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Exploratory Empirical Analysis on Financial and Productivity Sources of Microfinance Institutions in the West African Economic and Monetary Union

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Summary:

The West African Economic and Monetary Union (WAEMU) financial system consists of a relatively new regional stock market, a banking sector and a mesh of microfinance institutions, known as Decentralized Financial Structures (DFS). Despite their relative performance, decentralized financial structures have encountered various development requirements, particularly their inclusion in the financial system and sustainability in a long-term perspective. This paper offers an exploratory empirical analysis method based on organizational effectiveness of the microfinance sector in this monetary space. In using the Data Envelopment Analysis (DEA) for the period of 1998-2003, our results show that direct credit institutions appear to higher performance in distributing credits than savings and credit institutions and credit projects, while the latter appears to have the best financial spread.

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A Introduction

The financial crises of the 1980s caused eight countries in the West African Franc Zone to explore other possibilities for internal financing[1]. In fact, in a currency zone where more than 2/5 of the 80 million inhabitants are living below the income poverty line, microfinance institutions (known as Decentralized Financial Structures – DFS) appear to have responded to a financial service demand not offered by banking networks. Thus, very early on, a particular emphasis was put on DFS, more for their promotion than the intention to officially integrate them into the financial system of the Zone.

According to the development of microcredit institutions outline as recognized in literature (United Nations, 2006), DFS appear to have fully achieved its expansion phase. In fact, according to the Central Bank of West African States (CBWAS), from 1993 to 2007, beneficiaries from DFS services increased, on average, by more than 25%, while deposits and outstanding credit showed a growth rate of 28% and 29%, respectively. Incidentally, according to more recent analyses, West African Economic and Monetary Union (WAEMU) microcredit institutions are more efficient than those in the rest of Africa with levels of productivity among the highest in the world and a good control of costs, particularly for cooperatives organized in large networks[2]. However, despite the promising results, new challenges have surfaced, namely how to anchor and include these institutions in the financial system of the WAEMU countries. Furthermore, recently on November 4, 2008, the CBWAS launched project AFR/017 "Promotion of Inclusive Financial Sectors in the WAEMU Zone" with the general goal to consolidate microfinance in the Zone. In fact, despite a few analysis attempts (cf. Lahna 2003; Sodokin, 2006, Ary Tanimoune, 2007), the outline of this relatively new financial structure, in which banks, a recent regional stock market and DFS sectors coexist, is not as widely recognized to date.

However, in view of consolidating this financial sector, it seems important to reconcile the social objectives of reducing poverty, increasing access to financial services and those of financial profitability in a long-term perspective. In other words, sustainability appears to be the main issue related to the development of DFS in this region. In this case, one of the recurring issues is to know the necessary conditions for carrying out the sustainability of DFS.

The goal of this paper is to provide exploratory empirical analysis elements on this topic, particularly in relation to the scope of the organizational structure of DFS. The article continues as follows: first, an explanation of the characteristics of DFS according to their type, followed by the methodology and the specification of variables used for the analysis. Finally, the results are presented with commentary.

B DFS characteristics according to type

In the WAEMU, a savings and credit institution or credit union for the purpose of self-help is known as a Decentralized Financial Structure (DFS). These institutions offer several financial services wherein the structure of operations varies. (Lelart, 1990). In fact, the simplification of fiscal and administrative procedures, the speed of the transaction and, if necessary, the availability of small sums are the effects of the highly flexible operations that run these institutions. In this case, the simplicity of loan

[1] These countries (Benin, Burkina Faso, the Ivory Coast, Guinea-Bissau, Senegal and Togo) comprise the West African Economic and Monetary Union (WAEMU).

