between two harvests and spells of possible famine. The colonial authorities asked each family to contribute part of their harvest to be stored in the granaries. During spells of food shortages and famines, the families were to be given back the quantity of food they had contributed. However, the system did not work for very long due to desiccation, the deductions made by the colonial authorities and village and district chiefs, and abuses of authority on the part of the administration (Bontianti, 2003).

The indigenous provident societies were created after the failure of reserve granaries. They brought together farmers and animal breeders. Their primary aim was to help the peasants increase their production by providing them with training and farming equipment. Membership of those societies was compulsory for all. However, the laxity in their management did not foster a sustainable development. The mutual-aid societies for rural development came after the first two forms of cooperatives. They were specifically interested in cash crops, notably groundnuts and cotton. But, due to constraints and abuses, they too failed to achieve the goals initially assigned to them (Bontianti, 2003).

Independence years

The independence years were dominated by the development of the rural world. A policy of rural development was set up that took into account both the nature of rural communities and the diversity of their climatic, economic, technical, institutional and

sociocultural constraints: illiteracy, low productivity, poverty, and malnutrition (Bontianti, 2003). That is why the Union Nigérienne de Crédit et de Coopératives (UNCC) [Niger Union of Credit and Cooperatives] was created in 1962. It was set up by the government as part of its promotion of the rural economy in order to meet the people's needs in terms of granting them the loans they needed to both modernize their farming methods and apply them, and to enable the country's farmers to acquire concrete skills for operating in cooperatives, for investing, and for saving productively instead of building up a capital which was not put to profitable use.

The UNCC was in charge of organizing and managing mutual-aid groups, development cooperatives, and rural credit and cooperative societies. It was in charge of mobilizing short- and medium-term loans which were granted, with its approval, by the societies for rural development to farmers, artisans, and small traders plying their trade in the rural area. When the government was no longer able to provide the necessary resources for the functioning of the UNCC, this was dissolved and replaced by the Union Nationale de Coopératives (UNC) [the National Union of Cooperatives]. The UNC is the national representative of rural organizations of a cooperative and mutualist nature.

The 1980s

While it is undeniable that village cooperatives were successful and were of considerable assistance to the population, their being controlled by the government did not allow them to survive. As the main sponsor of those cooperatives, the government had always provided them with the bulk of the financial and human resources they needed. So, when it was no longer able to do that, the village co-operatives weakened. The slowdown in their activities meant that the rural populations, who formed about 90% of Niger's population, no longer had viable organizations capable of supporting their activities. Yet, it was essential for those rural cooperatives to have a financial intermediary. Conventional banks were no longer interested in this population segment which they considered to be insolvent and hard to serve. The cooperatives were thus left at the mercy of usurers who charged them exorbitant interest rates. Such a state of affairs continued into the 1980s.

During this period, Niger (as well as most of the countries of the West African Monetary Union, UMOA) experienced a banking crisis. The deterioration in export revenues, combined with a high level of outstanding payments, led to a banking crisis (Eboué, 2007) which, in turn, led to the closure of development banks. So, in the face of this closure and of the conventional banks' inability to serve the poor, the government of Niger felt compelled to find an alternative solution. The Central Bank of Western African States (BCEAO) and development partners decided to put in place a legal framework which would authorize informal institutions (like tontines) to continue serving those rural populations. That is how microfinance institutions, also known as decentralized financial systems, came into being.

Microfinance industry in Niger in figures[1]

Growth in institutions, service outlets and membership

Much progress has been made by the microfinance industry in Niger since its creation. However, this progress has not been steady, as the figures in Table 1 show. That is, while the number of MFIs increased between 2002 and 2004, it decreased from 2005. The number of their branches rose between 2010 and 2011, then dropped, until 2012. As for the number of their service outlets, it started decreasing in 2004; it was only in 2010 that it rose to reach and even exceed its level of 2002. It should also be noted that the growth in institutions was not in tandem with that of their service outlets. For instance, in 2007, there were 28 MFIs, with 121 service outlets, while in 2008 they were still 28, but with 161 service outlets. What can be concluded from this is that either the number of service outlets went up, or the lists of the MFIs identified over the two years are not identical.

Table 1: Growth of the microfinance industry in Niger

	MFIs[2]	Service outlets	Unions[3]	Membership	Outlet/ Population (%)
2002	57	177	1	84,584	0.0015
2003	54	177	1	85,848	0.0014
2004	61	170	1	94,096	0.0013
2005	24	140	2	129,840	0.0010
2006	30	165	2	167,861	0.0012
2007	28	121	2	418,110	0.0008
2008	23	103	3	431,895	0.0007
2009	28	161	3	443,269	0.0011
2010	80	180	2	440,083	-
2011	81	190	2	447,725	-
2012	52	212	2	280,872	-
2013	52	240	2	350,643	-

Source: The West African Monetary Union's indicators of decentralized financial systems published by the BCEAO and the annual reports of the ARSM (Agence de Régulation du Secteur de la Microfinance [Microfinance Sector Regulation Agency])

The number of unions also experienced changes. In 2006, when the Crédit Mutuel du Niger [Niger Mutual Credit] started its activities, their number rose from two to three. But another event later happened that changed the situation: in 2010, the number fell again, following the withdrawal of the licence of the *U*nion des Mutuelles d'Epargne et de Crédit (UMEC) [Union of Savings and Credit Mutual Societies] and of a large number of its affiliated branches.

From a legal point of view, there are three types of institutions in Niger: the Savings and Credit Mutual Societies (Mutuelles d'Epargne et de Crédit, MEC); the framework agreements (Conventions Cadres, CC), and credit schemes (Projets à Volet Crédit, PVC). The MECs collect deposits and grant loans to their members. They have to be legal entities, unlike the CCs, which have only to sign a two-year agreement which does not

oblige them to abide by this condition. Savings mobilization is not a priority activity for the latter institutions. They operate with the grants they get from the government and other partners. As for the PVCs, they are not directly involved in microfinance activities. In line with their goals, they deposit their funds with the MFIs in order to finance specific activities.

The new law of 2007 obliged the credit schemes (CCs) to effect an institutional transformation. Other forms of MFIs were introduced, among which public limited companies and private limited companies (see Annexe 1).

Microfinance industry in Niger was also marked by the growth of its membership (see Table 1). The average growth rate was 30%. However, a notable slowdown was recorded between 2012 and 2013. So, despite the rising number of service outlets, the microfinance institutions' penetration rate declined and was around 0% (see Table 1). This means that the country's population grew faster than the MFI service outlets, which in turn means that the volume of services to be offered grew higher.

There are two possible explanations for this irregular growth in the number of microfinance institutions in Niger. First, the variation in the number of institutions that filed their financial statements to the Central Bank of Western African States (BCEAO). Second, the industry was not stable; that is, microfinance institutions were set up, operated for a moment, then stopped their activities.

Microfinance institutions' services in Niger

The main services offered by the MFIs in Niger are savings, loans, and money transfer. The savings collected by the MFIs increased (see Table 2): from CFAF 2,981 million in 2002 to CFAF 7,862 million in 2009 and CFAF 24,308 million in 2013.

Table 2: The savings collected by the MFIs in Niger (in millions of CFAF)

	Savings*	Loans*	Grants**
2002	2,981	2,829	354
2003	3,325	3,586	347
2004	3,856	4,380	294
2005	4,891	6,101	300
2006	5,423	9,414	372
2007	6,100	12,191	351
2008	6,120	12,817	389
2009	7,862	16,151	473
2010	8,253.84	14,425.74	-
2011	8,525.13	14,360.42	-
2012	15,627.43	18,102.23	-
2013	24,308.90	22,483.91	-

Source: *The West African Monetary Union's indicators of decentralized financial systems published by the BCEAO

**Database of the Projet d'Assistance aux Systèmes Financiers (PDSF) [Financial Systems Assistance Project]

The trends in members' deposits shown in Table 1 were beneficial for the refinancing of MFI activities. The table shows that the average growth rate was 7.55%. However, a significant slowdown was recorded between 2007 and 2008. It should be noted that

unlike banks, not all microfinance institutions are authorized to collect deposits: of the three types of institutions (savings and credit mutual societies, framework agreements, and credit schemes), only the savings and credit mutual societies are. The government must step in to protect savers, because when an institution stops its activities (as happened in 2009 for about 10 of the microfinance institutions affiliated to the UMEC Union), their customers lose their savings. Equally, they cannot have access to loans, since these presuppose that the applicant has savings in the first place.

The volume of loans granted by the MFIs in Niger increased (see Table 2), with an average rate of 25.75%. However, this rate declined in 2008, to mirror the decline in deposits.

The relationship between the two indicators is perfectly logical, since in matters of microfinance, loans and savings go together: before applying for a loan to a microfinance institution, the applicant must have deposited some money with it. In some institutions this saving represents one-third of the amount that the applicant intends to borrow.

In addition to collecting savings and granting loans, microfinance institutions also provide money-transfer services, both through the traditional money-transfer type and the mobile-phone transfer type. The traditional type is relatively new for microfinance institutions. Western Union is the most visible partner for most of these institutions. Money transfer is a means which microfinance institutions use to pursue their economic and social goals. Indeed, given that the MFIs generally target low-income customers and those living in the remote areas of the country that are hardly accessible, money transfer services enable them to achieve their social goals by providing an additional service much needed by their poor customers and, in addition, to do this at a lower rate than that charged by the "traditional" service providers (CGAP, 2008).

Telephone money transfer consists in sending money from a mobile telephone. The receiver will receive the money from a licensed distributor. In Niger, the system is run by the Airtel Niger and Orange Niger telephone companies. This relatively recent type of money transfer service is already provided by the ASSUSSU microfinance institution. ASSUSSU serves as the correspondent for the money transfer service operated by Airtel Niger (see Annexe 2). This is a source of income for ASSUSSU, through the commissions it is paid. But in addition to this income, the money transfer service is also likely to attract new customers to the microfinance institution: when people come to "buy" electronic money, it is possible that, out of curiosity, they will get interested in the institution's activities and decide to become members of it.

Microfinance institutions' resources

Microfinance institutions cannot conduct their activities without stable resources which, for the MFIs, usually consist of savings and grants. Table 2 shows that during the 2002-2009 period these resources were on the increase. While savings followed a steady trend, grants were on a downward between 2002 and 2005, before going on an upward trend between 2008 and 2009. These unsteady trends for grants are attributable to their origin: grants are awarded by the government and development partners, whose contribution hinges on their goals and not necessarily on the MFIs' needs (see Annexe 3). It should be noted that the amounts of deposits are higher than those of grants, which is a positive thing for the financial autonomy which microfinance institutions seek.

In addition to savings and grants, some microfinance institutions apply for loans from banks. The relationship between them and banks can thus be done through refinancing. As a consequence of the microfinance industry's growth and the implementation of the 2010 law, the microfinance institutions in Niger have been compelled to move from dependency to financial autonomy. Banks can play an important role in this by granting them loans. For the moment, and as indicated in Tables 3 and 4, the microfinance institutions' level of borrowing from banks is low: on average it only represents 8.95% of their resources, compared with 4.98% for grants and 79.85% for deposits.