[2] *Microfinance Information eXchange* Report, 2007, p.7.

disbursements is understood by the closeness of DFS with the beneficiaries. For example, when a group goes into debt or collectively assures the success of the financial intermediary, only the borrowers who feel capable and intend on holding to their commitments can use their institution's services (savings and credit), most often in fear of social sanctions. This substitution of collateral for mutual monitoring of savings and credit thereby enables the pre-selection of potential clients or the collection of loans (Guérin, 2000). The main operations that regulate and supervise microfinancing in the WAEMU are the Law governing Mutual or Cooperative Savings and Credit Institutions (LMCSCI) and the Convention on Mutual or Cooperative Institutions (FCMCI). The LMCSCI assures the creditworthiness of DFS and protects depositors by watching over the credibility of the system[3]. The Convention of July 1996 is aimed at financial intermediaries working in informal activity sectors. The Convention determines the rules of operation as well as the terms of monitoring for Cooperative or Mutual Institutions (CMI), often composed of individuals who generally know each other and agree to mutually render financial intermediary services.

The operational structure of DFS can be classified in three categories: Savings and Credit Institutions (SCI), Direct Credit Institutions (DCI) and Credit Projects (CP). SCI collect savings beforehand in order to distribute loans. However, for the two other types of DFS, the loans distribution is either an incidental activity (CP) or a major activity regardless of savings collected beforehand (DCI). These three types of institutions have their own characteristics. Based on their financial sources, it seems that the last two types affect, incentively or coercively, the relative efficiency of the institutions, more so from the perspective of their *portfolio quality* than their *financial management*.

A financial institution's portfolio quality is more important than it seems in representing an essential condition for the sustainability of DFS. A contrario, in an example of bad debts accrued—a direct consequence of bad portfolio quality— the institution is put at risk. Nevertheless, the extent of this characteristic is valued differently according the type of microfinance institution. In this case, in order to assure adequate maturity transformation, SCI must invest more in looking at potential borrowers' information, so that their debt portfolio is in the best quality possible. When it is assessed on bad debts, the constraint appears just as severe for DCI, despite being a different type of institution. In fact, because this type of institution does not collect savings and their main resources are external, it is reasonable to think that expertise management from external groups enable them to reduce the consequences of information asymmetry. However, in terms of portfolio quality, this type of expertise can also unbalance the group of borrowers so that DCI will only pick good risks, leaving bad borrowers to other microfinance institutions. In the case of CP, given that the financial activity is incidental and the beneficiary population is targeted in advance, it can be deduced that for an equal level of risk, this type of institution would likely have a better portfolio quality. Thus, in view of providing financial services, Savings and Credit Institutions have more incentives in looking at essential information for a better selection of good risks than Credit Projects and in lesser measure than Direct Credit Institutions.

The incentives and constraints related to financial management orthodoxy can also seem different according to the type of DFS. At this level, the question is if microfinance institutions must, at equivalent financial costs, fix their credits beforehand or, alternatively, lower their financial costs on given financial results. Presumably, we can in fact think that DCI and CP, contrary to SCI, have fewer constraints, because these institutions do not have to pay large financial costs (as collecting savings is not a main activity). In fact, savings and credit institutions bear additional fees, as they have to cover the financial

[3] The prudential regulation on DFS enacts four main management standards: respect the liquidity threshold in order to assure the solvency of institutions; outreach to medium- to longer term employment through stable resources in order to monitor the stability of the institution, namely during the maturity transformation; respect the risk threshold to avoid their concentration on only one member; and finally, the limiting of loans to avoid speculation of higher bids.

management of savings. For equivalent financial results, SCI are obliged to assure the interest on savings. Thus, inasmuch a constraint to reconcile fiscal imperatives and financial intermediations for social development, it is important for SCI to offer good returns for financial management. To obtain a larger margin, the institution must effectively define their clientele. In fact, on another level, it is the diversification of its financial sources which becomes important for diminishing the cost of its operations and in arriving at a conclusive result in the matter of financial management. As a result, the dependency on financial sources, such as equities or subsidies, presents another analysis grid on financial management for social development. In this case, if the donations can loosen the constraint of SCI resources, SCI must take into account the need to undertake sustainable financial activities that counterbalance this rather limited source.