Table 3: Trends in the MFIs' borrowing (in millions of CFAF)

	Borrowing from banks	Borrowing from other sources[4]	Total borrowing
2004	231	47	279
2005	204	378	583
2006	34	427	461
2007	1,682	1,416	3,099
2008	1,330	0	1,330

Source: Projet d'Assistance aux Systèmes Financiers (PDSF) [Financial Systems Assistance Scheme]

Table 4: Trends in the MFIs' proportions of refinancing resources

	Proportion of bank loans (%)	Proportion of savings (%)	Proportion of grants (%)
2004	6.87	85.54	6.11
2005	4.03	82.52	5.92
2006	0.48	88.19	5.27
2007	18.78	61.65	3.63
2008	14.60	81.38	3.99

Source: Author's computations based on PDSF data

As can be seen from Table 4, microfinance institutions have focused more on mobilizing savings than on bank loans to finance their activities. Rigour in recruiting human resources and regular training are indispensable for microfinance institutions to improve their relationships with banks.

2. Introduction

Problem statement

The goal of microfinance institutions in Niger is to serve the populations that are excluded from the traditional banking system. To ensure that their activities continue uninterrupted, the MFIs need to achieve efficiency and social performance. Efficiency is an institution's ability to produce satisfactory results with minimum resources (Hauner and Peiris, 2005). Social performance consists in serving a large number of poor people. However, to achieve these two goals, enough resources are necessary. After all, like the other types of financial institutions, the MFIs require both human and physical capital, in addition to financial capital. This latter is composed of deposits, grants and loans. But these resources are not enough to enable the MFIs to fully play their intermediation role. To start with, deposits come from customers and in small amounts. This means that as a strategy to expand their activities, the MFIs must increase their membership and, hence, their volume of savings.

But achieving this goal will be difficult because only a few MFIs are capable of following this strategy. One obstacle lies in the fact that even if we put aside the time it takes to start an MFI, rarely is an awareness campaign mounted to publicize it. Besides, for regulatory reasons, it is often difficult for microfinance institutions to use deposits on current account as a source of financing their loans (Lapenu, 2008). Furthermore, in Niger not all microfinance institutions are allowed to collect deposits from people. Only the savings and credit mutual societies (Mutuelles d'Épargne et de Crédit, MEC) are allowed to mobilize deposits, which they in turn redistribute in the form of loans. For their part, the framework conventions (Conventions Cadres, CC) use grants, which they transform into loans. As for the credit schemes (Projets à Volet Crédit, PVC), they are run by non-governmental organizations, which target a given category of the population and have financial matters as just one aspect of their project.

Grants are awarded by the government and donors. The former awards grants in the form of assistance and on the basis of criteria (see Annexe 2). Yet, the history of microfinance in Niger has taught us that the government can at any time withdraw its participation, partially or totally. As for development partners, they participate in a specific programme area (assistance to women, education…) or geographical area, and depending on the stability or otherwise in the country. And since Niger has experienced chronic instability in the recent past, this has disrupted the regularity at which the country received financial assistance from its development partners. Furthermore, the grants given to microfinance institutions in developing countries engender strong

suspicion that brings to mind the bankruptcy, in the 1960s and 1970s, of the many state-owned banks that were heavily subsidized (Franka, 2007). And the high rate of "mortality" on the part of the institutions partly results from this type of subsidized assistance (MEFN II, 2006).

Not many MFIs get access to bank loans because of their managers' inadequate level of training which does not enable them to put together the necessary documentation for securing a loan. The other reason is the banking system's mistrust of the microfinance institutions' capacity to repay loans. Anxious to protect the quality of its lending portfolio, the banking system underestimates the MFIs' capacity to repay their loans. Such a risk, coupled with the additional operational costs that come with lending money to the SMEs, causes banks to avoid lending to the latter or to lend to them at very high interest rates (Lefilleur, 2009). The size of a microfinance institution is also another factor (see Fall, 2011), as is the interest rate charged by banks. However, the banks' argumentation related to the high default risk on the part of the SMEs (moral uncertainty and lack of guarantees and cover for collaterals) can be put into the right perspective by looking for more reliable guarantee mechanisms (Semedo, 2012). In any case, having recourse to local resources and, hence, resources from the banking sector, is, for the SMEs, often preferable to resorting to external resources that are subject to exchange rate fluctuations (Fall, 2011).

This situation of inadequate resources was compounded by the 2010 law that obliged the MFIs that were not registered as legal entities to effect an institutional change (see Annexe 3). But those that chose to transform themselves into societies were, as a consequence, to operate without external assistance.

While a microfinance institution's goal is undoubtedly to fulfil a social role, in order for the MFI to enable a large number of people to get access to financial services, it must function sustainably by mobilizing enough resources and using them efficiently. Indeed, when an MFI collapses, it plunges its members into a difficult situation, since they lose their savings. This was the case in 2010, when the operating licence granted to the Union des Mutuelles d'Epargne et de Crédit (UMEC) [Union of Savings and Credit Mutual Societies] was withdrawn.

Research question, objectives and justification

Research question

The question which the present study seeks to answer is whether the resources used by MFIs in Niger are adequate enough for the sustainability of their activities.

Objectives of the study

The first objective is to test the effect of the different types of financing (deposits, grants, and loans) on those MFIs' efficiency. The second objective is to analyse the link between this refinancing-efficiency relationship and the outreach of the MFIs' activities.

Hypotheses

The first hypothesis is that the types of sources of refinancing have an effect on the microfinance institutions' efficiency. The second is that there is a positive relationship between efficiency and social performance. The point is that if the MFIs have adequate resources, they will be able to increase their services. This increase will in turn lead to a reduction in their operational costs in the long term, which in turn will lead to a larger number of people having access to their services.

Justification of the study

The goal of the MFIs in Niger to serve the poor is only possible through practical solutions that will enable them to be efficient and, thus, to serve their members better. Concrete analyses are thus indispensable. The present study seeks not only to add to the literature on the refinancing of MFIs, but also to encourage other researchers to develop interest in and explore research avenues on the development of the MFI industry. Most of the studies on the topic have focused on physical capital, human capital, deposits, and grants as inputs. This study will examine the effect of bank loans, which are a resource to which the MFIs in Niger have little access. The present study's results will provide these MFIs with avenues for improving their performance and for choosing the variables that will guide them for a more efficient refinancing of their activities. They will also enable the BCEAO and the Agency for the Regulation of the Microfinance Industry to better orient their rules and regulations. The government and the development partners will also use the study's conclusions to redefine their intervention in the microfinance industry and to know which variables to take into account in their actions.

The present study examined the relationship between efficiency and the refinancing of MFIs by calculating the economies of scale after estimating a Translog function (in the form of a system with the Seemingly Unrelated Regression, SUR). The variables were determined according to the intermediation approach. The data used for the study's model consist of a panel of 24 MFIs over the 2005-2008 period. They were obtained from the database of the Financial Systems Assistance Scheme (Projet d'Assistance aux Systèmes Financiers, PDSF) and from microfinance institutions. The outreach of these MFIs' activities was determined on the basis of a descriptive analysis of three indicators of social performance.

Besides the presentation of microfinance institutions in Niger and the problem statement in the preceding sections, the remainder of this paper consists of the following sections: the literature review, the methodology used to test the study's hypotheses, the data analysis, the results of the different analyses (efficiency and social performance), and economic policy recommendations.

3. Literature review

Theoretical modelling of banking institutions' efficiency

Banking institutions' efficiency

Microfinance institutions' primary goal is to fight poverty.[5] However, to realize it, they need to achieve financial autonomy. This requires them to manage their costs well and to be efficient. The concept of efficiency was introduced by Farrell (1957). Efficiency analysis entails addressing three key concepts: inputs, outputs, and the cost function. The acquisition of inputs and the production of outputs entail costs which the banking institutions concerned must incur. These costs are taken into account when a bank's performance is appraised and when a decision has to be made to expand the bank or to diversify its products (Clark, 1996; Cuevas, 1988). Cost minimization will have a positive effect on a financial institution's activities because an efficient financial system leads to an improvement in the quality of its services and its profitability and increases the volume of funds that circulate between the borrowers and the lenders (Sufian and Habibullah, 2009).

A production unit's efficiency is measured by comparing its performance with a cost standard or a fixed production frontier (Kumbhakar, 1989). A given firm is inefficient if it uses more resources than those initially planned to produce the same quantity of goods. Sufian and Habibullah (2009) add that an efficient financial system leads to an improvement in the quality of services provided to customers and in profitability, and increases the amount of money in circulation between borrowers and lenders. While assessing a financial institution's efficiency, the primary objective is to separate the production units that recorded a good performance from those that did not (Berger and Humphrey, 1997). Increased competition encourages banks to reduce their costs and, thus, to achieve efficiency, that is, their ability to produce services with minimal resources (Weill, 2003).

Relationship between cost and efficiency

Acquisition of inputs and the production of outputs entail costs which banks must incur. Those are costs related to, among other things, the mobilization of savings (deposits), to the acquisition of the credit which the institutions will grant to their customers, to

the management of accounts, and to running expenses. The nature and magnitude of the costs will depend on the type of bank or microfinance institution. So, for instance, a large bank will incur relatively lower costs than a small one.

So, cost control is an important factor in the development of a banking institution. It is at the heart of the decision-making process. Indeed, production costs are taken into account when a bank's performance is being appraised and when the decision to expand the bank or to diversify its products has to be taken (Clark, 1996; Cuevas, 1988). The principle is to reduce the costs to a minimum in order to have enough resources to provide the services required. Institutions aiming at efficiency must therefore strive to minimize their production costs. Cost minimization will have a positive effect on their activities.

Effect of resources on intermediaries' efficiency

Human capital and physical capital

Before banking products are made available, they must have been produced. To produce them, it is necessary to combine production factors, or inputs. These are the resources which banks use to deliver quality services to their customers (Mukherjee et al, 2003). Their cost and quantity must be minimized by the institutions. Inputs consist of physical capital, human capital and financial capital.

Human capital is composed of the people who work within the institution. With the advent of information and communications technology (ICT), the level of human capital has been reduced in some organizations. However, in the case of the MFIs in Niger, the human capital input remains considerable; it has not at all been replaced by ICT. Therefore, the human capital in Niger should enable the country's MFIs to be more efficient.

Physical capital is composed of movables, buildings and computer equipment. These resources are important for the MFIs, especially those operating from rural areas, which are hardly accessible due to lack of road and telecommunications infrastructure. This state of affairs raises intermediary costs, that is those related to travelling and the setting up of branches. Having to travel a long distance to get to a remote branch and, once there, having to stand in a queue, or having to keep cash or personal property for saving (Mas and Kumar, 2008), are the other consequences of the lack of infrastructure. In recent years, some equipment adapted to rural areas has been used. It consists especially of notebooks (which have much autonomy and thus can run for a relatively long time without electricity) and mini-printers. This physical capital should therefore lead to improved activities for the MFIs in those areas.

Financial capital

Financial capital covers deposits, grants and loans. When these resources are adequate, they should enable the MFIs to be efficient. But for this to happen these institutions must first and foremost succeed in returning positive results, and at minimal cost. At present, this is a real concern for the majority of MFIs, since they rely much on grants. Yet, they would benefit from no longer depending on the latter. The grants given to

microfinance institutions in developing countries raise strong suspicion that brings to mind the bankruptcy, in the 1960s and 1970s, of the many state-owned banks that were heavily subsidized (Franka, 2007). Heavy reliance on development partners can take away the sense of responsibility from the MFIs' managers and cause them to deviate from their primary mission of educating the local populations on the outreach financial services offered (especially of educating them on their partners' intervention in the choice of customers, on the low level of motivation in collecting the accounts receivable, and on the low level of savings mobilization).