The empirical data shows these operational variations. It appears that, in terms of volume, financial intermediary resources from savings and credit institutions are largely superior to the other types of DFS[4].

Table 1: Microfinance activity in the WAEMU results, according to Type of DFS

	Savings and Credit (SCI)		Direct Credit (DCI)		Credit Projects (CP)	
	Average	Growth Rate	Average	Growth Rate	Average	Growth Rate
Total Credits	99951	19	23465	37	1916	11
Bad Debt	8669	7	1041	18	134	13
Savings	126158	21	5485	51	1039	27
Final Charges/Savings	0.02	-10,00	0.06	10,48	0.06	-1.28
Final Results/Credits	0.18	2.89	0.17	4,60	0.18	3.39
Net Profitability	0.16	4.92	0.11	1.72	0.12	8.36
Equities Excluding Subsidies	24293	17.99	12619	34.01	762	-13.22
Subsidies	5067	6.71	2067	-0.99	483	-5.62
Number of institutions	354	36.44	22	-0.93	49	19.61

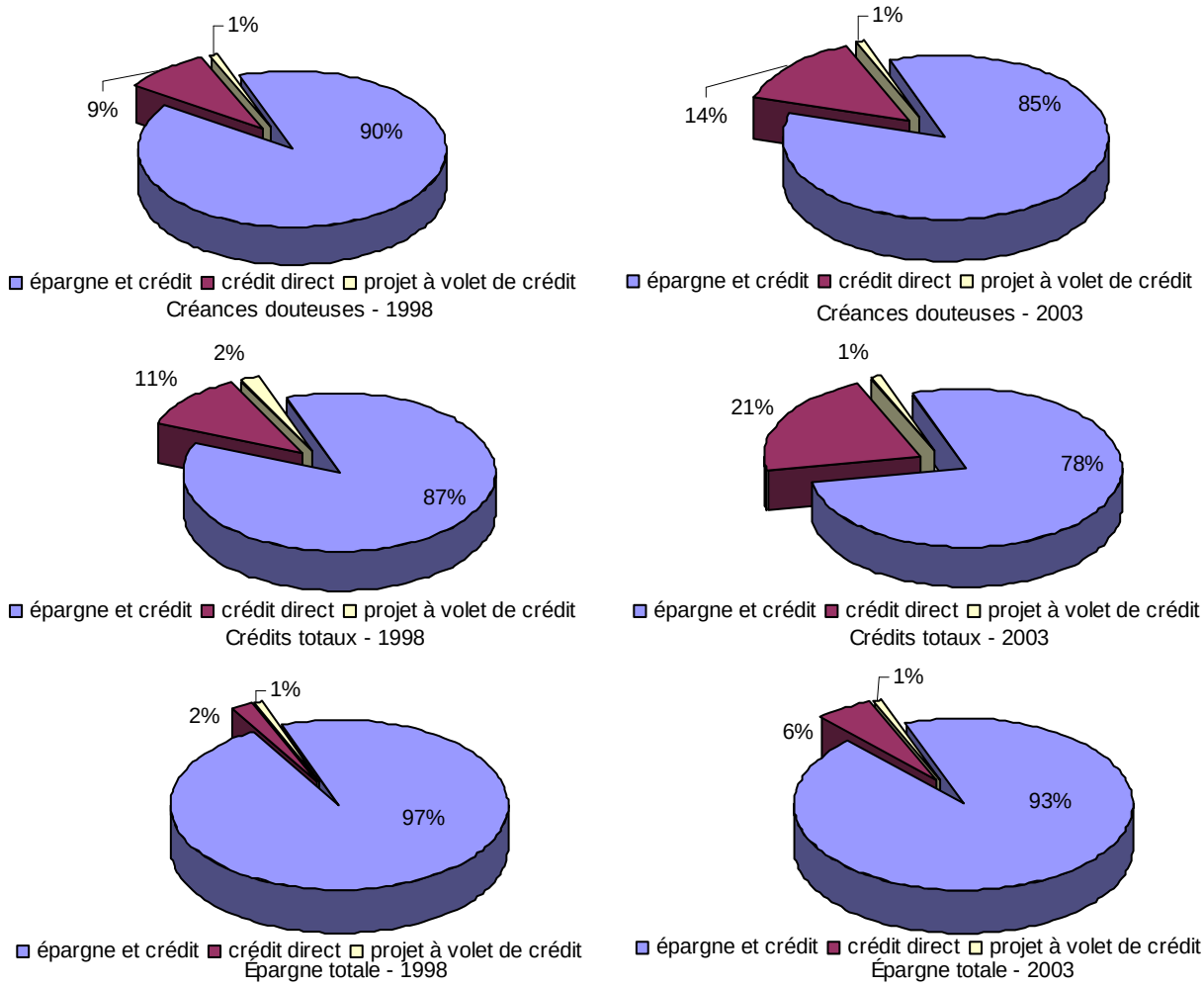
As expected, in 1998, the average savings collected by savings and credit institutions represent almost 97% of the total deposits accumulated by all DFS, against 2% for direct credit institutions and 1% for Credit Projects. In 2003, these numbers were respectively 93%, 6% and 1%. As for the credits allocated by SCI from 1998 to 2003, they were at least four times more significant than the amount granted by DCI and more than 52 times the credits distributed by CP.