Deposits are the savings that an institution succeeds in mobilizing from its members. This is a means of mobilizing financial resources at a lesser cost (Ngendahayo, 2008). Indeed, besides grants, savings mobilization is the other source of refinancing for most microfinance institutions. Mobilizing small and micro-savings can help the MFIs to attain financial autonomy (Bass and Henderson, 2000). The MFIs use these savings as a source of financing because savings not only enable them to carry on with their activities and are a more regular source of refinancing than donors' grants or the refinancing lines available at central banks, but they also reduce the risk of illiquidity due to the limited number of withdrawals operated on small savings accounts (Bass and Henderson, 2000).

With regard to bank loans, few MFIs apply for them. There are mixed reasons for the low level of MFI refinancing by the banking system. On the one hand, anxious to protect the quality of its lending portfolio, the banking system underestimates the MFIs' capacity to honour their commitment to repay their loans. On the other hand, the MFIs do not make enough effort to employ a human capital that has the required skills to prepare a loan application file and follow up on it. Yet, bank loans should enable the MFIs to achieve efficiency.

The concept of banking institutions' outputs

Outputs are products derived from a combination of production factors. In the case of microfinance institutions, they are the services that are offered to customers (loans, money transfers, and micro-insurance). Unlike loans, money transfers and micro-insurance are relatively recent services for the MFIs. One of the MFIs' goals is to grant loans to destitute populations at low rates. This microcredit enables these populations to start and sustain small-scale income-generating activities (Vermminen, 2006), and thus to free themselves from dependency and poverty. Indeed, many poor people have stopped begging thanks to microcredit. Loans are also given to micro-enterprises that cannot produce the necessary documentation required by the traditional banks before they can grant them loans. While the interest rate charged on microcredit is admittedly high (from 20% to 35%) (Kota, 2007), this does not deter destitute populations from applying for microcredit. The charges related to loan production should come down when the volume of loans granted increases.

Outreach of a microfinance institution's operations

Outreach, or social performance, is an institution's capacity to reach a large number of users. In addition to achieving efficiency, it is imperative for microfinance

institutions to reach the poor (the poorest of them actually), to offer quality services, to improve their customers' living standards, and to assume social responsibility in favour of their customers, their employees and the community at large (Hashemi, 2007). The MFIs must ensure that the products they offer respond to the needs of the target populations. So, to achieve such a mission, they must ensure that there is harmony between the interests of the various stakeholders, and that compromise is achieved when necessary.

Nevertheless, experts wonder if it is possible for an institution to be financially efficient and at the same time extend its activities to the community at large. Some are of the view that the two are incompatible. Indeed, by focusing on their commercial goals, the MFIs are likely to serve high-income customers to the detriment of the poorer ones. They run the risk of using resources that could increase their operating costs. To avoid this, they raise the cost of the services they offer to their customers. But, given that the target population are poor, these find it difficult to get access to the very services intended for them. This explains why the MFIs tend to redirect their activities towards the urban areas, which are easier to serve (Kota, 2007).

For other experts, it is possible to reconcile financial and social goals; they argue that the two are not necessarily contradictory (Hashemi, 2007). Readjustments can enable the two types of goals to be achieved. The future of the MFIs lies in innovation: a new type of management, a new contract, and new attitudes (Morduch, 1999). In less than 10 years, the modern microfinance sector has managed to multiply the number of its beneficiary customers by six; more and more MFIs have been set up, and they are diversified (Labie, 2007).

Empirical measurement of financial institutions' efficiency

Non-parametric methods of measuring efficiency

Efficiency is measured using two types of methods: parametric and non-parametric. The non-parametric methods are mathematical programmes. The most often used is the Data Envelopment Analysis (DEA). This is linear programming developed by Charnes, Cooper and Rhodes. It identifies the frontiers of efficiency from a linear combination of units/observations which, within a production space, use comparatively less inputs in order to produce comparatively more outputs (Casu and Girardone, 2009). The method enables a comparison between branches of one bank (using the same raw materials), by distinguishing those of them that have achieved satisfactory results from those that have not (Scheel and Scholtes, 2003). It is also used for institutions that use a variety of inputs to produce a variety of products (Yeh, 1996; Camanho and Dyson, 1999).

The DEA method consists in minimizing costs under certain constraints. By considering the N production units that use I input(s) and produce J output(s), the DEA model makes it possible to maximize the ratio between input weight and output weight (Yeh, 1996):

$$\max e^{o} = \sum_{j=1}^{J} u_j j_j \; / \; \sum_{i=1}^{I} v_i i_i \qquad \max e^{o} = \sum_{j=1}^{J} u_j j_j \; / \; \sum_{i=1}^{I} v_i i_i \leq 1$$

$$i = 1. \; . \; .I$$
$$j = 1. \; . \; .J$$

where $e°$ corresponds to the profit of the reference unit, or unit *0*, with which the others are compared.

The method has an advantage in terms of specification. The cost function does not need to be specified; only the inputs and outputs. However, the method rests on the assumption that there is no random error (Berger and Humphrey, 1997). The error term is supposed to be zero, which means that there is no random variation in costs. Thus, all the cost variations that are unexplained reflect inefficiencies (Dietsch, 1996).

In a study on bank efficiency from 1993 to 1996 within the West African Economic and Monetary Union (UEMOA), Kablan (2007) used the DEA method to assess technical efficiency and used the Stochastic Frontier Approach (SFA) to measure cost efficiency. The study found that private banks were the most efficient, followed by foreign banks, then public ones. Kablan (2012) conducted a follow-up study on the efficiency of the banking environment in the UEMOA area. He studied 106 MFIs using the DEA and found a low return to scale (both increasing and constant). Using the same method, Kamgna and Dimou (2008) measured the efficiency of 24 banks in the Economic and Monetary Community of Central Africa (CEMAC) between 2001 and 2004 and concluded that the banks in question used only 69% of their production capacity.

Parametric methods

The Stochastic Frontier Approach

Unlike the non-parametric methods, the parametric ones enable the measurement of efficiency based on a cost function. The Stochastic Frontier Approach (SFA) is one of the commonly used methods. It provides information on the deficiencies in the production process and on the optimality of input combinations (Weill, 2003). The method consists in determining a frontier and then comparing it with the score of each institution in the sample. The SFA is also used because of its flexibility, compared with the DEA (Figueira et al, 2006). The basic model for the SFA is a cost function of the following type:

$$TC = f(Y, P) + e$$

where *TC* represents the total costs, *Y* is the vector of inputs, *P* the vector of the prices of inputs, and *e* the error term. This term is composite and includes one component

representing, hypothetically, inefficiencies, and another one representing the random error. The latter component reflects the influence of chance or measurement errors (Dietsch, 1996). However, when a firm offers several products instead of one, the SFA cannot be applied because a production function cannot be determined in the case of multiple products (Kimenyi et al, 2012).

Hunter and Timme (1986) used the SFA to analyse the efficiency of 91 American banks in relation to technological change and found that the banks minimized their costs. In the same vein, Hunter and Timme (1991) measured the efficiency of 219 banks over the 1980-1986 period, using the SFA (a translog function), and observed significant production economies.

Neff et al (1994) measured the efficiency of 1973 banks from the USA using a translog function and found that they were inefficient because their outputs were not productive. To measure the efficiency of the banks in the UEMOA area over the 1993-1996 period, Kablan (2007) used the SFA and found that the private banks were the most efficient, followed by foreign banks, and lastly public ones. Servin et al (2006) used the SFA to analyse the efficiency of 247 MFIs between 2003 and 2009 and found that those whose goal was profit-making were more efficient than those for whom this was not a priority. Using the same method, Servin et al (2012) analysed the relationship between efficiency and ownership of 315 MFIs in 18 Latin American countries. They found that non-governmental organizations and cooperatives were less efficient than the other non-financial institutions and the banks. Using the SFA, Suela (2013) analysed the efficiency and performance ratios of the banks in Albania and found that the larger banks were more efficient than the smaller ones.

Economies of scale and efficiency

The efficiency of financial intermediaries is also determined on the basis of economies of scale obtained from an estimation of a Translog function. An institution achieves a good cost management when it realises economies of scale. So, when the level of its production increases, the resources used decrease. That is, while products increase, costs reduce. This is a reflection of efficiency, which, it should be recalled, refers to an organization's ability to produce outputs with a minimum of inputs. Several studies have analysed the relationship between costs and production by calculating economies of scale.

Hunter and Timme (1986) estimated a Translog function while analysing the production structure of 91 American banks in relation to technological change and found that the banks minimized their costs. Cuevas (1988) also used the same method to assess the costs, in relation to the intermediation, of 28 agricultural banks from Honduras over the 1971-1982 period, and found that their economies of scale disappeared when their outputs increased. In the same vein, Hunter and Timme (1991) addressed the same issue by measuring the efficiency of 219 banks over the 1980-1986 period and observed significant production economies.

Input and output determination

Two approaches, namely production and intermediation, have been used to specify

the variable costs, prices (inputs) and product (output). According to the production approach, which was introduced by Benson (1965), a bank is defined as an enterprise of services that can be divided into two groups: one that generates resources (deposits on current account, fixed-term deposits, etc.) and another that generates employment (commercial loans, instalment loans, shares, etc.) (Sassenou, 1992). The former group refers to outputs, and the latter to inputs. The total costs essentially consist of operational costs; interest charges and loan charges are not included. They are excluded from costs because they are not considered as costs incurred from the bank's direct operations (Yeh, 1996). Outputs are measured by units of customer accounts. Operational costs are considered as the inputs (capital and labour), while the number of customer transactions is the outputs (loans, deposits, and account-related services) (Anthanassopoulos, 1998; Camanho and Dyson, 1999).

The intermediation approach, a relatively more recent one, was proposed by Sealey and Lindley (1977). In this approach, the production process requires financial intermediation; that is, the collection or borrowing of funds that will later be granted as loans or will be invested (Sassenou, 1992). In other words, banks collect deposits from customers and later give the same money as loans or invest it (Pasiouras, 2007). In such a process the deposits are the inputs. Labour and capital are also considered as inputs.

Moreover, in the intermediation approach, the total costs comprise interest and loan charges as well as operational costs (Sassenou, 1992). The total costs represent interest charges, account service charges and charges for the acquisition of inputs (capital, labour, and deposits). Unlike in the case of the production method where outputs are measured per unit of customer account, in the intermediation approach they are estimated in monetary amounts (Mitchell and Onvural, 1996; Camanho and Dyson, 1999).

Authors rely on one of the two approaches to specify the cost variables, the inputs and the outputs. Cuevas (1988) used non-financial costs to represent the expenses. For their part, Hunter and Timme (1991) did not make any distinction in their analysis; they used the total expenses to measure costs. As for Kablan (2007), he measured the cost variable by using the interest payable, the operating expenses, and the depreciation of the total assets.

Authors have also been divided on the measurement of inputs (physical capital, human capital, and financial capital). For instance, Kablan (2012) chose to use the production approach in his study on the efficiency of the MFIs in the UEMOA area. He defined inputs as the interest earned on deposits, on loans and on equity funds. Hunter and Timme (1986) used salaries, benefits, pensions, the total amount of expenditure on supplies, equipment, and rent for premises, to represent inputs, while Hunter and Timme (1991) used salaries and benefits in relation to the number of employees, the rent for the premises occupied by the bank, and the interest fees collected. For his part, Kablan (2012) chose to use the production approach in his study on the efficiency of the MFIs in the UEMOA area: he used interest on deposits, on loans, and on equity funds to represent inputs.

The financial-capital variables are rarely used in bank analyses (compared to physical and human capital). Nonetheless, some authors take them into account in their studies of microfinance, as long as the MFIs use them as inputs. For instance, Kablan (2007) took into account interest and related charges in the case of credit establishments, and

customers in the case of total number of borrowers. In the same vein, Kablan (2012) also included in inputs the grants that the MFIs he studied had received.

Various indicators of outputs have also been used in the literature. For instance, Cuevas (1988) measured outputs by the volume of loans in relation to their size and by the deposits in relation to the number of accounts. Hunter and Timme (1986) used loans, deposits and investments in stocks to represent outputs, while Hunter and Timme (1991) used loans and deposits. Kamgna and Dimou (2008) used loans to represent outputs. For his part, Kablan (2012) measured outputs by using the gross lending portfolio, the number of borrowers, the average loan per borrower, and the proportion of women borrowers.

Effect of the refinancing resources on efficiency

There is little literature on the effect of the refinancing resources on efficiency. Research has focussed more on the measurement of efficiency than on its determinants. While the variables in this research were defined as inputs and outputs, most of the time their impact was not really studied. It should be remembered that the principal resources are deposits, grants and loans.

Deposits are an important resource in the functioning of financial intermediaries. Cuevas (1988) measured the efficiency of banks from Honduras over the 1971-1982 period by calculating their economies of scale and found that there existed unexploited economies of scale in relation to savings mobilization. Pursuing the same goal, Kablan (2007) analysed bank efficiency in the UEMOA area over the 1993-1996 and found that a stable deposit base had a positive impact on this efficiency.

With regard to grants, they must be used with caution if they have to have a positive impact on efficiency. According to Franka (2007), over-reliance on grants or on grants that are not prudently awarded can slow down development. Hartarska (2004) measured the performance of the MFIs in Central Europe and Central Asia and found that their use of grants led to an increase in their running costs. For their part, Hudon and Traca (2011) tested the effect of grants on the efficiency of 100 MFIs and found a positive relationship between the two variables. However, grants should not be used excessively if their effects have to be beneficial. In the same vein, using grants as inputs, Kablan (2012) measured the efficiency of 106 MFIs in the *UEMOA* area and found that grants had a positive effect on this efficiency.

Empirical measurement of financial institutions' social performance

Social performance

In addition to financial efficiency, a microfinance institution's capacity to extend its services to a large number of people is an important component while measuring the outreach of its activities. Different indicators have been used to analyse the outreach of the MFIs' activities. For instance, Hartarska (2004) analysed the outreach of the MFIs in

Central Europe, Eastern Europe and the New Territories by using the number of borrowers and the ratio of the loans granted to GDP. In the same vein, based on reports appraising the outreach of several institutions, Merl and and Strom (2008) used the number of outlets, that of borrowers, and the average of loans granted. Crepon et al (2013) measured the social performance of the microcredit granted by the Al Amana microfinance institution in Morocco in 2006 and found that the beneficiary populations had been able to invest the microcredit in question and had increased their profit, but that their consumption and income had not increased significantly. Banerjee et al (2013)[6] measured the outreach of the activities of the MFIs located in 104 slums of Hyderabad, India, by focusing their study on the introduction of microcredit. They found that the loans granted had not enabled the beneficiaries to undertake an income-generating activity.

Social performance and efficiency

Researchers went further to investigate the relationship between the outreach and the efficiency of microfinance institutions. In order to measure the outreach of the activities of 1,000 MFIs, Waddock and Graves (1997) used the Kinder-Lydenberg-Domini index (composed of variables representing the community, the environment, diversity, products, and the relationship between employees) and found a positive relationship between the MFIs' social and financial goals. Makame and Murinde (2006) tested the relationship between efficiency and social performance based on data from 33 institutions from East Africa over the 2000-2005 period and confirmed the idea that the MFIs that were efficient were those that were likely to reach a larger number of poor people.

Hermes et al (2011) tested the relationship between the two variables using data from 415 MFIs for the period between 1997 and 2007 and found that those whose goal was social performance were less efficient. Zerai and Rani (2012) tested the relationship between the efficiency and social performance of 85 MFIs in India and found a strong relationship between their financial and social goals. Servin et al (2012) measured the efficiency of 315 MFIs from Latin America between 2003 and 2009 and found that those that focused on achieving social performance were less efficient. For his part, Roy (2012) tested the relationship between the efficiency and social performance of 34 MFIs in 14 districts of Assam and found that there was negative relationship between the two variables.

4. Methodology

The econometric model of efficiency and the method of its estimation

The econometric model

Following Cuevas (1988), Hunter and Timme (1989), and Hunter and Timme (1991), the present study used parametric methods (while calculating economies of scale) to measure the efficiency of the MFIs in Niger. It did not use the DEA method because this does not take into account the error term that arises from the impact of chance or measurement errors. The number of observations (96) in the study's database was not sufficient enough to enable the use of the DEA. The decision to calculate the economies of scale enabled the present study to measure the relationship between efficiency and performance on the basis of the descriptive analysis chosen.

The MFIs used as the present study's sample used deposits from their members to offer them loans. That is why the data in the study are expressed in CFA francs. The study thus chose to use the intermediation approach to define inputs and outputs. The relationship between the MFIs' resources and their running costs was described using a translog function with a quadratic form. This form enables the expenditure on inputs to vary according to the amount of total costs and to several types of substitution between inputs (Christensen et al, 1975). Microfinance institutions combine physical capital (*PC*), human capital (*PT* [in the equation below]), deposits (*DP*), borrowing (*EMP*), and grants (*SUB*) in order to grant loans (*Q*) to their customers. The use of these resources has an impact on the MFIs' total costs (*TC*): physical capital, human capital, savings, and loans, were all expected to have a positive effect on costs. However, the study expected a negative impact of grants on the MFIs' costs.

The Translog equation is defined as follows:

$$\begin{aligned}\text{Log(TC)}=&\text{C1+C2*log(Q)+C3*log(PC)+C4*log(PT)+C5*log(PD)}\\&\text{+C6*log(SUB)+C7*log(EMP) +C8*1/2*log(Q)2}\\&\text{+C9*1/2*log(PC)2+C10*1/2*log(PT)2+C11*1/2*log(PD)2}\\&\text{+C12*1/2*log(SUB)2+C13*1/2*log(EMP)2+C14*log(PC)*log(PT)}\end{aligned}$$

equation continued next page

Lot(TC) equation continued

$$+C15*\log(PC)*\log(Q)+C16*\log(PC)*\log(PD)$$
$$+C17*\log(PC)*\log(SUB)+C18*\log(PC)*\log(EMP)$$
$$+C19*\log(PT)*\log(Q)+C20*\log(PT)*\log(PD)$$
$$+C21*\log(PT)*\log(SUB)+C22*\log(PT)*\log(EMP)$$
$$+C23*\log(PD)*\log(Q)+C24*\log(PD)*\log(SUB)$$
$$+C25*\log(PD)*\log(EMP)+C26*\log(SUB)*\log(Q)$$
$$+C27*\log(SUB)*\log(EMP)+ +C28*\log(Q)*\log(EMP)+e$$

where *log*: logarithm, and *e*: the term of error

The endogenous variable

TC represents the total running costs (*TC* = total costs - staff costs - post and telecommunication costs - technology investment costs).

The exogenous variables

a) The inputs

- *PC*: cost of capital (*PC* = amount of tangible assets + investments in technology)
- *PT*: cost of labour (*PT* = amount of staff costs).
- *PD*: amounts of members' deposits
- *SUB*: amounts of grants received by the MFIs
- *EMP*: the microfinance institutions' loans from banks

b) The outputs

- *Q*: amounts of loans granted by the microfinance institutions

Method of econometric estimation of the model

The effect of refinancing resources on MFI efficiency was tested using a Translog function. The model was estimated in the form of a system (the function and equations of the cost-sharing of inputs). Using such a system enables the researcher to obtain better results, especially concerning the number of significant variables. It equally enables the researcher to solve, by multiplying the number of observations, the multicollinearity problems that come with the Translog function (Hunter and Timme, 1986).

To estimate the system, the present study eliminated one of the equations so as to avoid the issues related to the singularity of the matrix. And since the cost-sharing equations were derived from the Translog function, the same coefficients were used for both the function and the cost-sharing equations. The system was estimated using the Seemingly

Unrelated Regression (SUR) method, which takes into account the heteroscedasticity of the sample.

The equations derived from the Translog function are the following:

$$SPC = \frac{d * \log(TC)}{d * \log(PC)} C_3 + C_9 * \log(PC) + C_{14} * \log(PT) + C_{15} * \log(Q) +$$

$$C_{16} * \log(PD) + C_{17} * \log(SUB) + C_{18} * \log(EMP)$$

$$SPT = \frac{d * \log(TC)}{d * \log(PC)} C_4 + C_{10} * \log(PT) + C_{14} * \log(PC) + C_{19} * \log(Q) +$$

$$C_{20} * \log(PD) + C_{21} * \log(SUB) + C_{22} * \log(EMP)$$

$$SPD = \frac{d * \log(TC)}{d * \log(PD)} C_5 + C_{11} * \log(PD) + C_{16} * \log(PC) + C_{20} * \log(PT) +$$

$$C_{23} * \log(Q) + C_{24} * \log(SUB) + C_{25} * \log(EMP)$$

$$SSUB = \frac{d * \log(TC)}{d * \log(PD)} C_6 + C_{12} * \log(SUB) + C_{17} * \log(PC) + C_{21} * \log(PT) +$$

$$C_{24} * \log(PD) + C_{26} * \log(Q) + C_{27} * \log(EMP)$$

$$SEMP = \frac{d * \log(TC)}{d * \log(PD)} C_7 + C_{13} * \log(EMP) + C_{15} * \log(PC) + C_{22} * \log(PT) +$$

$$C_{25} * \log(PD) + C_{27} * \log(SUB) + C_{28} * \log(Q)$$

where:

SPC: share of the physical capital (*PC*) in the total cost; *SPT*: the share of the human capital (*PT*) in the total cost; *SPD*: share of deposits (*PD*) in the total cost; *SSUB*: share of grants (*SUB*) in the total cost; SEMP: the share of borrowing (*EMP*) in the total cost.

Economies of scale

Economies of scale (*EE* below) represent the percentage of variations in costs when the quantity of all the outputs increases owing to a common variable (Cuevas, 1988). They enable the researcher to know whether the management of the current costs of the MFIs in the sample can provide the opportunity to offer other new products without their running costs increasing considerably. In the Translog function, the economies of scale are obtained by deriving the equation by the output.

$$EE = \frac{d * \log(TC)}{d * \log(Q)} C_2 + C_8 * \log(Q) + C_{15} * \log(PC) + C_{19} * \log(PT) +$$

$$C_{23} * \log(PD) + C_{26} * \log(SUB) + C_{28} * \log(EMP)$$

If $EE < 1$, then there are economies of scale; that is, the more services an institution produces, the less the costs it incurs increase (efficiency).

If $EE > 1$, then there are diseconomies of scale; that is, the more services the institution produces, the more the costs it incurs increase.

If $EE = 1$, then the economies of scale are constant.