Nonetheless, during the same period, it important to note that the financing provided by DCI had a significant increase (37%), still higher than CP (11%) (see Table 1). In contrast, direct credit institutions had the highest increase in bad debts (18% versus 13% for CP and 7% for SCI) even though the total in the Zone was generated by SCI (see graph below). Furthermore, it is important to emphasize that the subsidies received by savings and credit types of DFS are twice as significant as those received by DCI. This scale is roughly the same for equities from each of these two types of institutions, for the period 1998-2003.

[4] The availability of homogeneous data restricts the analysis period from only 1998 to 2003. The raw data are from DFS monographs of the WAEMU, formerly known as DFS Data Bank.

Moreover, in terms of the financial spread, the average implicit debtor rate on financing[5], during the same analysis period, was almost the same for the three types of DFS: 18% for SCI and CP, and 17% for DCI. From the SCI viewpoint, the large amount of savings could be what enables them to show the lowest payment of savings wherein collection is the main activity. In this case, the average implicit credit rate was 2% for SCI and 6% for DCI and CP. In total, the financial spread of savings and credit institutions are relatively the most significant.

Graph 1: Relative proportions to resources intermediated by type of DFS



It does not seem evident to infer the comparative performance of a type of DFS against another based on mono-criterion productivity indicators, especially since they distinguish themselves differently; and all the more, to identify the variable characteristic of this allocative performance. Thus, to compensate for this limit, the Data Envelopment Analysis (DEA) method is applied.

[5] The rapport between financial results and credits disbursed.

C Methodology and specification of models

The general idea of the analysis is to identify the level of technical efficiency that an institution uses to transform one or more resources (inputs) into one or more services (outputs).

According to the intermediation approach (Berger and Humphrey, 1997), an institution is assumed efficient in its financial services offered, namely loans, based on its resources, equities, subsidies received, savings collected and staff, among others. However, in order to draw the analysis method, the financial viability approach must also be considered, i.e. the performance study based on the most significant financial spread derived. The non-parametric method[6] of the Data Envelopment Analysis (DEA) enables the implementation of a multi-criteria analysis (several inputs and outputs) of various performance measurements. First, technical efficiency, the most used, which is understood in two supplementary ways (Banker, Charnes and Cooper, 1984): to produce a maximum number of outputs for a given level of inputs (directed output) or to reach a certain level of production with a minimum number of inputs (directed input)[7]. Furthermore, the technical efficiency analysis can be refined in terms of allocative efficiency and cost-effectiveness, as the relative prices of inputs and/or outputs are taken into account.