Substitution elasticities between inputs

Estimating the Translog function also enables the researcher to calculate substitution elasticities (ES) between inputs. According to Hunter and Timme (1991), the substitution elasticities between two inputs *n* and *m* are obtained using the following formula:

$$ES_{n,m} = (C_{n,m} / S_n * S_m) + 1$$

Cn,m: coefficient of the inputs *n* and *m* in the translog function

S_n: share of the input n (*SPn*).

If $ES > 0$, then inputs *n* and *m* are substitutable.

By calculating substitution elasticities the researcher is able to test not only whether microfinance institutions are financially autonomous, but also the optimal combinations of inputs. That is why the present study analysed the possible substitution between grants and deposits, grants and borrowings, and borrowings and deposits.

The social performance of MFI activities

Indicators of social performance

The outreach of a microfinance institution's activities is addressed through a descriptive analysis. Three indicators are used: the number of the MFI's outlets, its membership and the volume of loans it grants. Indeed, for the MFIs to grant loans to a maximum number of people is a quintessential indicator of good performance, since that is their primary goal. If the MFIs' results lead to an increase in the target populations' income, this means that those institutions contribute to the country's economic growth, which constitutes the second indicator (loans/GDP), which Hartarska (2004) refers to as a "depth" indicator. This means that the higher the volume of loans granted, the larger the number of people who have been reached.

Since loans are granted to people who are expected to allocate them to an income-generating activity, there is a need to verify the proportion of people reached by the MFIs' activities. That is why sales points are essential in order to stay in touch with members. Based on the number of outlets, one can test the effective availability of the proposed products. So, once the number of beneficiary populations and that of sales points are large, the MFI can be said to have achieved its goal of contributing to poverty reduction.

Method of analysis of the outreach of MFI activities

Service delivery points are essential, and their location matters a great deal. While traditional banks are exclusively located in towns, microfinance institutions are located both in towns and in rural areas. The present study looked at how the MFIs' outlets were set up between 2005 and 2008 according to areas of activities (urban, semi-urban and rural) and to types of MFI (savings and credit mutual societies or framework agreements).

It is important for the MFIs to specify their target populations in order to appraise the outreach of their activities. The present study looked at how, over four years, MFI activities reached the populations and how they affected males vs females vs legal entities, in which areas and by which types of MFI.

After specifying where the services and their beneficiaries are located, it is important to analyse the types of services offered and to establish which ones are a determining factor in the fight against poverty, in the same way as loans are. In relation to this, the present study looked at the trends in the grants that were given by the 24 institutions studied over the 2005-2008 period, as well as at how those grants were distributed according to areas and types of microfinance institutions.

Sampling method and source of data

Sampling method

Stratified sampling was used to select the sample. This type of sampling consists in dividing the population into strata, or sub-groups, then selecting elements from each

stratum by using, if one wishes, several sampling weightings or even different sampling techniques. One reason why stratified sampling is frequently used for research in developing countries is that while there are maps or lists that can serve as the basis for sampling in urban areas, they do not exist for rural areas. In the present study, microfinance institutions were first divided into two strata: one based on their affiliation status (i.e. independent vs. union-affiliated MFIs) and the other based on the number of years they had each been in operation between 2005 and 2008 (subject to the availability of data covering the entire period).

Source of data

The data used in the present study came basically from two sources: the database of the Technical Assistance Scheme for the Financial Sector Development (Projet d'assistance technique pour le développement du secteur financier, PDSF) and the MFIs selected as the study's sample. The PDSF is a project funded by the World Bank; it is under the Niger Ministry of Economy and Finance. From its database the present study extracted data for the years 2005, 2006, 2007 and 2008 related to the MFIs used in the sample and which had filed their financial statements to the ministry. It should be pointed out that few MFIs actually send their data to the ministry on a regular basis. That is why the data from the ministry had to be complemented with those from the MFIs themselves. And in cases where the MFIs had not filed their statements, all the data were collected from them directly.

The present study's sample is composed of 24 microfinance institutions selected from the 187 that were operational in 2008 (see Annexe 4). Eighteen of the 24 MFIs were union-affiliated[7] while 6 were independent. The former are the MFIs affiliated to the Grouping of Savings and Credit Banks (Mouvement des Caisses d'Epargne et de Crédit, MCPEC). In 2010 the Ministry of Economy and Finance withdrew the licence from the Union of Savings and Credit Mutual Societies (Union des Mutuelles d'Epargne et de Crédit, UMEC) because this institution was not financially viable and its management had diverted the grants received from the government to other uses. That is why the present study did not have access to all the necessary data for its analysis. The MFIs under the Niger Mutual Credit (CMN) started their activities in 2008. The 24 MFIs used in the sample are disseminated across four of the eight regions of Niger. Eighteen are located in semi-urban areas, while six are located in urban areas. It is worth pointing out that in addition to their headquarters in Niamey, the MFIs Taanadi, MECREF, and CAPITAL FINANCE also have branches in other regions of Niger.

All in all, the study's sample is composed of a balanced panel of 96 observations (24*4= 96). The period of study runs from 2005 to 2008. The choice of the panel of MFIs was motivated by the amount of data needed for the sample. This was limited to four years, and was thus insufficient for the use of models relying on cross-sectional or chronological data.

5. Data analysis

Descriptive statistics for the model's variables

Table 5 gives descriptive statistics for the variables taken into account in the present study. The table shows that the number of deposits was larger than that of the other resources used by the MFIs for their operations. But the disparities between the MFIs are more significant in the case of the loans they granted.

Table 5: Descriptive statistics for the model's variables

	TC [Total cost]	Q [loans granted]	PC [cost of capital]	PC [cost of labour]	PD [deposits]	EMP [loans]	SUB [grants received]
Mean	50294315	2.95 E+08	11157210	18931985	1.16 E+08	53689893	28248208
Maximum	5.09 E+08	3.13 E+09	1.42 E+08	2.31 E+08	9.81 E+08	1.48 E+09	1.74 E+09
Minimum	765325	0.00	0.00	0.00	0.00	0.00	0.00
Std. Dev.	89556268	5.59 E+08	23676543	39321447	1.89 E+08	1.98 E+08	1.79 E+08
Observations	96	96	96	96	96	96	96

Source: Author's computations based on the sample

Principal Components Analysis (PCA)

For the year 2005, the table of eigenvalues (in Annexe 5) enables the choice of F1 and F2, which, together, represent 98% of the information. F1 represents grants (95%) and loans (93%), while F2 represents deposits (66%). The table of the relative contributions of the observations shows that the independent MFIs located in urban areas used more grants and loans as their resources. Such results are more evident in relation to deposit mobilization.

For the year 2006, the variables "loans" and "grants" are represented by F1, while the variable "deposits" is represented by F2. The table (in Annexe 6) of the correlation between the variables and the factors shows that loans, grants and deposits are close to the circle; that is, they are correlated with F1 and F2. Thus, the independent MFIs were found to use grants, loans, and deposits most.

For the year 2007, F1 and F2 together represent 83% of the variation. Grants and deposits are represented by F1, and loans by F2. The variables and factors were found to be correlated (see the correlation table in Annexe 7). The independent MFIs used the resources coming from deposits, grants, and loans most.

For the year 2008, the factors F1 and F2 represent 91% of the information. F1 represents deposits and grants, while F1 represents loans (see Annexe 8). The variables and factors were found to be correlated. As was the case in the years 2005, 2006, and 2007, the independent MFIs used deposits, grants and loans most. Some of them (e.g. ASSUSSU) operated exclusively from the urban areas, while others operated from both the urban and the semi-urban areas.

Cluster analysis of the sample

The present study did a cluster analysis for the "costs" variable in order to establish which institutions had incurred most costs. Based on the results of the PCA, the institutions were divided into two categories. For the year 2005, Category 1 comprises three institutions, two of them independent, and one union-affiliated. Category 2 comprises the remaining 21 MFIs. For the year 2006, Category 1 comprises four independent MFIs, and Category 2 the remaining 20 MFIs, both independent and union-affiliated. For the year 2007, Category 1 comprises four independent MFIs and Category 2 the remaining 20, both independent and union-affiliated. For the year 2008, Category 1 comprises 4 independent MFIs, and Category 2 the remaining 20, both independent and union-affiliated.

Cluster analysis for the refinancing variables (deposits, grants, and loans) brings out the distribution of the institutions in the sample very clearly. Two categories were also established. For the year 2005, the two categories are composed of both independent and union-affiliated MFIs. For the year 2006 and the subsequent ones, the results are different: Category 1 is composed of one independent MFI, while the remaining 23 are in Category 2. For the year 2007, Category 1 comprises 5 independent institutions, and Category 2 the remaining one independent institution and all the union-affiliated ones. For the year 2008, Category 1 is composed of 20 institutions (2 independent and 18 union-affiliated), and Category 2 of four independent MFIs.

6. Results of the estimations of the efficiency model

Contribution of the inputs

The results of the estimations are presented in Table 6. Fifteen variables were found to be statistically significant.

Physical capital was found to have a positive effect on the MFIs' costs (SPC= - 4.53). For instance, when tangible assets increased by 1%, the costs decreased by 4%. Staff costs were also found to have a positive effect on the MFIs' costs (SPT= -1.78). For example, a 1% increase in human resources led to a 1% drop in costs. The drop was higher in the case of deposits: when these rose by 1%, the running costs decreased by 31% (SPD= -31.7).

However, the results observed for grants and loans are not those that were expected. Indeed, these two variables were found to have a negative effect on MFI activities (SSUB= 5.23; SEMP= 2.93), a finding which, thus, disproved the study's working hypothesis. The observed negative effect can be attributed to the fact that the amounts of the two types of resources were at the time of the study not sufficient enough to enable the MFIs to be efficient. Grants were equally found to have a negative effect on the efficiency of the MFIs studied (SSUB = 5.23).

Economies of scale

The econometric estimations (in Table 6) also revealed that the MFIs in Niger were not efficient (EE= 31.83). They did not benefit from any economies of scale, as there was no reduction in their production costs. Granting loans to customers was found to have a negative effect on those MFIs' activities. The increase in loan amounts led to an increase in the costs incurred by the MFIs. The latter therefore have to review their mode of functioning and combinations of inputs so as to better manage their costs. The MFIs' current resources did not enable them to sustain the costs they incurred. Such a situation was going to have an impact on the future of microfinance in Niger, since a microfinance institution cannot function sustainably while it is making losses or is dependent on grants. The MFIs must therefore review their strategies, especially those concerning the mobilization and choice of their resources and, for banking institutions, strategies concerning the recruitment of adequate human capital.

Table 6: Summary of the results of econometric estimations

	Variables	Coefficients	t-statistic
C_1	Constant	25.17 (25.85)	0.97
C_2	*Q*	33.85*** (7.13)	4.74
C_3	*PC*	-4.76*** (1.34)	-3.53
C_4	*PT*	-2.13 (1.92)	-1.10
C_5	*PD*	-33.22*** (7.13)	-4.65
C_6	*SUB*	5.44*** (1.39)	3.91
C_7	*EMP*	2.96*** (0.98)	3.02
C_8	Q^2	-3.26*** (0.89)	-3.65
C_9	PC^2	-0.16*** (0.05)	-3.10
C_{10}	PT^2	0.21** (0.10)	2.03
C_{11}	PD^2	1.27*** (0.23)	5.46
C_{12}	SUB^2	0.16*** (0.03)	4.23
C_{13}	EMP^2	0.20*** (0.02)	6.91
C_{14}	*PC*PT*	0.01 (0.05)	0.18
C_{15}	*PC*Q*	0.16 (0.13)	1.21
C_{16}	*PC*PD*	0.18 (0.13)	1.31
C_{17}	*PC*SUB*	0.005 (0.02)	0.23
C_{18}	*PC*EMP*	0.03 (0.02)	1.08
C_{19}	*PT*Q*	0.03 (0.14)	0.20
C_{20}	*PT*PD*	0.05 (0.11)	0.47

continued next page

Table 6 Continued

	Variables	Coefficients	t-statistic
C_{21}	*PT*SUB*	0.05 (0.05)	0.96
C_{22}	*PT*EMP*	-0.007 (0.04)	-0.17
C_{23}	*PD*Q*	0.86** (0.40)	2.12
C_{24}	*PD*SUB*	-0.81*** (0.12)	-6.77
C_{25}	*PD*EMP*	-0.03 (0.07)	-0.48
C_{26}	*SUB*Q*	0.40*** (0.12)	3.09
C_{27}	*SUB*EMP*	-0.006 (0.02)	-0.23
C_{28}	*Q*EMP*	0.21*** (0.09)	-2.36

***: significance level at 1%; **: significance level at 5%; *: significance level at 10%
(…): standard deviation; number of observations: 96
Source: Author's computations based on data from the sample

Diversification can also be a solution for those institutions. Indeed, by raising enough funds, they can offer their clients simple savings-related by-products, in the same way as micro-insurance does. They should encourage people to save a little more for a possible spell of food insecurity. Such saving will enable the MFIs to mobilize more resources and will cause the costs they incur to be distributed across their various services.

Substitution between inputs (refinancing resources)

Deposits and bank loans can be substituted for each other ($ES_{pd,EMP} = 1.09$). Savings can also be substituted for grants ($ES_{pd,sub} = 0.004$). However, loans and grants are not substitutable resources ($ES_{emp,sub} = - 3.91$). The results of the estimations also showed that the joint use of deposits and borrowings on the one hand, and of deposits and grants on the other hand, had a positive impact on the functioning of the MFIs, as it led to a decrease in their costs.

In relation to loans, the MFIs have two options. First, they should not have recourse to borrowing as a source of refinancing, since borrowing is not beneficial to them; it causes them to incur additional costs (such as interest on loans). Such a solution would be most beneficial to the small-sized MFIs which are not able to sustain their costs. The second option would be for the MFIs to take out even more loans so as to enjoy the benefits that come with them. But if they go for the latter option, they will need to recruit staff who have skills in managing the loan portfolio, or to upgrade the skills of

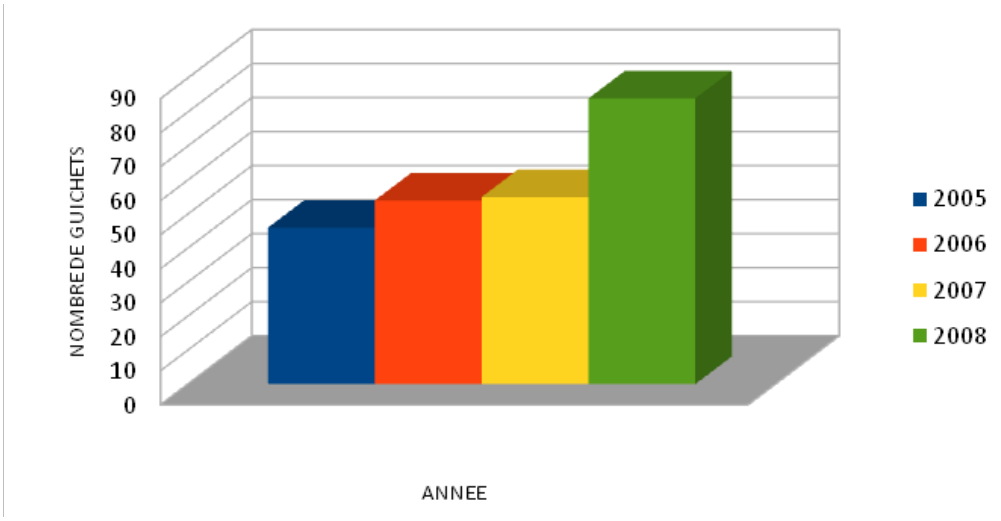
the already existing staff so that they are able to prepare files for loan application and to follow up on them. The regulatory authorities (the BCEAO and the Ministry of Economy and Finance) should offer their support by closely monitoring the MFIs' activities, in particular how people's savings are being protected.

7. The social performance of the MFIs in Niger[8]

Service outlets

The number of the MFIs' service outlets increased between 2005 and 2008 (see Figure 1). Most service outlets were set up in urban centres (see Table 7-I)[9]; that is, in large towns where the traditional banks do most of their business as well. The second largest number of service outlets was set up in rural areas. However, the number of outlets did not change over the 2005-2008 period (see Table 7-I), which is an indication of the microfinance industry's limitations in serving the poor.

Figure 1: Number of the MFIs' outlets in Niger over the 2005-2008 period



Source: Author, using data from the sample

[NB: Vertical axis: Number of outlets; horizontal axis: Years]

Only one MFI in the sample, Taanadi, runs activities both in the semi-urban and the urban areas. Taanadi is one the MFIs referred to as "Framework Agreements" (Conventions Cadres, CCs). These CCs, which are three out of the 24 MFIs in the sample, had an increasing number of outlets over the study period (see Table 7-II), which actually outnumbered those of the remaining 21 MFIs. These observations are not surprising, since the CCs receive considerable external funding. For instance, in 2005 the seven

operational CCs in Niger received 61% of all the grants (MEFN, 2007). Because of this, the CCs do not need to collect deposits in order to grant loans to their members, unlike the Savings and Credit Mutual Societies (Mutuelles d'Épargne et de Crédit, MEC). However, the availability of funds does not necessarily encourage the CCs to offer their services to the people living in the small villages.

Moreover, the MFIs in Niger will have difficulty in serving the rural areas as long as they are not efficient. Indeed, their running costs, already high in urban areas, become even higher in the rural areas due to administrative costs and those related to lack of adequate infrastructure. Yet, an MFI which fails to reduce its costs despite an increase in its production will not be able to function sustainably not only in those remote areas, but also in the big towns.

There is, however, a positive point to be noted: the MFIs give priority to deposits when it comes to refinancing their activities. It should be remembered that the present study found a positive effect of deposits on the efficiency of the MFIs in Niger. If these institutions set themselves the goal of reducing their operating costs, they can set up enough service outlets in rural areas at accessible fees for the destitute populations. Otherwise, by concentrating their service outlets in towns, they simply do not reach the country's poorest.

Table 7: Number of the MFIs' service outlets depending on activity areas and type of MFI

	2005	2006	2007	2008
ACTIVITY AREA (I)				
URBAN	28	34	35	63
SEMI-URBAN	5	5	5	5
SEMI-URBAN AND URBAN	5	7	7	8
RURAL	8	8	8	8
TYPE OF MFI (II)				
MEC	24	26	28	41
CC	22	28	27	43

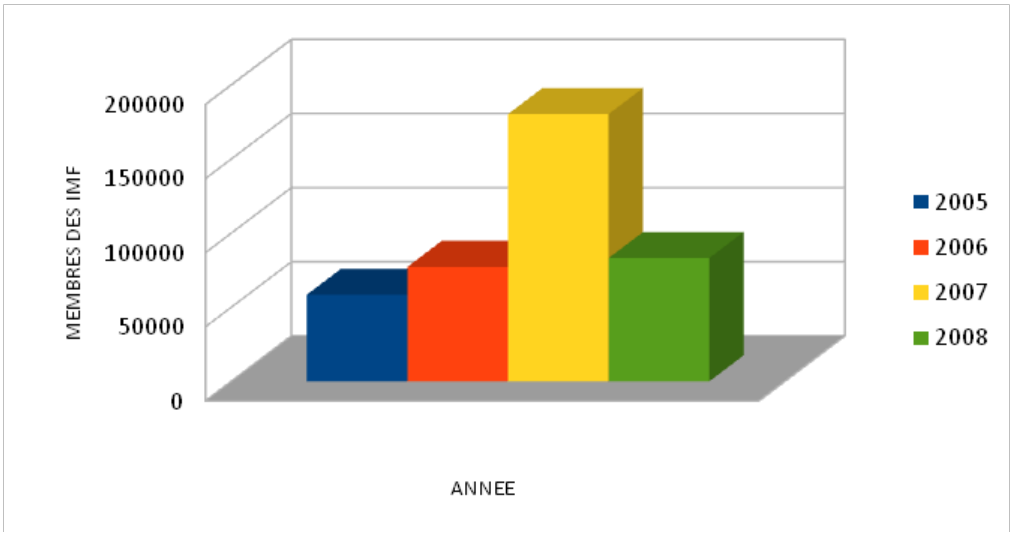
MEC: Savings and Credit Mutual Societies [Mutuelles d'Épargne et de Crédit]; CC: Framework Agreements [Conventions Cadres]
Source: Author, using data from the sample

Customers served by the MFIs in Niger

The number of people served by the MFIs in Niger increased between 2005 and 2007. However, it significantly decreased in 2008 (see Figure 2), a decrease resulting from the considerable drop in the membership of three MFIs (Taimako, Assussu and Ambuta).

Between 2005 and 2007, the proportion of men was higher than that of women (See Table 8-I). The difference was greatest between 2006 and 2007. However, in 2008, the proportion of women exceeded that of men. The same situation was observed in relation to the different activity areas, as can be seen in Table 8-I-II-III-IV-V. With the exception of MECREF, an MFI that served women only, the other MFIs grant loans to men, and women and/or legal entities (which are female or mixed groupings).

Figure 2: Membership of the MFIs in Niger from 2005 to 2008



Source: Author, using data from the sample

[NB: Vertical axis: Membership; horizontal axis: Years]

Table 8: Distribution (in %) of the MFIs' membership according to activity area

	2005	2006	2007	2008
ALL THE AREAS (I)				
MEN	50.82	35.87	80.57	41.96
WOMEN	47.13	16.41	12.15	49.56
LEGAL ENTITIES	2.05	2.08	3.67	1.98
URBAN AREA (II)				
MEN	48.94	46.5	90.98	25.85
WOMEN	48.21	47.22	7.33	74.15
LEGAL ENTITIES	2.85	6.28	1.69	0
SEMI-URBAN AREA (III)				
MEN	74.35	31.46	49.27	50.19
WOMEN	25.65	10.85	16.96	18.07
LEGAL ENTITIES	0	57.7	33.77	31.73
SEMI-URBAN AND URBAN AREA (IV)				
MEN	42	0	57.48	40
WOMEN	58	0	38.32	60
LEGAL ENTITIES	0	100	4.2	0
RURAL AREA (V)				
MEN	77.32	58.73	54.01	26.24
WOMEN	22.68	17.83	21.55	32.24
LEGAL ENTITIES	0	23.44	24.43	41.51

Source: Author, using data from the sample

In relation to type of MFI, the proportion of people served by the MEC-type MFIs was higher than that of those served by the CC-type ones, except for the year 2007 (see Table 9-I). During this year, the membership of the Assussu MFI increased considerably. In the MEC-type MFIs, the number of men (see Table 9-II) was higher than that of women, except for the year 2006. This is the period during which the membership of MECREF rose from 8,000 to 11,000. Most of these were women, who thus received most of the loans.