The calculation of the technical efficiency coefficient is carried out with a solution that maximizes the ratio between the weighted outputs and the weighted inputs through coefficients. Charnes et al. (1978) suggests adding them in order to avoid the infinity of solutions. With *N* institutions, as the exponent *i* uses *xi* vector of *1K* inputs to produce a *yi* vector of *JM* outputs (Coelli et al., 2005), the solution is solved sequentially, for each institution, with the following:

$$\max \Lambda^{i} = \sum_{m=1}^{M} \mu_m^i y_m^i \quad i = 1,\ldots,N;\ m = 1,\ldots,M;\ \text{sc} \quad \mu' y^{i} - \upsilon' x^{i} \le 0 \qquad \mu, \upsilon \ge 0 \qquad \upsilon' x^{i} = 1 \qquad [1]$$

Or, under dual representation:

$$\min_{\theta,\lambda} \theta^{i} \quad \text{sc}: -y^{i} + M\lambda \le 0 \quad i = 1,\ldots,N;\ \theta\, x^{i} - K\lambda \ge 0;\ \lambda \ge 0 \qquad [2]$$

with λ as a constant vector of *N*x1 and θ as a scalar representation of the technical efficiency score of the *i* institution[8].

Thus, according to Farrell (1957), the institution *i* with an efficiency coefficient of $\theta^{i} = 1$ is said to be efficient in comparison with other institutions, and a score less than one (1) is said to be less efficient, when the calculations are directed inputs[9].

The availability of data published by the Central Bank as well as the characteristics of DFS according to type of institution leads us to retain the variables presented below for the calculation of technical performances. The first category of three (3) basic models are considered:

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[6] It is not necessary to make a hypothesis beforehand on the distribution of observations.

[7] In both trends, particular attention is made to the technology implemented by the institutions, whether it is done with the Constant Returns to Scale (CRS) or Variable Returns to Scale (VRS). Under certain conditions, the calculation of the technical efficiency following these two output technologies leads to the economy of scale analysis, which will not be presented in this study, even though the calculations are easily deduced.

[8] This situation is described under condition of the constant returns to scale is easily transposed to a variable returns to scale.

[9] In the case of a technical efficiency directed output, the coefficient is higher than 1.

- Model 1 assumes that DFS uses savings collected (SAV) as an input and the number of institutions (INST) in order to produce outputs: more total credits (TOCT) and fewer bad debts (BDT). Failing to receive accurate data on the number of employees per type of DFS, the number of institutions has been considered as a proxy[10]. For bad debts, given that they must be produced *less and less*, the total credits report is used. In order to do this, it is not the bad debts that are penalized, but rather the part they take up in the credit total.

- Model 2 takes into account, for the same outputs, a supplementary input in relation to Model 1: subsidies.

- Model 3 includes four inputs: SAV, INST, SUB and EQT for the two outputs listed above.

  Furthermore, as cost variables, associated with each input, necessary for the calculation of allocative efficiency, we have retained the implicit debit rate for SAV; administrative expenses (including personnel costs) for the INST variable; external services for the SUB variable; and the average rate of inflation for EQT.

The second category of three (3) other models is calculated. They respectively use the same inputs as Models 1, 2 and 3, while only one output is considered: the net profitability (NTPR). In order to do this, the intermediation method of each type of DFS is analyzed, whereas the first three models were based on financial viability logic.

In total, six performance models were calculated using the DEA method. The results are presented in the following section.

D Results

Tables 2 and 3 show, respectively, the synthesis of different performance results in the first and second model categories.

The first result in Table 2 shows that taking into account the subsidy in one part and equities in another does not affect the relatively good performance of direct credit institutions. They still appear to be the best in terms of technical efficiency. However, when these two additional inputs are taken into account, credit projects technically become higher performing than savings and credit institutions. Would equity funding thus be a predominant factor in efficiency?