On the other hand, the CC-type MFIs (see Table 9-III) offered their services to more women than men, except for the year 2007.[10] This means that, unlike the MEC-type MFIs, they were concerned about extending the outreach of their activities to women, as pointed out by Zerai and Rani (2012).

According to these authors, the MEC-type MFIs (the largest number of them) have a lower social performance, because they serve more men than women. Yet, the history of microfinance has revealed that women use the loans they get to start income-generating activities that contribute to meeting their families' needs. Women are also known to repay their loans and thus to enable the lending institution to get enough funds to refinance itself. So, by serving more men than women, there is a risk that the portfolio quality will be negatively affected. Moreover, for not being efficient, microfinance institutions are not in a position to offer their services at affordable rates for the poor. Interest rates, which are already high, are thus likely to rise. As a consequence, the target population will be the rich rather than the poor, thus rendering microfinance institutions just rent-seeking ones.

Table 9: Membership distribution (in %) according to type of MFI

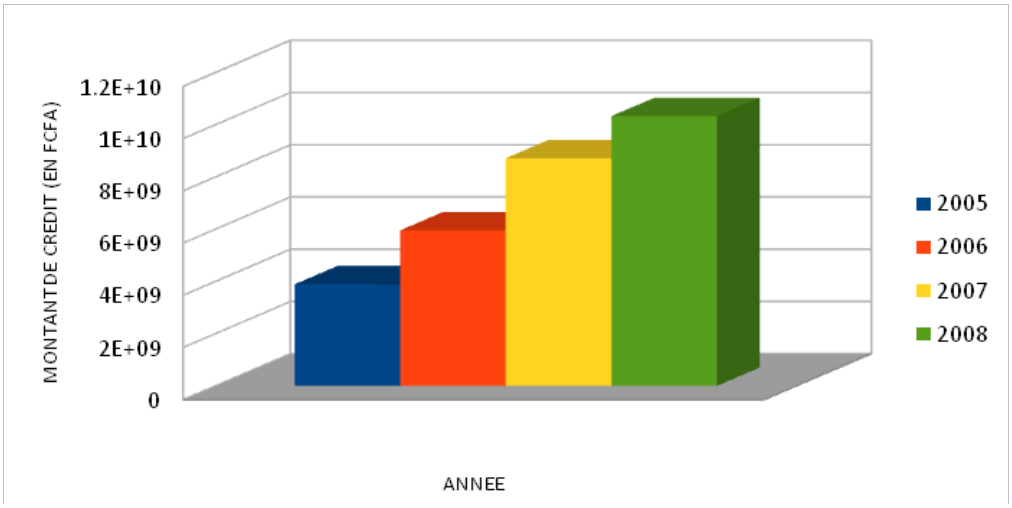
	2005	2006	2007	2008
ALL THE MFIs (I)				
MEC-type MFI	78.89	77.13	30.6	66.32
CC-type MFI	21.1	22.87	69.4	33.68
***MECs* (II)**				
MEN	54	22.6	69.8	50.98
WOMEN	43.4	67.8	9.26	46.11
LEGAL ENTITIES	2.6	9.61	1.62	2.9
***CCs* (III)**				
MEN	38.96	50.26	93.49	34
WOMEN	61.03	49.73	5.81	65.25
LEGAL ENTITIES	0	0	0.7	0.75

MEC: Savings and Credit Mutual Societies; CC: Framework Agreements
Source: Author, using data from the sample

Loans granted by MFIs in Niger

The volume of loans granted by MFIs in Niger steadily rose between 2005 and 2008, as shown in Figure 3.

Figure 3: Volume of loans granted by the MFIs in Niger



Source: Author, using data from the sample

[NB: Vertical axis: Volume of loans (in CFAF); horizontal axis: Years]

Taanadi, an MFI which runs its activities in both semi-urban and urban areas, granted more loans than the other MFIs located in other areas (See Table 10-I). The rural areas (villages) are the second region best served by the MFIs. It should be noted, though, that the share allocated to this region considerably dropped (see table 10-I). A similar situation can be observed for urban and semi-urban areas.

Table 10: Loan distribution (in %) according to activity areas

	2005	2006	2007	2008
ACTIVITY AREA (I)				
URBAN	16.7	13.31	9.29	10.1
SEMI-URBAN	0.93	0.29	0.26	0.13
SEMI-URBAN AND URBAN	53	68.14	79.2	81.3
RURAL	29.36	18.25	11.25	8.48
TYPE OF MFI (II)				
MEC-type	57.46	48.13	44.36	39.5
CC-type	42.54	51.87	55.64	60.5
LOANS/GDP (III)				
LOANS/GDP (%)	0.21	0.31	0.42	0.43

Source: Author, using data from the sample

Between 2005 and 2008, the MFI industry in Niger experienced a slowdown in terms of the loans it granted, a slowdown attributable to their inefficiency. Indeed, when the MFIs did not realise economies of scale, while at the same time raising the volume of loans they could grant, their costs were bound to rise. Yet, the resources at their disposal

were not enough to sustain this rise. So, the MFIs did not have choice but reduce their credit to customers. This credit-rationing had a negative impact on the latter's financial autonomy, which diminished for lack of support. That is how the MFIs' products were not affordable by the poor.

Despite their limited number, the CC-type MFIs (only three out of 24) granted more loans to the populations of Niger than the others (see Table 10-II). For example, in the year 2006 the proportion of loans granted by the three MFIs exceeded 50% of the total. It should be remembered that the CCs receive significant amounts of grants, which enablethem to grant loans to their customers. These results are a reflection of a good strategy used by these MFIs for their refinancing.

Beyond individuals, the contribution of the loans granted by microfinance institutions to Niger's economic growth remains considerable (see Table 10-III). Indeed, the share of the microfinance industry to the country's GDP rose between 2005 and 2008; it actually exceeded the 20% that are usually required for this indicator (see Makame and Murinde (2006). This means that the social performance of the MFIs in Niger was low. This observation confirms one made earlier, namely that between 2005 and 2008, the target customers of the MFIs in Niger were not the poor people.

8. Conclusion and policy implications

Implications of the results

The MFIs in Niger were found not to use their resources efficiently. Except for savings, the other external inputs (loans and grants) did not enable them to achieve efficiency. Indeed, the MFIs did not realize their full potential because the costs of having access to their services were high. So, they were not likely to achieve their mission of serving the poor, since, in order for them to sustain the costs they incurred, they had to offer their services to those who could pay for them, thus reducing their chances of achieving social performance. It is essential, therefore, that these institutions focus their efforts on what is essential for the prosperity of the microfinance industry.

Economic policy proposals

In view of the present study's results, it is undeniable that savings mobilization is an essential activity for the good running of the MFIs in Niger. These institutions should attach greater importance to it by conducting awareness campaigns aimed at persuading the populations to entrust them with their savings. Such campaigns can be done through the media and by periodically interacting with their customers and the potential users of their services. Among other things, the MFIs must assure the individual customers of their credibility by explaining to the latter the reasons for the closure of a number of institutions, especially from 2010. Indeed, when about 20 institutions affiliated to the Union of Savings and Credit Mutual Societies (UMEC) were closed, many customers lost their savings. Such a situation has no doubt dented people's confidence in the microfinance industry.

The government and its development partners should provide financial and technical support to awareness campaigns. For instance, they can fund the airing of commercials (presented by comedians in a language understood by all the population segments) on national television (which has followers in most of the country). They can also contribute to the cost of designing advertising posters. In view of this, a review of the financial allocations to budget items for grants is needed.

The Central Bank and the Agency for the Regulation of the Microfinance Industry should carry out more auditing missions in order to protect the customers' savings. Fixed-term contracts should be introduced for unemployed young auditors can solve the issue of inadequate human resources while at the same time reducing youth inactivity.

So, by mobilizing enough savings, the MFIs will be able to gradually do without grants (to the extent that the two variables can be substituted for each other and that grants have a negative effect on their activities). The MFIs should be able to conform to a new environment capable of discouraging them from using grants. Indeed, the law adopted by Niger in 2010 obliges microfinancing institutions to rely less on grants. Reliance on grants is most visible among the CCs (the Framework Agreements), a significant amount of whose funds essentially comes from grants. The CCs do not need to mobilize savings in order to grant loans. But with the new law, they must carry out institutional reforms which will discourage their use of grants as the only source of their funds.

The present study's analysis of efficiency and social performance shows that the MFIs in Niger are inefficient and have a low social performance. Therefore, they need to increase their financial resources if they are to benefit from reduced costs, which in turn will increase their efficiency. By so doing, the MFIs will be able to meet their costs and offer savings-related by-products (since these have a positive impact on their activities). The costs will thus be shared across the products. In other words, it is essential that the MFIs put in place resource mobilization strategies, which could revolve around the intensification of savings collection, as explained earlier. Further, they can increase their borrowing amounts (since, it can be argued, their current limited amounts cannot produce a positive effect on efficiency). In this regard, they have two options: first, they can take out more loans (in which case they will need to recruit enough staff capable of preparing and managing loan application files); second, they can focus their efforts on savings mobilization and thus not worry about borrowing (since this is not beneficial to them: it causes them to incur additional costs in the form of interest on loans). The latter option would be most beneficial to the small-sized MFIs.

The study's results also show that the use of loans and grants is not beneficial to the MFIs in Niger, at least not at the stage at which they were at the time of the study. Continuing to rely on loans and grants leads to more costs yet without producing a positive impact. The government and development partners need to review their grant-allocation budget items by redirecting part of the funds towards training the MFI's management. For its part, the Ministry of Economy and Finance should study the operating-licence applications carefully so that licences are granted to those who really meet the requirements. For instance, the MFIs' management's level of instruction must carry weight in the granting of the licence. Enhancing the managers' capacity will enable them to prepare loan application files effectively and to determine the loan volume that their organizations need for the latter to achieve efficiency.

A significant drop in the loan volume was observed over the study period. Instability in credit granting can have a negative impact on economic activity for the poor and, hence, on their well-being. That is why important measures should be taken to facilitate access to loans on a regular basis. The MFIs should improve their loan application selection process by sharpening their information gathering process and by ensuring a meticulous monitoring of how the money they have loaned has been used. For their part, loan applicants must be ready to recognize the necessity to honour their contract with the MFIs by allocating the money they have been lent

to the activities for which it was initially intended. They can be sensitized through posters at the MFIs' branches, the media, and regular exchanges between the MFIs and their customers. It is hoped that this sensitization will foster confidence between the two parties, as a result of which the customers will repay their loans and the MFIs will collect enough resources to enable the poor to have access to their loans as well.

9. Conclusion

The aim of the present study was to establish the effect of financial resources on the efficiency of the microfinance institutions in Niger as well as to analyse their social performance. The relationship between efficiency and financial resources was tested by calculating the economies of scale after estimating a Translog function in the form of a system (with cost-sharing equations). The outreach of the MFIs' activities was analysed using three indicators: service outlets, membership, and loans. The data were obtained from a panel of 24 microfinance institutions based in Niger and covered the 2005-2008 period.

A Principal Components Analysis (PCA) and a cluster analysis showed that the independent MFIs used deposits, grants and loans the most. Taking the operating costs into account, the independent MFIs were categorized into one identical group, and the union-affiliated ones into another one. Cluster analysis did not produce conclusive results.

The results of econometric estimations showed that the MFIs in Niger were not efficient. Physical capital, human capital and deposits were found to have a positive effect on MFI activities, since they reduced the costs incurred by the MFIs. However, grants and loans were found to have a negative effect, a result which can be explained by the fact that their amounts were lower than that of savings. It was also found that deposits could be substituted for grants and loans.

Efficiency is no doubt important, but so is social performance. Thus the microfinance industry should strive to achieve both through opening more outlets, through reaching more people, and through increasing their credit to people. The study found that the number of service outlets had indeed increased; these were located mostly in urban areas. Membership of the MFIs also increased. However, male members outnumbered female ones, which is not a good sign in terms of the MFIs' social impact. Loans were concentrated in urban areas, and a significant slowdown in their increase was observed. This slowdown can be attributed to the MFIs' inefficiency, since they did not realize economies of scale. At the time of the study, the MFIs could not increase the volume of loans they could grant, as this would have led to an increase in the costs they incurred, while they did not have enough resources to meet the latter. Such a situation could only have a negative impact on the MFIs' goal of serving the poor. When prices are high, the services offered can only be afforded by wealthy people.

The present study tackled only part of the issue of lowering the costs incurred by the MFIs in Niger. Further research could address the issue of using adequate human capital, for example.

Notes

1. The background to this study is based on an analysis of data for the entire microfinance industry.

2. This is the number of institutions that had filed their financial statements with the BCEAO.

3. A union consists of a set of institutions under an umbrella management. These institutions share certain services (office furniture, control, and loans).

4. The other forms of borrowing are loans obtained by microfinance institutions from the umbrella structure through networking.

5. In Niger, there are three types of entities, each with its aims, behind the creation of microfinance institutions: first, there are projects, whose aim is to fight poverty; second, there are promoters-cum-politicians, whose ostensible motivation is to help people, but whose real aim is to woo voters; third, there are private investors, whose aim is to make profit. But the majority of MFIs set up by the latter category have been closed (Source: *ARSM*).

6. The authors used the randomization method. This consists in observing the effects of a project before and after it has been started. Randomization experiences are increasingly being used in the measurement of the impact of development programmes (Jonathan Bauchet and Morduch , 2010).

7. The microfinance industry in Niger comprises three Unions: the Grouping of Savings and Credit Banks (Mouvement des Caisses d'Epargne et de Crédit, MCPEC), the Union of Savings and Credit Mutual Societies (Union des Mutuelles d'Epargne et Crédit, UMEC), and the Niger Mutual Credit (Crédit Mutuel du Niger, CMN).

8. The preceding sample (of 24 MFIs between 2005 and 2008) is used here to talk about social performance.

9. Urban area: large towns; semi-urban: the small towns; rural area: the villages

10. For the year 2007, no data were available for the distribution of the ASSUSSU MFI's membership. This can explain the results that were observed.

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Annexes

Annexe 1: Criteria for the distribution of grants to the MFIs

Grants can be allocated by development partners in the form of project or can be applied for by a given MFI. The PDSF, for instance, is a project funded by the World Bank. It allocates its financial grants based on the applicant institution's financial situation. The institutions that are cash-strapped are given priority. In 2009-2010, for example, the priority was to rescue two unions (UMEC and MCPEC) from collapse. However, the results were not those hoped-for, as the UMEC saw its licence withdrawn because its management had used the funds destined to help the Union to stay afloat to pay fees to the members of its Board of Directors. The situation of the MCPEC was not rosy either.

Source: PDSF and ARSM

Annexe 2: The Koudina a salula service offered by Airtel Niger

Airtel Niger's mobile banking was launched on 8 January 2010. Its goal is to enable every Airtel subscriber who has a mobile phone to do (money transfer, goods payment, and banking) transactions. To deliver its new product, Airtel Niger uses correspondents, among which are licensed telephone card distributors, banks, postal agencies, and microfinance institutions. It trains all the retail correspondents before launching its operations. Its services are available in both urban and rural areas. The number of its customers was estimated at 500,000 in 2011.

Source: Author, based on data from Airtel Niger

Annexe 3: Assumptions and transformation stages for the MFIs in Niger

*In the PARMEC law of 1996, three types of institutions are defined: the savings and credit mutual societies (mutuelles d'épargne et de credit, MEC), the framework agreement institutions (institutions sous conventions cadres, CC), and credit schemes (projets à volet credit, PVC). The New Microfinance Law 2010 provides for the following types of institutions: public limited company, private limited company, cooperative or mutual society, and association.

*A MEC has the possibility of transforming itself into a public limited company, a private limited company, or an association. However, transformation can only take place after the MFI in question has been dissolved. This implies the withdrawal of the licence and, hence, the loss of its legal-entity status. However, the MECs which so wish have the option of coming together with other investors in order to create a public limited company, a private limited company, or an association. An MFI in the form of a framework agreement (a CC) can become a public limited company, a private limited company, an association, or a cooperative or mutual society. Similarly, a PVC can choose to become any one of these.

**In 2013, the seven CCs which did not have the legal-entity status had their status regularized. Two of them became public limited companies, while five of them took on the status of cooperative societies. The other institutions which did not have to undergo any change kept their former status (of savings and credit mutual societies).

Source: *Author; ** ARSM

Annexe 4: The MFIs included in the sample

	Name of MFI	Affiliation status		Name of MFI	Affiliationstatus
1	*ALBARAKAT*	union-affiliated	13	*KAANI*	independent
2	*AMBUTA*	union-affiliated	14	*KARHE*	union-affiliated
3	*ANFANIN GOBIR*	union-affiliated	15	*KOKARI*	independent
4	*ASSUSSU CIGABA*	independent	16	*KULAWA*	union-affiliated
5	*BAWARAHA*	union-affiliated	17	*MAMAR*	union-affiliated
6	*CAPITAL FINANCE*	independent	18	*MECREF*	independent
7	*CIGABA*	union-affiliated	19	*MUTUNCI*	union-affiliated
8	*DARZA*	union-affiliated	20	*MY YETTI ALLAH*	union-affiliated
9	*DOURE*	union-affiliated	21	*Taanadi*	independent
10	*GOMNI*	union-affiliated	22	*TONDIKANDIA*	union-affiliated
11	*GOMNI KA*	union-affiliated	23	*TONTONI*	union-affiliated
12	*HAMZARI*	union-affiliated	24	*WADATAR KOWA*	union-affiliated

Source: Author

Annexe 5: Principal Components Analysis for the 2005 data

Eigenvalues

	F1	F2
Eigenvalue	2.112	0.628
Variability (%)	70.406	20.944
Cumulative%	70.406	91.351

Correlation between the variables and the factors

	F1	F2
EMP	0.752	0.646
SUB	0.913	-0.121
PD	0.844	-0.444

Proportions of the observations (%):

	F1	F2
CAPITAL	0.398	1.335
MUTUNCI	1.369	0.052
AMBUTA	1.084	0.000
ASSUSSU	50.264	9.168
ANFANIN	1.302	0.031
CIGABA	1.084	0.000
DARZA	1.121	0.001
GOMNIKA	0.964	0.007
GOMNI	0.827	0.025
HAMZARI	1.143	0.003
KAANI	2.494	1.005
KARHE	0.802	0.685
MAMAR	0.856	0.042
MYYETTI	0.522	0.299
KOKARI	2.240	0.358
Taanadi	19.898	60.652
MECREF	5.384	23.530
WADATAR	0.015	2.461
ALBARAKAT	1.358	0.048
KULAWA	1.415	0.070
BAWARAHE	1.390	0.060
DOURE	1.436	0.078
TONTONI	1.293	0.033
TONDIKANDIA	1.341	0.057

Source: Author, based on data from the sample

Annexe 6: Principal Components Analysis for the 2006 data

Eigenvalues:

	F1	F2
Eigenvalue	2.300	0.498
Variability (%)	76.657	16.608
Cumulative%	76.657	93.265

Correlation between the variables and the factors

	F1	F2
EMP	0.908	-0.277
SUB	0.913	-0.250
PD	0.800	0.6

Proportions of the observations (in %):

	F1	F2
CAPITAL	2.426	38.311
MUTUNCI	0.771	0.853
AMBUTA	0.734	0.721
ASSUSSU	7.957	3.520
ANFANIN	0.546	0.196
CIGABA	0.586	0.286
DARZA	0.470	0.066
GOMNIKA	0.479	0.080
GOMNI	0.586	0.299
HAMZARI	0.531	0.166
KAANI	76.786	5.766
KARHE	0.632	0.649
MAMAR	0.375	0.000
MYYETTI	0.396	0.005
KOKARI	0.097	0.520
Taanadi	0.291	0.013
MECREF	1.702	41.495
WADATAR	0.039	2.005
ALBARAKAT	0.771	0.856
KULAWA	0.676	0.535
BAWARAHE	0.811	1.001
DOURE	0.791	0.925
TONTONI	0.751	0.786
TONDIKANDIA	0.795	0.944

Source: Author, based on data from the sample

Annexe 7: Principal Components Analysis for the 2007 data

Eigenvalues:

	F1	F2
TEigenvalue	1.803	0.704
Variability (%)	60.105	23.453
Cumulative%	60.105	83.558

Correlation between the variables and the factors

	F1	F2
EMP	0.699	0.713
SUB	0.819	-0.255
PD	0.803	-0.361

Proportions of the observations (in %):

	F1	F2
CAPITAL	10.696	6.169
MUTUNCI	1.172	0.039
AMBUTA	1.112	0.028
ASSUSSU	10.804	16.923
ANFANIN	1.071	0.021
CIGABA	0.881	0.001
DARZA	0.899	0.002
GOMNIKA	0.845	0.000
GOMNI	0.891	0.002
HAMZARI	0.966	0.007
KAANI	46.689	2.042
KARHE	0.273	0.072
MAMAR	0.715	0.003
MYYETTI	0.463	0.068
KOKARI	0.000	0.714
Taanadi	14.941	72.791
MECREF	0.176	0.167
WADATAR	0.048	0.622
ALBARAKAT	1.216	0.049
KULAWA	1.272	0.063
BAWARAHE	1.230	0.064
DOURE	1.264	0.061
TONTONI	1.149	0.038
TONDIKANDIA	1.224	0.052

Source: Author, based on data from the sample

Annexe 8: Principal Components Analysis for the 2008 data

Eigenvalues

	F1	F2
Eigenvalue	2.112	0.628
Variability (%)	70.406	20.944
Cumulative%	70.406	91.351

Correlation between the variables and the factors

	F1	F2
EMP	0.752	0.646
SUB	0.913	-0.121
PD	0.844	-0.444

Proportions of the observations

	F1	F2
CAPITAL	0.398	1.335
MUTUNCI	1.369	0.052
AMBUTA	1.084	0.000
ASSUSSU	50.264	9.168
ANFANIN	1.302	0.031
CIGABA	1.084	0.000
DARZA	1.121	0.001
GOMNIKA	0.964	0.007
GOMNI	0.827	0.025
HAMZARI	1.143	0.003
KAANI	2.494	1.005
KARHE	0.802	0.685
MAMAR	0.856	0.042
MYYETTI	0.522	0.299
KOKARI	2.240	0.358
Taanadi	19.898	60.652
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WADATAR	0.015	2.461
ALBARAKAT	1.358	0.048
KULAWA	1.415	0.070
BAWARAHE	1.390	0.060
DOURE	1.436	0.078
TONTONI	1.293	0.033
TONDIKANDIA	1.341	0.057

Source: Author, based on data from the sample