Nevertheless, there were no trends for cost-effectiveness and allocative efficiency. When subsidies and equities are not taken into account, it appears that SCI are better performing in production cost management and the allocation of resources (in this case, savings and the number of institutions). The best SCI yields can potentially be explained by their capacity to reschedule credits more efficiently. SCI are then followed by DCI and CP. However, taking subsidies into account, credit projects would be better performing than SCI and DCI. And when equities are also added (Model 3), DCI are the most efficient.

[10] Cf. Lensink et al. (2008) for similar studies in bank cases.

Table 2: Relative efficiency by Type of DFS, in terms of credits offered

	Model 1	Model 2	Model 3
	TOTAL CREDITS AND BAD DEBTS		
Input	SAV; INST	SAV; INST; SUB	SAV; INST; SUB; EQT
Technical efficiency	[DCI; SCI; CP]	[DCI; CP; SCI]	[DCI; CP; SCI]
Cost-effectiveness	[SCI; DCI; CP]	[CP; SCI; DCI]	[DCI; SCI; CP]
Allocative efficiency	[SCI; DCI; CP]	[CP; SCI; DCI]	[DCI; SCI; CP]

[X; X; X]= order of classification, from the most efficient institution to the least performing, in relation to respective efficiency coefficients. Total Savings (SAV); Number of Institutions (INST); Subsidies (SUB); Equities (EQT).
DCI: Direct Credit Institution; SCI: Savings and Credit Institutions; CP: Credit Projects

However, the relative efficiency analysis, in terms of net profitability, appears to show a trend towards credit projects instead, for its technical efficiency, cost-effectiveness and allocative efficiency (Table 3).

Table 3: Relative efficiency by Type of DFS, in terms of net profitability

	Model 4	Model 5	Model 6
	NET PROFITABILITY		
Input	SAV; INST	SAV; INST; SUB	SAV; INST; SUB; EQT
Technical efficiency	[CP; DCI; SCI]	[CP; DCI; SCI]	[CP; DCI; SCI]
Cost-effectiveness	[CP; SCI; DCI]	[CP; SCI; DCI]	[CP; SCI; DCI]
Allocative efficiency	[CP; SCI; DCI]	[CP; SCI; DCI]	[CP; SCI; DCI]

[X; X; X]= order of classification, from the most efficient institution to the least performing, in relation to respective efficiency coefficients. Total Savings (SAV); Number of Institutions (INST); Subsidies (SUB); Equities (EQT).
DCI: Direct Credit Institution; SCI: Savings and Credit Institutions; CP: Credit Projects

Furthermore, in the cost of input management and the statistically optimal allocation of resources (SAV, INST, with SUB and EQT), savings and credit institutions become comparatively higher performing than direct credit institutions. However, in terms of the financial spread, DCI are better than SCI.

In the end, our results showed that neither subsidies, nor equities are determining factors in distinguishing between the three main types of DFS according to the financial spread.

E Conclusion

In this report, we have attempted to identify the main variables in distinguishing the types of DFS in relation to the best distribution of credits and the financial spread. In the period 1998-2003, the trend was not conclusive in the first case. Direct credit institutions appear technically more efficient as they do not take DFS subsidies and equities into account. Thus, is it internal management of this type of institution that enables them to comparatively lend more while having fewer bad debts? Under

these conditions, if they are more likely to take fewer risks, do they favour financial inclusion in these cases, knowing that savings are not the main financial service they offer to their borrowing clientele? The order of classification differs in relation to cost-effectiveness and allocative efficiency. In this regard, for example, in taking subsidies into account, DFS liquidity increases. Because direct credit institutions are best performing and do not have to pay savings, would it be logical to think that relative returns are not affected by another liquidity source?

The trend drawn from the analysis performance in relation to the financial spread, for credit projects, is just as illustrative. This trend raises the question of the reconciliation in carrying out the double objective of financial soundness and optimal structure of financial systems in the WAEMU. In fact, one of the questions prompted by our results is what can explain the performance of savings and credit institutions, and to know more about it. The next step would consist of undertaking thorough work in this way. Incidentally, is the analysis of the ins and outs of this viability necessary in formulating economic policy measures?

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